# Board of Education

**5 Minortown Road ~ Woodbury, CT 06798**
www.ctreg14.org

***Mission:*** The mission of Connecticut Region 14 Schools is to educate all students to their highest level of academic potential and to teach them the skills and knowledge to become capable, creative, collaborative lifelong learners and responsible members of the world community.

***Board of Education Goals***:
***Academic Performance*** - The district will strive to improve academic performance for all students on multiple assessment indicators and the staff will be committed to continuous improvement.
***Communication*** - Region 14 will develop partnerships with all stakeholders in the school community to highlight the exemplary programs the district offers
***Safety*** - Region 14 will provide safe and secure facilities equipped with technology, enabling a 21st century learning environment that supports the values of the district
***Budget*** - Region 14 will prepare a budget that meets the needs of every student and communicates the needs and priorities of Region 14 in a clear and concise manner.

---

## A G E N D A

Regular Meeting of the Region 14 Board of Education
Monday, June 2, 2025; 6:00 p.m.
**Mitchell Elementary School**
**Flanders Room**

I. Call to Order……..…..James Crocker

II. Pledge of Allegiance……....James Crocker

III. Introductions……..……..…..James Crocker

IV. Approval of Minutes (Action Anticipated)…….James Crocker
- A. District Meeting on Budget, Monday, May 5, 2025
- B. Regular Meeting, Monday, May 5, 2025
- C. District Meeting (BoE Member Nominations), Thursday, May 8, 2025
- D. Special Meeting, Friday, May 9, 2025
- E. District Meeting on Budget, Monday, May 19, 2025

V. Superintendent's Report
- A. Student Representative Report
- B. Litchfield County Superintendent Award Recipients
- C. Mitchell Elementary School Resource Officer Update
- D. Discussion/possible action on 2025/2026 Budget
  1. Discussion/possible action on revised budget for 2025-2026

2. Discussion/possible action on calling of District meeting and referendum on revised budget
3. Discussion/possible action on authorization and approval of explanatory text/materials and notices
4. Community Notification System (Action Anticipated)

VI. Committee Reports

A. Curriculum Committee

On a recommendation by the Curriculum Committee to accept/approve the following:

1. Curriculum Documents for Approval (Action Anticipated)
   a. Human Anatomy and Physiology
   b. World Languages - Year 1
   c. World Languages - Year 2
   d. Advanced Culinary Arts
   e. Ag Production 11/12 - Integrated Food Science and Production; Livestock Science and Agricultural Sustainability
   f. Veterinary Science 11/12 - Animal Anatomy and Physiology; Business and Hospital Management, Reproduction, Genetics, and Animal Behavior and Training
   g. 10th Grade Nursery Landscape

2. Textbook Proposal for Approval (Action Anticipated)
   a. Financial Algebra: Advanced Algebra with Financial Applications

B. Finance Committee

1. Technology Lease Request for $350,000 for school year 2025-2026 (Anticipated Action)

C. Policy Committee

On a recommendation by the Policy Committee to accept/approve the following policies: (First Read, No Action Anticipated)

1. Policy 6141.3273/4118.53/4218.53 Generative AI (Artificial Intelligence)

VII. Board Chair's Comments

VIII. Privilege of the floor

The Board of Education will recognize citizens of Bethlehem and Woodbury, any parent/guardian of a child enrolled in the Region 14 School District, or any current employee of the Region 14 School District who are asked to state their name and town of residence and to please limit comments to three (3) minutes. Up to 21 minutes of statements per topic are allowed. All comments should be addressed to the Board of Education Chair. Decorum will be enforced.

IX. Old Business

X. New Business

A. Field Trip – National FFA Convention, Indianapolis, Indiana, October 26, 2025 through November 2, 2025 (Action Anticipated)

XI. Other Business

XII. Adjournment

**Minutes**
Board of Education – District Meeting (Budget)
Monday, May 5, 2025; 6:00 p.m.
Flanders Room, Mitchell Elementary School

**Present:**
Jim Crocker, Chairman
Chris Matta
Carol Ann Brown
Alice Jones
Michael Carbonneau
Caren Lipinski

**Absent:**
Tikva Rose
Chris Griffin

**Also Present:**
Brian Murphy, Superintendent
Tina Tanguay, Director of Finance and Operations
Jamie McLaughlin, Moderator of the Meeting
Patricia Paige, Meeting Clerk

**I. Call to Order**
Chairman Crocker called the meeting to order at 6:00 p.m.

**II. Pledge of Allegiance/Introductions**
The Pledge of Allegiance was recited and acquaintances were made

**III. Appointment of Moderator**
Chairman Crocker appointed Mr. Jamie McLaughlin as Meeting Moderator

**IV. Appointment of Meeting Clerk by Moderator**
Mr. McLaughlin appointed Patricia Paige as the Meeting Clerk

**V. CALL OF MEETING**
Mr. Jamie McLaughlin read the "Call of the Meeting"

All electors and citizens who are qualified to vote in town meetings of the Towns of Bethlehem and Woodbury, Connecticut, are hereby notified and warned that a District Meeting of Regional School District No. 14 will be held Monday, May 5, 2025 at 6:00

DRAFT

p.m. at the Mitchell Elementary School; Flanders Room; 14 School Street; Woodbury, CT.

PURPOSE:
TO CONSIDER THE BUDGET SUBMITTED BY
THE BOARD OF EDUCATION FOR REGIONAL SCHOOL DISTRICT NO. 14 FOR THE FISCAL YEAR COMMENCING JULY 1, 2025 AND ENDING JUNE 30, 2026 IN THE AMOUNT OF $43,346,298.
The vote on said budget will be by the voting machines in the towns of Bethlehem, (Town Hall, 36 Main Street South) and Woodbury, (Senior Center, 265 Main Street South) Connecticut on Tuesday, May 6, 2025, between the hours of 6:00 a.m. and 8:00 p.m., the day following the District Meeting.

## VI. NOTE OF REFERENDUM HOURS

Mr. McLaughlin noted the referendum hours

- Referendum, Tuesday, May 6, 2025 from 6:00 a.m. to 8:00 p.m.

## VII. STATEMENT BY CHAIRPERSON

**Chairman Crocker read the Statement by Chairperson**

"I present the 2025-2026 School District Budget, approved by the Region 14 Board of Education in the amount of $43,346,298 in accordance with Section 10-51 of the Connecticut General Statutes.

In accordance with Section 10-51 of the Connecticut General Statutes, the Region 14 Board of Education has separately established a "Reserve Fund for Capital and Nonrecurring Expenditures" in which the aggregate amount of annual appropriations and any supplemental appropriations from surplus funds shall not exceed 2% of the annual district operating budget.

In accordance with Section 10-51 (a) of the Connecticut General Statutes, the Region 14 Board of Education has a statement of Estimated Receipts and Expenditures for the 2024-2025 and 2025-2026 fiscal years, Estimated Surplus or Deficit in operating funds at the end of the current fiscal year, Bonded Debt, and Estimated Per Pupil Expenditures for the Current and Next Fiscal Year."

## VIII. ADJOURNMENT

Adjournment read by Mr. McLaughlin

"The Annual District Meeting this evening is to be considered in recess until the following day, Tuesday, May 6, 2025 when the polls open in each of the two member towns for the purpose of voting the question. The meeting shall then be considered

DRAFT

adjourned following the close of the polls in the two member towns and announcements made of the results of the voting question.

IX. VOTING MACHINE INFORMATION

QUESTION:

Shall the budget submitted by the Board of Education for Regional School District No. 14 for the fiscal year commencing July 1, 2025 and ending June 30, 2026 in the amount of $43,346,298 be approved?

_____YES _____NO"

The Board recessed at 6:05 p.m.

DRAFT

# Minutes
# Regular Meeting of the Region 14 Board of Education
# Monday, May 5, 2025; 6:05 p.m.
# (Immediately Following District Meeting on Budget)
# Mitchell Elementary School
# Flanders Room

**Present:**
Jim Crocker, Chairman
Chris Matta
Carol Ann Brown
Alice Jones
Michael Carbonneau
Caren Lipinski

**Absent:**
Tikva Rose
Chris Griffin

**Also Present:**
Brian Murphy, Superintendent
Tina Tanguay, Director of Finance and Operations

## I. Call to Order
Chairman Crocker called the meeting to order at 6:05 p.m.

## II. Approval of Minutes
### A. Regular Meeting, Monday, April 7, 2025
A motion was made by Jim Crocker and seconded by Carol Ann Brown to accept/approve the minutes as presented, all in favor, none opposed, motion carried unanimously.

## III. Superintendent's Report
### A. Student Representatives' Reports: No Report
### B. TAG/National Geography Bee Regional Winner
- The Superintendent introduced Benjamin Harrison, a 5th grade student at Mitchell Elementary School, who won the national geography bee regional finals
- Benjamin completed three challenging qualifying rounds with buzzer-based questions on countries, cities, and industries
- Allison Loiseau, Benjamin's talented and gifted teacher, was acknowledged for her leadership and guidance

### C. Region 14 Staff Appreciation
- The Superintendent recognized team members who wake up at 3:30 AM during inclement weather to assess conditions
- Team members recognized included:
  - Jon O'Neill - Public Works Director from Bethlehem

DRAFT

The Regional School District 14 Board of Education does not discriminate on the basis of race, color, religion, marital status, national/ethnic origin, age, sex, gender identity or expression, sexual orientation, or disability in its programs, activities, and employment practices as set forth in compliance with the Office of Civil Rights, Title VI, Title IX, and Section 504. Any person having inquiries concerning Regional School District 14 Public Schools' compliance with Section 504, Title VI or Title IX should contact Dina Ericson, Director of Student Services, Regional School District 14, 5 Minortown Road, PO Box 469, Woodbury, CT 06798 (203) 263-6356

- Rich Lamont - Public Works Director from Woodbury
- Tina Tanguay - Director of Operations and Finance
- Mike Molzon - Director of Facilities
- Maggie Gildea - District Data Specialist
- Patricia Paige - Administrative Assistant to the Superintendent

- The team was praised for keeping students and staff safe during inclement weather events

**IV. Committee Reports**

**A. Policy Committee**

On a recommendation by the Policy Committee to approve the following polices, second read, action anticipated.

1. Policy 4111/4211 Recruitment and Selection
   A motion was made by Chris Matta and seconded by Jim Crocker to accept/approve Policy 4111/4211 Recruitment and Selection as presented, all in favor, none opposed, motion carried unanimously.

2. Policy 4134 Tutoring
   A motion was made by Chris Matta and seconded by Jim Crocker to accept/approve Policy 4134-Tutoring as presented, all in favor, none opposed, motion carried unanimously.

**V. Board Chair Comments**

Chairman Crocker expressed his appreciation to the staff for their dedication, experience and commitment
Region 14 continues to focus on the four pillars – safety, communication, budget, and academic performance
Two major on-going projects – policy and curriculum

Superintendent Murphy English SAT Scores for students in grade 11 went up 13% percentage points from last year

Chairman Crocker announced that the Board will be creating an Ad hoc Committee, Government Funding, to address Agriscience Funding. Committee Members will consist of Jim Crocker as chair of the committee, Chris Matta, Alice Jones, and Carol Ann Brown. Region 14 representatives will include Superintendent Murphy, Principal Kuslis, Director of Finance and Operations Tina Tanguay, Agriscience Director Lee McMillan.

**VI. Privilege of the Floor**

There was none

**VII. Old Business**

There was none

DRAFT

## VIII. New Business

**A.** Discussion and possible action on ratification of the following Region 14 bargaining agreements (Executive Session Anticipated):

1. Collective bargaining agreement between the Nonnewaug Regional School District No. 14 and Teamsters Local Union No. 443 International Brotherhood of Teamsters, Chauffeurs, Warehousemen, and helpers of America covering the period of July 1, 2025 through June 30, 2029.

2. Collective bargaining agreement between the Nonnewaug School District #14 and the Local 1303-247 of Council #4 AFSCME, AFL-CIO; Nonnewaug School Nurses for the period of July 1, 2025 to June 30, 2029.

3. Collective bargaining agreement between the Regional School District No. 14 Board of Education and the Nonnewaug Instructional Support Union Local 1303-443 of Council 4, AFSCME, AFL-CIO for the period of July 1, 2025 to June 30, 2029.

**Executive Session**

A motion was made by Jim Crocker to enter into Executive Session for the discussion/ratification of the Region 14 Bargaining Units as presented, seconded by Alice Jones, all in favor, none opposed; the Board invited Superintendent Murphy and Tina Tanguay and entered into the Executive Session at 6:27 p.m.

**Public Session**

The Board returned to Public Session at 6:47 p.m.

**Motions**

**(Custodial Contract)**

- Jim Crocker moved that the Region 14 Board of Education ratify the proposed collective bargaining agreement between the Nonnewaug Regional School District No. 14 and Teamsters Local Union No. 443 International Brotherhood of Teamsters, Chauffeurs, Warehousemen, and helpers of America covering the period of July 1, 2025 through June 30, 2029, seconded by Alice Jones, all in favor, none opposed, motion carried unanimously.

- Jim Crocker moved that the Region 14 Board of Education authorize the Board Chair to sign said agreement, subject to any further necessary legal review, seconded by Caren Lipinski, all in favor, none opposed, motion carried unanimously.

DRAFT

**(Nurses' Contract)**

- Jim Crocker moved that the Region 14 Board of Education ratify the proposed collective bargaining agreement between the Nonnewaug School District #14 and the Local 1303- 247 of Council #4 AFSCME, AFL-CIO; Nonnewaug School Nurses for the period of July 1, 2025 to June 30, 2029, seconded by Michael Carbonneau, all in favor, none opposed, motion carried unanimously.

- Jim Crocker moved that the Region 14 Board of Education authorize the Board Chair to sign said agreement, subject to any further necessary legal review, seconded by Caren Lipinski, all in favor, none opposed, motion carried unanimously.

**(Instructional Assistants' Contract)**

- Jim Crocker moved that the Region 14 Board of Education ratify the proposed collective bargaining agreement between the Regional School District No. 14 Board of Education and the Nonnewaug Instructional Support Union Local 1303-443 of Council 4, AFSCME, AFL-CIO for the period of July 1, 2025 to June 30, 2029, seconded by Caren Lipinski, all in favor, none opposed, motion carried unanimously.

- Jim Crocker moved that the Region 14 Board of Education authorize the Board Chair to sign said agreement, subject to any further necessary legal review, seconded by Carol Ann Brown, all in favor, none opposed, motion carried unanimously.

**B. Region 14 School District Pension Plan Discussion (Action Anticipated)(Public Session)**

**Motion (Region 14 Pension Plan)**

Whereas, Regional School District No. 14 (hereinafter called the Employer) adopted a document entitled "PENSION PLAN FOR REGIONAL SCHOOL DISTRICT NO. 14' effective July 1, 1972, as amended and restated effective July 1, 1983 and as further amended and restated via an Adoption Agreement, dated July 1, 2010; and

Whereas, Section 8.1 of said Plan provides that the Employer shall have the right to amend said Plan at any time, and

Whereas, the Employer now desires to amend said Plan;

Now therefore, **Jim Crocker moved that** said Plan is amended effective June 30, 2025 by deleting Section 1.22 and substituting the following:

DRAFT

Eligible Employer shall include any person who is not a teacher or certified school administrator and who is 1) a non-certified employee who was hired on or before June 30, 2025 and either a) works at least 10 months per year or b) is an hourly employee who works at least 7 hours per day and 52 weeks per year. Eligible employee shall not include any person whose job description, contract or collective bargaining agreement specifically excludes participation in this plan or who works less than 1,000 hours per year, **seconded by Caren Lipinski**, all in favor, none opposed, motion carried unanimously.

C. Superintendent's Evaluation/Employment (Executive Session Anticipated/Action Anticipated)

**Executive Session**

A motion was made by Jim Crocker and seconded by Chris Matta to enter into Executive for the purpose of discussing the Superintendent's Evaluation/Employment, all in favor, none opposed, motion carried unanimously. The Board invited Superintendent Murphy into Executive Session at 6:55 p.m.

**Public Session**

The Board returned to Public Session at 8:40 p.m.

**Motions**

Jim Crocker moved that the Board of Education appoint Superintendent Brian Murphy to a new three year term of employment as Superintendent of Schools, and offer him a new contract as presented to the Board, commencing on July 1, 2025 and ending June 30, 2028, seconded by Caren Lipinski, all in favor, none opposed, motion carried unanimously.

Jim Crocker moved that the Region 14 Board of Education authorize the Board Chair to sign said contract, subject to any further necessary legal review, seconded by Alice Jones, all in favor, none opposed, motion carried unanimously.

**IX. Other Business**

There was none

**X. Adjournment**

A motion was made by Jim Crocker to adjourn the meeting, seconded by Mike Carbonneau, all in favor, none opposed, the meeting adjourned at 8:45 p.m.

*Respectfully Submitted,*



DRAFT

*Patricia Paige*
*Board Clerk*
***Recorded and filed subject to Board of Education approval by: Patricia Paige, Board Clerk***
***Minutes created with assistance of Circleback AI"***

DRAFT

Your future begins here.
Region 14 Schools
Serving the Towns of Bethlehem and Woodbury

**Minutes**
**Regional District Meeting**
**Thursday, May 8, 2025; 6:00 p.m.**
**Flanders Room/Mitchell Elementary School**
**14 School St, Woodbury, CT 06798**

**Present:**
Jim Crocker, Board Chairman
Chris Matta
Carol Ann Brown
Alice Jones
Caren Lipinski
Michael Carbonneau

**Absent:**
Chris Griffin
Tikva Rose

**Also Present:**
Brian Murphy, Superintendent
Tina Tanguay, Director of Finance and Operations
Attorney John McDonald, Moderator of the Meeting
Patricia Paige, Recording Clerk

**I. Call to Order**
Jim Crocker called the District meeting to order at 6:00 p.m.

**II. Pledge of Allegiance**
The Pledge of Allegiance was recited and acquaintances were made

**III. Appointment of a Moderator**
Mr. Crocker appointed Attorney John McDonald as Moderator of the Meeting

**IV. Appointment of Meeting Clerk by Moderator**
Attorney McDonald appointed Patricia Paige as Clerk of the Meeting

**V. Call of the Meeting**
Attorney McDonald read the Call of the Meeting

***All electors and citizens qualified to vote in meetings of the Towns of Bethlehem and Woodbury, CT are hereby notified and warned that a District Meeting of Regional School District 14 will be held in the Flanders Room at Mitchell Elementary School, 14 School Street, Woodbury, CT on Thursday, May 8, 202 at 6:00 p.m.***

DRAFT

The Regional School District 14 Board of Education does not discriminate on the basis of race, color, religion, marital status, national/ethnic origin, age, sex, gender identity or expression, sexual orientation, or disability in its programs, activities, and employment practices as set forth in compliance with the Office of Civil Rights, Title VI, Title IX, and Section 504. Any person having inquiries concerning Regional School District 14 Public Schools' compliance with Section 504, Title VI or Title IX should contact: Donna Marcinek, Director of Student Services, Regional School District 14, 5 Minortown Road, PO Box 469, Woodbury, CT 06798 (203) 263-0416

***Purpose:***

***To nominate candidates, at least (3) from Bethlehem and at least (3) from Woodbury, to fill four (4) seats on the Regional School District 14 Board of Education for the term of July 1, 2025 to June 30, 2028.***

**VI. Nominations**

Attorney McDonald opened the floor to nominations:

**Bethlehem Nominees**

Philip Dunphy, 30 West Shore Drive, Bethlehem, nominated *Mark Crane, Bethlehem*

Pam Zmek, 198 Paddy Hollow Road, Bethlehem, nominated *Carol Ann Brown, Bethlehem*

Chris Matta, 36 Saxony Lane, Woodbury, nominated *Chris Griffin, Bethlehem*

**Woodbury Nominees**

Mimi DeLessio-Matta, 36 Saxony Lane, Woodbury, nominated *Chris Matta, Woodbury*

Chris Matta, 36 Saxony Lane, Woodbury, nominated *Jim Crocker, Woodbury*

Vanita Bhalla, 26 Parkland Drive, Woodbury, nominated *Bill Hayden, Woodbury*

Hearing no further nominations, Attorney McDonald ensured that the proper number of nominations was received for each of the towns. Each candidate present was then offered the opportunity to make a brief statement.

**XI. Adjournment**

Attorney McDonald adjourned the meeting at 6:11 p.m.

*Respectfully Submitted,*



DRAFT

*Patricia Paige*
*Board Clerk*

*Recorded and filed subject to Board of Education approval by: Patricia Paige, Board Clerk*

DRAFT

**Minutes**
**Special Meeting**
**Region 14 Board of Education**
**Friday, May 9, 2025; 4:00 p.m.**
**Mitchell Elementary School**
**Flanders Room**

**Present:**
Jim Crocker, Chairman
Chris Matta
Carol Ann Brown
Alice Jones
Caren Lipinski
Tikva Rose
Michael Carbonneau

**Absent:**
Chris Griffin

**Also Present:**
Brian Murphy, Superintendent
Tina Tanguay, Director of Finance and Operations

**I. Call to Order**

Chairman Crocker called the meeting to order at 4:00 p.m.

**II. Pledge of Allegiance/Introductions**

The Pledge of Allegiance was recited and acquaintances made.

Chairman Crocker and Superintendent Murphy provided some opening remarks.

**III. Discussion/possible action on revised budget for 2025-2026**

Eliminations from the current budget proposal:

- New Spanish Teacher
- BES Media Specialist from F/T to P/T
- High School Lab Tech
- One Section of Culinary Arts at NHS
- MES One Full-time Kindergarten Teacher
- Guidance Counselor NHS
- Agriscience Teacher Savings (New teacher at a lower rate)
- Savings of $413,895 for a total overall budget proposal of $42,932,403

State School District Average Increase is 5.6%

DRAFT

The Regional School District 14 Board of Education does not discriminate on the basis of race, color, religion, marital status, national/ethnic origin, age, sex, gender identity or expression, sexual orientation, or disability in its programs, activities, and employment practices as set forth in compliance with the Office of Civil Rights, Title VI, Title IX, and Section 504. Any person having inquiries concerning Regional School District 14 Public Schools' compliance with Section 504, Title VI or Title IX should contact Dina Ericson, Director of Student Services, Regional School District 14, 5 Minortown Road, PO Box 469, Woodbury, CT 06798 (203) 263-6356

**Motion**
Chris Matta made a motion to eliminate the Dean of Students/Athletic Director position at the high school, seconded by Jim Crocker,

Discussion
Superintendent Murphy does not support the cut
The cut is above and beyond the cuts previously noted
Superintendent would propose 2-$20,000 stipends if the position is eliminated

Tikva Rose (1-No), Alice Jones, Jim Crocker, Chris Matta, Carol Ann Brown, Caren Lipinski, and Michael Carbonneau (6-Yes), motion carried, positon eliminated.

**The decision was made to discuss and motion each elimination separately**

**Spanish Teacher**
Jim Crocker made a motion to eliminate the new Spanish teacher position with a savings of $75,000, seconded by Tikva Rose, all in favor, none opposed, motion carried unanimously, position eliminated.

**Media Specialist Full-time to Part-time at Bethlehem Elementary School**
Jim Crocker made a motion to move the full-time Media Specialist position at BES from full-time to part-time for a savings of $50,000, seconded by Alice Jones; Tikva Rose, Alice Jones, Michael Carbonneau, Jim Crocker and Chris Matta (5-Yes), Carol Ann Brown and Caren Lipinski (2-No), motion carried.

**Lab Tech at Nonnewaug High School**
Jim Crocker made a motion to eliminate the High School Lab Tech for a savings of $40,295, seconded by Tikva Rose; Alice Jones, Mike Carbonneau, Jim Crocker and Chris Matta (4-Yes); Tikva Rose, Caren Lipinski, and Carol Ann Brown, (3-No) motion carried, position eliminated.

**One Teaching Section of Culinary Arts at Nonnewaug High School**
Jim Crocker made a motion to eliminate one teaching section of culinary arts at the high school for a savings of $22,600, seconded by Tikva Rose; Caren Lipinski, Mike Carbonneau, Chris Matta (3-Yes); Tikva Rose, Alice Jones, Carol Ann Brown, and Jim Crocker, (4-No) motion does not pass, section remains.

**One Full-time Kindergarten Teacher at Mitchell Elementary School**
Jim Crocker made a motion to eliminate one full-time kindergarten teacher for a savings of $100,434, seconded by Michael Carbonneau; Tikva Rose, Alice Jones, Michael Carbonneau, Jim Crocker, Chris Matta and Carol Ann Brown (6-Yes); Caren Lipinski, (1-No) motion carried, position eliminated.

DRAFT

**Guidance Counselor at Nonnewaug High School**

Jim Crocker made a motion to eliminate a Guidance Counselor position for a savings of $68,365, seconded by Alice Jones; Alice Jones, Mike Carbonneau, Jim Crocker, Chris Matta (4-Yes); Tikva Rose, Caren Lipinski, Carol Ann Brown, (3-No) motion carried, position eliminated.

**Agriscience teacher savings (new teacher)**

Jim Crocker moved that the savings of $57,201 be accepted, seconded by Tikva Rose, all in favor, none opposed, motion carried unanimously.

**Motion**

Jim Crocker moved that the Region 14 Board of Education approve and adopt the Superintendent's proposed amended budget for the year 2025/2026 in the amount $42,876,216 as further amended by the Board, seconded by Mike Carbonneau; Alice Jones, Jim Crocker, and Chris Matta (3-Yes); Tikva Rose, Caren Lipinski, Carol Ann Brown, and Michael Carbonneau, (4-No) motion fails.

*Chairman Crocker and Superintendent Murphy explained to the Board that the above motion was a formality. The aggregate budget had already been decided upon through the collective motions.*

**Motion**

Jim Crocker moved that the Region 14 Board of Education approve and adopt the Superintendent's proposed amended budget for the year 2025/2026 in the amount of $42,876,215 as presented and modified by the Board, Alice Jones seconded; Alice Jones, Michael Carbonneau, Jim Crocker, Chris Matta, and Carol Ann Brown, (5-Yes); Tikva Rose and Caren Lipinski; (2-No) motion carried.

## IV. Discussion/possible action on calling of District meeting and referendum on revised Budget

Jim Crocker moved that the Board of Education schedule and warn a District Meeting for Monday, May 19, 2025 at 5:00 p.m. in the Flanders Room at Mitchell Elementary School, 14 School Street, Woodbury, CT concerning the amended 2025/2026 budget, with said meeting to be adjourned to a referendum on Tuesday, May 20, 2025 from 6:00 a.m. to 8:00 p.m. in the Towns of Bethlehem and Woodbury, CT, seconded by Tikva Rose, all in favor, none opposed, motion carried unanimously.

## V. Discussion/possible action on authorization and approval of explanatory text/neutral materials and notices

Jim Crocker moved that the Secretary of the Board of Education is authorized, in such official's discretion, to prepare and cause to be printed and distributed explanatory text and other neutral materials and notices regarding the 2025/2026 budget referendum scheduled for May 20, 2025, with such explanatory text and materials and notices subject to the review and approval of the District's legal counsel and to be prepared and distributed in accordance with Section 9-369b of the Connecticut General Statutes,

DRAFT

seconded by Michael Carbonneau, all in favor, none opposed, motion carried unanimously.

**VI. Community Notification System (Action Anticipated)**

Jim Crocker moved that the Chairman of the Board of Education is authorized, in such official's discretion, to request and cause the Superintendent of Schools to use the District's community notification system to provide notice of the referendum, in accordance with Section 9-369b of the Connecticut General Statutes, seconded by Caren Lipinski, all in favor, none opposed, motion carried unanimously.

**V. Adjournment**

Jim Crocker made a motion to adjourn the meeting at 5:34 p.m., seconded by Tikva Rose, all in favor, none opposed, motion carried.

*Respectfully Submitted,*



*Patricia Paige*
*Board Clerk*
*Recorded and filed subject to Board of Education approval by: Patricia Paige, Board Clerk*

*Minutes created with assistance of Circleback AI"*

DRAFT

**Minutes**
Board of Education – District Meeting (Budget)
Monday, May 19, 2025; 5:00 p.m.
Flanders Room, Mitchell Elementary School

**Present:**
Chris Matta, Presiding Board Member
Carol Ann Brown
Alice Jones
Michael Carbonneau

**Absent:**
Jim Crocker
Chris Griffin
Tikva Rose
Caren Lipinski

**Also Present:**
Brian Murphy, Superintendent
Tina Tanguay, Director of Finance and Operations
Jamie McLaughlin, Moderator of the Meeting
Patricia Paige, Meeting Clerk

**I. Call to Order**
Presiding Board Member Chris Matta called the meeting to order at 5:02 p.m.

**II. Pledge of Allegiance/Introductions**
The Pledge of Allegiance was recited and acquaintances were made

**III. Appointment of Moderator**
Chris Matta appointed Mr. Jamie McLaughlin as Meeting Moderator

**IV. Appointment of Meeting Clerk by Moderator**
Mr. McLaughlin appointed Patricia Paige as the Meeting Clerk

**V. CALL OF MEETING**
Mr. Jamie McLaughlin read the "Call of the Meeting"

All electors and citizens who are qualified to vote in town meetings of the Towns of Bethlehem and Woodbury, Connecticut, are hereby notified and warned that a District Meeting of Regional School District No. 14 will be held Monday, May 19, 2025 at 5:00 p.m. at the Mitchell Elementary School; Flanders Room; 14 School Street; Woodbury,

DRAFT

CT.

PURPOSE:
TO CONSIDER THE AMENDED BUDGET SUBMITTED BY
THE BOARD OF EDUCATION FOR REGIONAL SCHOOL DISTRICT NO. 14 FOR THE FISCAL YEAR COMMENCING JULY 1, 2025 AND ENDING JUNE 30, 2026 IN THE AMOUNT OF $42,876,215.
The vote on said budget will be by the voting machines in the towns of Bethlehem, (Town Hall, 36 Main Street South) and Woodbury, (Senior Center, 265 Main Street South) Connecticut on Tuesday, May 20, 2025, between the hours of 6:00 a.m. and 8:00 p.m., the day following the District Meeting.

## VI. NOTE OF REFERENDUM HOURS

Mr. McLaughlin noted the referendum hours

- Referendum, Tuesday, May 20, 2025 from 6:00 a.m. to 8:00 p.m.

## VII. STATEMENT BY CHAIRPERSON

**Chris Matta read the Statement by Chairperson**

"I present the 2025-2026 School District Amended Budget, approved by the Region 14 Board of Education in the amount of $42,876,215 in accordance with Section 10-51 of the Connecticut General Statutes.

In accordance with Section 10-51 of the Connecticut General Statutes, the Region 14 Board of Education has separately established a "Reserve Fund for Capital and Nonrecurring Expenditures" in which the aggregate amount of annual appropriations and any supplemental appropriations from surplus funds shall not exceed 2% of the annual district operating budget.

In accordance with Section 10-51 (a) of the Connecticut General Statutes, the Region 14 Board of Education has a statement of Estimated Receipts and Expenditures for the 2024-2025 and 2025-2026 fiscal years, Estimated Surplus or Deficit in operating funds at the end of the current fiscal year, Bonded Debt, and Estimated Per Pupil Expenditures for the Current and Next Fiscal Year."

## VIII. ADJOURNMENT

Adjournment read by Mr. McLaughlin

"The Annual District Meeting this evening is to be considered in recess until the following day, Tuesday, May 20, 2025 when the polls open in each of the two member towns for the purpose of voting the question. The meeting shall then be considered

DRAFT

adjourned following the close of the polls in the two member towns and announcements made of the results of the voting question.

IX. VOTING MACHINE INFORMATION

QUESTION:

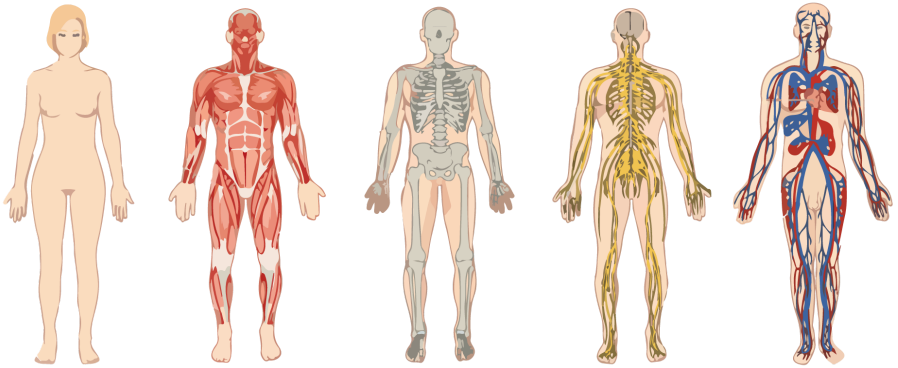
Shall the amended budget submitted by the Board of Education for Regional School District No. 14 for the fiscal year commencing July 1, 2025 and ending June 30, 2026 in the amount of $42,876,215 be approved?

_____YES _____NO

The Board recessed at 5:06 p.m.

DRAFT

# ANATOMY & PHYSIOLOGY CURRICULUM



| | |
|---|---|
| **Grade Level(s): 11th & 12th** | **Curriculum Author(s):** Shelly Stone |

Human Anatomy and Physiology is for students who are preparing for careers in the allied health fields or who are interested in this subject. Emphasis is placed on a detailed study of the human body by systems and discussions of recent medical advances and laboratory experiences. Dissections are used to enhance course material.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner Attribute and Indicator** |
| Human Body: An Orientation (2-3 weeks) | How do the interactions between molecular, cellular, and organismal levels contribute to the functioning and health of human beings? | Molecular and cellular interactions support the structure and function of the whole body. These connections are key to maintaining health. | TCC3(9-12); TCC4(9-12); TI3(9-12) |
| Cells and Medical Imaging (2-3 weeks) | What are the molecular components and structural adaptations of the cell membrane that contribute to its functions? | The cell membrane's structure—made of lipids, proteins, and carbohydrates—enables selective transport, communication, and protection, supporting overall cell function and homeostasis. | TCC2(9-12) |
| Tissues (2-3 weeks) | How do the structures of tissues relate to their functions? | Tissues have distinct structures that are closely tied to their specific functions—such as movement, support, protection, or communication—in the body. | TI2(9-12) |
| Body Membranes and Integumentary System (2-3 weeks) | What are the main components of the integumentary system, and how do they work together to protect the body? | The skin, hair, nails, and glands form a barrier that protects the body from physical, chemical, and biological threats. | TI2(9-12); TCC1(9-12) |
| Skeletal System (4 weeks) | What are the primary functions of the skeletal system, and how do they contribute to overall health and survival? | The skeletal system provides support, protection, movement, blood cell production, and mineral storage—essential for survival and health. | TCC2(9-12); TCC4(9-12); TI2(9-12) |

| | | | |
|---|---|---|---|
| Muscular System (3 weeks) | How does the structure of muscles enable their function in the body? | Muscle fibers are organized to contract efficiently, allowing muscles to generate force and produce movement. | TCC2(9-12) |
| Nervous System (4 weeks) | What is the overall structure and function of the nervous system? | The nervous system includes the brain, spinal cord, and nerves, working together to control body functions, process information, and respond to stimuli. | TCC1(9-12; TCC2(9-12) |
| Special Senses (4 weeks) | How do the special senses interact with and influence each other to detect and process environmental stimuli? | The special senses work together to collect and process sensory input, creating a complete picture of the environment. | TCC1(9-12); TCC2(9-12) |
| Blood & Circulatory System (4-5 weeks) | How does the structure of the circulatory system facilitate the movement of blood and how do the main components of blood contribute to its overall function? | The heart, arteries and veins each play key roles in transporting red blood cells, white blood cells, platelets, and plasma, supplying oxygen, fighting infection, and maintaining homeostasis. | TCC1(9-12) |
| Lymphatic/ Immune Systems (1 week) | Why is the lymphatic system essential for maintaining homeostasis? | The lymphatic system helps maintain fluid balance, supports immune defense, and removes waste from tissues. | TI2(9-12) |
| Respiratory System (1-2 weeks) | How does the structure of the respiratory system enable it to facilitate efficient gas exchange and energy production? | The respiratory system's branching airways and thin alveoli maximize surface area for gas exchange, supplying oxygen for energy production. | TCC1(9-12) |
| Digestive System (2 weeks) | How does the structure of the digestive system enable it to efficiently break down food and absorb nutrients? | The digestive system's specialized organs and enzymes work together to break down food and absorb nutrients through a highly folded, efficient | TCC4(9-12) |

| | | | |
|---|---|---|---|
| | | surface. | |

adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

## Unit 1- Human Body: An Orientation

**Desired Results - Students will know the body systems, how the body maintains homeostasis, and proper terminology to describe anatomical structure in the body**

**Established Goals:**

**NGSS Standards**

**HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

**HS-LS1-3.** Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI3(9-12):** I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that...

- Homeostasis keeps internal conditions stable, allowing the body to function properly. Disruptions can lead to illness or dysfunction.
- Molecular and cellular interactions support the structure and function of the whole body. These connections are key to maintaining health.
- Using accurate terminology improves clarity and precision in discussing the body, supporting effective communication in science and healthcare.

**Essential Questions:**

- Why is homeostasis important to the human body?
- How do the interactions between molecular, cellular, and organismal levels contribute to the functioning and health of human beings?
- How does understanding anatomical and physiological terminology enhance our ability to communicate about human health and function?

| **Students will know…** | **Students will be able to…** |
|---|---|
| • the difference between the terms “anatomy” and “physiology”.<br>• the different levels of organization and give an example at each level within a given system (atoms, molecules, compounds, macromolecules, cells, tissues, organs, organ systems, organism).<br>• survival needs and life functions of humans.<br>• the relationships among directional and body terms | • compare and contrast positive and negative feedback mechanisms for homeostatic regulation.<br>• demonstrate the use of anatomical terms and directional terms using dissection methods on a “Pickle Man”.<br>• answer “At the Clinic” questions at the end of the chapter. |
| **Key Vocabulary:** Cell, tissue, organ, organ systems, homeostasis, negative and positive feedback, receptor effector, homeostatic imbalance, language of Anatomy: anatomical position, directional terms, regional terms for body regions, body cavities, body planes | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Introduction to Body systems activity - APK<br>• Body Diagrams<br>• Homeostasis STEM GIZMO<br>• Medical Disorders Research Activity<br>• Introduction to Dissection Lab- “Pickle Man” - Students need to show understanding of anatomical and physiological terminology to complete the dissection. | **Other Evidence:**<br>Class Notes<br>Guided reading<br>Quiz body systems/function/organs<br>Directional terms worksheet<br>Review Kahoot<br><br>Summative:Test Ch. 1 Orientation of Human Body Systems · Students will provide a consistent, meaningful interpretation of the key issues/concepts through multiple choice, labeling diagrams, and “At the Clinic” questions. The “At the Clinic” questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario. |
| **Learning Plan** | |
| TCC3(9-12): I can integrate relevant information to produce multiple valid solutions<br>• Quiz on body systems, functions, and organs<br><br>NGSS HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. | |

NGSS HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

- Gizmo Homeostasis STEM case
- Body Regions & Body Cavities
- Worksheets 2,3,10,12 & 13

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.

- Lab: Introduction to Dissection – “The Pickle Man” – teacher designed – students use terminology that they have learned to dissect a “pickle man”.

TI3(9-12): I can formulate and investigate probing questions to further my learning.

- Research a medical disease.
- Ch. 1 Test Orientation of Human Body

**Teacher Resources:**
Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access to text; Introduction Human Machine Video

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 2- Cells and Medical Imaging

## Desired Results

**Established Goals:**

**NGSS**

- **HS-LS1-1.** Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
- **HS-LS1-2.** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
- **HS-LS1-3.** Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**Understandings:** Students will understand that...

- Organelles have specialized roles that work together to maintain cellular balance and perform essential functions like energy production, protein synthesis, and waste removal.
- The cell membrane's structure—made of lipids, proteins, and carbohydrates—enables selective transport, communication, and protection, supporting overall cell function and homeostasis.
- Medical imaging technologies offer different perspectives on body structure and function, enhancing diagnosis, treatment, and understanding of human anatomy and physiology.

**Essential Questions:**

- What are the roles of specific organelles in maintaining cellular homeostasis and supporting cellular functions?
- What are the molecular components and structural adaptations of the cell membrane that contribute to its functions?
- How do different imaging techniques provide unique insights into anatomical structures and physiological functions?

| **Students will know…** | **Students will be able to...** |
|---|---|
| • the structure of the cell membrane and explain how it maintains homeostasis within the cell.<br>• the different cell organelles and their importance in keeping the cell alive.<br>• different forms of medical imaging | • explain how a cell membrane responds to different solutions to maintain homeostasis<br>• research medical imaging techniques and present them to the class using technology |
| **Key Vocabulary:** Cell organelles: nucleus, cytoplasm, nuclear envelope, chromatin, chromosome, nucleolus, ribosome, endoplasmic reticulum, Golgi apparatus, lysosome, vacuole, mitochondrion, chloroplast, cytoskeleton, centriole, cell membrane, lipid bilayer, cell wall, selectively permeable, interstitial fluid, intracellular fluid, Types of transport: diffusion, facilitated diffusion, active transport, endocytosis, phagocytosis, pinocytosis, exocytosis, concentration, equilibrium, osmosis, isotonic, hypotonic, hypertonic, and Medical Imaging Techniques | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Cell Organelle chart<br>• Lab: Membrane Transport using a Dialysis Bag Summative:To investigate the permeability of a model cell membrane to different substances. These experiments cover various principles related to cell membranes, such as permeability, diffusion, osmosis, and temperature effects<br>• Performance Based Assessment: Medical Imaging Report | **Other Evidence:**<br>Class Notes<br>Guided Reading<br>At the Clinic Questions<br>• Bozeman Edpuzzles: Cells and Cell Organelles / Diffusion Experiment / How does the cell work?<br>• Review Kahoot<br>• Quiz: cell organelles and types of transport |
| **Learning Plan** | |
| **Performance Tasks:**<br>*HS-LS1-1. Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.*<br>• Cell Organelle chart<br>• Ch. 3 Notes Cell Organelles<br>• Ch. 3 Guided Reading<br>*HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.* | |

*HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.*

- Ch. 3 Cell Membrane Notes
- Lab: Membrane Transport using a Dialysis Bag

TCC2(9-12): I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

- Performance Based Assessment: Medical Imaging Report

**Teacher Resources:**
Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access to text

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 3- Tissues

## Desired Results

**Established Goals:**

NGSS

*HS-LS1.A: Structure and Function*

- *Tissues and organs are composed of cells that have specific functions, and these tissues work together to form organ systems.*

***NGSS Alignment:***

*Integrates HS-ETS1-1 and HS-ETS1-2, encouraging problem-solving and innovation in tissue engineering.*

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

**Understandings:** Students will understand that...

- Tissues have distinct structures that are closely tied to their specific functions—such as movement, support, protection, or communication—in the body.
- Tissues combine in specific ways to form organs, which work together in systems to carry out complex body functions.
- Tissues support homeostasis by performing specialized roles that help regulate internal conditions and respond to changes in the body.
- Tissues repair and regenerate through cellular processes like inflammation, cell division, and remodeling, which help restore structure and function.

**Essential Questions:**

- How do the structures of tissues relate to their functions?
- How do tissues work together to form organs and organ systems?
- In what ways do tissues contribute to the overall homeostasis of an organism?
- What mechanisms do tissues use to repair and regenerate after injury or damage?

| Students will know… | Students will be able to... |
|---|---|
| ● the definition of tissue<br>● the function, structure and location of epithelial, connective, muscle, and nervous tissue.<br>● the differences between types of epithelial, connective, muscle and nervous tissues.<br>● How tissues Contribute to the Overall Homeostasis of an Organism. | ● draw different tissues under 100X and 400X using a microscope.<br>● identify tissues under the microscope or using a picture.<br>● explain how tissues repair and regenerate |

**Key Vocabulary:** *Epithelial: simple epithelium, stratified epithelium, transitional epithelium, glandular epithelium, connective: extracellular matrix, cartilage, bone, areolar, adipose, reticular, blood, muscle: skeletal, cardiac, smooth, and nervous tissues. Regeneration, fibrosis*

**Assessment Evidence**

| Performance Tasks: | Other Evidence: |
|---|---|
| Lab: Microscopic Examination of Tissues: Summative. Students draw 11 different tissue slides using a microscope under low and high power. They also research information using their textbook in terms of location of the tissue, function and any special features of the tissue.<br><br>Tissue Lab Practical – Stations are set up around the classroom and students go to each station to identify a tissue sample under the microscope, or a drawing on an index card or identify specific information such as: where the tissue is found or what is the function of that tissue. They can use their microscope drawings from the Summative assessment. | Review Kahoot<br><br>Quiz on tissues |

| Learning Plan |
| --- |
| *NGSS HS-LS1.A: Structure and Function: Tissues and organs are composed of cells that have specific functions, and these tissues work together to form organ systems.*<br><br>*HS-LS1.A: Structure and Function: Tissues and organs are composed of cells that have specific functions, and these tissues work together to form organ systems.*<br><br>***NGSS Alignment:*** *Supports HS-LS1-4 and MS-LS1-1 by illustrating cell differentiation and tissue structure.*<br><br>TI2(9-12): I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.<br><br>● ***Lab: Microscopic Examination of Tissues Objective:*** *Use microscopes or digital imaging to examine tissue samples, identifying different cell types and their organization.*<br>● Tissue Lab Practical |
| **Teacher Resources:**<br>Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access to text |

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 4- Body Membranes and Integumentary System

## Desired Results

**Established Goals:**

***HS-LS1-1., HS-LS1.A:*** *Structure and Function: The skin and its associated structures (e.g., hair, nails, glands) are organized into a system that performs essential functions like protection, sensation, and temperature regulation.*

***HS-LS1-2:*** *Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.*

***HS-LS1-3:*** *Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.*

- ***Objective:*** *Students can conduct experiments to observe tissue repair and regeneration, analyzing factors that influence these processes.*
- ***NGSS Alignment:*** *Supports MS-LS1-5 and HS-LS1-4 by examining the mechanisms of tissue growth and regeneration.*

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.

**Understandings:** Students will understand that...

- The skin, hair, nails, and glands form a barrier that protects the body from physical, chemical, and biological threats.
- The skin's layered structure supports its roles in defense, sensory detection, and regulation of body temperature.
- The integumentary system works with other systems—like nervous and circulatory—to manage temperature, fluid balance, and immune responses.
- Melanin helps determine skin color and protects cells by absorbing harmful UV radiation, reducing the risk of DNA damage.

**Essential Questions:**

- What are the main components of the integumentary system, and how do they work together to protect the body?
- How does the structure of the skin contribute to its functions, such as protection, sensation, and temperature regulation?
- In what ways does the integumentary system interact with other body systems to maintain homeostasis?
- What is the role of melanin in the skin, and how does it affect skin color and protection against UV radiation?

| Students will know… | Students will be able to... |
|---|---|
| ● the general functions of the four body membrane types (cutaneous, mucous, serous and synovial) and give the location in the body.<br>● how the structure of the skin affects its functions.<br>● the functions of the skin appendages (nails, hair, sebaceous glands and sudoriferous glands)<br>● how imbalances or diseases in the body can manifest themselves through the skin.<br>● How to differentiate between first, second, and third degree burns in terms of parts of skin that is damaged, what the characteristics are for each type of burn and what repair happens.<br>● the purpose of the “Rule of Nines”.<br>● the characteristics of different types of skin cancer: basal cell carcinoma, squamous cell carcinoma, and malignant melanoma.<br>● how skin heals itself. | ● diagram the skin labeling its structures.<br>● compare the structure of the major membrane types.<br>● design and conduct an experiment to answer the question, “Is all Human Hair the Same?”<br>● answer “At the Clinic” questions at the end of the chapter. |
| **Key Vocabulary:** Epithelial membranes, cutaneous, mucous, and serous, synovial membranes, integumentary system, epidermis, dermis hypodermis, melanin, papillary layer, reticular layer, homeostatic imbalance, skin appendages, sebaceous gland, sebum, sudoriferous gland, eccrine gland, apocrine gland, hair, nails, burns, skin cancer | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Lab: Burns and Homeostasis<br><br>Lab:Hair Analysis “Is All Human Hair the Same?<br><br>GIZMO: Human Homeostasis | **Other Evidence:**<br>Unit class Notes<br>Guided Reading<br><br>● Unit Test- Summative- Students will provide a consistent, meaningful interpretation of the key issues/concepts through multiple choice, labeling diagrams, and “At the Clinic” questions. The “At the Clinic” questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario. |

| | |
|---|---|
| | • Case study on skin burns – Students read scenarios about burns and answer questions.<br>• Cancer worksheet<br>• Review Kahoot |

**Learning Plan**

***HS-LS1-3:*** *Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.*

- ***NGSS Alignment:*** *Supports MS-LS1-5 and HS-LS1-4 by examining the mechanisms of tissue growth and regeneration.*

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.

- Lab: Burns and Homeostasis Students research various burn types and create a model of them. Then they research tissue growth and repair.

- Lab: Hair Analysis Lab: "Is All Human Hair the Same? Students design an experiment to answer the question and write a lab conclusion supporting their hypothesis.

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

- Gizmo Human Homeostasis: To survive in a changing environment, all organisms must maintain relatively stable internal conditions. Thermoregulation is one of the clearest examples of homeostasis in our bodies. Core temperatures in humans must remain between about 30 °C and 41 °C (86 °F–106 °F) for survival. Several processes, both voluntary and involuntary, help maintain normal body temperature.

**Teacher Resources:**
Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access to text

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 5- Skeletal System

## Desired Results

**Established Goals:**

***HS-LS1-1.,LS1.A:*** *Structure and Function*

- *The skeletal system provides structure and support for the body, protects vital organs, and works with the muscular system to facilitate movement.*
- *Bones are living tissues that undergo constant remodeling through the activity of osteoblasts and osteoclasts.*

***Developing and Using Models:***

- *Students can create models to represent the organization of the skeletal system and its integration with other body systems.*

***Crosscutting Concepts:***

- ***Structure and Function:***
  - *Understanding how the shape and composition of bones relate to their specific functions, such as support, protection, and movement.*
- ***Systems and System Models:***
  - *Explore how the skeletal system interacts with the muscular system to produce movement.*

***HS-LS1-2****.,* ***LS1.B:*** *Growth and Development of Organisms*

  - *Bones grow and develop through processes such as endochondral ossification, where cartilage is gradually replaced by bone tissue.*
  - *Bone remodeling is influenced by factors like nutrition, hormones, and physical activity.*

***Constructing Explanations and Designing Solutions:***

- *Explain how bones grow, develop, and repair themselves.*

***Crosscutting Concepts:***

- *Examine how genetic and environmental factors influence bone growth and development.* ***HS-LS1-3.*** *,*
- **Case Study Analysis of Bone Disorders: NGSS Alignment:** Supports **HS-LS1-6** by examining the impact of genetic and environmental factors on skeletal health.

**Human Anatomy and Physiology Connections**

While NGSS does not specifically address the skeletal system in its standards, the following connections can be made to align with biology and health education:

- **Bone Structure and Function:**
  - Explore the anatomy of bones, including the microscopic structure of compact and spongy bone, and understand their roles in protection and movement.
- **Joints and Movement:**
  - Investigate different types of joints (e.g., hinge, ball-and-socket) and how they contribute to the range of motion and flexibility.
- **Bone Health and Disease:**
  - Examine factors affecting bone health, such as osteoporosis, fractures, and the impact of nutrition and exercise on bone density.
- **Developmental Biology:**
  - Study the process of bone development from infancy through adulthood, including growth plate function and the role of hormones.
- **Technological and Medical Applications:**
  - Explore advancements in medical imaging, prosthetics, and treatments for skeletal system disorders.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| • The skeletal system provides support, protection, movement, blood cell production, and mineral storage—essential for survival and health.<br>• Bone and joint structures are specialized to support weight, enable movement, and withstand stress in different parts of the body.<br>• Muscles pull on bones to create movement, with joints acting as levers—requiring close coordination between both systems.<br>• Nutrition, physical activity, hormones, and age all impact bone health. Healthy habits can strengthen bones and prevent disease.<br>• Skeletal diseases and disorders can weaken bones, impair movement, and reduce quality of life, requiring medical management and prevention.<br>• Bones interact with systems like muscular, circulatory, and endocrine to support movement, protect organs, produce blood cells, and regulate minerals. | • What are the primary functions of the skeletal system, and how do they contribute to overall health and survival?<br>• How does the structure of bones and joints relate to their specific functions in the human body?<br>• In what ways do the skeletal and muscular systems work together to facilitate movement?<br>• What factors influence bone health, and how can individuals maintain a healthy skeletal system throughout their lives?<br>• How do diseases and disorders affect the skeletal system, and what are the implications for human health?<br>• How do bones interact with other body systems to maintain homeostasis and support overall body function? |
| **Students will know…** | **Students will be able to...** |
| • the functions of the skeletal system.<br>• the structure of bone and describe how it gets made, repaired and remodeled.<br>• the different types of bone fractures in terms of causes, what happens to the bone and how the bone is repaired<br>• the difference between the axial and appendicular skeleton.<br>• the different types of joints: synarthroses, amphiarthroses and diarthroses<br>• the race and sex of a person can be determined by measurement and observations of their bones | • compare and contrast the pelvic girdles, femur bone, humerus bone, tibia bone and skull. Then use the information to determine the sex and the race of a person.<br>• Identify and label the bones found in the body, including individual skull bones.<br>• label and describe the macroscopic and microscopic anatomical features of a long bone.<br>• use a caliper to determine the difference between male and female pelvises by measuring different attributes of the bones.<br>• research a bone disorder or knee surgery, create a PowerPoint presentation and present it to the class.<br>• answer “At the Clinic” questions at the end of the chapter. |
| **Key Vocabulary:** skeletal, cardiac, smooth, endomysium, perimysium, fascicle, epimysium, sarcolemma, myofibrils, sarcomeres, myosin, actin, motor unit, neuromuscular junctions, synaptic cleft, neurotransmitter, acetylcholine, action potential, graded response, muscle twitches, tetanus, | |

aerobic respiration, anaerobic glycolysis, lactic acid formation, muscle fatigue, oxygen debt, isotonic contractions, isometric contractions, flaccid, origin, insertion, body movements: flexion, extension, rotation, abduction, adduction, circumduction, dorsiflexion and plantar flexion, inversion, eversion, supination, pronation, opposition, prime mover, antagonist, synergist, fixators, frontalis, orbicularis oris, buccinators, zygomaticus, masseter, temporalis, platysma, sternocleidomastoid, pectoralis major, intercostal muscles, rectus, abdominus, external oblique, internal oblique, transversus abdominis, trapezius, latissimus dorsi, erector spinae, deltoid, biceps brachii, brachialis, triceps brachii, gluteus maximus, gluteus medius, iliopsoas, adductor muscles, hamstring group: biceps femoris, semimembranosus, semitendinosus, sartorius, rectus femoris, vastus muscles, tibialis anterior, extensor digitorium longus, fibularis gastrocnemius, soleus, muscular dystrophy,

**Assessment Evidence**

**Performance Tasks:**

Disarticulated Skeleton Activity

Investigation: Estimate Height from the Length of Bones

Bone identification Lab: Male or Female - Students are given bones from a crime scene of three different victims and using a caliper, meter stick and other observations determine the sex and race of the victims.

Skeletal System Case Studies- Students take the role of a medical intern at Waterbury Hospital in the emergency room. They preside over cases and evaluate the different x-rays to classify the break, order more testing and advise treatment.

Bone disorder project - Students research a bone disorder or disease and create a presentation. They then present what they have found to the class.

Muscle and Bone Gizmo

**Other Evidence:**

- Bone tissue guided learning
- Class notes
- Guided Reading
- Long Bone Guided Learning & Labeling
- Edpuzzle Bone Remodeling and Modeling and Ossification
- Skull Diagrams coloring & labeling
- Cranial Bone Quiz
- Caliper practice activity
- Edpuzzle: Living Body Bones and Joints
- Vertebrae, Ribs, Shoulder girdle, arm, hand, leg, foot & whole skeleton labeling
- Edpuzzle: Skeletal System Review
- Label Skeleton: Skeletal Anatomy Viewer Bone ID
- Review Kahoot
- Unit 5 Test: Summative- Students will provide a consistent, meaningful interpretation of the key issues/concepts through multiple choice, labeling diagrams, and “At the Clinic” questions. The “At the Clinic” questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario.

| Learning Plan |
| --- |
| ***HS-LS1-1.,LS1.A:*** *Structure and Function: The skeletal system provides structure and support for the body, protects vital organs, and works with the muscular system to facilitate movement.* ***Developing and Using Models:*** *Students can create models to represent the organization of the skeletal system and its integration with other body systems.* ***Crosscutting Concepts: Structure and Function:*** *Understanding how the shape and composition of bones relate to their specific functions, such as support, protection, and movement.*<br><br>● Disarticulated Skeleton Activity<br>● Bone tissue guided learning<br>● Long Bone Guided Learning & Labeling<br>● Investigation: Estimate Height from the Length of Bones<br>● Bone identification Lab: Male or Female<br><br>***Systems and System Models:*** *Explore how the skeletal system interacts with the muscular system to produce movement.*<br><br>● Muscle and Bone Gizmo<br><br>**TCC2(9-12)**: I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.<br><br>● Investigation: Estimate Height from the Length of Bones<br>● Bone identification Lab: Male or Female<br><br>***HS-LS1-2., LS1.B:*** *Growth and Development of Organisms. Bones grow and develop through processes such as endochondral ossification, where cartilage is gradually replaced by bone tissue. Bone remodeling is influenced by factors like nutrition, hormones, and physical activity.* ***Constructing Explanations and Designing Solutions:*** *Explain how bones grow, develop, and repair themselves.*<br><br>● Edpuzzle Bone Remodeling and Modeling and Ossification<br>● Long Bone Guided Learning & Labeling<br>● Bone identification Lab: Male or Female<br><br>**NGSS Alignment: Supports HS-LS1-6** by examining the impact of genetic and environmental factors on skeletal health. **Case Study Analysis of Bone Disorders: Objective:** Students analyze case studies of bone diseases (e.g., osteoporosis) to understand their causes, symptoms, and treatments. |

- Skeletal System Case Studies
- Bone Disorder Project

**Vol TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.
- Skeletal System Case Studies

**Vol TI.2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
- Bone Disorder Project

***HS-LS1-3.*** *Examine how genetic and environmental factors influence bone growth and development.*

- Bone Disorder Project

**Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access to text

# Unit 6- Muscular System

## Desired Results

**Established Goals:**

HS-LS1-1.,**LS1.A:** Structure and Function

- The muscular system is essential for movement, stability, and posture, working closely with the skeletal system to produce coordinated actions.
- Muscles are composed of specialized cells called muscle fibers, which contract to facilitate movement.

**LS1.C:** Organization for Matter and Energy Flow in Organisms

- The muscular system requires energy in the form of ATP for muscle contractions.
- Different types of muscle tissues (skeletal, cardiac, and smooth) perform various functions, from voluntary movement to involuntary actions like digestion and heartbeat.

Science and Engineering Practices:

**Planning and Carrying Out Investigations:**

- Conduct experiments to investigate muscle fatigue and the effects of exercise on muscle performance.
- **Example Activity:** Measure muscle strength and endurance before and after physical activity, analyzing data to understand the role of ATP and oxygen in muscle function.

Crosscutting Concepts: **Systems and System Models:**

- Explore the interaction between the muscular and other body systems, including the skeletal and nervous systems. Growth and Development of Organisms (HS-LS1-5) **Disciplinary Core Ideas:**

  **LS1.B:** Growth and Development of Organisms

  - Muscle growth occurs through hypertrophy and the repair of muscle fibers in response to exercise and physical stress.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**Understandings:** Students will understand that...

- Muscle fibers are organized to contract efficiently, allowing muscles to generate force and produce movement.
- Muscles attach to bones and pull on them to create movement, with joints acting as pivot points for coordinated motion.
- Muscle performance is influenced by exercise, nutrition, age, genetics, and overall health.
- The muscular system helps regulate body temperature, maintain posture, and support circulation—all vital to homeostasis.
- The nervous system sends signals to muscles, controlling voluntary and involuntary movements with precise timing and coordination.
- Muscular disorders can limit movement, reduce strength, and affect daily function, often requiring medical care or rehabilitation.

**Essential Questions:**

- How does the structure of muscles enable their function in the body?
- How do the muscular and skeletal systems work together to produce movement?
- What factors affect muscle strength, endurance, and flexibility?
- How does the muscular system contribute to homeostasis in the human body?
- How does the nervous system coordinate muscle contractions and movements?
- What are common muscular system disorders, and how do they impact human health?

**Students will know…**

- the functions of the muscular system.
- how the nervous system is involved in muscle contraction.
- the roles of actin, myosin, calcium ions and ATP in muscle contraction.
- what causes different degrees of contraction.
- Three types of muscle tissue (smooth, skeletal and cardiac) create the body movements and transport of materials in the body.
- muscle performance depends on adequate amounts of oxygen to the muscle tissue.
- muscular contraction is controlled by the nervous system through electrical and chemical signaling.

**Students will be able to...**

- compare and contrast the three types of muscle tissue in terms of structure, function, where found in the body and whether it is voluntarily or involuntarily controlled.
- classify muscles based on how they are named.
- explain how muscles get fatigued
- determine different effects on muscle contraction
- perform and explain the 13 body movements (flexion, extension, rotation, abduction, adduction, circumduction, dorsiflexion, plantar flexion, inversion, eversion, and opposition).
- identify and label major muscles of the body and their functions.
- perform a  Chicken Wing dissection

| | |
|---|---|
| • Actin, myosin, $Ca^{+2}$ and ATP have a role in the cellular and molecular basis of muscle contraction. | • answer “At the Clinic” questions at the end of the chapter. |

**Key Vocabulary:** skeletal, cardiac, smooth, endomysium, perimysium, fascicle, epimysium, sarcolemma, myofibrils, sarcomeres, myosin, actin, motor unit, neuromuscular junctions, synaptic cleft, neurotransmitter, acetylcholine, action potential, graded response, muscle twitches, tetanus, aerobic respiration, anaerobic glycolysis, lactic acid formation, muscle fatigue, oxygen debt, isotonic contractions, isometric contractions, flaccid, origin, insertion, body movements: flexion, extension, rotation, abduction, adduction, circumduction, dorsiflexion and plantar flexion, inversion, eversion, supination, pronation, opposition, prime mover, antagonist, synergist, fixators, frontalis, orbicularis oris, buccinators, zygomaticus, masseter, temporalis, platysma, sternocleidomastoid, pectoralis major, intercostal muscles, rectus, abdominus, external oblique, internal oblique, transversus abdominis, trapezius, latissimus dorsi, erector spinae, deltoid, biceps brachii, brachialis, triceps brachii, gluteus maximus, gluteus medius, iliopsoas, adductor muscles, hamstring group: biceps femoris, semimembranosus, semitendinosus, sartorius, rectus femoris, vastus muscles, tibialis anterior, extensor digitorium longus, fibularis gastrocnemius, soleus, muscular dystrophy

**Assessment Evidence**

| | |
|---|---|
| **Performance Tasks:**<br><br>*Lab: Grip Strength and Muscle Fatigue*<br><br>· *Lab: Chicken Wing Dissection*<br><br>Case of the Tired Swimmer | **Other Evidence:**<br>Edpuzzle: Crash Course Introduction to muscle system<br>Edpuzzle: Muscle System Vocab<br>Quiz muscle anatomy and contraction<br>Edpuzzle: Body Movement Terms<br>Muscle Naming and labeling: Head, Trunk, Arm, Leg, and whole body<br>Edpuzzle: Brain Pop: Duchenne muscular Dystrophy<br>Edpuzzle: What is Myasthenia Gravis**?**<br>Muscle Disease Documentary<br>Labeling Muscle structure google slides<br>Labeling Muscles Google slides<br>At the clinic chapter questions<br>Review Kahoot<br><br>Unit 6 Muscular System Test: Summative- Students will provide a consistent, meaningful interpretation of the key issues/concepts through multiple choice, labeling diagrams, and “At the Clinic” questions. The “At the Clinic” questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario. |

| Learning Plan |
|---|

***HS-LS1-1.,LS1.A:*** *Structure and Function. The muscular system is essential for movement, stability, and posture, working closely with the skeletal system to produce coordinated actions. Muscles are composed of specialized cells called muscle fibers, which contract to facilitate movement.*

- *Muscle and Bone Gizmo*
- Labeling Muscle structure google slides
- Labeling Muscles
- Ch. 6 Muscular System Class Notes
- Ch. 6 Muscular System Guided Reading
- *Lab: Chicken Wing Dissection*
- *Lab: Grip Strength and Muscle fatigue*
- Edpuzzle: Crash Course Introduction to muscle system
- Edpuzzle: Muscle System Vocab
- Quiz muscle anatomy and contraction
- Edpuzzle: Body Movement Terms
- Muscle Naming and labeling: Head, Trunk, Arm, Leg, and whole body

.

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

- *Lab: Chicken Wing Dissection*

***LS1.C:*** *Organization for Matter and Energy Flow in Organisms. The muscular system requires energy in the form of ATP for muscle contractions.*

*Science and Engineering Practices:* ***Planning and Carrying Out Investigations:*** *Conduct experiments to investigate muscle fatigue and the effects of exercise on muscle performance. Crosscutting Concepts:* ***Systems and System Models:*** *Explore the interaction between the muscular and other body systems, including the skeletal and nervous systems.*

- *Lab: Grip Strength and Muscle Fatigue*

*Growth and Development of Organisms (HS-LS1-5)* ***Disciplinary Core Ideas:***

- ***LS1.B:*** *Growth and Development of Organisms*
  - *Muscle growth occurs through hypertrophy and the repair of muscle fibers in response to exercise and physical stress.*

| |
|---|
| ○ Edpuzzle: Brain Pop: Duchenne muscular Dystrophy<br>○ Edpuzzle: What is Myasthenia Gravis**?**<br>○ Muscle Disease Documentary |
| **Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access |

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 7 - Nervous System

## Desired Results

**Established Goals:**

HS-**LS1: From Molecules to Organisms: Structures and Processes**

- **LS1.A: Structure and Function.** The Nervous System Structure: The nervous system is comprised of specialized cells called neurons that transmit signals. Brain Organization: The brain has distinct regions responsible for different functions, such as sensory processing, motor control, and cognitive abilities. Communication Pathways: The peripheral nervous system includes sensory and motor pathways that connect the CNS to the rest of the body.
- **LS1.D: Information Processing.** Sensory Reception: Different sensory receptors detect specific stimuli, sending signals to the brain for processing. Neural Processing: The brain processes sensory inputs and coordinates appropriate responses, often involving multiple brain regions. Response and Adaptation: Organisms respond to stimuli via nervous and muscular systems, adapting to environmental changes.

**Science and Engineering Practices (SEP) Asking Questions and Defining Problems.** Formulate questions regarding how neurons communicate or how the brain processes information.

**Developing and Using Models.** Create models of neurons to understand their structure and function. Model the reflex arc to demonstrate neural pathways.

**Analyzing and Interpreting Data.** Investigate how changes in sensory input affect response time or reflex actions. Analyze data from brain scans to understand functional areas of the brain.

**Constructing Explanations and Designing Solutions.** Explain the impact of neurological disorders on the nervous system. Design experiments to test hypotheses about sensory perception.

**Crosscutting Concepts (CCC). Cause and Effect.** Examine how specific stimuli cause nerve impulses and how these lead to responses.

**Systems and System Models.** Study the nervous system as an interconnected network involving various subsystems (CNS and PNS).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**Understandings:** Students will understand that...

- The nervous system includes the brain, spinal cord, and nerves, working together to control body functions, process information, and respond to stimuli.
- Neurons transmit electrical and chemical signals to communicate rapidly and accurately across the body.
- Different brain regions have specialized structures that support functions like thinking, movement, memory, and emotion.
- Reflexes are fast, automatic responses that help the body protect itself and maintain internal stability.
- The nervous system monitors internal and external conditions, sending signals to other systems to adjust and maintain balance.
- Nervous system disorders can disrupt communication in the body, leading to physical, mental, or sensory impairments.

**Essential Questions:**

- What is the overall structure and function of the nervous system?
- How do neurons communicate and transmit information throughout the body?
- How does the brain's structure relate to its functions?
- How do reflexes demonstrate the nervous system's role in maintaining homeostasis?
- How does the nervous system coordinate with other body systems to maintain balance and respond to changes?
- What are some common disorders of the nervous system, and how do they affect human health?

**Students will know…**

- that different cells are found in the nervous system. (neurons, astrocytes, microglial, oligodendrocytes, Schwann cells, ependymal cells and satellite cells)
- the structure and function of the nervous system.
- the five types of receptors and their functions.
- how the senses receive stimuli and process the information.
- how nerve impulses travel from one neuron to the next.
- the coverings of the brain and how each protects the brain.
- how the brain is protected.

**Students will be able to...**

- draw, label and describe the functions of parts of a neuron.
- compare and contrast the central nervous system and peripheral nervous systems in terms of organs and functions.
- draw and describe a reflex arc.
- label and describe the parts of the brain and their functions.
- compare and contrast the sympathetic nervous system and the parasympathetic nervous system in terms of situations when that system is used, neurotransmitters involved, target organs involved and the responses of those target organs in the body.

| | |
|---|---|
| • the functions of the twelve pairs of cranial nerves, spinal nerves and spinal nerve plexuses.<br>• the developmental aspects of the brain | • Conduct an experiment to gather information and data about use of the body senses to determine which sensory scenario creates the fastest reaction time.<br>• Research information about how specific drugs affect the brain and report it back to the class in a presentation using technology.<br>• Dissect a sheep brain and identify structures. |
| **Key Vocabulary:** Central nervous system, peripheral nervous system, stimuli, sensory input, integration, motor output, somatic nervous system, voluntary, involuntary, autonomic, neuroglia, astrocytes, microglia, ependymal, oligodendrocytes, Schwann cells, neuron, axon, dendrites, axonal terminals, neurotransmitters synaptic cleft, myelin sheath, Nodes of Ranvier, white matter, grey matter, cutaneous, proprioceptors, Meissner corpuscle, Pacinian corpuscles, efferent, afferent, association , polarized, action potential, nerve impulse, repolarization, reflex arc, somatic, cerebral hemisphere, lobes; parietal, occipital, temporal, and frontal, fissures, gyri, cerebral cortex, corpus callosum, diencephalon, thalamus, hypothalamus, limbic system, pituitary gland, mammillary bodies, epithalamus, pineal body, choroid plexus, brain stem, cerebral aqueduct, cerebral peduncles, corpora quadrigemina, pons, medulla oblongata, reticular formation, cerebellum, meninges, cerebrospinal fluid, blood-brain barrier, Alzheimer's disease, Huntington's disease, Parkinson's disease, concussion, contusion, cerebral edema, cerebral accident, spinal cord, white matter, grey matter, cranial nerves, spinal nerves, nerve plexuses, sympathetic division, parasympathetic division, cerebral palsy | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Lab: Reaction Time- Students design an experiment to evaluate their reaction time using different sensory receptors.<br><br>Lab: Brain Dissection<br><br>Activity: How do impulses travel? Students model an impulse traveling with myelinated and unmyelinated neurons.<br><br>Activity: Reflex hammers-What are reflex arcs? Students work with reflex hammers to observe knee reflexes<br><br>Activity: Investigating a Concussion<br><br>Drug Dosage GIZMO | **Other Evidence:**<br>Nervous system pre- test<br>Ch. 7 Nervous System Class Notes<br>Nervous System Guided Reading<br>Nerves and Neuroglia Google Slides Labeling<br>CNS Brain Anatomy Labeling<br>Brain Google Slides Labeling<br>Brain Function Chart<br>Quiz – Brain anatomy<br>At the clinic chapter questions<br>Brain coverings- label diagram<br>Quiz – Cranial Nerves & Spinal cord<br>"A Closer Look" worksheet<br>Perfect Storm Reading and Questions- Explains the effect of drowning on the nervous system |

| | |
|---|---|
| Effects of Drugs on the Brain Project or Nervous System Disorder project -Summative. Students research a particular drug or disorder on how it acts on the brain and what effects it has on their body. They then present what they have found to the class. | Review for Nervous System Test- Crossword puzzle<br>Review Kahoot<br>Nervous System Test- Summative- Students will provide a consistent, meaningful interpretation of the key issues/concepts through multiple choice, labeling diagrams, and “At the Clinic” questions. The “At the Clinic” questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario. |

**Learning Plan**

HS-LS1: From Molecules to Organisms: Structures and Processes

- ***LS1.A: Structure and Function.*** *The Nervous System Structure: The nervous system is comprised of specialized cells called neurons that transmit signals. Brain Organization: The brain has distinct regions responsible for different functions, such as sensory processing, motor control, and cognitive abilities. Communication Pathways: The peripheral nervous system includes sensory and motor pathways that connect the CNS to the rest of the body.*
    - Nervous system pre- test
    - Ch. 7 Nervous System Class Notes
    - Nervous System Guided Reading
    - Nerves and Neuroglia Google Slides Labeling
    - CNS Brain Anatomy Labeling
    - Brain Google Slides Labeling
    - Brain Function Chart
    - Lab: Brain Dissection
    - Activity: How do impulses travel? Students model an impulse traveling with myelinated and unmyelinated neurons.
    - Activity: Reflex hammers-What are reflex arcs? Students work with reflex hammers to observe knee reflexes
- ***LS1.D: Information Processing.*** *Sensory Reception: Different sensory receptors detect specific stimuli, sending signals to the brain for processing. Neural Processing: The brain processes sensory inputs and coordinates appropriate responses, often involving multiple brain regions. Response and Adaptation: Organisms respond to stimuli via nervous and muscular systems, adapting to environmental changes.*
    - Lab: Reaction Time- Students design an experiment to evaluate their reaction time using different sensory receptors.
    - Lab: Brain Dissection
    - Activity: How do impulses travel? Students model an impulse traveling with myelinated and unmyelinated neurons.
    - Activity: Reflex hammers-What are reflex arcs? Students work with reflex hammers to observe knee reflexes

**Science and Engineering Practices (SEP) Asking Questions and Defining Problems.** Formulate questions regarding how neurons communicate or how the brain processes information. **Developing and Using Models.** Create models of neurons to understand their structure and function. Model the reflex arc to demonstrate neural pathways. **Analyzing and Interpreting Data.** Investigate how changes in sensory input affect response time or reflex actions. Analyze data from brain scans to understand functional areas of the brain. **Constructing Explanations and Designing Solutions.** Explain the impact of neurological disorders on the nervous system. Design experiments to test hypotheses about sensory perception.

- Lab: Reaction Time- Students design an experiment to evaluate their reaction time using different sensory receptors.
- Activity: How do impulses travel? Students model an impulse traveling with myelinated and unmyelinated neurons.
- Activity: Reflex hammers-What are reflex arcs? Students work with reflex hammers to observe knee reflexes
- Activity: Investigating a Concussion
- Effects of Drugs on the Brain Project or Nervous System Disorder project
- Drug Dosage GIZMO

**Crosscutting Concepts (CCC). Cause and Effect.** Examine how specific stimuli cause nerve impulses and how these lead to responses. **Systems and System Models.** Study the nervous system as an interconnected network involving various subsystems (CNS and PNS).

- Lab: Reaction Time- Students design an experiment to evaluate their reaction time using different sensory receptors.

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

- Lab: Reaction Time- Students design an experiment to evaluate their reaction time using different sensory receptors.
- Effects of Drugs on the Brain Project or Nervous System Disorder project

**Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

## Unit 8- Special Senses

**Desired Results - Students will understand how we see, hear, taste, smell, and maintain balance.**

**Established Goals:**

**LS1: From Molecules to Organisms: Structures and Processes**

- ***LS1.A: Structure and Function. Sensory Organs****: Each sense has specialized organs that detect specific stimuli, such as the eyes for vision, ears for hearing, tongue for taste, nose for smell, and vestibular system for balance.* ***Receptor Cells****: Specialized receptor cells in these organs convert stimuli into electrical signals that the brain can interpret.* ***Pathways****: Neural pathways transmit sensory information from receptors to specific brain regions for processing.*
- ***LS1.D: Information Processing. Sensory Processing****: The brain integrates and interprets sensory information to produce perceptions, responses, and behaviors.* ***Signal Transduction****: Sensory receptors transduce physical or chemical stimuli into electrical signals.* ***Integration and Response****: The nervous system integrates information from multiple sensory modalities to produce coordinated responses.*

---

**Science and Engineering Practices (SEP)**

**Developing and Using Models.** Construct models of sensory organs to understand their anatomy and function. Use diagrams to trace the pathways of sensory information from receptors to the brain.

**Planning and Carrying Out Investigations.** Design experiments to test hypotheses about sensory perception and thresholds. Investigate factors that affect sensory perception, such as adaptation or interference.

**Analyzing and Interpreting Data.** Analyze data from sensory experiments to draw conclusions about sensory function and perception. Compare sensory responses under different conditions to understand variability**.**

**Constructing Explanations and Designing Solutions** Explain how specific sensory receptors and pathways contribute to perception and behavior. Design solutions to mitigate sensory impairments or enhance sensory experiences.

---

**Crosscutting Concepts (CCC). Structure and Function.** Explore how the anatomy of sensory organs is adapted to their specific functions. Investigate how the structure of receptor cells determines their sensitivity to stimuli. **Systems and System Models.** Study the sensory systems as

interconnected networks that contribute to overall perception. Analyze how sensory information is integrated across systems to produce coherent experiences.**Cause and Effect.** Examine how stimuli cause specific receptor activations and subsequent neural responses. Analyze how alterations in sensory input can affect perception and behavior.**Stability and Change.** Investigate how sensory systems maintain stability through adaptation and homeostasis. Explore changes in sensory perception due to aging, injury, or environmental factors.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

**Understandings:** Students will understand that...

- The special senses work together to collect and process sensory input, creating a complete picture of the environment.
- Each sense organ has specialized structures designed to detect specific stimuli and convert them into neural signals.
- The brain interprets and combines sensory signals to create meaningful perceptions and guide responses.
- Advances in research and technology improve diagnosis, treatment, and quality of life for individuals with sensory impairments.
- Both genetic traits and environmental factors shape how the special senses develop and function over time.

**Essential Questions:**

- How do the special senses interact with and influence each other to detect and process environmental stimuli?
- How do the anatomical structures of the special senses contribute to their function?
- How does the brain integrate information from the special senses to form perceptions?
- How do technological and scientific advancements enhance our understanding and treatment of sensory disorders?
- How do genetics and the environment influence the development and function of the special senses?

**Students will know…**

- describe the different types of receptors found in the sense organs.
- Identify and label the structures of the eye and the muscles surrounding the eye.
- the functions of each eye structure
- how the rods and cones located on the retina helps us see.
- accessory structures of the eye and how they affect the

**Students will be able to...**

- dissect a sheep eye and identify structures.
- use different types of eye tests and processes to assess vision: Snellen eye chart, astigmatism, accommodation, pupillary reflex, optical illusions, convergence, and photopupillary reflex
- design and conduct an experiment to determine if there is a relationship between taste and smell.
- conduct a series of experiments to assess how we hear.

| | |
|---|---|
| eye.<br>● the difference between emmetropia, myopia and hyperopia.<br>● the causes, effects, and treatments for glaucoma and cataracts.<br>● the structures and function of the ear and how it allows us to hear.<br>● how the equilibrium organs of the ear help maintain balance.<br>● how we taste food.<br>● how we smell.<br>● the relationship between taste and smell. | |

**Key Vocabulary:**

Sight, smell, taste, smell, eye, Meibomian glands, ciliary glands, conjunctiva, lacrimal apparatus, sclera, cornea, choroid, ciliary body, lens, iris, pupil, retina, optic nerve, fovea centralis, aqueous humor, vitreous humor, canal of Schlemm, photoreceptors, Ophthalmoscope exam, accommodation, astigmatism, blind spot, cataract, emmetropia, glaucoma, hyperopia, myopia, refraction, optic cortex, pupillary and convergence reflexes, optic chiasma, optic tracts, binocular vision, hemianopia, ear, mechanoreceptors, pinna, external auditory canal, ceruminous glands, tympanic membrane, oval window, ossicles, malleus, incus, stapes, bony labyrinth, cochlea, vestibule, semicircular canals, perilymph, endolymph, organ of corti, cochlear nerve, static equilibrium, otolithic membrane, vestibular nerve, dynamic equilibrium, crista ampullaris, cupula, conduction deafness, sensorineural deafness, olfactory receptors, chemoreceptors, papillae, gustatory cells, strabismus, presbyopia

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| ● Sheep Eye Dissection Lab: students dissect a sheep eye to view the structures of the eye.<br>● Eye tests Lab: Students examine different types of eye tests and processes: Snellen eye chart, astigmatism, accommodation pupillary reflex, optical illusions, convergence, and photopupillary reflex<br>● Lab: How do we hear? Students explore the properties of sound and how they are perceived by the ear using tuning forks or sound generators to explore pitch, volume, and frequency. | ● Ch. 8 Special Senses Class Notes<br>● Special Senses Guided Reading<br>● Eye Labeling Diagrams<br>● Quiz: Labeling structures of the eye<br>● Ear labeling Diagrams<br>● Quiz: Labeling structures of the ear<br>● At the clinic questions<br>● Review Kahoot<br>● Unit Test: Summative- Students will provide a consistent, |

| | |
|---|---|
| • Skittles Taste and Smell lab: Students design and experiment to analyze how taste and smell interact and explain the role of chemoreceptors in detecting chemical stimuli.<br>• Senses, Vision 2 and Vision 3 Gizmos | meaningful interpretation of the key issues/concepts through multiple choice, labeling diagrams, and “At the Clinic” questions. The “At the Clinic” questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario. |

**Learning Plan**

***LS1: From Molecules to Organisms: Structures and Processes***

- ***LS1.A: Structure and Function. Sensory Organs****: Each sense has specialized organs that detect specific stimuli, such as the eyes for vision, ears for hearing, tongue for taste, nose for smell, and vestibular system for balance.* ***Receptor Cells****: Specialized receptor cells in these organs convert stimuli into electrical signals that the brain can interpret.* ***Pathways****: Neural pathways transmit sensory information from receptors to specific brain regions for processing.*
  - Ch. 8 Special Senses Class Notes
  - Special Senses Guided Reading
  - Eye Labeling Diagrams
  - Ear labeling Diagrams
  - Senses, Vision 2 and Vision 3 Gizmos
- ***LS1.D: Information Processing. Sensory Processing****: The brain integrates and interprets sensory information to produce perceptions, responses, and behaviors.* ***Signal Transduction****: Sensory receptors transduce physical or chemical stimuli into electrical signals.* ***Integration and Response****: The nervous system integrates information from multiple sensory modalities to produce coordinated responses.*
  - Ch. 8 Special Senses Class Notes
  - Special Senses Guided Reading
  - Lab: How do we hear? Students explore the properties of sound and how they are perceived by the ear using tuning forks or sound generators to explore pitch, volume, and frequency.
  - Skittles Taste and Smell lab: Students design and experiment to analyze how taste and smell interact and explain the role of chemoreceptors in detecting chemical stimuli.

**Science and Engineering Practices (SEP)Developing and Using Models.** Construct models of sensory organs to understand their anatomy and function. Use diagrams to trace the pathways of sensory information from receptors to the brain. **Planning and Carrying Out Investigations.** Design experiments to test hypotheses about sensory perception and thresholds. Investigate factors that affect sensory perception, such as adaptation or interference. **Analyzing and Interpreting Data.** Analyze data from sensory experiments to draw conclusions about sensory function and perception. Compare sensory responses under different conditions to understand variability**. Constructing Explanations and Designing Solutions** Explain how specific sensory receptors and pathways contribute to perception and behavior. Design

solutions to mitigate sensory impairments or enhance sensory experiences.

- Lab: How do we hear? Students explore the properties of sound and how they are perceived by the ear useing tuning forks or sound generators to explore pitch, volume, and frequency.
- Skittles Taste and Smell lab: Students design and experiment to analyze how taste and smell interact and explain the role of chemoreceptors in detecting chemical stimuli.

**Crosscutting Concepts (CCC). Structure and Function.** Explore how the anatomy of sensory organs is adapted to their specific functions. Investigate how the structure of receptor cells determines their sensitivity to stimuli. **Systems and System Models.** Study the sensory systems as interconnected networks that contribute to overall perception. Analyze how sensory information is integrated across systems to produce coherent experiences.**Cause and Effect.** Examine how stimuli cause specific receptor activations and subsequent neural responses. Analyze how alterations in sensory input can affect perception and behavior.**Stability and Change.** Investigate how sensory systems maintain stability through adaptation and homeostasis. Explore changes in sensory perception due to aging, injury, or environmental factors.

- Sheep Eye Dissection Lab: students dissect a sheep eye to view the structures of the eye.
- Eye tests Lab: Students examine different types of eye tests and processes: Snellen eye chart, astigmatism, accommodation pupillary reflex, optical illusions, convergence, and photopupillary reflex
- Lab: How do we hear? Students explore the properties of sound and how they are perceived by the ear using tuning forks or sound generators to explore pitch, volume, and frequency.
- Skittles Taste and Smell lab: Students design and experiment to analyze how taste and smell interact and explain the role of chemoreceptors in detecting chemical stimuli.

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.
TCC2(9-12): I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.

- Lab: How do we hear? Students explore the properties of sound and how they are perceived by the ear using tuning forks or sound generators to explore pitch, volume, and frequency.
- Skittles Taste and Smell lab: Students design and experiment to analyze how taste and smell interact and explain the role of chemoreceptors in detecting chemical stimuli.

**Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

## Unit 9- Blood & Circulatory System

**Desired Results -Students will gain a comprehensive understanding of the blood and circulatory system and their critical roles in maintaining health and homeostasis.**

**Established Goals:**

LS1: From Molecules to Organisms: Structures and Processes

- LS1.A: Structure and Function. Heart Anatomy: The heart's chambers, valves, and blood vessels are structured to efficiently pump and direct blood flow. Blood Components: Blood is composed of red blood cells, white blood cells, platelets, and plasma, each with specific functions. Vascular Network: The circulatory system includes arteries, veins, and capillaries that transport blood throughout the body.
- LS1.B: Growth and Development of Organisms. Developmental Changes: The circulatory system develops through specific stages, influencing growth and health.
- LS1.D: Information Processing. Homeostasis and Regulation: The circulatory system plays a key role in maintaining homeostasis by regulating body temperature, pH levels, and fluid balance.

**Science and Engineering Practices (SEP) Developing and Using Models.**
Create models of the heart and blood vessels to illustrate blood flow and circulation.
Use diagrams to map out the systemic and pulmonary circuits of the circulatory system.

**Planning and Carrying Out Investigations.**
Design experiments to measure heart rate and blood pressure under different conditions.
Investigate factors that affect blood flow and circulation, such as exercise and stress.

**Analyzing and Interpreting Data.**
Analyze data from circulatory experiments to understand cardiac output and vascular resistance.
Compare circulatory responses to various stimuli and conditions.

**Constructing Explanations and Designing Solutions.**
Explain how the structure of the heart and blood vessels supports efficient blood circulation.
Design solutions to address circulatory disorders, such as atherosclerosis and hypertension.

**Crosscutting Concepts (CCC) Structure and Function.**
Explore how the anatomy of the circulatory system supports its function in nutrient and oxygen transport.
Investigate how the design of blood vessels influences blood flow and pressure.

Systems and System Models.
Study the circulatory system as an interconnected network that supports overall body function.
Analyze how the circulatory system interacts with other systems, such as the respiratory and immune systems.

Stability and Change.
Examine how the circulatory system maintains homeostasis and responds to changes in the environment.
Investigate the effects of lifestyle choices and diseases on circulatory health.

Energy and Matter.
Understand how the circulatory system transports energy-rich nutrients and removes waste products.
Explore the role of the circulatory system in energy distribution and metabolism.

***HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. Example:*** *Use models to demonstrate how blood components work together to maintain homeostasis.*

***HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. Example:*** *Investigate how the circulatory system responds to physical activity.*

***HS-LS1-5: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. Example:*** *Explore how blood cells are produced in the bone marrow and differentiate into various types.*

***HS-LS1-6: Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. Example:*** *Explain how blood transports nutrients and gasses at the molecular level.*

***HS-LS1-7: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken, and new compounds are formed that can transport energy to cells. Example:*** *Illustrate how oxygen is transported by hemoglobin and used in cellular respiration.*

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC1(9-12)**: I can ask purposeful, insightful questions to find a variety of innovative solutions.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| • Red cells, white cells, platelets, and plasma each play key roles in transporting substances, fighting infection, and maintaining balance.<br>• Blood typing is crucial for safe transfusions, as the immune system reacts to incompatible blood types as foreign threats.<br>• White blood cells detect, attack, and destroy harmful pathogens, forming a vital part of the body's immune defense.<br>• Malfunctioning blood cells can lead to conditions like anemia, clotting disorders, or immune deficiencies, affecting overall health.<br>• The heart's chambers, valves, and muscle layers are designed to keep blood flowing in the right direction with each beat.<br>• The circulatory system delivers oxygen and nutrients, removes waste, and helps regulate temperature and pH—key to system-wide balance.<br>• Innovations in medicine and technology improve the diagnosis, monitoring, and treatment of heart and blood vessel conditions. | • How do the main components of blood contribute to its overall function?<br>• Why is blood typing important, and how does it relate to the immune response?<br>• How do white blood cells protect the body from infection and disease?<br>• What happens when blood cells are not functioning correctly?<br>• How does the structure of the heart enable it to efficiently pump blood throughout the body?<br>• How does the circulatory system maintain homeostasis and support other body systems?<br>• How do scientific and technological advancements contribute to our understanding and treatment of circulatory disorders? |
| **Students will know…** | **Students will be able to...** |
| • the components of blood and describe the function of each.<br>• what is hematopoiesis.<br>• the basis for the ABO blood groups in humans and how to determine blood type.<br>• the basis of adverse reactions in blood transfusions and organ transplants.<br>• the location of the heart and identify its anatomical areas on a diagram.<br>• the pathway of blood through the heart and body.<br>• the pulmonary and systemic circuits<br>• the components of the intrinsic conduction system and explain how it coordinates the beating of the heart.<br>• what affects cardiac output and what situations may change it.<br>• the differences between arteries and veins in terms of structure, pressure and function. | • compare and contrast red blood cells and white blood cells in terms of where made and functions.<br>• diagram, explain and sequence the events of hemostasis<br>• determine blood types of offspring given parent blood types or a child and one parent using Punnett Squares.<br>• conduct blood typing procedures to determine the blood types of four unknown simulated blood samples.<br>• dissect a heart and identify its structures and functions.<br>• palpate an artery to find a pulse.<br>• use a sphygmomanometer to take someone's blood pressure.<br>• design, conduct and analyze an experiment to see how either pulse or blood pressure is affected under abnormal conditions |

| | |
|---|---|
| • the major arteries and veins on a diagram.<br>• what is “special” about the circulations of the digestive organs, the brain and the fetus.<br>• what blood pressure is and what factors may affect it.<br>• how gases and molecules are transferred between the bloodstream and cells or vice versa.<br>• problems with the cardiovascular system such as heart attacks, murmurs, arteriosclerosis, etc. in terms of cause, effect on heart, diagnosis, and treatment. | |

**Key Vocabulary:**

Formed elements, plasma, hematocrit, erythrocytes, hemoglobin, anemia, polycythemia, leukocytes, leukocytosis, leukopenia, platelets, hematopoiesis, hemocytoblast, erythropoietin, hemostasis, coagulation, thrombocytopenia, hemophilia, transfusion, agglutination, ABO blood group, Rh blood group, cross matching, heart, pericardium, visceral pericardium, epicardium, parietal pericardium, myocardium, endocardium, atria, ventricles, interventricular septum, superior and inferior vena cava, pulmonary trunk, pulmonary arteries and veins, pulmonary circulation, aorta, systemic circulation, atrioventricular valves, bicuspid, tricuspid, chordae tendineae, semilunar valves coronary blood vessels, angina pectoris, myocardial infarction, intrinsic conduction system, sinoatrial node, atrioventricular node, bundle of His, Purkinje fibers, pacemaker, fibrillation, systole and diastole contraction, cardiac cycle. Cardiac output, stroke volume, arteries, arterioles, venules, veins, capillaries, tunica interna, tunica media, tunica externa, varicose veins, thrombophlebitis, pulmonary embolism, special circulations: brain and circle of Willis, hepatic portal, and fetal circulation, vital signs, pulse ,blood pressure, systolic and diastolic pressure, peripheral resistance, hypotension, circulatory shock, atherosclerosis, angioplasty, hypertension, coronary heart disease

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| • Lab: Blood typing: Students determine the blood types of four unknown simulated blood samples and answer questions concerning the procedure.<br>• Activity: Hemostasis mini project drawings: Students illustrate the process of hemostasis and also problems with hemostasis: thrombus, embolus, thrombocytopenia and hemophilia<br>• Lab: Heart dissection – students dissect a sheep’s heart and answer questions about the dissection. | • Blood APK Google from<br>• Unit class notes<br>• Unit Guided Reading<br>• Blood Cells Google slides<br>• Blood Typing genetic problems<br>• Blood Detective DVD- Rare blood disorders are diagnoses for Patients.<br>• Whose Baby is it? Carolina Biological Activity |

| | |
|---|---|
| • Lab: Effects of activity on heart rate or blood pressure – students design and conduct their own experiment to see how pulse rate or blood pressure is affected under abnormal conditions. | • Edpuzzle: The Beast Within-Physiology of a Heart Attack<br>• Cardiovascular System google slides<br><br>• Quiz: heart anatomy – given a diagram and a word bank, students label the diagram.<br>• At the clinic questions<br>• Review Kahoot<br>• Review Bingo<br>• Unit Test Blood & Circulatory Test-: Summative- Students will provide a consistent, meaningful interpretation of the key issues/concepts through multiple choice, and "At the Clinic" questions. The "At the Clinic" questions are either short answers or essays where the student is given a medical scenario where they answer questions pertaining to the scenario. |

**Learning Plan**

***LS1: From Molecules to Organisms: Structures and Processes***

- ***LS1.A: Structure and Function. Heart Anatomy: The heart's chambers, valves, and blood vessels are structured to efficiently pump and direct blood flow. Blood Components: Blood is composed of red blood cells, white blood cells, platelets, and plasma, each with specific functions. Vascular Network: The circulatory system includes arteries, veins, and capillaries that transport blood throughout the body.***
  - Blood APK Google from
  - Unit class notes
  - Unit Guided Reading
  - Blood Cells Google slides
  - Blood Typing genetic problems
  - Activity: Hemostasis mini project drawings: Students illustrate the process of hemostasis and also problems with hemostasis: thrombus, embolus, thrombocytopenia and hemophilia
  - Lab: Heart dissection – students dissect a sheep's heart and answer questions about the dissection.
- ***LS1.B: Growth and Development of Organisms. Developmental Changes: The circulatory system develops through specific stages, influencing growth and health.***
  - Unit class notes
  - Unit Guided Reading

***LS1.D: Information Processing. Homeostasis and Regulation: The circulatory system plays a key role in maintaining homeostasis by regulating body temperature, pH levels, and fluid balance.***

- Unit class notes
- Unit Guided Reading
- Lab: Blood typing: Students determine the blood types of four unknown simulated blood samples and answer questions concerning the procedure.

**Science and Engineering Practices (SEP) Developing and Using Models.** Create models of the heart and blood vessels to illustrate blood flow and circulation. Use diagrams to map out the systemic and pulmonary circuits of the circulatory system. **Planning and Carrying Out Investigations.** Design experiments to measure heart rate and blood pressure under different conditions. Investigate factors that affect blood flow and circulation, such as exercise and stress. **Analyzing and Interpreting Data.** Analyze data from circulatory experiments to understand cardiac output and vascular resistance. Compare circulatory responses to various stimuli and conditions. **Constructing Explanations and Designing Solutions.** Explain how the structure of the heart and blood vessels supports efficient blood circulation. Design solutions to address circulatory disorders, such as atherosclerosis and hypertension.

- Unit class notes
- Unit Guided Reading
- Blood Cells Google slides
- Cardiovascular System google slides
- Lab: Heart dissection – students dissect a sheep's heart and answer questions about the dissection.
- Activity: Hemostasis mini project drawings: Students illustrate the process of hemostasis and also problems with hemostasis: thrombus, embolus, thrombocytopenia and hemophilia

**Crosscutting Concepts (CCC) Structure and Function.** Explore how the anatomy of the circulatory system supports its function in nutrient and oxygen transport. Investigate how the design of blood vessels influences blood flow and pressure. **Systems and System Models.** Study the circulatory system as an interconnected network that supports overall body function. Analyze how the circulatory system interacts with other systems, such as the respiratory and immune systems. **Stability and Change.** Examine how the circulatory system maintains homeostasis and responds to changes in the environment. Investigate the effects of lifestyle choices and diseases on circulatory health. **Energy and Matter.** Understand how the circulatory system transports energy-rich nutrients and removes waste products. Explore the role of the circulatory system in energy distribution and metabolism.

- Blood Typing genetic problems
- Blood Detective DVD- Rare blood disorders are diagnoses for Patients.
- Whose Baby is it? Carolina Biological Activity
- Edpuzzle: The Beast Within-Physiology of a Heart Attack
- Lab: Heart dissection – students dissect a sheep's heart and answer questions about the dissection.

***HS-LS1-2: Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. Example:*** *Use models to demonstrate how blood components work together to maintain homeostasis.*

- Lab: Effects of activity on heart rate or blood pressure – students design and conduct their own experiment to see how pulse rate or blood pressure is affected under abnormal conditions.
- Activity: Hemostasis mini project drawings: Students illustrate the process of hemostasis and also problems with hemostasis: thrombus, embolus, thrombocytopenia and hemophilia

***HS-LS1-3: Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. Example:*** *Investigate how the circulatory system responds to physical activity.*

- Lab: Effects of activity on heart rate or blood pressure – students design and conduct their own experiment to see how pulse rate or blood pressure is affected under abnormal conditions.

***HS-LS1-5: Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. Example:*** *Explore how blood cells are produced in the bone marrow and differentiate into various types.*

- Lab: Blood typing: Students determine the blood types of four unknown simulated blood samples and answer questions concerning the procedure.
- Activity: Hemostasis mini project drawings: Students illustrate the process of hemostasis and also problems with hemostasis: thrombus, embolus, thrombocytopenia and hemophilia
- Blood Detective DVD- Rare blood disorders are diagnoses for Patients.

***HS-LS1-6: Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. Example:*** *Explain how blood transports nutrients and gasses at the molecular level.*

- Blood Typing genetic problems
- Blood Detective DVD- Rare blood disorders are diagnoses for Patients.
- Whose Baby is it? Carolina Biological Activity
- Edpuzzle: The Beast Within-Physiology of a Heart Attack

***HS-LS1-7: Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken, and new compounds are formed that can transport energy to cells. Example:*** *Illustrate how oxygen is transported by hemoglobin and used in cellular respiration.* ***Systems and System Models.****Understand the circulatory system as an interconnected system.*

***Structure and Function.*** *Relate the structure of blood cells and vessels to their functions.* ***Cause and Effect.*** *Explore how diseases or conditions (e.g., anemia, clotting disorders) affect blood function.****Stability and Change.****Investigate how homeostasis is maintained in response to internal and external changes.*

- Edpuzzle: The Beast Within-Physiology of a Heart Attack
- Blood Detective DVD- Rare blood disorders are diagnoses for Patients.
- Lab: Effects of activity on heart rate or blood pressure – students design and conduct their own experiment to see how pulse rate or blood pressure is affected under abnormal conditions.

**TCC1(9-12)**: I can ask purposeful, insightful questions to find a variety of innovative solutions.

- Lab: Effects of activity on heart rate or blood pressure – students design and conduct their own experiment to see how pulse rate or blood pressure is affected under abnormal conditions.

**Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

## Unit 10- Lymphatic / Immune System

**Desired Results - Students will understand that the lymphatic system is an essential part of the human anatomy, playing a crucial role in maintaining fluid balance, supporting the immune system, and facilitating the transport of nutrients and waste products.**

**Established Goals:**

**LS1: From Molecules to Organisms: Structures and Processes**

- ***LS1.A: Structure and Function. Anatomy of the Lymphatic System****: The lymphatic system includes lymph nodes, lymph vessels, lymphatic organs (such as the spleen and thymus), and lymph fluid, each with specific roles in maintaining health.* ***Fluid Balance****: The lymphatic system helps regulate interstitial fluid levels, preventing tissue swelling and maintaining fluid homeostasis.*
- ***LS1.B: Growth and Development of Organisms. Immune Function****: The lymphatic system is a key component of the immune system, facilitating the transport of immune cells and the detection of pathogens.*
- ***LS1.D: Information Processing. Immune Response****: The lymphatic system plays a role in recognizing and responding to foreign invaders, such as bacteria and viruses, through the activation of lymphocytes and the production of antibodies.*

**Science and Engineering Practices (SEP)**.
Investigate how the lymphatic system responds to infections and injuries.

**Analyzing and Interpreting Data.**
Compare lymphatic responses to various pathogens and environmental factors.

**Constructing Explanations and Designing Solutions.**
Explain how the structure of the lymphatic system supports its roles in fluid balance, immune response, and nutrient transport.

**Crosscutting Concepts (CCC). Systems and System Models.**
Study the lymphatic system as an interconnected network that supports overall body function and immune health.
Analyze how the lymphatic system interacts with other systems, such as the circulatory and immune systems.

**Stability and Change.**
Examine how the lymphatic system maintains homeostasis and responds to changes in the environment, such as infections and injuries.
Investigate the effects of lifestyle choices, such as diet and exercise, on lymphatic health and immune function.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

**Understandings:** Students will understand that...

- The lymphatic system helps maintain fluid balance, supports immune defense, and removes waste from tissues.
- Lymph vessels, nodes, and organs are structured to collect, filter, and return fluid to the bloodstream while detecting pathogens.
- The lymphatic system works with blood vessels and immune cells to detect and fight infections, preventing disease and promoting health.

**Essential Questions:**

- Why is the lymphatic system essential for maintaining homeostasis?
- How does the structure of the lymphatic system facilitate its functions?
- How does the lymphatic system interact with the circulatory and immune systems to protect the body from disease?

**Students will know…**

- the function of the the major lymphatic vessels (Lymph nodes, Peyer's patches, spleen, tonsils, thymus, mucosa-associated lymphatic tissue)
- the nonspecific and specific defenses and give and example of each.
- the inflammatory process.
- What are antigens and antibodies and explain how an antigen/antibody reaction occurs.
- the importance of phagocytes and natural killer cells
- the differences between B lymphocytes and T lymphocytes.
- the difference between active and passive immunity.
- what an autoimmune disease is, give an example and discuss how it affects the body.

**Students will be able to...**

- discuss HIV in terms of how it is transmitted, how it gets through our defense system, effects on the body, and treatments.
- answer at the clinic questions

**Key Vocabulary:** lymph, lymph nodes, spleen, thymus, tonsils, Peyer's patches, nonspecific defense system, specific defense system, nonspecific response, immunity, pathogens, phagocytes, natural killer cells, inflammatory response, chemotaxis, pus, antimicrobial, complement, interferon, fever, pyrogens, antigen, antibody, humoral immunity. lymphocytes, memory cells, secondary response, active immunity, passive immunity, vaccines, monoclonal antibodies, allergies, anaphylactic shock, immunodeficiency, autoimmune deficiencies,

## Assessment Evidence

**Performance Tasks:**

- Lymphatic Disorder Research Project: Students will investigate common lymphatic system disorders and present their findings, emphasizing the role of the lymphatic system in maintaining health. Summative

**Other Evidence:**

- Lymphatic Unit Class Notes
- Lymphatic Unit Guided Reading
- Autoimmune Diseases worksheet
- At the clinic questions
- Review Kahoot
- Quiz: Lymphatic and Immune systems

## Learning Plan

**LS1: From Molecules to Organisms: Structures and Processes**

- ***LS1.A: Structure and Function. Anatomy of the Lymphatic System****: The lymphatic system includes lymph nodes, lymph vessels, lymphatic organs (such as the spleen and thymus), and lymph fluid, each with specific roles in maintaining health.* ***Fluid Balance****: The lymphatic system helps regulate interstitial fluid levels, preventing tissue swelling and maintaining fluid homeostasis.*
  - Lymphatic Unit Class Notes
  - Lymphatic Unit Guided Reading
  - Autoimmune Diseases worksheet
- ***LS1.B: Growth and Development of Organisms. Immune Function****: The lymphatic system is a key component of the immune system, facilitating the transport of immune cells and the detection of pathogens.*
  - Lymphatic Unit Class Notes
  - Lymphatic Unit Guided Reading
  - Autoimmune Diseases worksheet
  - *Lymphatic Disorder Research Project*
- ***LS1.D: Information Processing. Immune Response****: The lymphatic system plays a role in recognizing and responding to foreign invaders, such as bacteria and viruses, through the activation of lymphocytes and the production of antibodies.*
  - Lymphatic Unit Class Notes
  - Lymphatic Unit Guided Reading

- Autoimmune Diseases worksheet
- *Lymphatic Disorder Research Project*

**Science and Engineering Practices (SEP)**. Investigate how the lymphatic system responds to infections and injuries. **Analyzing and Interpreting Data.** Compare lymphatic responses to various pathogens and environmental factors.**Constructing Explanations and Designing Solutions.** Explain how the structure of the lymphatic system supports its roles in fluid balance, immune response, and nutrient transport.

- Lymphatic Unit Class Notes
- Lymphatic Unit Guided Reading
- Autoimmune Diseases worksheet
- *Lymphatic Disorder Research Project*

**Crosscutting Concepts (CCC). Systems and System Models.** Study the lymphatic system as an interconnected network that supports overall body function and immune health. Analyze how the lymphatic system interacts with other systems, such as the circulatory and immune systems.**Stability and Change.** Examine how the lymphatic system maintains homeostasis and responds to changes in the environment, such as infections and injuries. Investigate the effects of lifestyle choices, such as diet and exercise, on lymphatic health and immune function.

- Lymphatic Unit Class Notes
- Lymphatic Unit Guided Reading
- Autoimmune Diseases worksheet
- *Lymphatic Disorder Research Project*

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

- *Lymphatic Disorder Research Project*

**Teacher Resources:** *Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access*

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 11- Respiratory System

**Desired Results - Students will understand how oxygen gets from the atmosphere into our bodies, how much air we have in our lungs, and how breathing can be impaired.**

**Established Goals:**

**LS1: From Molecules to Organisms: Structures and Processes**

- **LS1.A: Structure and Function. Anatomy of the Respiratory System**: The respiratory system comprises structures such as the nose, trachea, bronchi, lungs, and diaphragm, each with specific roles in facilitating gas exchange. **Gas Exchange**: The respiratory system enables the exchange of oxygen and carbon dioxide between the atmosphere and the bloodstream, essential for cellular respiration.
- **LS1.C: Organization for Matter and Energy Flow in Organisms. Oxygen Delivery**: Oxygen is transported from the lungs to body tissues, where it is used for cellular respiration to produce energy. **Carbon Dioxide Removal**: Carbon dioxide, a waste product of cellular respiration, is transported from tissues to the lungs for exhalation.

**Science and Engineering Practices (SEP)**

- **Developing and Using Models.** Create models of the respiratory system to illustrate airflow, gas exchange, and the mechanics of breathing. Use diagrams and animations to visualize the alveoli's structure and function in gas exchange.
- **Planning and Carrying Out Investigations.** Design experiments to study the effects of exercise, altitude, and pollutants on respiratory function. Investigate the impact of respiratory disorders on lung capacity and breathing efficiency.
- **Analyzing and Interpreting Data.** Analyze data from respiratory experiments to understand the relationships between lung function, oxygen delivery, and energy production. Compare respiratory responses to various environmental conditions and physical activities.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC1(9-12)**: I can ask purposeful, insightful questions to find a variety of innovative solutions

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| • The respiratory system’s branching airways and thin alveoli maximize surface area for gas exchange, supplying oxygen for energy production. | • How does the structure of the respiratory system enable it to facilitate efficient gas exchange and energy production?<br>• How do the respiratory, circulatory, and nervous systems work |

| | |
|---|---|
| • These systems coordinate to deliver oxygen, remove carbon dioxide, and adjust breathing based on the body's needs.<br>• Respiratory disorders can impair breathing and oxygen delivery, but many can be managed or prevented through lifestyle choices and medical care. | together to maintain health and homeostasis?<br>• What are common disorders of the respiratory system, and how can they be prevented or treated? |
| **Students will know…**<br><br>• the name and structure of the organs of the respiratory system (nasal cavity, pharynx, larynx, trachea, bronchi, alveoli, lungs).<br>• how to label a diagram of the respiratory organs.<br>• the protective mechanisms of the respiratory system.<br>• how gas exchange happens between the alveoli and the bloodstream.<br>• how breathing is controlled by the nervous system.<br>• factors that affect breathing.<br>• the difference between tidal volume, vital capacity, inspiratory reserve volume, expiratory reserve volume and residual volume. | **Students will be able to...**<br><br>• examine the differences in vital capacities of students in the class.<br>• answer at the clinic questions |
| **Key Vocabulary:** Cellular respiration, external respiration, internal respiration, pulmonary ventilation, expiration, inspiration, tidal volume, vital capacity, expiratory volume, inspiratory reserve volume ,residual volume, expiration, lungs, nasal cavity, pharynx, larynx, epiglottis, trachea, Heimlich maneuver, visceral pleura, bronchioles, alveoli, diaphragm, external internalcostals, asthma, chronic bronchitis, pneumonia, hypoxia, hyperventilation apnea, cyanosis, lung cancer, dyspnea, emphysema, cystic fibrosis | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br><br>• Lab: Vital Capacity –Summative- students determine if there is a correlation between gender, body size, disease or habits on the vital capacity of students in the class. | **Other Evidence:**<br>• Respiratory Class Notes<br>• Respiratory Guided Reading<br>• Respiratory Labeling Diagram<br>• At the clinic questions<br>• Review Kahoot<br>• Quiz: Respiratory system |

| Learning Plan |
| --- |
| **LS1: From Molecules to Organisms: Structures and Processes**<br><br>● **LS1.A: Structure and Function. Anatomy of the Respiratory System**: The respiratory system comprises structures such as the nose, trachea, bronchi, lungs, and diaphragm, each with specific roles in facilitating gas exchange. **Gas Exchange**: The respiratory system enables the exchange of oxygen and carbon dioxide between the atmosphere and the bloodstream, essential for cellular respiration.<br>○ Respiratory Class Notes<br>○ Respiratory Guided Reading<br>○ Respiratory Labeling Diagram<br>● **LS1.C: Organization for Matter and Energy Flow in Organisms. Oxygen Delivery**: Oxygen is transported from the lungs to body tissues, where it is used for cellular respiration to produce energy. **Carbon Dioxide Removal**: Carbon dioxide, a waste product of cellular respiration, is transported from tissues to the lungs for exhalation.<br>○ Respiratory Class Notes<br>○ Respiratory Guided Reading<br>○ Respiratory Labeling Diagram<br><br>**Science and Engineering Practices (SEP). Developing and Using Models.** Create models of the respiratory system to illustrate airflow, gas exchange, and the mechanics of breathing. Use diagrams and animations to visualize the alveoli's structure and function in gas exchange. **Planning and Carrying Out Investigations.** Design experiments to study the effects of exercise, altitude, and pollutants on respiratory function. Investigate the impact of respiratory disorders on lung capacity and breathing efficiency. **Analyzing and Interpreting Data.** Analyze data from respiratory experiments to understand the relationships between lung function, oxygen delivery, and energy production. Compare respiratory responses to various environmental conditions and physical activities.<br>● Lab: Vital Capacity<br><br>**TCC1(9-12)**: I can ask purposeful, insightful questions to find a variety of innovative solutions<br>● Lab: Vital Capacity |
| **Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access |

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 12 - Digestive System

## Desired Results

**Established Goals:**

**LS1: From Molecules to Organisms: Structures and Processes**

- **LS1.A: Structure and Function**
  - **Digestive System Anatomy**: The digestive system consists of organs such as the mouth, esophagus, stomach, intestines, liver, and pancreas, each playing specific roles in digestion and absorption.
  - **Enzymatic Function**: Digestive enzymes break down food into smaller molecules for absorption, highlighting the system's biochemical complexity.
- **LS1.C: Organization for Matter and Energy Flow in Organisms**
  - **Nutrient Absorption**: The digestive system facilitates the absorption of nutrients, water, and minerals, essential for cellular functions and energy production.
  - **Energy Transfer**: Digestion and metabolism convert food into usable energy, linking the digestive system to cellular respiration.

**Science and Engineering Practices (SEP) Developing and Using Models.**

- Create models of the digestive system to illustrate the flow of food, mechanical and chemical digestion, and nutrient absorption.
- Use diagrams and animations to visualize enzyme action and nutrient transport.
- Planning and Carrying Out Investigations.
- Design experiments to study the effects of different diets, enzymes, and pH levels on digestion. Investigate the impact of digestive disorders on nutrient absorption and health.

**Crosscutting Concepts (CCC) Structure and Function**

- Explore how the anatomy of the digestive system supports its functions in food breakdown, nutrient absorption, and waste elimination. Investigate how specialized structures, such as villi and microvilli, enhance nutrient uptake.

**Systems and System Models**

- Study the digestive system as an interconnected network that supports overall health and energy balance.
- Analyze how the digestive system interacts with other systems, such as the circulatory and endocrine systems.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC4(9-12)**: I can integrate my learning to adapt to experiences in the classroom, career and life.

**Understandings:** Students will understand that...

- The digestive system's specialized organs and enzymes work together to break down food and absorb nutrients through a highly folded, efficient surface.
- The digestive, circulatory, and endocrine systems coordinate to regulate digestion, absorb nutrients, and distribute them to cells for energy, growth, and repair.
- Digestive disorders can affect nutrient absorption and comfort, but many can be managed through diet, lifestyle, or medical treatment.
- Advances in diagnostics, imaging, and treatment options have improved our ability to detect, manage, and understand digestive health.

**Essential Questions:**

- How does the structure of the digestive system enable it to efficiently break down food and absorb nutrients?
- How do the digestive, circulatory, and endocrine systems work together to maintain health and homeostasis?
- What are common disorders of the digestive system, and how can they be prevented or treated?
- How do scientific and technological advancements contribute to our understanding and treatment of digestive disorders?

**Students will know…**

- the functions of the organs of the alimentary canal of the digestive system (oral cavity, pharynx, esophagus, stomach, small intestine, large intestine, rectum, anus).
- the functions of the accessory organs of the digestive system (liver, gall bladder and pancreas).
- where proteins, carbohydrates, lipids and nucleic acids are broken down in the digestive system, name what enzymes are involved with breaking down each macromolecule and where those enzymes come from.
- the endocrine function of the pancreas in maintaining homeostasis in terms of glucose levels in the blood.

**Students will be able to...**

- take a given meal and explain how it is digested in terms of the sequence of digestive organs the meal is passing through, where each component of the meal is getting digested, by what enzyme(s), where those enzymes are coming from and what the food is being broken down into.
- answer at the clinic questions
- dissect a Rat

**Key Vocabulary:** Alimentary canal, saliva, mechanical digestion, chemical digestion, peristalsis, mouth, pharynx, esophagus, stomach, gastric juices, small intestine: duodenum, junum, and ileum, pancreas, gallbladder, bile, large intestine, liver, enzymes, amylase, trypsin, chymotrypsin, carboxypeptidase, lipases, absorption, defecation, colon, anus, ulcer

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>● Celiac Disease Case Study<br><br>● Rat Dissection- Summative- Students dissect a Rat looking at all of the organs in the body systems studied this year and complete a comprehensive final lab report. | **Other Evidence:**<br>● Unit Digestive System Class Notes<br>● Digestive System Guided Reading<br>● Digestion Chart<br>● Digestive System Google Slides<br>● Review Kahoot<br>● Digestive System Quiz |

**Learning Plan**

**LS1: From Molecules to Organisms: Structures and Processes**

**LS1.A: Structure and Function. Digestive System Anatomy**: The digestive system consists of organs such as the mouth, esophagus, stomach, intestines, liver, and pancreas, each playing specific roles in digestion and absorption. **Enzymatic Function**: Digestive enzymes break down food into smaller molecules for absorption, highlighting the system's biochemical complexity.

- Unit Digestive System Class Notes
- Digestive System Guided Reading
- Digestion Chart
- Digestive System Google Slides

**LS1.C: Organization for Matter and Energy Flow in Organisms. Nutrient Absorption**: The digestive system facilitates the absorption of nutrients, water, and minerals, essential for cellular functions and energy production. **Energy Transfer**: Digestion and metabolism convert food into usable energy, linking the digestive system to cellular respiration.

- Unit Digestive System Class Notes
- Digestive System Guided Reading
- Digestion Chart
- Digestive System Google Slides

**Science and Engineering Practices (SEP)**

- Digestion Chart

- Digestive System Google Slides
- Celiac Disease Case Study

**Crosscutting Concepts (CCC)**
- Digestion Chart
- Digestive System Google Slides
- Celiac Disease Case Study
- *Rat Dissection*

**TCC4(9-12)**: I can integrate my learning to adapt to experiences in the classroom, career and life.
- *Rat Dissection*

**Teacher Resources:** Marieb, Elaine N., R.N., PhD. Essentials of Human Anatomy and Physiology. 7th ed. San Francisco: Benjamin Cummings, 2003. Print.; Marieb, Elaine N., R.N., PhD. Anatomy and Physiology Coloring Workbook. 6th ed. San Francisco: Addison Wesley Longman, Inc., 2000. Print. ISBN# 0-8053-4913-8; Teacher resources for textbook; Teacher made PowerPoints; Online Access

# World Language Year 1  CURRICULUM



**Grade Level(s): 9-12**

**Curriculum Author(s):** J. Caruso, K. Peterson, K. Sandor, D.Manogue, T. Fernandez, M. Greaves

**Course Description:** Students will develop their target language knowledge by acquiring interpretive, presentational, and interpersonal skills. This level is often referred to as “the survival level” as students can communicate and exchange information about predictable topics such as personal information, basic objects, activities, preferences, and immediate needs using phrases, simple sentences, and some memorized language. They can usually handle short social interactions in everyday situations by asking and answering simple questions.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner Attribute and Indicator** |
| *Getting to Know Me* | How do personal interests shape who we are? | Personal interests and activities reflect cultural values and individual personality. | TCC4(9-12); CCE4(9-12) |
| *My Student Life* | How does language help me navigate school-related interactions? | Language helps us function within a school setting by allowing us to ask for help, follow schedules, and build friendships. | TCC4(9-12), CCE4(9-12) |
| *Meet My Family* | How do family roles and structures differ across cultures? | Family structures and dynamics vary, but the concept of family is universal. | TCC4(9-12), CCE4(9-12) |
| *Tis the Season* | What can I learn about a culture through its seasonal celebrations and practices? | Celebrations and customs tied to seasons reflect a culture's relationship with nature and time. | TCC4(9-12), CCE4(9-12) |
| *Food for Thought* | What do people eat and why? | Meals are more than just nourishment—they are social and cultural expressions. | TCC4(9-12), CCE4(9-12) |
| *Practices, Products, and Perspectives of the Target Culture*<br>*(Included in each unit)* | How do I show basic cultural awareness when communicating in the target language? | Cultural practices, perspectives and products influence target languages. | TCC4(9-12), CCE4(9-12) |

(adapted from Wiggins, G. & McTighe, J. (2005). Understanding by Design (2nd Edition). ASCD.)

# Unit 1 - Getting to Know Me

## Desired Results - Goals, Transfer, Meaning, Acquisition

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

**Communication**

- **Interpretive (CT Communication 1.2):** Within the topics of self, family, school, activities, and food, students can identify the topic and some isolated facts from simple sentences in informational texts and short fictional texts (French, Spanish). Understands familiar questions and statements from simple sentences in conversations (ASL, French, Spanish).

- **Interpersonal (CT Communication 1.1)**: Request and provide information by asking and answering practiced and some original questions on familiar and everyday topics using simple sentences. Interact with others to meet basic needs related to daily life and activities. Express and give preferences and opinions using simple sentences and questions.

- **Presentational (CT Communication 1.3)**: Presents personal information, expresses preferences about their life, everyday topics, and activities, using simple sentences most of the time.

**Cultures (CT Cultures**

- **Relating Cultural Practices to Perspective (CT Cultures 2.1)**: Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.

- **Relating Cultural Products to Perspective (CT Cultures 2.2)**: Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

**Connections**

- **Making Connections (CT Connections 3.1)**: Learners build, reinforce, and expand their knowledge of geography and sociology while using the language to solve problems creatively.

- **Acquiring Information and Diverse Perspectives (CT Connections 3.1)**: Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Comparisons**

- **Language (CT Comparisons 4.1)**: Learners use the language to investigate, explain, and reflect on the nature of language through

comparisons of the language studied and their own.

- **Cultural (CT Comparisons 4.2)**: Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

**Communities**

**School and Global Communities (CT Communities 5.1)**: Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

**Lifelong Learning (CT Communities 5.2):** Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

**Vision of A Learner Attributes:** Students will be able to use their learning independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

| **Understandings:** The students will understand that... | **Essential Questions:** |
|---|---|
| • Language allows us to build relationships and express identity.<br>• Personal interests and activities reflect cultural values and individual personality.<br>• Preferences are communicated differently across cultures, but all people enjoy expressing what they like and dislike.<br>• Effective communication involves both linguistic knowledge and cultural understanding of emotions and reactions. | • How do I introduce myself and connect with others in a new language?<br>• How do personal interests shape who we are?<br>• How do people express likes and dislikes in different cultures?<br>• How can I understand and express emotions and preferences in a culturally appropriate way? |
| **Students will know...**<br><br>• Vocabulary and grammar concepts that enable them to describe themselves and greet people.<br>• Greetings and Goodbyes<br>• Descriptive adjectives for people<br>• Verbs to describe basic actions | **Students will be able to...**<br><br>Students will be able to communicate and interpret:<br><br>• Greetings and Goodbyes<br>• Descriptive adjectives for people<br>• Verbs to describe basic actions |

| | |
|---|---|
| • How people in the target culture greet and introduce themselves<br>• Where people in the target culture are from and how their likes and dislikes vary from our own. | • How people in the target culture greet and introduce themselves<br>• Where people in the target culture are from and how their likes and dislikes vary from our own. |
| **Key Vocabulary:** Hello, goodbye, my name is, I am..., I am from..., nice to meet you, how old are you, my birthday is, I like, I don't like, I live in..., where, when, how | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br><br>***Unit Test****: Identify and apply unit vocabulary and phrases through various modes of communication.TCC4(9-12)*<br><br>***Dialogue:*** *Students will be able to engage in conversation about self with others, demonstrating how people greet and introduce themselves, keeping cultural differences in mind. TCC4(9-12)*<br><br>***PBA****: Create and perform a presentation about oneself about their daily lives and/or being able to understand others. ie Flip, dialogue, etc., showing the ability to use salutations, varied adjectives in target language and varied verbs to describe action.* CCE4(9-12) | **Other Evidence:**<br><br>Speaking/Signing, writing, listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12) |
| **Learning Plan** | |
| TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>***Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.***<br><br>TCC4(9-12)TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>***Dialogue: Students will be able engage in conversation about self with others demonstrating how people greet and introduce themselves, keeping cultural differences in mind.***<br><br>CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.<br>***PBA: Create and perform a presentation about oneself about their daily lives and/or being able to understand others. ie Flip, dialogue,*** | |

***etc., showing the ability to use salutations, varied adjectives in target language and varied verbs to describe action.***
TCC4(9-12) I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12) I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**Speaking/Signing, writing, listening/receiving in performance-based formative interims**

**Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos

# Unit 2 - My Student Life

## Desired Results - Goals, Transfer, Meaning, Acquisition

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

**Communication**

- **Interpretive (CT Communication 1.2):** Within the topics of self, family, school, activities, and food, students can identify the topic and some isolated facts from simple sentences in informational texts and short fictional texts (French, Spanish). Understands familiar questions and statements from simple sentences in conversations (ASL, French, Spanish).
- **Interpersonal (CT Communication 1.1)**: Request and provide information by asking and answering practiced and some original questions on familiar and everyday topics using simple sentences. Interact with others to meet basic needs related to daily life and activities. Express and give preferences and opinions using simple sentences and questions.
- **Presentational (CT Communication 1.3)**: Presents personal information, expresses preferences about their life, everyday topics, and activities, using simple sentences most of the time.

**Cultures (CT Cultures**

- **Relating Cultural Practices to Perspective (CT Cultures 2.1)**: Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- **Relating Cultural Products to Perspective (CT Cultures 2.2)**: Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

**Connections**

- **Making Connections (CT Connections 3.1)**: Learners build, reinforce, and expand their knowledge of geography and sociology while using the language to solve problems creatively.
- **Acquiring Information and Diverse Perspectives (CT Connections 3.1)**: Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Comparisons**

- **Language (CT Comparisons 4.1)**: Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.
- **Cultural (CT Comparisons 4.2)**: Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

**Communities**

**School and Global Communities (CT Communities 5.1)**: Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

**Lifelong Learning (CT Communities 5.2):** Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

**Vision of A Learner Attributes:** Students will be able to use their learning independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings:** Students will understand that...

- Schools may look different around the world, but learning is a shared human experience.
- Language helps us function within a school setting by allowing us to ask for help, follow schedules, and build friendships.
- Comparing school systems can help us understand the values and priorities of a culture.
- Understanding and using school-related vocabulary helps us engage in meaningful conversations with peers from other cultures.

**Essential Questions:**

- What does student life look like in different parts of the world?
- How do I describe and compare my school routine to others'?
- How does language help me navigate school-related interactions?
- Why do schools reflect the values of the culture they are in?

**Students will know...**

- Vocabulary and grammar concepts to ask and talk about what you and others like or dislike.
- Vocabulary and grammar concepts to give and follow directions, specifically in navigating around a school campus.
- Verbs that describe basic actions, useful in everyday communication.

**Students will be able to...**

- Ask and tell about likes/dislikes
- Know how to give and follow directions around campus
- Verbs to describe basic actions
- Know how people in the target culture build school communities

| | |
|---|---|
| • How people in the target culture build school communities and establish affiliations.<br>• How student life in the target culture might differ from what students experience in your own culture.<br>• Vocabulary to communicate about their student life.<br>• How to compare and contrast the student life of cultures other than their own | • How student life may be different for people in the target culture |
| **Key Vocabulary:** Classroom, teacher, student, materials, writing, reading, paying attention, cafeteria, library, Front door, hallway, bathroom, main office, different subjects, How do I get to….? How many minutes/hours…? What are you learning? Who is your teacher? What is your favorite? What do you like/dislike? | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br><br>***Unit Test****: Identify and apply unit vocabulary and phrases through various modes of communication.TCC4(9-12)*<br>***Dialogue:*** *Students will be able engage in conversation with others about school life, likes and dislikes and school activities keeping cultural differences in mind.* TCC4(9-12)<br>***PBA****: Create and perform a presentation about their student life, classes and activities and/or be able to understand others. ie Flip, dialogue, etc., showing the ability to use unit vocabulary, varied adjectives in target language and varied verb phrases to describe likes and dislikes.* CCE4(9-12) | **Other Evidence:**<br><br>Speaking/Signing, writing, listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12) |
| **Learning Plan** | |
| TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>***Unit Test: Identify and apply unit vocabulary and phrases through various modes of communication.***<br><br>TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>***Dialogue: Students will be able engage in conversation about self with others demonstrating how people greet and introduce*** | |

***themselves, keeping cultural differences  in mind.***

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
***PBA: Create and perform a presentation about oneself  about their daily lives and/or being able to understand others. ie Flip, dialogue, etc., showing the ability to use salutations, varied adjectives in target language and varied verbs to describe action.***

TCC4(9-12) I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12)  I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode  of expression.
**Speaking/Signing, writing, listening/receiving in performance-based formative, interim and summative**

**Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos

## Unit 3 - Meet My Family

### Desired Results - Goals, Transfer, Meaning, Acquisition

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

**Communication**

- **Interpretive (CT Communication 1.2):** Within the topics of self, family, school, activities, and food, students can identify the topic and some isolated facts from simple sentences in informational texts and short fictional texts (French, Spanish). Understands familiar questions and statements from simple sentences in conversations (ASL, French, Spanish).
- **Interpersonal (CT Communication 1.1)**: Request and provide information by asking and answering practiced and some original questions on familiar and everyday topics using simple sentences. Interact with others to meet basic needs related to daily life and activities. Express and give preferences and opinions using simple sentences and questions.
- **Presentational (CT Communication 1.3)**: Presents personal information, expresses preferences about their life, everyday topics, and activities, using simple sentences most of the time.

**Cultures (CT Cultures**

- **Relating Cultural Practices to Perspective (CT Cultures 2.1)**: Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- **Relating Cultural Products to Perspective (CT Cultures 2.2)**: Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

**Connections**

- **Making Connections (CT Connections 3.1)**: Learners build, reinforce, and expand their knowledge of geography and sociology while using the language to solve problems creatively.
- **Acquiring Information and Diverse Perspectives (CT Connections 3.1)**: Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Comparisons**

- **Language (CT Comparisons 4.1)**: Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.
- **Cultural (CT Comparisons 4.2)**: Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

**Communities**

**School and Global Communities (CT Communities 5.1)**: Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

**Lifelong Learning (CT Communities 5.2):** Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

**Vision of A Learner Attributes:** Students will be able to use their learning independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings:** Students will understand that...

- Family structures and dynamics vary, but the concept of family is universal.
- Language is a tool for describing relationships, roles, and special moments with loved ones.
- Family traditions and roles reflect the values and beliefs of a culture.
- Exploring diverse family norms fosters empathy and appreciation for different ways of life.

**Essential Questions:**

- How do I describe my family and relationships in another language?
- How do family roles and structures differ across cultures?
- What do family traditions reveal about cultural perspectives?
- How does learning about other families help me understand my own?

**Students will know...**

- Vocabulary, grammar concepts, and cultural concepts associated with the following:
    - Different family structures, such as nuclear families, extended families, and other living arrangements.
- How individuals in the target culture form school communities and affiliations through clubs, groups, and shared activities, reflecting cultural values.
- The variations in family structures, roles, and dynamics across different cultures, including how family life and responsibilities may differ.

**Students will be able to...**

- inquire about someone else's family, including family members, relationships, and dynamics.
- Ask and tell about family structures
- communicate about similarities and differences among family members
- Provide basic information about family members.
- Show an understanding of the cultural practices of other families.

**Key Vocabulary:** Mother, father, brother, sister, pets, uncle, aunt, step-parent, grandmother, grandfather, oldest, youngest, close to, similar, different, nationalities etc...

## Assessment Evidence

**Performance Tasks:**

Unit Test: Identify and apply unit vocabulary and phrases through various modes of communication.TCC4(9-12)

Dialogue: Students will be able engage in conversation with others about one's family keeping cultural differences in mind. TCC4(9-12)??

PBA: Create and perform a presentation about their families and . ie Flip, slideshow, etc., showing the ability to use unit vocabulary, varied adjectives and verbs in target language to talk about their family relations and cultural practices . CCE4(9-12)

**Other Evidence:**

Speaking/Signing, writing, listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12)

## Learning Plan

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.***

TCC4(9-12)TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Dialogue: Students will be able engage in conversation about self with others demonstrating how people greet and introduce themselves, keeping cultural differences in mind.***

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
***PBA: Create and perform a presentation about oneself about their daily lives and/or being able to understand others. ie Flip, dialogue, etc., showing the ability to use salutations, varied adjectives in target language and varied verbs to describe action.***

TCC4(9-12) I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12) I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

| |
|---|
| **Speaking/Signing, writing, listening/receiving in performance-based formative, interim and summative** |
| **Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos |

## Unit 4 - ‘Tis the season

### Desired Results - Goals, Transfer, Meaning, Acquisition

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

**Communication**

- **Interpretive (CT Communication 1.2):** Within the topics of self, family, school, activities, and food, students can identify the topic and some isolated facts from simple sentences in informational texts and short fictional texts (French, Spanish). Understands familiar questions and statements from simple sentences in conversations (ASL, French, Spanish).
- **Interpersonal (CT Communication 1.1)**: Request and provide information by asking and answering practiced and some original questions on familiar and everyday topics using simple sentences. Interact with others to meet basic needs related to daily life and activities. Express and give preferences and opinions using simple sentences and questions.
- **Presentational (CT Communication 1.3)**: Presents personal information, expresses preferences about their life, everyday topics, and activities, using simple sentences most of the time.

**Cultures (CT Cultures**

- **Relating Cultural Practices to Perspective (CT Cultures 2.1)**: Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- **Relating Cultural Products to Perspective (CT Cultures 2.2)**: Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

**Connections**

- **Making Connections (CT Connections 3.1)**: Learners build, reinforce, and expand their knowledge of geography and sociology while using the language to solve problems creatively.
- **Acquiring Information and Diverse Perspectives (CT Connections 3.1)**: Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Comparisons**

- **Language (CT Comparisons 4.1)**: Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.
- **Cultural (CT Comparisons 4.2)**: Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

**Communities**

**School and Global Communities (CT Communities 5.1)**: Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

**Lifelong Learning (CT Communities 5.2):** Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

**Vision of A Learner Attributes:** Students will be able to use their learning independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings: The students will understand that...**

- Seasonal changes influence people's daily lives, activities, and clothing choices.
- Weather vocabulary is essential for navigating daily life and making social connections.
- Celebrations and customs tied to seasons reflect a culture's relationship with nature and time.
- Understanding how people in other parts of the world experience and describe seasons enhances intercultural understanding.

**Essential Questions:**

- How does weather affect what people do, wear, and celebrate?
- How are seasons experienced differently around the world?
- What can I learn about a culture through its seasonal celebrations and practices?
- How can I talk about the weather and daily routines in culturally appropriate ways?

**Students will know…**

- The vocabulary of various articles of clothing
- Descriptive adjectives for clothing, colors, etc
- Weather expressions
- Places to shop
- Verbs to describe what you wear, buy, put on.
- How cultural customs influence clothing worn in target language countries

**Students will be able to…**

- Describe the clothing they and others wear in various seasons.
- Discuss different weather conditions for seasons.
- Express preferences and talk about the clothing you want to purchase.

**Key Vocabulary:** Summer, Winter, Fall, Spring, I wear, I buy, It costs, How much does it cost? It is hot, It is cold, It's raining, It's snowing, It's good weather, It's bad weather, Articles of clothing, colors

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br><br>Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.TCC4(9-12)<br><br>Dialogue: Students will be able to engage in conversation with others about clothing for seasonal weather. TCC4(9-12)<br><br>PBA: Create a presentation about clothing and connected seasons including. ie Fashion magazine or slideshow, etc., showing the ability to use unit vocabulary, varied adjectives and verbs in target language to talk about clothing preferences . CCE4(9-12) | **Other Evidence:**<br><br>Speaking/Signing, writing, listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12) |

**Learning Plan**

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.***

TCC4(9-12)TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Dialogue: Students will be able engage in conversation about self with others demonstrating how people greet and introduce themselves, keeping cultural differences in mind.***

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
***PBA: Create and perform a presentation about oneself about their daily lives and/or being able to understand others. ie Flip, dialogue, etc., showing the ability to use salutations, varied adjectives in target language and varied verbs to describe action.***

TCC4(9-12) I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12) I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

| |
|---|
| **Speaking/Signing, writing, listening/receiving in performance-based formative, interim and summative** |
| **Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos |

# Unit 5 - Food for Thought

## Desired Results - Goals, Transfer, Meaning, Acquisition

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

**Communication**

- **Interpretive (CT Communication 1.2):** Within the topics of self, family, school, activities, and food, students can identify the topic and some isolated facts from simple sentences in informational texts and short fictional texts (French, Spanish). Understands familiar questions and statements from simple sentences in conversations (ASL, French, Spanish).
- **Interpersonal (CT Communication 1.1)**: Request and provide information by asking and answering practiced and some original questions on familiar and everyday topics using simple sentences. Interact with others to meet basic needs related to daily life and activities. Express and give preferences and opinions using simple sentences and questions.
- **Presentational (CT Communication 1.3)**: Presents personal information, expresses preferences about their life, everyday topics, and activities, using simple sentences most of the time.

**Cultures (CT Cultures**

- **Relating Cultural Practices to Perspective (CT Cultures 2.1)**: Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- **Relating Cultural Products to Perspective (CT Cultures 2.2)**: Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

**Connections**

- **Making Connections (CT Connections 3.1)**: Learners build, reinforce, and expand their knowledge of geography and sociology while using the language to solve problems creatively.
- **Acquiring Information and Diverse Perspectives (CT Connections 3.1)**: Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Comparisons**

- **Language (CT Comparisons 4.1)**: Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.
- **Cultural (CT Comparisons 4.2)**: Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

**Communities**

**School and Global Communities (CT Communities 5.1)**: Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

**Lifelong Learning (CT Communities 5.2):** Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

**Vision of A Learner Attributes:** Students will be able to use their learning independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings:**

- Food choices are influenced by geography, climate, culture, and tradition.
- Language enables us to share about what we eat, how we cook, and what food means to us.
- Meals are more than just nourishment—they are social and cultural expressions.
- Exploring food traditions fosters appreciation of cultural diversity and opens up meaningful connections with others.

**Essential Questions:**

- What do people eat and why?
- How does food reflect cultural identity and values?
- How can I describe meals, ingredients, and recipes in another language?
- How are food customs similar and different around the world?

**Students will know...**

- Vocabulary and grammar concepts required for communication about the following topics:
  - various foods and beverages
  - Meal times
  - Restaurants
  - Taste, temperature, and preferences
- Differences and similarities between the target culture gastronomy and their own.

**Students will be able to…**

- Express their preferences and ask about others' preferences in relation to the following:
  - foods and beverages
  - Meal times
  - Restaurants
- Explain differences and similarities between the target culture's gastronomy and their own.

**Key Vocabulary:** To eat, to drink, to prefer, to order, to want, breakfast, lunch, dinner, restaurant, waiter/waitress, menu, the check, food, various foods and beverages, cultural foods and beverages.

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br><br>Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.TCC4(9-12)<br><br>Dialogue: Students will be able engage in conversation with others about meal times and preferences and/or ordering food in a restaurant. TCC4(9-12)?<br><br>PBA: Create and perform a presentation about a specific cultural gastronomy from a target language country when applicable showing the ability to use rich and diverse unit vocabulary in the target language. CCE4(9-12) | **Other Evidence:**<br><br>Speaking/Signing, writing, listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12) |

**Learning Plan**

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.***

TCC4(9-12)TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Dialogue: Students will be able engage in conversation about self with others demonstrating how people greet and introduce themselves, keeping cultural differences in mind.***

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
***PBA: Create and perform a presentation about oneself about their daily lives and/or being able to understand others. ie Flip, dialogue, etc., showing the ability to use salutations, varied adjectives in target language and varied verbs to describe action.***

| |
|---|
| TCC4(9-12) I can integrate my learning to adapt to experiences in the classroom, career and life.<br>CCE4(9-12) I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.<br>**Speaking/Signing, writing, listening/receiving in performance-based formative, interim and summative** |
| **Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos |

# World Language Year 2 CURRICULUM



**Grade Level(s): 9-12**

**Curriculum Author(s):** J. Caruso, M. Greaves,K. Peterson, K. Sandor, D.Manogue, T. Fernandez

**Course Description:** Students will develop their target language knowledge by acquiring interpretive, presentational, and interpersonal skills. This level is often referred to as “the survival level” as students can communicate and exchange information about predictable topics such as personal information, basic objects, activities, preferences, and immediate needs using phrases, simple sentences, and some memorized language. They can usually handle short social interactions in everyday situations by asking and answering simple questions.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner Attribute and Indicator** |
| * Let's Review and Reuse | How can I use the language I know to express myself in more detail and in a comprehensible manner? | Building proficiency in a language requires consistent use of previously learned vocabulary and grammar concepts while incorporating new language structures and terms and being willing to make mistakes along the way. | TCC4(9-12), CCE4(9-12), |
| Everyday Life and Routines | How do habits and routines reflect personal and cultural values? | Daily routines are shaped by culture, lifestyle, and personal needs. | TCC4(9-12), CCE4(9-12), TI4(9-12) |
| Let's Go Explore | How do I make travel plans and move around in a new place? | Travel requires the ability to ask questions, follow directions, and understand local customs. | TCC4(9-12), CCE4(9-12), TI4(9-12), AA2(9-12) |
| Looking Back | How do I describe events and experiences from the past? | Recounting personal and historical events allows us to connect across time and cultures. | TCC4(9-12), CCE4(9-12), TI4(9-12), AA2(9-12) |
| Storytime | How can I interpret and share a story using another language? | Retelling stories builds vocabulary, strengthens grammar, and enhances comprehension skills. | TCC4(9-12), CCE4(9-12), TI4(9-12) |
| Interest Pathways | How can language skills support my personal and professional goals? | Cultural awareness and communication skills increase opportunities and effectiveness in the workplace. | TCC4(9-12), CCE4(9-12), TI4(9-12), AA2(9-12) |

## * Let's Review and Reuse

### Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

Communication

- Interpretive (CT Communication 1.2): Within the topics of daily life, travel and childhood, students can identify the topic and related information from simple sentences in informational texts and short fictional texts (French, Spanish). Students can identify the main idea in short conversations (ASL, French, Spanish).
- Interpersonal (CT Communication 1.2) Request and provide information in conversations on familiar topics by creating simple sentences and asking appropriate follow-up questions. Interact with others to meet basic needs in familiar situations. Express, ask about, and react with some details to preferences, feelings, or opinions on familiar topics.
- Presentational(CT Communication 1.3) Presents personal information about life, activities, events, and everyday topics as well as explains why they feel that way using simple sentences.

Cultures

- Relating Cultural Practices to Perspective (CT Cultures 2.1) Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- Relating Cultural Products to Perspective (CT Cultures 2.2 Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

Connections

- Making Connections (CT Connections 3.1) Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.
- Acquiring Information and Diverse Perspectives (CT Connections 3.2) Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

Communities

- School and Global Communities (CT Communities 5.1): Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

<table>
<tr><td colspan="2">❖ Lifelong Learning (CT Communities 5.2): Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.</td></tr>
<tr><td colspan="2">Vision of A Learner Attributes: Students will be able to use their learning independently...<br><br>TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br><br>CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.</td></tr>
<tr><td>Understandings: Students will understand that...<br><br>● Building proficiency in a language requires consistent use of previously learned vocabulary and grammar concepts while incorporating new language structures and terms and being willing to make mistakes along the way.</td><td>Essential Questions:<br><br>● How can I use the language I know to express myself in more detail and in a comprehensible manner?</td></tr>
<tr><td>Students will know…<br><br>● Greetings and introductions<br>● Verb list (regular and irregular)<br>● Descriptive adjectives and adjective-noun agreement<br>● Basic terminology to express likes<br>● Ser vs Estar<br>● Essential vocabulary for numbers, days of the week, and seasons to discuss self and activities of interest.<br>● Question words/phrases</td><td>Students will be able to…<br>● Use previously learned vocabulary and grammar concepts for conversational activities to talk about themselves.<br>● Communicate and interpret the following:<br>● Information about themselves and others<br>● Various expressions of preferences<br>● Descriptive words and phrases<br>● Conversational strategies<br>● Question words/ phrases<br>● Ask and answer questions that help them get to know others better</td></tr>
<tr><td colspan="2">Key Vocabulary: Commonly used greetings and introductions, verbs in the present tense, expressions for preferences, and Question words/ phrases.</td></tr>
<tr><td colspan="2">Assessment Evidence</td></tr>
<tr><td>Performance Tasks:</td><td>Other Evidence:</td></tr>
</table>

| | |
|---|---|
| ***Benchmark**: Students will show their level of proficiency in various modes of communication. TCC4(9-12)*<br><br>***Dialogue:** Students can engage in conversation about themselves and their likes. TCC4(9-12),*<br><br>***Unit Test:** To be able to identify verbs used in years 1 and 2 target language TI4(9-12)* | Speaking/Signing, writing, viewing and listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12)TI4(9-12) |

| **Learning Plan** |
|---|
| TCC4(9-12): I can integrate my learning to adapt to experiences at home and in life.<br>***Benchmark to measure modes of communication***<br><br>**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression. Dialogue<br><br>**TI4(9-12):** I can apply my strengths and anticipate challenges to reach my current and future goals.<br>**Speaking/Signing, writing, listening/receiving in performance-based formative interims** |

## **Unit 1 -** Everyday Life and Routines

### Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

Communication

- Interpretive (CT Communication 1.2) Within the topics of daily life, travel and childhood, students can identify the topic and related information from simple sentences in informational texts and short fictional texts (French, Spanish). Students can identify the main idea in short conversations (ASL, French, Spanish).
- Interpersonal (CT Communication 1.2) Request and provide information in conversations on familiar topics by creating simple sentences and asking appropriate follow-up questions. Interact with others to meet basic needs in familiar situations. Express, ask about, and react with some details to preferences, feelings, or opinions on familiar topics.
- Presentational (CT Communication 1.3)Presents personal information about life, activities, events, and everyday topics as well as explains why they feel that way using simple sentences.

Cultures

- Relating Cultural Practices to Perspective (CT Cultures 2.1)Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- Relating Cultural Products to Perspective (CT Cultures 2.2) Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

Connections

- Making Connections (CT Connections 3.1) Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.
- Acquiring Information and Diverse Perspectives (CT Connections 3.2) Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Vision of A Learner Attributes:** Students will be able to use their learning to independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| • Daily routines are shaped by culture, lifestyle, and personal needs.<br>• Understanding how people organize their day helps us make comparisons and build empathy across cultures.<br>• Concepts of health and wellness vary around the world, and language helps us navigate those cultural understandings.<br>• Describing routines, making appointments, or expressing how we feel are essential parts of communicating in real-world situations. | • How do people describe and manage their daily routines?<br>• How do habits and routines reflect personal and cultural values?<br>• How is health and wellness understood and maintained in different cultures?<br>• What role does language play in expressing needs and making healthy choices? |
| **Students will know…** | **Students will be able to…** |
| • Vocabulary to communicate about their daily life and routines.<br>• Basic information regarding health.<br>• Language to express clothing preferences for a variety of everyday situations.<br>• A variety of sources of information on the lives of others, their daily routines and the overall concept of beauty and aesthetics of student life of cultures other than their own. | Communicate and interpret information about daily routines, clothing preferences and basic health.<br>• Reflexive verbs<br>• Daily hygiene products<br>• Clothing for various activities, seasons, etc.<br>• Body parts and basic health<br>• Transitions and ordinal numbers |

Key Vocabulary: I like to wear, I enjoy, I prefer to, it's fashionable to wear, I feel, I need, I believe, My...is..., I get up, I go to bed at, my routine is, before school, after school, some "home" vocabulary

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| ***Unit Test****:Identify and apply unit vocabulary and phrases through* | |

| | |
|---|---|
| *various modes of communication.TCC4(9-12) Ex. Unit Test*<br><br>***Dialogue:*** *Students will be able engage in conversation about their clothing preferences for varied occasions or activities. TCC4(9-12),*<br><br>***Unit Interim****: Students will be able to interpret and communicate about basic health needs. TI4(9-12)*<br><br>***PBA****: Create and perform a presentation about oneself , their daily lives and/or being able to understand others. Ie Screencastify, dialogue, etc., showing the ability to use sequential verbiage, in target language and varied verbs to describe action.* CCE4(9-12) | Speaking/Signing, writing, viewing and listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12)TI4(9-12) |

**Learning Plan**

TCC4(9-12): I can integrate my learning to adapt to experiences at home and in life.
***Unit Test:Identify and apply unit vocabulary and phrases through various modes of communication.***

TCC4(9-12)TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
***Dialogue: Students will be able engage in conversation about myself with others demonstrating how I prepare for the beginning and end of their daily routines and practices***

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
***PBA: Create and perform a presentation about oneself , their daily lives and/or being able to understand others. ie Flip, dialogue, etc., showing the ability to use sequential verbiage, in target language and varied verbs to describe action.***

TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
TCC4(9-12) I can integrate my learning to adapt to experiences at home and in life.
CCE4(9-12) I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**Speaking/Signing, writing, listening/receiving in performance-based formative interims**

**Teacher resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts and videos

## Unit 2-Let's Go Explore

### Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

Communication

- Interpretive (CT Communication 1.2): Within the topics of daily life, travel and childhood, students can identify the topic and related information from simple sentences in informational texts and short fictional texts (French, Spanish). Students can identify the main idea in short conversations (ASL, French, Spanish).
- Interpersonal (CT Communication 1.1): Request and provide information in conversations on familiar topics by creating simple sentences and asking appropriate follow-up questions. Interact with others to meet basic needs in familiar situations. Express, ask about, and react with some details to preferences, feelings, or opinions on familiar topics.
- Presentational (CT Communication 1.3) : Presents personal information about life, activities, events, and everyday topics as well as explains why they feel that way using simple sentences.

Cultures

- Relating Cultural Practices to Perspective (CT Cultures 2.1): Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- Relating Cultural Products to Perspective (CT Cultures 2.2): Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

Connections

- Making Connections (CT Connections 3.1): Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.

Comparisons

- ❖ Language (CT Comparisons 4.1): Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.

- ❖ Cultural (CT Comparisons 4.2): Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

Communities

- ❖ School and Global Communities (CT Communities 5.1): Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

- ❖ Lifelong Learning (CT Communities 5.1 and 5.2): Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

Connections

- ❖ Making Connections (CT Connections 3.1) Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.
- ❖ Acquiring Information and Diverse Perspectives (CT Connections 3.2) Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Vision of A Learner Attributes:** Students will be able to use their learning to independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
AA2(9-12): I can assess my past successes and mistakes to change my approach.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| ● Travel requires the ability to ask questions, follow directions, and understand local customs.<br>● Landmarks, public spaces, and neighborhoods tell the story of a place and its people. | ● How do I make travel plans and move around in a new place?<br>● How do places and landmarks reflect a culture's identity and history?<br>● How can I navigate cities and transportation systems in culturally appropriate ways? |

| | |
|---|---|
| • Understanding cultural norms and expectations when traveling helps build intercultural competence.<br>• Navigating unfamiliar environments builds language confidence and global awareness. | • Why is learning about a place's geography, customs, and etiquette important when traveling? |
| **Students will know...**<br><br>• Travel vocab (general)<br>• Present tense verbs<br>• Prepositions of place-direction<br>• Verb "to be" (location)<br>• Places in town-city<br>• Modes of transportation<br>• Travel activities | **Students will be able to...**<br><br>• Identify and apply travel vocabulary for real world situations.<br>• Be able to understand and give directions in the target language<br>• Explore places of interest in the target language through interpretation and understanding.<br>• Communicate preferred activities while on a trip.<br>• Comprehend and create an itinerary for travel<br>• Apply varied travel vocabulary for situations,needs.<br>• Give and receive directions<br>• Navigate through an unfamiliar town or city<br>• Entertain a variety of possible activities to participate in during a trip<br>• Decide what modes of transportation might work best |
| **Key Vocabulary:** City and town vocab, places in town, general travel, Basic prepositions of place (directions), activities pertaining to travel, methods of transportation, common universal signs. | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br><br>***Unit Test****: Be able to identify and apply unit vocabulary to be able to interpret information about a travel destination. TCC4(9-12)*<br><br>***Dialogue****:Students will create a dialogue using the unit vocabulary and preferences for travel. TCC4(9-12) AA2(9-12)*<br><br>***PBA:*** *Students create a travel brochure that includes places of interest* | **Other Evidence:**<br>Speaking/Signing, writing, viewing and listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12)TI4(9-12) |

| | |
|---|---|
| *and activities offeredCCE4(9-12). TI4(9-12)* | |

**Learning Plan**

TCC4(9-12): I can integrate my learning to adapt to experiences at home and in life.
***Unit Test:Identify and apply unit vocabulary for interpretation.***

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life. AA2(9-12) I can assess my past successes and mistakes to change my approach
***Dialogue: Create a travel dialogue about planning a trip.***

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
***PBA: Create a travel or brochure or presentation.***

TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
TCC4(9-12) I can integrate my learning to adapt to experiences at home and in life.
CCE4(9-12) I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**Speaking/Signing, writing, listening/receiving in performance-based formative interims**

**Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos

## Unit 3-Looking back

### Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

Communication

- Interpretive (CT Communication 1.2): Within the topics of daily life, travel and childhood, students can identify the topic and related information from simple sentences in informational texts and short fictional texts (French, Spanish). Students can identify the main idea in short conversations (ASL, French, Spanish).
- Interpersonal (CT Communication 1.1): Request and provide information in conversations on familiar topics by creating simple sentences and asking appropriate follow-up questions. Interact with others to meet basic needs in familiar situations. Express, ask about, and react with some details to preferences, feelings, or opinions on familiar topics.
- Presentational (CT Communication 1.3): Presents personal information about life, activities, events, and everyday topics as well as explains why they feel that way using simple sentences.

Cultures

- Relating Cultural Practices to Perspective (CT Cultures 2.1): Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- Relating Cultural Products to Perspective (CT Cultures 2.2): Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

Connections

- Making Connections (CT Connections 3.1): Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.

Comparisons

- Language (CT Comparisons 4.1): Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.

- Cultural (CT Comparisons 4.2): Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

Communities

- ❖ School and Global Communities (CT Communities 5.1): Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.
- ❖ Lifelong Learning (CT Communities 5.1 and 5.2): Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

Connections

- ❖ Making Connections (CT Connections 3.1) Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.
- ❖ Acquiring Information and Diverse Perspectives (CT Connections 3.2) Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Vision of A Learner Attributes:** Students will be able to use their learning to independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
AA2(9-12): I can assess my past successes and mistakes to change my approach.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| ● Recounting personal and historical events allows us to connect across time and cultures.<br>● Childhood activities and traditions reflect cultural values and social expectations.<br>● Language enables us to reflect on and share memories in meaningful, structured ways.<br>● Mastering past tenses expands our ability to express ideas beyond the present and improves fluency. | ● How do I describe events and experiences from the past?<br>● How do cultures preserve memories and share stories from the past?<br>● What do our childhood activities say about our values and identity?<br>● How does using past tenses in another language help us communicate with greater depth? |
| **Students will know...**<br>● Different time frames have different ways to be expressed and interpreted and they will make connections between target language and English. | **Students will be able to…**<br><br>Communicate and interpret:<br>● Basic stories from their childhood |

| | |
|---|---|
| • General childhood vocabulary<br>• Past tense Preterite grammatical constructs and uses<br>• Expressions of time<br>• Frequency words<br>• Family vocabulary | • Recognize differences in timeframes<br>• Write/Sign short stories that relate to past tense events<br>• Interpret stories written in past tense |
| **Key Vocabulary:** Childhood vocabulary, celebrations, family review, expressions of time (frames), frequency word | |
| **Assessment Evidence** | |
| **Performance Tasks:** ***Unit Test****:Identify and apply unit vocabulary and phrases through various modes of communication.TCC4(9-12)*<br><br>***Dialogue:*** *Students will be able engage in conversation about their clothing preferences for varied occasions or activities. TCC4(9-12),*<br><br>***Unit Interim****: example Students will be able to interpret and communicate about past events. TI4(9-12)*<br><br>***PBA****: Example(past travel)* CCE4(9-12) Presentational writing in past tense preterite about a past travel experience | **Other Evidence:**<br><br>Speaking/Signing, writing, viewing and listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12)TI4(9-12) |
| **Learning Plan** | |
| **TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.<br>**I will create a dialog with the scene of a family at a playground, grocery store, or family dinner table.**<br><br>**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.<br>**I will be able to write a letter to "Grandparents" discussing my daily life.**<br><br>**TI4(9-12):** I can apply my strengths and anticipate challenges to reach my current and future goals. | |

**I will write a reflection page in English about why I selected the target language, what I have learned so far and how I imagine using the target language in my future life. I will include specific activities to reach this goal.**

AA2(9-12): I can assess my past successes and mistakes to change my approach.
**Speaking/Signing, writing, listening/receiving in performance-based formative interims**

**Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos

## Unit 4-Storytime

### Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

Communication

- Interpretive: (CT Communication 1.2) Within the topics of daily life, travel and childhood, students can identify the topic and related information from simple sentences in informational texts and short fictional texts (French, Spanish). Students can identify the main idea in short conversations (ASL, French, Spanish).
- Interpersonal: (CT Communication 1.2) Request and provide information in conversations on familiar topics by creating simple sentences and asking appropriate follow-up questions. Interact with others to meet basic needs in familiar situations. Express, ask about, and react with some details to preferences, feelings, or opinions on familiar topics.
- Presentational: (CT Communication 1.3) Presents personal information about life, activities, events, and everyday topics as well as explains why they feel that way using simple sentences.

Cultures

- Relating Cultural Practices to Perspective: (CT Communication 2.1) Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.

- ❖ Relating Cultural Products to Perspective: (CT Communication 2.2) Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

Connections
- ❖ Making Connections: (CT Communication 3.1)Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.

Comparisons
- ❖ Language (CT Comparisons 4.1): Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.

- ❖ Cultural (CT Comparisons 4.2): Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

Communities
- ❖ School and Global Communities (CT Communities 5.1): Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

- ❖ Lifelong Learning (CT Communities 5.1): Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

Connections
- ❖ Making Connections (CT Connections 3.1) Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.
- ❖ Acquiring Information and Diverse Perspectives (CT Connections 3.2) Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Vision of A Learner Attributes:** Students will be able to use their learning to independently...

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
AA2(9-12): I can assess my past successes and mistakes to change my approach.

| | |
|---|---|
| **Understandings:** Students will understand that...<br>● Stories preserve history, share beliefs, and shape identity in every culture.<br>● Retelling stories builds vocabulary, strengthens grammar, and enhances comprehension skills.<br>● Cultural stories reveal values, humor, morals, and social norms of a community.<br>● Understanding narrative structure and style in another language supports intercultural communication. | **Essential Questions:**<br>● How do stories help us understand cultures and values?<br>● How can I interpret and share a story using another language?<br>● What can I learn about myself and others through storytelling?<br>● How are stories structured across cultures and how does that affect meaning? |
| **Students will know…**<br>● How cultural comparisons help to understand a story.<br>● How the use of different past tense verbs impacts understanding of frequency and timing of events/actions.<br>● How transition words are utilized in the target language to indicate sequence of events. | **Students will be able to...**<br>● Interpret a story and identify the sequence and events in a story in the target language.<br>● Identify elements of literature in a short story, play in the target language.<br>● Identify the beginning, middle and end of the short story.<br>● Identify the main idea, main characters and plot of a book in the target language.<br>● State their opinions about the story with a brief explanation of why. |
| **Key Vocabulary:** General story unit vocabulary, sequential vocabulary, How to state an opinion about the story, present the main idea, and discuss the climax, setting/environment, protagonist, antagonist (when applicable) and themes | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>*PBA: Book Jacket PBA*<br>*Formative: Group discussions*<br>*Interim: Short writing/signing activity* | **Other Evidence:**<br>Speaking/Signing, writing, viewing and listening/receiving in performance-based formative interims. TCC4(9-12) CCE4(9-12)TI4(9-12) |

| Learning Plan |
| --- |
| TCC4 (9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>Interims :Identify and apply unit vocabulary for interpretation.<br><br>CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression. Book Jacket PBA, Create comic strips, Short stories<br><br>TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.<br>Speaking/Signing, writing, listening/receiving in performance-based formative interims<br><br>AA2(9-12): I can assess my past successes and mistakes to change my approach.<br>Listening to feedback, reviewing work and editing as needed |
| **Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts, and videos |

# Unit 5-Interest Pathways

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**
Standards are based on ACTFL and ACTFL Proficiency guidelines. For more information, visit: **ACTFL Standards**; **ACTFL Proficiency Guidelines** ; **Connecticut K–12 World Language Standards 2024**

**Communication**

- **Interpretive**: **(CT Communication 1.2)** Within the topics of daily life, travel and childhood, students can identify the topic and related information from simple sentences in informational texts and short fictional texts (French, Spanish). Students can identify the main idea in short conversations (ASL, French, Spanish).
- **Interpersonal**: **(CT Communication 1.2)** Request and provide information in conversations on familiar topics by creating simple sentences and asking appropriate follow-up questions. Interact with others to meet basic needs in familiar situations. Express, ask about, and react with some details to preferences, feelings, or opinions on familiar topics.
- **Presentational**: **(CT Communication 1.3)** Presents personal information about life, activities, events, and everyday topics as well as explains why they feel that way using simple sentences.

**Cultures**

- **Relating Cultural Practices to Perspective**: **(CT Communication 2.1)** Learners use the language to explore and reflect on the practices and perspectives of the cultures studied.
- **Relating Cultural Products to Perspective: (CT Communication 2.2)** Learners use the language to explore and reflect on the products and perspectives of the cultures studied.

**Connections**

- **Making Connections: (CT Communication 3.1)** Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.

**Comparisons**

- **Language (CT Comparisons 4.1)**: Learners use the language to investigate, explain, and reflect on the nature of language through comparisons of the language studied and their own.

- **Cultural (CT Comparisons 4.2)**: Learners use the language to investigate, explain, and reflect on the concept of culture through comparisons of the cultures studied and their own.

**Communities**

- **School and Global Communities (CT Communities 5.1)**: Learners use the language both within and beyond the classroom to interact with others in their community about themselves, their families, their activities, and the foods they enjoy.

- **Lifelong Learning (CT Communities 5.1):** Learners set goals and reflect on their progress in using languages for enjoyment, enrichment, and advancement.

**Connections**

- **Making Connections (CT Connections 3.1)** Learners build, reinforce, and expand their knowledge of health, geography, literature and sociology while using the language to solve problems creatively.

- **Acquiring Information and Diverse Perspectives (CT Connections 3.2)** Learners access and evaluate information and diverse perspectives that are available through the language and its cultures.

**Vision of A Learner Attributes:** Students will be able to use their learning to independently...
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
AA2(9-12): I can assess my past successes and mistakes to change my approach.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| • Language is a vital tool in careers such as healthcare, business, education, tourism, and technology.<br>• Cultural awareness and communication skills increase opportunities and effectiveness in the workplace.<br>• Professional interactions often require formal language, polite expressions, and specific vocabulary.<br>• Career-specific language skills empower learners to become global citizens and future-ready professionals. | • How can language skills support my personal and professional goals?<br>• How is language used in different careers and industries?<br>• What cultural knowledge is necessary for working with people from diverse backgrounds?<br>• How can I use language to collaborate effectively in a global environment? |
| **Students will know...** | **Students will be able to...** |

| | |
|---|---|
| • Career-interest specific vocabulary<br>• Cultural differences that would impact their interactions with others in their career field/area of interest<br>• Influences of the target culture in their career field/area of interest | • Interact with others in the target language at a novice-high level using career/study of interest-specific vocabulary.<br>• Interpret the main idea and some supporting details of video, audio, and/or written texts that focus on the career/study interest area. |
| **Key Vocabulary:** STEM vocabulary, Agriscience vocabulary, Arts vocabulary, and Human Services vocabulary, plus other areas of interest | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br><br>PBA: Vision Board | **Other Evidence:**<br>Speaking/Signing, writing, viewing and listening/receiving in performance-based formative interims. TCC4(9-12)<br>CCE4(9-12)TI4(9-12) |
| **Learning Plan** | |
| TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>• Create a vision board with career specific vocabulary in the target language<br>• Complete a job application/ cover sheet in the target language<br>CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.<br>• Dialogue/ mock interview/ interactive activity with unit specific vocabulary<br>TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.<br>• Reflective essay/ journaling of steps to acquiring goal<br>• Application for a travel/work abroad opportunity<br>AA2(9-12): I can assess my past successes and mistakes to change my approach.<br>Speaking/Signing, writing, listening/receiving in performance-based formative interims<br>Peer feedback using rubrics | |
| **Teacher Resources:** Various online authentic resources and realia from the target cultures, World Language Google Drive, Language-specific texts and videos | |

# ADVANCED CULINARY ARTS CURRICULUM




**Grade Level(s): 10 - 12**

**Curriculum Author(s):** John Dominello

**Course Description:** This course is designed for students who have a strong interest in the culinary field for employment, wish to attend a post-secondary school for a degree or continue to further develop their culinary skills. Students will study advanced food preparation techniques including braising, stewing, sauteing, stir frying, baking, roasting, poaching and steaming. Emphasis is placed on proper presentation of food, knife skills, safety, sanitation, nutrition and food science. Students are required to participate in all aspects of school based catered and community service events such as Region 14 Senior Citizen luncheons. Students will study the National Restaurant Association ServSafe curriculum and participate in collaborative programs such as a Chopped Mystery Basket unit and studying different cultures through food.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner "I Can" Statements** |
| Kitchen Safety & Sanitation | How do proper kitchen safety and sanitation practices impact the quality of food and the health of those who consume it? | Maintaining rigorous kitchen safety and sanitation practices is fundamental to preventing foodborne illnesses, ensuring the health of consumers, and upholding the integrity and quality of culinary creations. | TCC1 (9-12), TCC3 (9-12), TCC4 (9-12), CCE3 (9-12) |
| Advanced Kitchen Mise en Place & Cooking Principles | How does understanding and practicing mise en place and advanced cooking principles enhance efficiency, creativity, and consistency in culinary execution? | Mastery of mise en place and advanced cooking principles is essential for achieving precision, consistency, and creativity in culinary arts, enabling students to execute recipes with efficiency and quality results. | TCC1(9-12), TCC3(9-12), TCC4(9-12), CCE3(9-12), CCE4(9-12), DE4(9-12), TI1(9-12), P3(9-12) |
| Meat, Poultry & Seafood Identification / Dry & Moist Heat Cooking Techniques | How does understanding the characteristics of different meats, poultry, and seafood, combined with the appropriate cooking techniques, influence the flavor, texture, and overall success of a dish? | A thorough knowledge of meat, poultry, and seafood identification, paired with the appropriate use of dry and moist heat cooking techniques, is crucial for maximizing flavor, texture, and success in the preparation of a wide variety of recipes. | TCC1(9-12), TCC3(9-12), TCC4(9-12), CCE3(9-12), CCE4(9-12), DE4(9-12), TI1(9-12), P3(9-12) |
| Advanced Bakeshop | How do precision, technique, and creativity in advanced baking contribute to the successful execution of pastries, breads and desserts? | Advanced baking requires a balance of precision, refined technique, and creative expression to achieve consistent structure, texture, and flavor. Mastery of these elements transforms basic ingredients into visually appealing and professionally executed baked goods. | TCC1(9-12), TCC3(9-12), TCC4(9-12), CCE3(9-12), CCE4(9-12), DE4(9-12), TI1(9-12), P3(9-12) |

| | | | |
|---|---|---|---|
| Breakfast Cookery | How do the principles of basic cooking techniques and ingredient selection influence the preparation and presentation of simple to complicated breakfast recipes? | Foundational techniques and intentional ingredient choices determine the flavor, texture, nutritional value, and appearance of breakfast foods. Mastery of these elements ensures well-balanced, visually appealing meals that meet professional culinary standards. | TCC1(9-12), TCC3(9-12), TCC4(9-12), CCE3(9-12), CCE4(9-12), DE4(9-12), TI1(9-12), P3(9-12) |
| Exploring Culinary Arts through World Cultures | How do understanding and incorporating diverse culinary traditions and techniques from around the world broaden our cooking skills and contribute to a greater appreciation of global cultures within our own? | Integrating culinary traditions and techniques from around the world enhances culinary creativity, fosters a deeper appreciation of global cultures, and enriches our understanding of food's role in cultural expression. It allows us to see the similarities and differences of the world through food. | TCC1(9-12), TCC3(9-12), TCC4(9-12), CCE3(9-12), CCE4(9-12), DE4(9-12), TI1(9-12), P3(9-12) |
| Catering and Community Service | How do efficient and effective catering management and table service techniques impact the overall dining experience and customer satisfaction? | Mastering catering management, timing, planning and table service skills are important for delivering exceptional dining experiences and ensuring high levels of customer satisfaction. | TCC4(9-12), CCE3(9-12), DE4(9-12), TI4(9-12), AA3(9-12) |

# Unit 1 - KITCHEN SAFETY & SANITATION

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standards

Sanitation & Food Safety: Evaluate factors that affect food safety, from production through consumption.

11. Determine conditions and practices that promote safe food handling, production, and consumption.
12. Identify characteristics of major food borne pathogens, their role in causing illness, foods involved in outbreaks, and methods of prevention.
13. Describe food borne illness as a health issue for individuals and families.

G. Safety Issues: Demonstrate procedures applied to safety issues.

16. Demonstrate procedures applied to safety issues.
17. Demonstrate skills in safe handling of knives, tools, and equipment.
18. Examine procedures for safe and secure storage for equipment and tools.

H. Food Safety and Sanitation: Demonstrate food safety and sanitation procedures.

19. Describe and practice good personal hygiene/health procedures, and report symptoms of illness.
20. Explain and demonstrate methods for properly handling and storing both raw and prepared foods.
21. Explain and demonstrate techniques for food handling and preparation that prevent cross contamination between raw, cooked, and ready-to-eat foods and between animal or fish sources and other food products.
22. Demonstrate procedures for cleaning and sanitizing small equipment, serving dishes, glassware, and utensils.

Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.

13. Demonstrate professional skills in safe handling of knives, tools, and equipment.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.
TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.

| | |
|---|---|
| **Understandings:** Students will understand that…<br>● Maintaining rigorous kitchen safety and sanitation practices is fundamental to preventing foodborne illnesses, ensuring the health of consumers, and upholding the integrity and quality of culinary creations.<br>● Proper kitchen sanitation and safety practices are essential to prevent foodborne illness, ensure personal and workplace hygiene, and uphold industry standards, laying the foundation for safe, high-quality food production in both home and professional kitchens.<br>● Sanitation, safety, and food preparation skills foster responsibility, attention to detail, and critical thinking—attributes that support personal health, workplace readiness, and lifelong learning in diverse settings beyond the kitchen.<br>● The skills learned through culinary training—such as time management, safety awareness, teamwork, and precision—are transferable and valuable in a variety of careers and real-world environments, from hospitality to healthcare to everyday home life. | **Essential Questions:**<br>● How do proper kitchen safety and sanitation practices impact the quality of food and the health of those who consume it?<br>● Why is proper kitchen sanitation and safety so important in simple food production?<br>● How do these skills translate to life beyond the classroom?<br>● Can I utilize these skills outside of the kitchen? |
| **Students will know...**<br>● How to explain the difference between clean and sanitary.<br>● What a food borne illness is and how it can be prevented.<br>● The various aspects of personal hygiene that are important in food service.<br>● What the Danger Zone is and how important it is to preventing food borne illnesses.<br>● How Cross Contamination occurs and how to work safely to avoid it.<br>● What the proper procedures are when cleaning and sanitizing food-contact surfaces in the kitchen. | **Students will be able to...**<br>● Evaluate factors that affect food safety, from production through consumption.<br>● Demonstrate procedures applied to kitchen safety issues.<br>● Demonstrate food safety and sanitation procedures.<br>● Apply the principles of time and temperature when handling food.<br>● Classify the sources of biological, chemical and physical hazards and ways to prevent them or control their growth.<br>● Describe and practice good personal hygiene/health procedures, and report symptoms of illness.<br>● Explain and demonstrate techniques for food handling and preparation that prevent cross contamination between raw, cooked and ready-to-eat foods and between animal or fish sources and other food products.<br>● Determine methods and demonstrate the ability to ensure safety at all times. |

| | |
|---|---|
| | • Discuss fire prevention and what to do when a fire occurs.<br>• Identify common accidents and injuries and discuss preventative maintenance for these issues. |

**Key Vocabulary:** Cross Contamination, Pathogen, Bacteria, Danger Zone, Sanitizing/Cleaning, Physical, Chemical and Biological Hazards, Fire Safety, Knife Safety, Foodborne Illness/Outbreak

## Assessment Evidence

| Performance Tasks: | Other Evidence: |
|---|---|
| Summative: Group Case Study: They will complete and present a written Case Study. They are the City Health Inspector. They are presented with a list of real world situations in a restaurant kitchen and they will determine if they are in violation of sanitation/safety standards with detailed support. | • Formative: Pre-test to evaluate level of understanding of prior knowledge.<br>• Interim: Cooking lab to evaluate their ability to translate kitchen sanitation/safety to a hands-on lab. |

## Learning Plan

Class discussions and real world situations as they apply to food safety and sanitation. TCC1(9-12) CCE3 (9-12) TCC4 (9-12)

Health Inspector Case Study, group project. TCC3(9-12) TCC4 (9-12)

Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.
Identify characteristics of major food borne pathogens, their role in causing illness, foods involved in outbreaks, and methods of prevention, class discussion and Case Study. CCE3 (9-12) TCC4 (9-12)

Safety Issues: Demonstrate procedures applied to safety issues (Lab demonstration).CCE3 (9-12) TCC4 (9-12)
Demonstrate skills in safe handling of knives, tools, and equipment.
Examine procedures for safe and secure storage for equipment and tools through class discussions and demonstrations.

Food Safety and Sanitation: Demonstrate food safety and sanitation procedures. CCE3 (9-12) TCC4 (9-12)

- Explain and demonstrate methods for properly handling and storing both raw and prepared foods.
- Explain and demonstrate techniques for food handling and preparation that prevent cross contamination between raw, cooked, and ready-to-eat foods and other food products.
- Demonstrate procedures for cleaning and sanitizing small equipment, serving dishes, glassware, and utensils.

**Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current.

# Unit 2 - Advanced Kitchen Mise en Place & Cooking Principles

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standard

Sanitation & Food Safety: Evaluate factors that affect food safety, from production through consumption.

E. Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.

Culinary and Food Production

E. Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
13. Demonstrate professional skills in safe handling of knives, tools, and equipment.
14. Demonstrate professional skills for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising,stewing, poaching, steaming, and baking using professional equipment and current technologies.
15. Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.
16. Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.
17. Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
18. Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
19. Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
20. Prepare various salads, dressings, marinades, and seasonings using safe handling and professional preparation techniques
24. Demonstrate professional plating, garnishing, and food presentation techniques.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.
TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.

CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.
TI1(9-12): I can implement a realistic plan and adapt when necessary to achieve my goals.
P3(9-12): I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

| | |
|---|---|
| **Understandings:** Students will understand that...<br>● Mastery of mise en place and advanced cooking principles is essential for achieving precision, consistency, and creativity in culinary arts, enabling students to execute recipes with efficiency and quality results.<br>● Mise en place, or "everything in its place," is a foundational culinary practice that promotes efficiency, organization, and precision in food preparation, reducing errors and enhancing workflow in both individual and team-based cooking environments.<br>● Proper seasoning enhances the natural flavors of food, elevating the sensory experience and demonstrating the cook's skill in balancing taste, aroma, and texture to meet diverse culinary expectations and preferences.<br>● The ability to accurately interpret a recipe is critical for culinary success, as it ensures correct ingredient usage, proper timing, and appropriate cooking techniques—skills that promote consistency, creativity, and adaptability in the kitchen.<br>● Cooking techniques differ in their methods, purposes, and outcomes—from moist heat to dry heat or combination methods—each influencing texture, flavor, and presentation. A deep understanding of these methods allows chefs to make informed decisions to achieve desired culinary results. | **Essential Questions:**<br>● How does understanding and practicing mise en place and advanced cooking principles enhance efficiency, creativity, and consistency in culinary execution?<br>● What is mise en place and its role in the kitchen?<br>● Why is seasoning food properly important to the final product?<br>● How important is understanding how to properly read a recipe?<br>● Are all cooking techniques the same? How do they compare and contrast? |
| **Students will know...**<br>● The differences between and how to execute cooking techniques.<br>● Recall basic preparation skills such as peeling, concasse, knife skills and how to season food. | **Students will be able to…**<br>● Properly read and execute a recipe.<br>● Demonstrate through comparing and contrasting most cooking techniques to include; Sautéing/Stir Frying, Pan-Frying/Deep Frying, Poaching/Steaming/Simmering. |

| | |
|---|---|
| • And identify the differences between stocks and broths.<br>• By comparing and contrasting, the importance of proper cooling, heating, cooking and holding foods at proper temperatures.<br>• The proper execution of most cooking techniques.<br>• Food needs to be properly seasoned for a successful recipe.<br>• Procedures such as the Standard Breading Procedure are necessary to successfully complete many recipes. | • Assess through repetition and tasting how to properly season food.<br>• Demonstrate and practice advanced knife skills.<br>• Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.<br>• Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.<br>• Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.<br>• Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.<br>• Prepare various salads, dressings and marinades using ratios.<br>• Understand and display proper food presentations.<br>• Identify the Standard Breading Procedure process. |
| **Key Vocabulary:** Recipe, Mise en Place, Stocks/Broths, Herbs, Spices, Seasonings, Stir Fry/Saute, Braise/Stew, Grill/Broil, Poach/Steam/Steam, Chiffonade, Concasse, Proper Knife Skills, Rubbed Dough Method | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Summative: Cooking labs to compare and contrast the following cooking techniques: Stir Fry/Saute, Braise/Stew, Grill/Broil, Poach/Steam/Steam, Deep Frying/Pan-Frying.<br>Chopped Mystery Basket group project. | **Other Evidence:**<br>Formative: Practicing preparation techniques such as Standard Breading Procedure, Concasse, Knife Skills, Preparing Sauces and Recipe Reading.<br>Interim: Written Group Project the will be presented, comparing and contrasting all cooking techniques. |
| **Learning Plan** | |
| Discussion, demonstrating then practicing properly the following:<br>• Reading a recipe TCC1(9-12)<br>• Standard breading procedure TCC1(9-12)<br>• Concasse and knife skills TI1(9-12), P3(9-12)<br>• Preparing broths and stocks CCE3(9-12), CCE4(9-12)<br>• Preparing recipes with the following techniques: Stir Fry/Saute, Braise/Stew, Grill/Broil, Poach/Steam/Steam, Deep Frying/Pan-Frying CCE3(9-12), CCE4(9-12) | |

| |
|---|
| • Chopped Mystery Basket group project TCC4(9-12), CCE3(9-12), CCE4(9-12) |
| **Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current. |

## Unit 3 - Meat, Poultry & Seafood Identification / Combination Dry & Moist Heat Cooking Techniques

### Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standard

Sanitation & Food Safety

E. Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.

Nutrition and Wellness Practices: Analyze factors that influence nutrition and wellness practices across the life span.

2. Explain the impact of physical, psychological, cultural, spiritual, and social influences on food choices.
3. Describe the impact of global and local events and conditions on the cost and availability of foods.

Culinary and Food Production

E. Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
13. Demonstrate professional skills in safe handling of knives, tools, and equipment.
14. Demonstrate professional skills for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising,stewing, poaching, steaming, and baking using professional equipment and current technologies.
15. Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.
16. Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.
17. Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
18. Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
19. Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
20. Prepare various salads, dressings, marinades, and seasonings using safe handling and professional preparation techniques
24. Demonstrate professional plating, garnishing, and food presentation techniques.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.

TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.
TI1(9-12): I can implement a realistic plan and adapt when necessary to achieve my goals.
P3(9-12): I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

**Understandings:** Students will understand that…

- A thorough knowledge of meat, poultry, and seafood identification, paired with the appropriate use of dry and moist heat cooking techniques, is crucial for maximizing flavor, texture, and success in the preparation of a wide variety of recipes.
- Stewing and braising are both moist-heat cooking techniques that tenderize tough cuts of meat through slow cooking; while stewing involves fully submerging smaller pieces in liquid, braising uses less liquid and typically involves larger cuts. Both methods develop rich flavors and textures through prolonged, gentle heat.
- Simmering and poaching both cook food gently in hot liquid, but differ in temperature and purpose. Poaching uses lower heat to preserve delicate texture, ideal for eggs or fish, while simmering uses slightly higher heat for ingredients like grains or tougher proteins, promoting thorough cooking and flavor infusion.
- Not all cuts are suited to braising or stewing; tougher, more connective tissue-rich cuts benefit most from slow, moist heat, while tender cuts may become dry or overcooked. Selecting the appropriate technique based on texture and structure is essential for optimal results.
- Fish and shellfish differ in anatomy, texture, and cooking requirements. Fish typically have soft, flaky flesh, while shellfish may be firmer or more delicate depending on the species. Understanding these differences helps ensure proper handling, preparation, and cooking for flavor, safety, and presentation.

**Essential Questions:**

- How does understanding the characteristics of different meats, poultry, and seafood, combined with the appropriate cooking techniques, influence the flavor, texture, and overall success of a dish?
- How do stewing and braising differ and what are their similarities?
- How do simmering and poaching differ and what are their similarities?
- Can all cuts of meat, poultry and seafood be braised or stewed?
- Are there differences between fish and shellfish?
- Is it necessary to season all meats, poultry and seafood before preparation?

| | |
|---|---|
| • Seasoning is essential to enhance natural flavors and improve texture during cooking. While methods may vary—such as marinades, rubs, or simple salt application—pre-seasoning contributes significantly to the taste, aroma, and overall quality of the final dish. | |
| **Students will know...**<br>• Proper storage methods to maintain freshness and prevent spoilage.<br>• What cuts of meat need to use the searing, poaching, simmering, braising and stewing techniques.<br>• Food safety practices to avoid cross-contamination and ensure the safe handling of raw products. | **Students will be able to…**<br>• Properly execute simmering, poaching, stewing and braising with meat and seafood.<br>• Choose the appropriate cuts of meat and seafood with the appropriate cooking method.<br>• Identify the safety and quality concerns when handling meat and seafood.<br>• Determine the doneness of various cuts of meat and seafood with the appropriate cooking techniques.<br>• Properly poultry fabrication into portion sized cuts.<br>• Interpret various indicators of freshness for various types of finfish and shellfish.<br>• Recognize common portions in which meats are cut.<br>• assess the freshness and quality of meat, poultry, and seafood through visual and sensory cues.<br>• properly identify what cuts of meats and seafood require which cooking methods.<br>• recognize the differences between lean and tough cuts of meat.<br>• associate previously learned safety and sanitation practices with the proper handling and storage methods for meat and poultry. |
| **Key Vocabulary:** Braise/Stew, Poach, Simmer, Butcher, Finfish, Shellfish, Bivalves, Shucking, Aquaculture, Fabrication, Searing, Dredging, Carry-over cooking, Jus, Nappe | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Summative: Students will break down a whole chicken and fabricate the different cuts for various recipes. | **Other Evidence:**<br>Interim: Preparing, comparing and contrasting a braising vs a stewing recipe.<br>Interim: Boning the chicken thighs, stuffing and roasting them.<br>Formative: Using the chicken bones to simmer chicken stock. |

| Learning Plan |
| --- |
| Class demonstrations and discussions.TCC1(9 -12) CCE4(9-12)<br>Comparing and contrasting project for various cooking methods. TCC3(9-12) CCE4(9-12) DE4(9-12) TI1(9-12)<br>Kitchen Labs to include fabrication of chicken, braising, stewing and roasting. TCC4(9-12)<br>Group kitchen labs. CCE3(9-12) CCE4(9-12) DE4(9-12) P3(9-12) |
| **Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current. |

# Unit 4 - Advanced Bakeshop

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standard

Sanitation & Food Safety

E. Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.

Nutrition and Wellness Practices: Analyze factors that influence nutrition and wellness practices across the life span.

2. Explain the impact of physical, psychological, cultural, spiritual, and social influences on food choices.
3. Describe the impact of global and local events and conditions on the cost and availability of foods.

Culinary and Food Production

E. Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
13. Demonstrate professional skills in safe handling of knives, tools, and equipment.
14. Demonstrate professional skills for a variety of cooking methods including pan frying, deep frying, poaching, steaming, and baking using professional equipment and current technologies.
15. Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.
16. Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.
22. Prepare breads, baked goods, and desserts using safe handling and professional preparation techniques.
24. Demonstrate professional plating, garnishing, and food presentation techniques.
F. Customer Service: Demonstrate the concept of internal and external customer service.
25. Demonstrate quality services that meet industry standards in the food service industry.
26. Analyze the relationship between employees and customer satisfaction.
24. Demonstrate professional plating, garnishing, and food presentation techniques.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.
TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.
TI1(9-12): I can implement a realistic plan and adapt when necessary to achieve my goals.
P3(9-12): I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

**Understandings:** Students will understand that…

- Advanced baking requires a balance of precision, refined technique, and creative expression to achieve consistent structure, texture, and flavor. Mastery of these elements transforms basic ingredients into visually appealing and professionally executed baked goods.
- Ingredient selection is critical in baking; variations in flour protein, sugar type, fat composition, and leavening agents directly influence the structure, tenderness, browning, and taste of baked goods. Understanding their properties allows bakers to tailor recipes to desired results.
- Mixing methods—such as creaming, folding, whipping, and the muffin method—affect gluten development, aeration, and batter consistency, which in turn influence crumb texture, rise, and product uniformity. Choosing the right method is essential for recipe success.
- Accurate measuring and scaling using appropriate tools and techniques ensures consistency and predictability in baked goods, which is critical in baking’s science-based processes. Precision prevents ingredient imbalances that can compromise texture, rise, or flavor.
- Oven temperature controls the rate of rise, caramelization, and moisture retention in baked goods. Proper calibration and

**Essential Questions:**

- How do precision, technique, and creativity in advanced baking contribute to the successful execution of pastries, breads and desserts?
- How do different types of flours, sugars, fats, and leavening agents impact the texture, flavor, and appearance of baked goods?
- How do different mixing methods affect the outcome of baked goods?
- What are the best practices for measuring and scaling ingredients accurately in baking?
- What are the effects of oven temperature on the cooking time and quality of baked goods?

| | |
|---|---|
| understanding of baking temperatures are vital for achieving ideal texture, color, and doneness without under- or over-baking. | |
| **Students will know…**<br><br>● The differences between mixing methods and categories of bakeshop items.<br>● Yeast and chemical leaveners are not interchangeable and their uses.<br>● That time management leads to success in creating baked goods.<br>● The importance of maintaining cleanliness in the baking environment to prevent contamination.<br>● Learn proper storage techniques for baked goods to maintain freshness and prevent spoilage.<br>● Understand the chemical reactions that occur during baking, such as caramelization and gluten formation.<br>● Proper Use of Equipment; familiarity with essential baking tools and equipment, including mixers, ovens and smallwares.<br>● The importance of accurate measuring and scaling of ingredients for consistent results in baking.<br>● The difference between cakes, pies, quickbreads and tarts.<br>● The difference between quick breads and yeast raised breads.<br>● The process for assembling a quality cake. | **Students will be able to…**<br><br>● Prepare a variety by understanding the proper mixing method.<br>● Prepare both yeast raised products and quickbreads by knowing how each's leavening agents react.<br>● Utilize the appropriate safety and kitchen sanitation strategies to produce safe products.<br>● Properly utilize the necessary tools to produce a variety of desserts.<br>● Prepare bulk quantities of desserts for Community Service events.<br>● Scale raw batters and doughs for production.<br>● Prepare cookies from each category.<br>● Prepare and decorate cakes.<br>● Create custards, creams and sauces.<br>● classify cakes according to mixing methods. |
| **Key Vocabulary:** All purpose flour, High and Low Gluten Flours, Yeast, Chemical Leaveners, Mixing Methods, Fermentation/Proofing, Cookie Categories, Kneading, Scaling, Blind Baking, Pie Dough Method, Well Method, Pastry Cream, Ganache, Quickbreads, Candy Thermometer | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Summatives:<br>● Baking and decorating layer cakes.<br>● Preparing desserts for Community service events.<br>● Frying donuts and beignets using yeast and chemical leaveners.<br>● Creating various pastries from pate au choux | **Other Evidence:**<br>Interim:<br>● Preparing individual cheesecakes.<br>● Completing labs with yeast raised breads, focaccia and sour dough.<br>● Group written project researching and presenting pastries from different cultures.<br>Formative: |

| | |
|---|---|
| | • Cookies for events such as Veterans Day, Staff Meetings and Special Occasions as needed |

**Learning Plan**

Class/Student demonstrations and discussions.TCC1(9 -12) CCE4(9-12)
Group written project researching and presenting pastries from different cultures.TCC3(9-12) CCE4(9-12) DE4(9-12) TI1(9-12)
Kitchen Labs to include quickbreads, yeast raised products, baked and fried pastries and layer cakes. TCC4(9-12)
Group kitchen labs. CCE3(9-12) CCE4(9-12) DE4(9-12) P3(9-12)
Community Service projects. DE4(9-12)

**Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current.

# Unit 5 - Breakfast Cookery

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standard

Sanitation & Food Safety: Evaluate factors that affect food safety, from production through consumption.

E. Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.

Culinary and Food Production

E. Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
13. Demonstrate professional skills in safe handling of knives, tools, and equipment.
14. Demonstrate professional skills for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising,stewing, poaching, steaming, and baking using professional equipment and current technologies.
15. Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.
16. Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.
17. Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
18. Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
19. Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
22. Prepare breads, baked goods, and desserts using safe handling and professional preparation techniques.
23. Prepare breakfast meats, eggs, cereal grains, and batter products using safe handling and professional preparation techniques.
24. Demonstrate professional plating, garnishing, and food presentation techniques.
F. Customer Service: Demonstrate the concept of internal and external customer service.
25. Demonstrate quality services that meet industry standards in the food service industry.
26. Analyze the relationship between employees and customer satisfaction.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.

TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.
TI1(9-12): I can implement a realistic plan and adapt when necessary to achieve my goals.
P3(9-12): I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

**Understandings:** Students will understand…

- Foundational techniques and intentional ingredient choices determine the flavor, texture, nutritional value, and appearance of breakfast foods. Mastery of these elements ensures well-balanced, visually appealing meals that meet professional culinary standards.
- Eggs can be boiled, poached, fried, scrambled, baked, or used in emulsions, each method affecting texture, structure, and flavor. Understanding heat application and technique allows chefs to produce consistent, high-quality results tailored to individual preferences.
- Modifying recipes to accommodate dietary needs involves substituting ingredients while maintaining texture, flavor, and visual appeal. Knowledge of alternative proteins, flours, and fats allows chefs to adapt meals that are inclusive, safe, and satisfying.
- Breakfast traditions reflect a culture's values, climate, available ingredients, and historical influences. Exploring global morning meals fosters cultural appreciation and broadens culinary perspectives through diverse flavor profiles and preparation methods.
- Preventing cross-contamination through proper sanitation, separation of tools and surfaces, and safe handling of raw foods is essential for protecting consumers' health and maintaining a professional standard of kitchen hygiene.

**Essential Questions:**

- How do the principles of basic cooking techniques and ingredient selection influence the preparation and presentation of breakfast recipes?
- What are the different cooking techniques for eggs and how do these methods impact the final dish?
- What are some strategies for modifying traditional breakfast dishes to suit vegetarian, vegan, gluten-free, or other special diets?
- What do traditional breakfast dishes reveal about a culture?
- How can cross-contamination be avoided when preparing breakfast meats, eggs, and other ingredients?
- What is the role of leavening agents in pancakes and waffles, and how do they contribute to the texture and rise of the final product?

| | |
|---|---|
| • Leavening agents like baking powder or baking soda create air pockets that give pancakes and waffles a light, fluffy texture. Correct use and balance of these ingredients directly impact volume, tenderness, and appearance. | |
| **Students will know…**<br><br>• The different cooking techniques for eggs.<br>• Why it is important to practice proper kitchen safety and sanitation with breakfast, especially egg dishes.<br>• How chemical and organic leaveners are used in breakfast cookery.<br>• Breakfast is a diverse meal globally.<br>• In today's society, there are many versions of a traditional breakfast.<br>• The functions are of breakfast cookery ingredients.<br>• How important it is to properly plate and present these items.<br>• Nutrition and Health Considerations.<br>• How timing is important when preparing breakfast, especially egg items.<br>• That breakfast in the United States is unique from what the rest of the world eats in the morning. | **Students will be able to...**<br><br>• Practice the variety of egg preparation methods and cooking techniques.<br>• Prepare breakfast items using different leaveners, batters and dough.<br>• Identify the components of a traditional American breakfast and compare/contrast with breakfast items from different cultures.<br>• Use proper kitchen safety and sanitation methods to prepare safe breakfast items.<br>• Identify and prepare traditional breakfast items with different ingredients that can be vegetarian and vegan friendly.<br>• Prepare and present a variety of breakfast items from mise en place to completion.<br>• prepare the different components of a balanced breakfast.<br>• prevent common issues like overcooked eggs, burnt toast, or undercooked pancakes |
| **Key Vocabulary:** poach, fry, baste, scramble, batter, dough, frittata, yeast, chemical leaveners, grits, omelets, plant based ingredients | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Summative:<br>Students will learn about and practice one breakfast item each month. These assessments will vary from traditional breakfast items to breakfast from different cultures. | **Other Evidence:**<br>Interim:<br>This assessment will be a group project in which the teams will research breakfast from a specific region of the world and compare it to a traditional American breakfast.<br><br>Formative: Groups will brainstorm a list of basic ingredients that can be added to pancake, french toast or waffle batter and discuss how this will affect the final product. |

| Learning Plan |
| --- |
| Class discussion regarding an overview of what breakfast is in America and how they perceive it globally. CCE3(9-12), CCE4(9-12), DE4(9-12),P3(9-12)<br>Poached egg project. CCE3(9-12), CCE4(9-12), DE4(9-12)<br>Monthly group breakfast cookery recipe labs. TCC1(9-12), TCC3(9-12), TCC4(9-12)<br>Group research and presentation project comparing and contrasting American breakfast to different cultures. CCE3(9-12), CCE4(9-12), P3(9-12) DE4(9-12)<br>Students will create lists of ingredients that can be added to breakfast batters and discuss how this will affect the final product. CCE3(9-12), CCE4(9-12)<br>The class may be called on to prepare breakfast items for catering events. TCC4(9-12) |
| **Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current. |

# Unit 6 - Exploring Culinary Arts through World Cultures

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standard

Sanitation & Food Safety: Evaluate factors that affect food safety, from production through consumption.

E. Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.

Culinary and Food Production

E. Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
13. Demonstrate professional skills in safe handling of knives, tools, and equipment.
14. Demonstrate professional skills for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising,stewing, poaching, steaming, and baking using professional equipment and current technologies.
15. Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.
16. Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.
17. Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
18. Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
19. Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
20. Prepare various salads, dressings, marinades, and seasonings using safe handling and professional preparation techniques.
Prepare sandwiches, canapés, and appetizers using safe handling and professional preparation techniques.
22. Prepare breads, baked goods, and desserts using safe handling and professional preparation techniques.
23. Prepare breakfast meats, eggs, cereal grains, and batter products using safe handling and professional preparation techniques.
24. Demonstrate professional plating, garnishing, and food presentation techniques.

Customer Service: Demonstrate the concept of internal and external customer service.
25. Demonstrate quality services that meet industry standards in the food service industry.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

TCC1(9-12): I can ask purposeful, insightful questions to find a variety of innovative solutions.
TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
CCE4(9-12): I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.
TI1(9-12): I can implement a realistic plan and adapt when necessary to achieve my goals.
P3(9-12): I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

**Enduring Understandings:** Students will understand…

- Integrating culinary traditions and techniques from around the world enhances culinary creativity, fosters a deeper appreciation of global cultures, and enriches our understanding of food's role in cultural expression. It allows us to see the similarities and differences of the world through food.
- Geographic factors like climate, terrain, and access to trade shape a region's ingredients and culinary practices. Understanding this connection reveals how cultures adapt to their environments and highlights the role of place in defining taste and technique.
- Traditional foods serve as historical records, reflecting colonization, migration, trade, and cultural exchange. Studying culinary heritage reveals how food evolves over time in response to social, political, and economic influences.
- Each culture has its own approach to achieving flavor harmony, influenced by local ingredients, preferences, and traditions. Recognizing these differences enhances palate development and promotes versatile, globally inspired cooking.
- Cultural celebrations and religious observances shape food choices, preparation styles, and meal timing. These customs connect people through shared meaning and reinforce identity and community through symbolic and traditional dishes.

**Essential Questions:**

- How do understanding and incorporating diverse culinary traditions and techniques from around the world broaden our cooking skills and contribute to a greater appreciation of global cultures within our own?
- How does geography influence the ingredients and cooking methods of a culture's cuisine?
- How do specific dishes, ingredients, or cooking methods reflect the history of a culture?
- How do different cultures balance flavors (sweet, salty, sour, bitter, umami) in their cuisine?
- How do festivals, rituals, and religious practices influence the foods eaten in various cultures?
- What are some challenges and solutions for recreating authentic dishes with limited access to traditional ingredients or tools?

| | |
|---|---|
| • Recreating authentic global dishes often requires adaptation. By understanding the purpose of each component or technique, chefs can make informed substitutions that maintain cultural integrity while embracing resourcefulness and creativity. | |
| **Students will know…**<br><br>• How culinary arts are connected to different cultures, history, and geography.<br>• How historical influences, geography and climate play a major role in global cuisine.<br>• What role traditional cooking techniques play in understanding international foods.<br>• How religion, festivals and holidays play a major role in global cuisine.<br>• How food is the common connector to people and cultural diplomacy.<br>• The diverse culinary traditions around the world, as well as the cultural, historical, religious and social contexts that create them.<br>• Global cuisines and cultural diversities.<br>• How ingredients affect global cuisine.<br>• What the differences are with global street foods through cooking methods, tradition and ingredients.<br>• identity, traditions, and values of different societies. | **Students will be able to...**<br><br>• Develop the skills to recreate and adapt global cuisines with respect and authenticity within the limits of our classroom.<br>• Utilize ingredients, not common to American cuisine, to identify and recreate foods from other cultures.<br>• Demonstrate cultural cooking techniques.<br>• Analyze the influence of culture, history and geography on cuisine.<br>• Adapt recipes for specific dietary needs.<br>• Explore the role of food in cultural events and traditions.<br>• Respect and appreciate cultural diversity through culinary arts.<br>• Collaborate on multicultural group projects.<br>• Connect cultural diversity through cuisine. |
| **Key Vocabulary:** Puposa, Pastels, Pegao, Braising, Deep Frying, Global Pasta, Risotto, Gelato, Beignets, Empanada, Curry, Pho, Flaky Dough, Gyoza, Focaccia, Galette | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Summative:<br>Students will learn about and practice two recipes from different cultures each month. | **Other Evidence:**<br>Interim:<br>These assessments will be group projects in which the teams will research the cuisine from a specific region of the world and explore it through such factors as geography, history, religion and climate. |

| | |
|---|---|
| | Formative: Groups will brainstorm a list of basic ingredients that are used in different cuisines. Some of these ingredients American cuisine uses in a different way and some are foreign to our culture. |
| **Learning Plan** | |
| Class discussion regarding an overview of what culture and cuisine are and how the cuisine of a region of the world has evolved. CCE3(9-12), CCE4(9-12), DE4(9-12),P3(9-12)<br>Ingredients project. CCE3(9-12), CCE4(9-12), DE4(9-12)<br>Monthly group International cuisine labs. TCC1(9-12), TCC3(9-12), TCC4(9-12)<br>Group research and presentation project researching different world cultures through their cuisine. CCE3(9-12), CCE4(9-12), P3(9-12) DE4(9-12)<br>The class will prepare some of these items for Bistro offerings to the staff. TCC4(9-12) | |
| **Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current. | |

# Unit 7 - Catering and Community Service

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

Connecticut Career & Technical Education Performance Standards and Competencies & Common Core Standard

Sanitation & Food Safety: Evaluate factors that affect food safety, from production through consumption.

E. Food Safety: Evaluate factors that affect food safety, from production through consumption with a demonstration and group cooking lab.

Menu Planning: Demonstrate menu planning principles and techniques based on standardized recipes to meet customer needs.

11. Apply menu-planning principles to develop and modify menus.
12. Analyze food, equipment, and supplies needed for menus.

Culinary and Food Production

E. Professional food Preparation Methods and Techniques: Demonstrate professional food preparation methods and techniques for all menu categories to produce a variety of food products that meet customer needs.
13. Demonstrate professional skills in safe handling of knives, tools, and equipment.
14. Demonstrate professional skills for a variety of cooking methods including roasting, broiling, smoking, grilling, sautéing, pan frying, deep frying, braising,stewing, poaching, steaming, and baking using professional equipment and current technologies.
15. Utilize weight and measurement tools to demonstrate knowledge of portion control and proper scaling and measurement techniques.
16. Apply the fundamentals of time, temperature, and cooking methods to cooking, cooling, reheating, and holding a variety of foods.
17. Prepare various meats, seafood, and poultry using safe handling and professional preparation techniques.
18. Prepare various stocks, soups, and sauces using safe handling and professional preparation techniques.
19. Prepare various fruits, vegetables, starches, legumes, dairy products, fats, and oils using safe handling and professional preparation techniques.
20. Prepare various salads, dressings, marinades, and seasonings using safe handling and professional preparation techniques.
21. Prepare sandwiches, canapés, and appetizers using safe handling and professional preparation techniques.
22. Prepare breads, baked goods, and desserts using safe handling and professional preparation techniques.
23. Prepare breakfast meats, eggs, cereal grains, and batter products using safe handling and professional preparation techniques.
24. Demonstrate professional plating, garnishing, and food presentation techniques.

Customer Service: Demonstrate the concept of internal and external customer service.

25. Demonstrate quality services that meet industry standards in the food service industry.
26. Analyze the relationship between employees and customer satisfaction.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.
CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
AA3(9-12): I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.

**Understandings:** Students will understand that…

- Mastering catering management, timing, planning and table service skills are important for delivering exceptional dining experiences and ensuring high levels of customer satisfaction.
- Successful menu planning for diverse audiences requires attention to dietary needs, cultural preferences, flavor variety, and food allergies. Inclusive, balanced menus reflect respect for all guests and demonstrate professional awareness of culinary equity and hospitality.
- In catering, strict food safety and sanitation practices prevent contamination and ensure public health. Consistent monitoring of temperature, cross-contamination risks, personal hygiene, and transport protocols is essential when serving food off-site to large groups.
- Culinary arts empower students to serve their communities by preparing meals for shelters, fundraisers, or events. These experiences foster empathy, responsibility, and a deeper understanding of how food can nourish both body and community.
- Effective teamwork ensures efficiency, quality, and positive outcomes in catering and service projects. Clear communication, task delegation, and collaboration build

**Essential Questions:**

- How do efficient and effective catering management and table service techniques impact the overall dining experience and customer satisfaction?
- What are the most important considerations when creating a menu for a diverse audience?
- Why is food safety and sanitation critical in catering, and how can it be maintained during large events?
- How can culinary arts be used for community service?
- What role does teamwork play in the success of a catering or community service project?
- How can feedback from clients and participants be used to improve future catering and community service efforts?

| | |
|---|---|
| professional kitchen habits and contribute to meaningful, well-executed events.<br>● Constructive feedback is a valuable tool for growth, helping culinary professionals refine their practices, enhance customer satisfaction, and improve organization and execution for future events. It fosters a mindset of continuous improvement and excellence. | |
| **Students will know…**<br>● The skills, responsibilities, and ethical considerations involved in catering and community service, preparing them to apply these concepts both in professional settings and in giving back to their communities.<br>● What role Food Safety and Sanitation play.<br>● How to properly present food for large scale and ala carte events.<br>● How to properly assist with the coordination and execution of a catered event.<br>● The impact of Community Service and how important building relationships are.<br>● What teamwork, leadership, flexibility and feedback mean to the success of an event. | **Students will be able to…**<br>● Plan and organize catering events.<br>● Assist with designing and preparing menus.<br>● Implement Food Safety and Sanitation practices.<br>● Prepare and present the menu.<br>● Serve and interact with guests.<br>● Conduct community service projects.<br>● Lead and work in teams.<br>● Self reflect and improve performance.<br>● Determine a budget and project costs |
| **Key Vocabulary:** Menu Design, Planning, Execution, Scaling Recipes, Portion Control, Safety & Sanitation, Community Relations, Engaging with Guests, Yield, Mise en Place, Batch Cooking, Teamwork, Collaboration | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>Summative:<br>Students will participate from planning and service to reflection in two Senior Citizen Community Service meals. | **Other Evidence:**<br>Interim:<br>Real world Bistro service projects scheduled several times per year.<br>Middle School soup collaboration for the region's Senior Citizens.<br>Veteran's Day catering project.<br>Staff meeting catering projects.<br>Various catering projects as requested.<br><br>Formative: Community Service reflection assignments. |

| Learning Plan |
| --- |
| TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.<br>CCE3(9-12): I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.<br>DE4(9-12): I can work respectfully with all members of my community and support the needs of others.<br>TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.<br>AA3(9-12): I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.<br><br>Class discussion regarding an overview of our year's projects and Community Service. CCE3(9-12), DE4(9-12)<br>Instructor and student demonstrations of project components. TCC4(9-12), CCE3(9-12),<br>Preparation of each component of Catering/Community Service projects. TCC4(9-12), CCE3(9-12), DE4 (9-12), TI4(9-12), AA3(9-12)<br>Group research and presentation project researching various recipes for catering projects. TCC4(9-12), CCE3(9-12), DE4 (9-12), TI4(9-12), AA3(9-12)<br>Community Service and Catering presentation and service. TCC4(9-12), CCE3(9-12), DE4 (9-12), TI4(9-12), AA3(9-12)<br>Reflection on each Community Service project. TCC4(9-12) |
| **Teacher Resources:** The Culinary Professional, Goodheart-Wilcox Publisher, Second Edition; Servsafe Essentials, fifth Edition, National Restaurant Solutions; The New Professional Chef, The Culinary Institute of America, Sixth Edition; Instructional Videos; Resources may be added to keep current. |

# INTEGRATED FOOD SCIENCE AND PRODUCTION CURRICULUM







**Grade Level(s):** 11-12

**Curriculum Author(s):** Kathleen Gorman

**Course Description:**
This course integrates key concepts of livestock science and food science, focusing on producing, processing, and marketing livestock-derived food products. Students will gain comprehensive knowledge of livestock management, meat and dairy science, food safety, and sustainable practices, preparing them for careers in the livestock and food industries. After completion of this course, students will be able to understand the principles of livestock production and management, apply knowledge of meat and dairy science to improve product quality and safety, develop effective marketing strategies for livestock products, implement sustainable practices, and utilize innovative technologies in livestock and food production and analyze and respond to trends and challenges in the livestock and food industries. This course aims to provide students with a holistic understanding of the intersection between livestock science and food science, equipping them with the skills needed to address contemporary issues in the field. Every student must maintain and document an approved supervised agriculture experience (SAE) project and actively participate in the Woodbury FFA Chapter to develop premier leadership, personal growth, and career success through attending FFA meetings and participating in chapter events and planning.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner "I Can" Statements** |
| Food Safety Investigation | How can we ensure the safety and quality of food from producer to consumer to protect public health and prevent foodborne illnesses? | Ensuring food safety requires a comprehensive understanding of the biological, chemical, and physical hazards that can contaminate food and implementing effective practices and regulations to mitigate these risks. Maintaining rigorous safety standards from production to consumption can protect public health and prevent foodborne illness, ensuring a safe and reliable food supply. | TI2(9-12), CCE1(9-12), CCE4(9-12), DE1(9-12), AA3(9-12) |
| Dairy Herd Management | How can we apply specialized knowledge and best practices in the care and management of dairy cattle to ensure their health, productivity, and welfare throughout their lifecycle/? | Proper care and management of dairy cattle require a deep understanding of their nutritional, health, and welfare needs. By implementing best practices and evidence-based strategies, we can enhance the well-being and productivity of dairy cattle, leading to a sustainable and efficient dairy production system. | TI3(9-12), TCC2(9-12), CCE2(9-12), CCE3(9-12), P3(9-12) |
| Milk Quality and Products | How do we transform raw milk into safe, high-quality dairy products, and what processes ensure their safety, nutritional value, and appeal to consumers? | The transformation of raw milk into various dairy products involves a series of complex processes that ensure safety, quality, and nutritional value. Understanding these processes, from milking and pasteurization to fermentation and packaging, is essential for producing dairy products that meet consumer expectations and regulatory standards. | TI3(9-12), TCC1(9-12), CCE1(9-12), CCE3(9-12), P4(9-12), AA3(9-12) |
| Animal Proteins | How do we sustainably produce and process animal proteins to meet | Producing and processing animal proteins sustainably involves understanding animal | TI3(9-12), CCE3(9-12), DE1(9-12), DE2(9-12), |

| | | | |
|---|---|---|---|
| | global nutritional needs while considering health, ethical, and environmental impacts? | agriculture's biological, nutritional, and environmental aspects. By balancing the need for high-quality protein sources with considerations for animal welfare, human health, and environmental sustainability, we can develop practices that ensure a reliable and ethical supply of animal proteins to meet global nutritional demands. | DE3(9-12), P2(9-12), AA1(9-12), AA2(9-12) |
| Poultry Flock Management | How can we apply specialized knowledge and best practices in the care and management of poultry to ensure their health, productivity, and welfare throughout their lifecycle? | Effective poultry care and management require a comprehensive understanding of their nutritional, health, and welfare needs. By implementing evidence-based practices and maintaining optimal living conditions, we can enhance poultry well-being and productivity, contributing to a sustainable and efficient poultry production system. | TCC2(9-12), CCE1(9-12), P2(9-12), AA1(9-12), AA3(9-12) |
| Food Product Development | How can we design and develop innovative food products that meet consumer taste, nutrition, and sustainability demands? | Developing new food products requires a blend of creativity, scientific knowledge, and an understanding of consumer preferences. By integrating principles of food science, nutrition, and sustainable practices, we can create food products that are appealing, nutritious, environmentally responsible, and aligned with current market trends. | TCC3(9-12), CCE4(9-12) |

# Unit 1 - FOOD SAFETY INVESTIGATION

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resource Standards**

**FPP.01.01** Distinguish between various food safety programs and management systems in food products and processing facilities.
**FPP.01.02** Apply food safety and quality assurance procedures in the harvesting, handling and processing of food products.
**FPP.01.03** Apply food safety procedures during storage and distribution to ensure food quality.
**FPP.03.01** Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.
**FPP.04.01** Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.
**FPP.04.02** Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.
**FPP.04.03** Identify the purpose of industry organizations, groups, and regulatory agencies that influence the local and global food systems.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**BS.01.02** Evaluate the roles, scope, and implications of regulatory agencies in applications of biotechnology in agriculture and protection of public interests (e.g., health, safety, environmental issues, etc.).
**BS.02.01** Read, document, evaluate, and secure accurate laboratory records of experimental protocols, observations, and results.
**BS.02.02** Identify and apply standard laboratory procedures and equipment maintenance to create and maintain reliable data.
**BS.02.05** Examine and perform scientific procedures using microbes, DNA, RNA and proteins in a laboratory.
**BS.03.02** Apply biotechnology principles, techniques, and processes to enhance the production of food through the use of microorganisms and enzymes.

**Common Core State Standards**

**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as

inferences drawn from the text, including determining where the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on the explanations in the text.
**ELA-LITERACY.RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
**ELA-LITERACY.W11-12.9** Draw evidence from literary or information texts to support analysis, reflections and research.
**ELA-LITERACY.WHST.11-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
**ELA-LITERACY.WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection, and research.

**Next Generation Science Standards**

**HS-LS3-1** Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
**HS-LS3-3** Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
**HS-ETS1-3** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**CCE1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE1(9-12):** I can acknowledge, process and respond appropriately to others' comments and perspectives.
**AA3(9-12):** I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.

**Understandings:** Students will understand that...

- By exploring aspects of safe food handling in a retail situation individuals can become informed consumers and industry professionals.
- The safety of our food supply is dependent on a complex system involving agriculture processing, transportation and regulation.
- Effective food safety practices involve identifying potential risks,

**Essential Questions:**

- Why is food safety important?
- What are the three categories of food safety standards?
- What is foodborne illness?
- What segments of the population are most susceptible to foodborne illness?
- What conditions increase microbial growth in food?
- How do agricultural commodities move from farm to table?

| | |
|---|---|
| implementing preventative measures, and responding to emergencies.<br>● Food safety is governed by a range of regulations and standards designed to protect public health. Awareness of these regulations help us understand how they contribute to the safety and quality of the food we consume.<br>● Individuals play a crucial role in ensuring food safety through proper handling, storage, and preparation of food.<br>● Food safety issues have both local and global implications.<br>● Recognizing how global practices, trade, and environmental factors affect our local food supply helps us understand the broader context of food safety challenges.<br>● Advances in technology and science contribute to improving food safety but also introduce new challenges.<br>● Ensuring food safety involves ethical considerations, including fair treatment of workers, sustainable practices and minimizing environmental impact. | ● What are some ways that food producers and consumers can minimize food safety hazards?<br>● How are food safety issues relevant to students' lives as consumers and potential future producers?<br>● How can students reduce microbial risks during food handling and prevent foodborne illness? |
| **Students will know...**<br>● The relationship between food safety hazards and foodborne illness.<br>● Characteristics of bacteria, viruses, parasites, yeasts, and molds associated with foods.<br>● The uses of bacteria, yeasts, and molds in the food industry.<br>● Three causes of food spoilage: microbial factors, natural food enzymes, and other factors.<br>● The definition of the acronym "FATTOM" and factors affecting microbial growth.<br>● The difference between infection, intoxication, and toxin-mediated infection.<br>● The twelve most common or dangerous foodborne pathogens.<br>● The definition of Good Agricultural Practices (GAPs) in food science and technology.<br>● The definition of the 4 C's of safe food handling. | **Students will be able to...**<br>● Distinguish between three types of food safety hazards associated with food contamination.<br>● Identify some common microorganisms that cause foodborne illnesses and recognize symptoms common to each.<br>● Identify five types of microorganisms.<br>● Record observations of five microorganisms using microscope slides.<br>● Examine samples of different foods and determine factors that caused the changes.<br>● Work in a team to create a research presentation.<br>● Identify several paths food could take as it moves from farm to table.<br>● Determine where physical, chemical, and biological hazards could contaminate food.<br>● Identify methods used in developing a traceback system.<br>● Read and analyze a foodborne illness outbreak report.<br>● Determine ways contamination risks could be reduced during product movement.<br>● Write a professional letter evaluating the strengths and |

| | |
|---|---|
| | weaknesses of a farm operation.<br>● Demonstrate minimizing food safety hazards through proper handling, preparation, and storage techniques. |

**Key Vocabulary:**
antibiotics, bacteria, beneficial microorganisms, chlorine, compost, contamination, cross-contamination, drip irrigation, enzyme, fecal coliform bacteria, flume, food additive, food spoilage, foodborne illness, food safety, fungi, good agricultural practices (GAPs), hazards, hygiene, infection, intoxication, lot, microbial spoilage, microorganism, parasites, pathogen, potable, sanitize, standard operating procedures (SOPs), sanitation standard operating procedures (SSOPs), toxin, toxin-mediated infection, traceback, vacuum cooling, viruses

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| *Summative*: Investigate a foodborne illness outbreak to understand its causes and impacts on public health. **DE1**<br><br>*Interim*: Design a public awareness campaign to educate the community about a common foodborne pathogen that puts the food system at risk. **CCE4**<br><br>*Classwork:* Conduct a workshop on safe food handling practices applying food preservation techniques, such as canning, to prevent foodborne pathogen growth. **AA3**<br><br>*Classwork:* Conduct a mock food safety audit to assess the safety practices of a food processing facility. **CCE4** | *Classwork:* Conduct a literary analysis of the text *The Jungle* by Upton Sinclair. **CCE1**<br><br>*Classwork*: Perform a risk assessment on a food production process and propose a risk management plan. **CCE4** |

**Learning Plan**

- Research the twelve most common foodborne pathogens in the food system. **TI2**
- Investigate a foodborne illness outbreak to understand its causes and impacts on public health. **DE1**
- Evaluate food safety practices to maintain a safe and healthy environment. **AA3**

**Teacher Resources:**
Teacher Created Resources

# Unit 2 - DAIRY HERD MANAGEMENT

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Standards**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.
**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.
**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.
**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).
**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.
**ABS.05.01** Determine the role of markets, trade, competition, and price in relations to an AFNR business sales and marketing

plans.
**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.
**PST.04.01** Create plans for AFNR structures.
**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS3-2**

**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TI3(9-12):** I can formulate and investigate probing questions to further my learning.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**CCE2(9-12):** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions.
**CCE3(9-12):** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback,and working with others to solve problems and/or design products.
**P3(9-12):** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.

**Understandings:** Students will understand that...

- Unique characteristics, strengths, and purposes of different dairy cattle breeds are essential for effective management and production in the dairy industry.
- Effective dairy cattle management involves a comprehensive approach that integrates animal health, nutrition, genetics, and environmental stewardship.
- There is a strong relationship between the welfare of dairy cattle and their productivity. Proper care, including adequate housing, nutrition and veterinary care, is essential for maintaining high levels of milk production and overall health.
- Dairy cattle have specific nutritional requirements that must be met to optimize milk production and health. Balancing their diet with the right nutrients and feed types is crucial for maintaining a productive and healthy herd.
- Genetic selection and breeding practices play a significant role in improving dairy cattle traits such as milk yield, disease resistance, and overall health.
- Dairy cattle management practices have environmental implications, including waste management, water usage, and greenhouse gas emissions. Implementing sustainable practices

**Essential Questions:**

- What differences exist between the major breeds of dairy cattle?
- How do various aspects of dairy cattle management (health, nutrition, genetics) interrelate to influence the overall productivity and welfare of the herd?
- What are the key factors in designing a balanced and effective nutritional program for dairy cattle, and how do these factors impact milk production and health?
- How do breeding and genetic selection impact the performance and health of dairy cattle, and what are the ethical considerations involved?
- In what ways do dairy cattle management practices affect the environment, and what strategies can be implemented to minimize negative environmental impacts?
- How can dairy farmers balance the economic aspects of production with the need to maintain high standards of animal welfare and sustainability?
- What role does technology play in modern dairy cattle management, and how can it be utilized to improve animal care and farm efficiency?

| | |
|---|---|
| helps mitigate these impacts and supports environmental stewardship.<br>● Managing a dairy operation involves understanding economic principles such as cost of production, market prices, and financial planning.<br>● Effective management strategies help ensure the financial viability of dairy farming. | |
| **Students will know...**<br>● Advantages and disadvantages of different cattle breeds in various dairy production systems.<br>● Historical development and geographic distribution of dairy cattle breeds and their significance in the global dairy industry.<br>● Key parts of a dairy business that must be managed to ensure a profitable business.<br>● Types of barns and environments that dairy cattle are housed in.<br>● Methodology to manage a milking parlor including, but not limited to, procedures for detecting, testing, and treating mastitis.<br>● The major dairy regions of the United States.<br>● Dairy cattle housing that demonstrates best management practices (BMPs)<br>● Common diseases and ailments of dairy cattle animals.<br>● The basics of reproduction include, but not limited to, the length of pregnancy, reproductive anatomy, hormones involved in reproduction and the artificial insemination process.<br>● Environmental stewardship techniques dairy producers implement to protect the productivity of their land. | **Students will be able to...**<br>● Identify and describe the major breeds of dairy cattle, including their physical characteristics, milk production qualities, and temperament.<br>● Utilize industry “benchmarks” to determine how efficiently and profitably a farm is functioning.<br>● Design a dairy facility to the specifications of a hypothetical client.<br>● Perform a California Mastitis Test to determine possible mastitis infections in dairy animals.<br>● Analyze economic data to explain the economic impact the dairy industry has on the United States economy.<br>● Perform animal treatment techniques safely and confidently.<br>● Create a preliminary diagnosis given signs, symptoms and observations of a dairy cattle animal.<br>● Perform the artificial insemination technique on a model animal.<br>● Interpret information on DHIA reports to determine how a dairy herd is performing and make education recommendations regarding management decisions. |
| **Key Vocabulary:**<br>artificial insemination, Ayrshire, benchmark, best management practice, breed, Brown Swiss, bunk space, calf hutch, California Mastitis Test, claw, composting, conservation, contagious mastitis, dairy farm, dairy products, economy, environmental mastitis, estrous cycle, estrus, estrus synchronization, export, freestall barn, free stall barn, gestation, group pen, Guernsey, head, Holstein, import, Jersey, mastitis, maternity pen, milk, Milking Shorthorn, milking stall, milking unit, milk line, pack barn, protocol, recordkeeping, recycling, regions, reproductive tract, robotic milking unit, rotational grazing, somatic cell count, teat cup, teat dip, tie stall barn, vacuum line, wean | |
| **Assessment Evidence** | |

| | |
|---|---|
| **Performance Tasks:**<br>*Classwork:* Analyze the performance of a dairy herd based on production, health, and reproductive metrics. **CCE3**<br><br>*Classwork:* Design a dairy cattle facility that includes pens, feeding areas, water sources, and handling systems that consider animal welfare biosecurity, and efficient management practices. **TCC2**<br>*Classwork:* Perform a California Mastitis Test on a milk sample to determine the level of infection in an animal. **TI3** | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment.<br><br>*Summative:* Written summative (test) assessment. |

**Learning Plan**

- Explore and identify the six dairy cattle breeds. **P3**
- Design and evaluate dairy cattle facilities according to best management practices. **TCC2**
- Perform a California Mastitis Test on milk samples. **TI3**
- Interpret production data to evaluate the productivity of a dairy cattle herd. **CCE2**

**Teacher Resources:**
Teacher Created Resources
Dairy Leaders of Tomorrow Online Platform

# Unit 3 - MILK QUALITY AND PRODUCTS

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resource Standards**

**FPP.01.01** Distinguish between various food safety programs and management systems in food products and processing facilities.
**FPP.01.02** Apply food safety and quality assurance procedures in the harvesting, handling and processing of food products.
**FPP.01.03** Appy food safety procedures during storage and distribution to ensure food quality.
**FPP.02.02** Apply principles of microbiology and chemistry to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.
**FPP.03.01** Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.
**FPP.03.02** Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.
**FPP.04.02** Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.
**FPP.04.03** Identify the purpose of industry organizations, groups and regulatory agencies that influence the local and global food systems.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.04.01** Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.
**BS.01.01** Investigate and explain the relationships in the timeline of developing biotechnology applications and techniques in agriculture (e.g., major innovators, historical developments, potential applications of biotechnology, etc.).
**BS.01.03** Analyze the relationship and implications of bioethics, laws, and public perceptions on applications of biotechnology in

agriculture (e.g., ethical, legal, social, cultural issues).
**BS..03.02** Apply biotechnology principles, techniques, and processes to enhance the production of food through the use of microorganisms and enzymes.
**BS.03.05** Apply biotechnology principles, techniques, and processes to produce bioproducts (e.g., fermentation, transesterification, methanogenesis, etc.).
**BS.02.05** Examine and perform scientific procedures using microbes, DNA, RNA, and proteins in a laboratory.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matter uncertain.
**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or information texts to support analysis, reflection, and research.
**ELA-LITERACY.RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
**ELA-LITERACY.WHST.11-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
**ELA-LITERACY.WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection, and research.
**MATH.CONTENT.HSN.Q.A.1** Use units as ways to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

**Next Generation Science Standards**

**HS-LS3-1** Ask questions to clarify relationships about the role of DNA and chromosomes in coding instructions for characteristic traits passed from parents to offspring.
**HS-LS3-3** Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TI3(9-12):** I can formulate and investigate probing questions to further my learning.

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**CCE1(9-12):** I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others and responding thoughtfully with peer-reviewed evidence that is free of bias.
**CCE3(9-12):** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**P4(9-12):** I can take-on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through personal experience that failures are more instructive.
**AA3(9-12):** I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.

**Understandings:** Students will understand that...

- Milk quality is crucial in determining the safety, taste, and shelf life of dairy products, and is influenced by factors such as somatic cell count, bacterial contamination, and handling practices.
- Proper handling and storage of milk are essential to maintaining its quality, preventing spoilage, and ensuring it is safe for consumption.
- Dairy product production involves various processes that transform raw milk into consumable products like cheese, butter, and yogurt, each with unique sensory characteristics and potential defects.
- Sensory evaluation is a critical tool in the dairy industry for assessing the quality of milk and dairy products, identifying defects, and maintaining consumer satisfaction.
- Processing milk into dairy products involves a series of steps that transform raw milk into consumable goods like cheese, butter, and yogurt, with each step critically affecting the quality, flavor, and texture of the final product.
- Milk testing and evaluation are necessary for monitoring and ensuring the quality of milk which directly impacts the overall quality of dairy products.

**Essential Questions:**

- How do milk quality, handling practices, and product evaluation processes ensure the production of safe, high-quality dairy products?
- What are the key factors that influence the quality of milk, and why is milk quality crucial in the dairy industry?
- In what ways do milk handling and storage practices affect milk quality and shelf life?
- How do different processing methods transform raw milk into various dairy products, and how do these methods impact the quality of the final product?
- How can sensory evaluation be used to assess the quality of dairy products and identify potential defects?
- How are milk quality tests conducted, and what do the results reveal about the safety and suitability of milk for dairy product production.
- How do the various processes used to convert raw milk into dairy products influence the quality, taste, and texture of the final products?
- How can knowledge of milk quality and dairy product evaluation be applied in real-world dairy production and processing to ensure high standards?

**Students will know...**

- Factors that affect milk quality, including somatic cell count, bacterial contamination, and temperature control.
- Proper handling and storage practices required to maintain milk quality.
- Basic processes involved in producing dairy products like

**Students will be able to…**

- Identify and describe the key factors that affect milk quality, including somatic cell count, bacterial contamination, and temperature control.
- Evaluate milk samples for quality indicators using laboratory techniques such as pH testing, somatic cell count, and bacterial

| | |
|---|---|
| cheese, butter, and yogurt.<br>• Sensory characteristics of various dairy products and how to identify common defects.<br>• Methods used to test and evaluate milk quality and interpret the results.<br>• The importance of milk quality and sensory evaluation in ensuring the safety and quality of dairy products in the marketplace.<br>• Key steps involved in processing milk into dairy products such as cheese, butter, and yogurt.<br>• The role of ingredients, temperature control, and timing in the quality and characteristics of dairy products.<br>• Common challenges and defects that can occur during dairy product processing. | culture.<br>• Analyze the impact of milk handling and storage practices on milk quality and shelf life.<br>• Compare and contrast different types of dairy products, including milk, cheese, butter, and yogurt, based on production processes and sensory characteristics.<br>• Conduct sensory evaluations of dairy products, identifying defects and assessing product quality.<br>• Apply knowledge of milk quality and product evaluation to make informed decisions in dairy production and processing.<br>• Apply proper techniques to produce different dairy products such as cheese, yogurt, butter and other products.<br>• Demonstrate the process of making cheese, butter, and yogurt from raw milk.<br>• Apply temperature control and ingredient management techniques to produce high quality dairy products.<br>• Identify and troubleshoot defects in the production process that may affect the quality of the final product. |

**Key Vocabulary:**
bacterial contamination, butterfat, cheddaring, coagulation, creaming, curdling, dairy starter culture, emulsification, fermentation, homogenization, ice cream overrun, lactase, lactose, microbial spoilage, milk fat, milk solids-not-fat (MSNF), pasteurization, pasteurization temperature, pH level, probiotics, rennet, ripening, sensory evaluation, shelf life, Somatic Cell Count (SCC), starter culture, ultrafiltration, whey, yield, yogurt incubation

**Assessment Evidence**

| | |
|---|---|
| **Performance Tasks:**<br>*Classwork:* Determine the fat content of various dairy products using the Babcock test or other appropriate methods. **TI3**<br><br>*Classwork:* Test milk samples for bacterial contamination using standard microbiological techniques. **TCC1**<br><br>*Interim:* Identify various dairy products based on taste, texture and other sensory characteristics. **P4**<br><br>*Summative:* Evaluate the quality of milk samples using sensory analysis, chemical tests, and temperature checks. **AA3** | **Other Evidence:**<br>*Classwork:* Identify common defects in milk and other dairy products and propose solutions to prevent these defects. **AA3**<br><br>*Classwork:* Analyze the factors influencing milk pricing and develop a marketing strategy for a dairy product. **CCE1**<br><br>*Interim:* Create and deliver a presentation on a current issue or trend in the dairy industry that affects milk quality. **CCE3** |

| Learning Plan |
| --- |
| ● Participate in a mock Milk Quality and Products career development event contest. **CCE3**<br>● Test milk samples for quality and bacterial contamination. **TCC1**<br>● Identify various dairy products based on taste, texture and other sensory characteristics. **P4** |
| **Teacher Resources:**<br>Teacher Created Resources<br>National FFA Milk Quality and Products CDE Resources |

# Unit 4 - ANIMAL PROTEINS

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resource Standards**

**FPP.01.01** Distinguish between various food safety programs and management systems in food products and processing facilities.
**FPP.01.02** Apply food safety and quality assurance procedures in the harvesting, handling and processing of food products.
**FPP.01.03** Appy food safety procedures during storage and distribution to ensure food quality.
**FPP.02.02** Apply principles of microbiology and chemistry to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.
**FPP.03.01** Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.
**FPP.03.02** Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.
**FPP.04.02** Evaluate the significance and implications of changes and trends in the food products and processing industry in the local and global food systems.
**FPP.04.03** Identify the purpose of industry organizations, groups and regulatory agencies that influence the local and global food systems.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.04.01** Analyze characteristics and planning requirements associated with developing business plans for different types of AFNR businesses.
**BS.01.01** Investigate and explain the relationships in the timeline of developing biotechnology applications and techniques in agriculture (e.g., major innovators, historical developments, potential applications of biotechnology, etc.).
**BS.01.03** Analyze the relationship and implications of bioethics, laws, and public perceptions on applications of biotechnology in agriculture (e.g., ethical, legal, social, cultural issues).
**BS..03.02** Apply biotechnology principles, techniques, and processes to enhance the production of food through the use of

microorganisms and enzymes.
**BS.03.05** Apply biotechnology principles, techniques, and processes to produce bioproducts (e.g., fermentation, transesterification, methanogenesis, etc.).
**BS.02.05** Examine and perform scientific procedures using microbes, DNA, RNA, and proteins in a laboratory.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matter uncertain.
**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or information texts to support analysis, reflection, and research.
**ELA-LITERACY.RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
**ELA-LITERACY.WHST.11-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
**ELA-LITERACY.WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection, and research.
**MATH.CONTENT.HSN.Q.A.1** Use units as ways to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

**Next Generation Science Standards**

**HS-LS3-1** Ask questions to clarify relationships about the role of DNA and chromosomes in coding instructions for characteristic traits passed from parents to offspring.
**HS-LS3-3** Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TI3(9-12):** I can formulate and investigate probing questions to further my learning.
**CCE3(9-12):** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.

**DE1(9-12):** I can acknowledge, process, and respond appropriately to others' comments and perspectives.
**DE2(9-12):** I can honor my own feelings and show empathy toward others through my actions.
**DE3(9-12):** I can recognize my triggers, use appropriate coping strategies, and access relevant resources to help regulate my emotional response.
**P2(9-12):** I can strengthen my weakness by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**AA1(9-12):** I can evaluate different approaches and justify the best pathway to success.
**AA2(9-12):** I can assess my past successful strategies and apply them independently.

**Understandings:** Students will understand that...

- The ethical considerations and humane practices in meat processing are essential for ensuring animal welfare, maintaining food safety, and upholding industry standards.
- Proper handling and storage of knives are crucial for maintaining safety, preventing injuries, and ensuring the efficiency of meat processing operations.
- Understanding the anatomy of knives is fundamental for selecting the appropriate tool for various tasks, maintaining knife safety, and ensuring precision in cutting and processing activities.
- Knowledge of carcass anatomy is essential for accurately assessing meat quality, making informed decisions in meat processing, and maximizing the value of meat products.
- Niche markets in the United States include mutton and chevon; these animal products are important staples for ethnic and religious groups.
- The components of the muscle that a primal and retail cut originate from dictate the type of cooking methods applied to the product.
- A quality grade is determined by the United States Department of agriculture and is an assessment of the palatability of a cut of meat.
- A yield grade is a voluntary assessment of the marbling and meat quality of a cut of meat that dictates the value and overall economic returns from an animal.
- The consumption of meat plays a major role in the majority of religions - what can be consumed, what cannot and how an animal is processed to meet religious law.

**Essential Questions:**

- How do humane practices in meat processing facilities impact animal welfare, food safety and public perception of the meat industry?
- Why is the safe handling and storage of knives essential in a meat processing facility, and how do these practices contribute to overall workplace safety and productivity?
- How does knowledge of knife anatomy enhance safety, precision, and efficiency in cutting and processing tasks?
- How does knowledge of carcass anatomy influence the quality assessment, processing techniques, and economic value of meat products?
- Is there a market for mutton and chevon in the United States agricultural industry?
- How do you provide rationale as to why a particular cut of meat is selected for a recipe as opposed to another cut?
- What is the value of a carcass grading?
- What is the relationship between food and culture?

| Students will know... | Students will be able to... |
|---|---|
| • Key principles of humane handling and slaughter practices in meat processing facilities.<br>• The impact of ethical treatment of animals on the quality and safety of meat products.<br>• The role of regulatory standards and guidelines in ensuring humane practices in meat processing.<br>• Correct handling of knives to minimize the risk of injury.<br>• Protocols for safely storing knives when not in use.<br>• The importance of maintaining sharp and well-maintained knives for efficient processing and safety.<br>• Potential hazards associated with improper knife use and storage in a meat processing environment.<br>• The different parts of the knife include the blade, handle, tang, edge, point, spine, and bolster.<br>• The functions of each part of the knife and how they contribute to overall performance and safety of the tool.<br>• The types of knives used in meat processing and their specific applications.<br>• The major anatomical parts of a carcass, including primal and subprimal cuts.<br>• The relationship between different cuts of meat and their market value.<br>• How muscle structure and fat distribution affect meat quality, tenderness, and flavor.<br>• The demographic change in the United States has created a niche market for chevon and mutton.<br>• The four primal cuts of pork, and the retail cuts associated with each primal cut.<br>• The types of cooking to use based on the muscle group.<br>• The eight primal cuts of beef, and the retail cuts associated with each primal cut.<br>• Positive and negative characteristics of a carcass.<br>• The relationship between food and culture.<br>• How different aspects of religion affect food choice, and meat consumption in different cultures. | • Identify and explain the humane practices used in meat processing facilities.<br>• Analyze the importance of ethical considerations in the meat processing industry.<br>• Demonstrate proper knife handling techniques that reduce the risk of cuts and other injuries.<br>• Assess the risks of improper knife use and develop strategies to promote safe practices.<br>• Identify and label the parts of a knife and explain the function of each part.<br>• Choose the appropriate knife for various cutting tasks in meat processing based on its anatomy and intended use.<br>• Demonstrate proper handling techniques based on an understanding of knife anatomy.<br>• Evaluate the condition of a knife and determine when it needs maintenance or replacement to ensure optimal performance and safety.<br>• Identify and label the major anatomical parts of a carcass, including primal and subprimal cuts.<br>• Analyze market data to determine economic characteristics of a niche market.<br>• Differentiate between suspension and locomotion muscles on a carcass.<br>• Categorize moist and dry heat methods - roast, broil, grill, pan-broil, pan-fry, braise and cook in liquid.<br>• Identify chevon and mutton retail cuts by pictures of live examples.<br>• Identify pork retail cuts by pictures of live examples.<br>• Identify beef retail cuts by pictures or live examples.<br>• Evaluate retail cuts of meat using the USDA quality grading system.<br>• Calculate yield grades using the characteristics of a carcass.<br>• Measure ribeye/loin eye area and fat thickness of a carcass to assist in calculating a yield grade. |

**Key Vocabulary:**
aging, antemortem inspection, blade, bolster, bovine spongiform encephalopathy, brining, butt, byproducts, carcass, chopping board, cold chain, cross-contamination, curing, cutability, cut-resistant gloves, dry-aging, edge, finger guard, foodborne pathogens, food safety modernization act, grading, ground meat, HACCP, handle, heel, knife block, knife safety, knife sharpening, lean-to-fat ratio, marbling, muscle fiber, offal, point, postmortem inspection, primal cuts, quality grade, rendering, rigor mortis, sanitization, sharpening steel, sheath, spine, subprimal cuts, tang, tenderization, traceability, USDA inspection, wet-aging, whetstone, yield grade

## Assessment Evidence

**Performance Tasks:**
*Classwork:* Demonstrate understanding of carcass fabrication through participation in laboratories. **P2**

*Classwork:* Evaluate the quality of different cuts of meat based on industry standards. **CCE3**

*Classwork:* Investigate how different cooking methods affect meat quality, including texture, flavor, and nutrient retention. **CCE3**

*Classwork:* Calculate the quality and yield grades of cuts of meat based on established industry standards. **AA1**

**Other Evidence:**
*Interim:* Written interim (quiz) assessment.

*Summative:* Written summative (test) assessment.

## Learning Plan

- Students will review the humane and ethical guidelines of the meat harvesting industry. **DE1, DE3**
- Students will identify the primal, subprimal and retail cuts of chevon, mutton, lamb, pork and beef. **P2**
- Students will assess the quality and yield grades of cuts of meat. **AA1**
- Students will participate in laboratories fabricating a carcass. **TI3, DE2**

**Teacher Resources:**
Teacher Created Resources

.

# Unit 5 - POULTRY FLOCK MANAGEMENT

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Standards**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.
**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.
**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.
**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).
**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.
**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing

plans.
**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.
**PST.04.01** Create plans for AFNR structures.
**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS3-2**

**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**CCE1(9-12):** I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully as I apply new knowledge to my thinking.
**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**AA1(9-12):** I can evaluate different approaches and justify the best pathway to success.
**AA3(9-12):** I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.

**Understandings:** Students will understand that...

- Poultry breeds have unique characteristics that influence their suitability for various purposes, such as egg production, meat production, and ornamental use, which is crucial for selecting the right breed for specific farming goals.
- Poultry science encompasses the study of the biology, production, management and processing of poultry, providing essential knowledge for sustainable and efficient poultry production.
- Understanding the life cycle, anatomy, and physiology of poultry is critical for optimizing their health, welfare, and productivity.
- The design and engineering of hen houses play a critical role in ensuring the health, productivity, and welfare of poultry by providing a controlled environment that meets their physical and behavioral needs.
- Effective poultry management practices including nutrition, housing, disease prevention, and biosecurity, are essential for the success of the poultry industry.
- The poultry industry plays a vital role in global food security, providing a significant source of animal protein through meat

**Essential Questions:**

- How do different poultry breeds' characteristics and traits influence their use in egg and meat production?
- What factors influence the growth, development, and productivity of poultry?
- What key factors must be considered in the design and engineering of hen houses to optimize poultry welfare and production efficiency?
- How can effective management practices improve the health and welfare of poultry?
- In what ways does the poultry industry contribute to global food security and sustainability?
- How do anatomy and physiology affect the health and production efficiency of poultry?
- What role does biosecurity play in preventing disease outbreaks in poultry production?

| | |
|---|---|
| and eggs. | |
| **Students will know...**<br>● Major breeds of poultry used in commercial egg and meat production, including their physical characteristics, production capabilities, and suitability for different environments.<br>● The difference between dual-purpose, meat-type, and egg-type poultry breeds.<br>● Basic anatomy and physiology of poultry species, including the digestive, respiratory, and reproductive systems.<br>● Essential components of hen house design, including ventilation, lighting, space requirements, and temperature control.<br>● The impact of environmental factors, such as air quality, lighting, and space, on the health and productivity of poultry.<br>● Different housing systems for poultry, such as cage-free, conventional cages, and free-range systems, and their respective benefits and challenges.<br>● Key factors influencing poultry growth, health, and productivity, including genetics, nutrition, and environmental conditions.<br>● Common poultry diseases and their prevention strategies, including vaccination and biosecurity measures.<br>● Stages of the poultry production cycle, from hatching to processing.<br>● The importance of proper housing, ventilation, and environmental control in poultry management.<br>● The role of the poultry industry in providing food, economic value, and contributing to global food security. | **Students will be able to…**<br>● Identify and describe key traits of various poultry breeds and explain their advantages and disadvantages for specific production purposes.<br>● Select appropriate poultry breeds for a given production goal based on their characteristics and needs.<br>● Compare and contrast the production capabilities for different poultry breeds in terms of growth rate, egg production, and feed efficiency.<br>● Identify and describe the major anatomical structures of poultry and their functions.<br>● Design a basic hen house layout that incorporates proper ventilation, lighting, and space for optimal poultry health and productivity.<br>● Evaluate the advantages and disadvantages of various hen housing systems and propose improvements based on animal welfare and production goals.<br>● Analyze how changes in housing design or management practices can affect the welfare and productivity of the poultry flock.<br>● Develop a basic nutrition plan for poultry at different stages of growth.<br>● Implement and evaluate biosecurity measures in a poultry production facility.<br>● Recognize symptoms of common poultry diseases and suggest appropriate preventative and management strategies.<br>● Analyze the impact of housing, environmental conditions, and management practices on poultry welfare and productivity.<br>● Discuss the significance of the poultry industry in the context of global food security and sustainability. |
| **Key Vocabulary:**<br>acute stress, aerosol transmission, avian, biosecurity, breaker egg, broiler, chalazae, chick, chronic stress, corticosterone, farm animal welfare council, feed conversion rate, flock, genotype, hen, heritability, infundibulum, isthmus, layer, light intensity, litter, magnum, manure pasteurization, molting, mortality rate, novel object test, oocyte, oviposition, ovulation, phenotypes, photoperiod, pullet, rooster, selective breedings, stigma, The Brambell Committee, the five freedoms, thermoneutral zone, thermoregulation, the three circles model, tonic immobility tests, welfare quality | |

framework

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>*Classwork:* Identify different poultry breeds and select appropriate breeds for specific production goals. **P2, AA3**<br><br>*Classwork:* Evaluate and grade eggs based on industry standards. **CCE1**<br><br>*Interim:* Design a hen house that incorporates proper ventilation, lighting, and space for optimal poultry health and productivity. **TCC2**<br><br>*Summative:* Analyze a case study of a poultry facility transitioning between two types of facility designs that will alter poultry production statistics to provide informed recommendations to flock producers. **AA1** | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment. |

**Learning Plan**

- Students will review the most influential poultry breeds currently being raised in the poultry industry. **P2**
- Students will evaluate table eggs using industry standards for quality control. **CCE1**
- Students will design a hen house that incorporates proper ventilation, lighting, and space for optimal poultry health and productivity. **TCC2**
- Students will analyze a case study to make informed recommendations regarding beneficial design components to apply to a hen house production facility. **AA1**

**Teacher Resources:**
Teacher Created Resources
Purdue University High School E.G.G. Curriculum

# Unit 6 - FOOD PRODUCT DEVELOPMENT

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resource Standards**

**FPP.01.02** Apply food safety and quality assurance procedures in the harvesting, handling and processing of food products.
**FPP.01.03** Apply food safety procedures during storage and distribution to ensure food quality.
**FPP.02.01** Apply principles of nutrition and biology to develop food products that provide a safe, wholesome, and nutritious food supply for local and global food systems.
**FPP.02.02** Apply principles of microbiology and chemistry to develop food products to provide a safe, wholesome, and nutritious food supply for local and global food systems.
**FPP.02.03** Apply principles of human behavior to develop food products to provide a safe, wholesome and nutritious food supply for local and global food systems.
**FPP.03.01** Implement selection, evaluation, and inspection techniques to ensure safe and quality food products.
**FPP.03.02** Design and apply techniques of food processing, preservation, packaging, and presentation for distribution and consumption of food products.
**FPP.04.01** Examine the scope of the food industry by evaluating local and global policies, trends, and customs for food production.
**FPP.04.02** Evaluate the significance and implication of changes and trends in the food products and processing industry in the local and global food systems.
**FPP.04.03** Identify the purpose of the industry organizations, groups and regulatory agencies that influence the local and global food systems.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.01.01** Apply economic principles to plan and manage inputs and outputs in an AFNR business.
**ABS.01.02** Evaluate and create statements of purpose and business goals for AFNR businesses.
**ABS.04.01** Analyze characteristics and planning requirements associated with developing business plans for different types of

AFNR businesses.
**ABS.06.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.
**ABS..05.03** Assess marketing principles and develop marketing plans to accomplish AFNR business objectives.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or information texts to support analysis, reflection, and research.
**ELA-LITERACY.RI.11-12.4** Determine the meaning of words and phrases as they are used in text, including figurative, connotative, and technical meanings; analyze how an author uses and refines the meaning of a key term or terms over the course of a text.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**ELA-LITERACY.RST.11-12.9** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflict information when possible.
**ELA-LITERACY.WHST.11-12.2** Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
**ELA-LITERACY.WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection and research.
**ELA-LITERACY.SL.11-12.6**
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
**MATH.CONTENT.HSS.ID.C.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSF.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.HSF.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
**MATH.CONTENT.HSF.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

**Next Generation Science Standards**

**HS-ETS1-3** Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings:** Students will understand that...

- The process of food product development involves creativity, scientific knowledge, and market analysis to create products that meet consumer needs and preferences.
- The steps of food product development, from concept to market is crucial for creating safe, nutritious, and appealing food products.
- Successful food product development requires collaboration, problem-solving, and attention to regulatory standards and food safety protocols.

**Essential Questions:**

- What are the key steps in developing a new food product, and how do they contribute to the final product's success in the market?
- How do consumer preferences, nutritional requirements, and food safety regulations shape the development of new food products?
- In what ways does innovation and problem-solving play a role in the food product development process?
- How can market analysis and consumer testing inform the successful launch of a new food product.

**Students will know...**

- The stages of food product development, including concept generation, formulation, testing, packaging, and marketing.
- The importance of sensory evaluation and consumer feedback in refining food products.
- The role of food safety and regulatory requirements in product development.
- How to balance nutritional content, taste, cost, and marketability in creating a food product.
- Techniques for conducting market research and analyzing consumer trends.

**Students will be able to...**

- Identify and explain the stages of food product development from concept to market.
- Develop a food product concept, including formulating a recipe and designing packaging.
- Conduct sensory evaluations and use feedback to refine a food product.
- Apply knowledge of food safety and regulatory standards to ensure the product meets industry requirements.
- Analyze market trends and consumer preferences to inform the development and marketing strategy of a food product.
- Collaborate with peers to solve problems and make decisions during the food product development process.

**Key Vocabulary:**
allergen management, consumer testing, cost analysis, emulsifier, flavor profile, food safety, formulation, functional food, ingredient sourcing, innovation, market research, nutritional labeling, packaging, preservatives, product differentiation, product iteration, product launch, prototype, quality control, recipe standardization, regulatory compliance, sensory evaluation, shelf life, sustainability, texture

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>*Summative:* Create a unique food product to be marketed to peers. **TCC3**<br><br>*Classwork:* Create marketing material to advertise a unique food product. **CCE4**<br><br>*Classwork:* Design a recipe for a new food product. **CCE4**<br><br>*Interim:* Present a business pitch to peers to gain peer approval for a created food product. **CCE4** | **Other Evidence:**<br>*Interim:* Develop a nutrition label based on governmental regulations. **CCE4** |

| Learning Plan |
|---|
| ● Students will design, develop and present a food product of their own making. **CCE4**<br>● Students will complete marketing activities to advertise for their created food product. **CCE4**<br>● Students will analyze the nutritional components of their created food product to develop a food nutrition label. **CCE4** |

| |
|---|
| **Teacher Resources:**<br>Teacher Created Resources |

# LIVESTOCK SCIENCE AND AGRICULTURAL SUSTAINABILITY CURRICULUM







**Grade Level(s):** 11-12

**Curriculum Author(s):** Kathleen Gorman

**Course Description:**
This course focuses on livestock production and management principles and practices, emphasizing animal breeding, nutrition, health, and welfare. Students will learn how to optimize livestock systems to ensure high productivity and sustainability, including breed identification and species-specific care. By completing this course, students will comprehensively understand livestock production and management, identify major livestock breeds and provide species-specific care, develop marketing strategies for animal products, and explore sustainable and innovative livestock production and food processing practices. This course is designed to provide a holistic education in integrating livestock science and food science, preparing students for diverse careers in the agricultural and food industries. Every student must maintain and document an approved supervised agriculture experience (SAE) project and actively participate in the Woodbury FFA Chapter to develop premier leadership, personal growth, and career success through attending FFA meetings and participating in chapter events and planning.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner "I Can" Statements** |
| Introduction to the Livestock Industry | How does exploring the livestock industry deepen our understanding of the complexities and opportunities within modern agricultural systems? | Diverse segments within the livestock sector, the influential role of leading states, industry trends, and the presence of alternative livestock species develop a comprehensive perspective on sustainable agricultural practices and economic considerations in the modern livestock industry. | TCC2(9-12), TCC4(9-12), CCE4(9-12), DE4(9-12), AA4(9-12) |
| Biosecurity Fundamentals | How can professionals in the animal production industry implement and maintain biosecurity measures to protect livestock from diseases and ensure sustainable agricultural practices? | Understanding and implementing comprehensive biosecurity measures are crucial for protecting livestock from infectious diseases, ensuring animal welfare, and maintaining agricultural operations' sustainability and economic viability. | TI3(9-12), TCC1(9-12), TCC3(9-12), TCC4(9-12), DE1(9-12), P1(9-12) |

| | | | |
|---|---|---|---|
| Livestock Nutrition Management | What strategies can producers use to manage livestock to ensure optimal health, growth, and productivity while balancing economic and environmental considerations? | Effective livestock nutrition management promotes animal health, growth, and productivity. It requires a comprehensive understanding of the nutritional needs of different species, the compositions of various feedstuffs, and the principles of ration formulation. Balancing these factors with economic and environmental considerations is crucial for sustainable and profitable livestock production. | TCC1(9-12), TCC3(9-12), CCE4(9-12), P2(9-12), P4(9-12), AA1(9-12), AA2(9-12) |
| Species Specific Care: Beef Cattle | How can producers apply species-specific knowledge and management practices to ensure beef cattle's health, welfare, and productivity throughout their lifecycle? | Proper beef cattle management requires a thorough understanding of their specific health, nutritional, and welfare needs at each stage of their lifecycle. By applying this knowledge, producers can optimize their herds' growth, productivity, and overall well-being, leading to more efficient and sustainable beef production. | TI1(9-12), TCC2(9-12), TCC3(9-12), TCC4(9-12), CCE4(9-12), DE2(9-12), P2(9-12) |
| Species Specific Care: Swine | How can producers apply species-specific knowledge and management practices to ensure swine health, welfare, and productivity throughout their lifecycle? | Proper swine management requires a thorough understanding of the animals' specific health, nutritional, and welfare needs at each stage of their lifecycle. By applying this knowledge, producers can optimize the animals' growth, productivity, and overall well-being, leading to more efficient and sustainable pork production. | TI2(9-12), TCC2(9-12), TCC3(9-12), CCE2(9-12), P2(9-12), AA1(9-12) |

| | | | |
|---|---|---|---|
| Species Specific Care: Small Ruminant | How can producers apply species-specific knowledge and management practices to ensure small ruminants' health, welfare, and productivity throughout their lifecycle? | Proper small ruminant management requires a thorough understanding of their specific health, nutritional, and welfare needs at each stage of their lifecycle. By applying this knowledge, producers can optimize herd growth, productivity, and overall well-being, leading to a more efficient and sustainable meat and fiber industry. | TI2(9-12), TI4(9-12), TCC2(9-12), CCE2(9-12), CCE4(9-12), P2(9-12) |
| Livestock Breeding and Genetics | What principles of genetics and breeding can be applied to improve livestock populations' health, productivity, and sustainability? | Understanding and applying the principles of genetics and breeding is essential for improving livestock populations' health, productivity, and sustainability. Through selective breeding and genetic management, we can enhance desirable traits, reduce disease prevalence, and ensure the long-term viability of livestock operations. | TI1(9-12), TI2(9-12), CCE4(9-12), P2(9-12), P3(9-12), P4(9-12), AA1(9-12), AA3(9-12) |
| Livestock Selection & Judging | What role does effective livestock selection and judging play in enhancing herd quality and ensuring successful livestock operations? | Mastering the techniques of livestock selection and judging is crucial for identifying animals that meet specific production goals, improving herd genetics, and ensuring the sustainability and profitability of livestock operations. | TI2(9-12), TCC3(9-12), CCE1(9-12), CCE3(9-12), CCE4(9-12) |

# Unit 1 - INTRODUCTION TO THE LIVESTOCK INDUSTRY

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Framework**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact agriculture from a local, tribal, state, national, and global perspective.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoning and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies when interacting with others in formal and informal settings.
**CRP.06.01** Synthesize information, knowledge, and experience to generate original ideas and challenge assumptions in the workplace and community.
**CRP.07.02** Evaluate the validity of sources and data used when considering the adoption of new technologies, practices, and ideas in the workplace and community.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.01.02** Evaluate and create statements of purpose and business goals for AFNR businesses.
**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investment, taxes, etc.).
**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical contents relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,and information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**ELA-LITERACY.RI.11-12.4** Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings, analyze how an author uses and refines the meaning of a key term or terms over the course of a text.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.ED.C.7** Interpret the slope (rate of change) and intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
**MATH.CONTENT.HSF.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.HSF.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimated the rate of change from a graph.
**MATH.CONTENT.HSA.CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

**Next Generation Science Standards**

**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE4(9-12):** I can work respectfully with all members of my community and support the needs of others.
**AA4(9-12):** I can create opportunities to extend my learning by remaining open-minded in any situation.

**Understandings:** Students will understand that...

- The current commercial status of the livestock industry is vastly different from the historical views of the production industry.
- Regional dynamics and agricultural factors shape the leading states in the livestock industry, influencing production, market dominance, and economic impact.

**Essential Questions:**

- Why aren't livestock all raised on the farm in the same way?
- What factors contribute to certain states emerging as leaders in the livestock industry, and how does this dominance affect agricultural practices, economy, and regional development?
- How have inventory numbers for beef cattle, dairy cattle, hogs,

| | |
|---|---|
| • Various factors, including economics, environment, and technology, affect the dynamics of the livestock industry and its impact on agriculture and the United States food supply.<br>• Alternative or non-commodity livestock are considered unconventional because they are not well-known in society and often lack the supplies, management knowledge, and even veterinarian expertise to care for them similarly to livestock species. | and chickens in the United States changed from 2000 to 2030, and what factors might be driving these trends?<br>• How do alternative animals contribute to human society? |
| **Students will know...**<br>• The production path of beef cattle, swine, small ruminants, and dairy cattle in the livestock industry.<br>• The key characteristics that create an ideal location for a particular livestock industry.<br>• Appropriate methods to analyze data and identify trends in data.<br>• How to assess data quality and accuracy of predicted data.<br>• The phases and economic scope of the alternative animal industry. | **Students will be able to...**<br>• Trace the production path of livestock production animals - beef cattle, swine, small ruminants, and dairy cattle.<br>• Create a presentation to teach peers the characteristics present in specific states that allow the highlighted states to be leaders in a particular livestock industry.<br>• Use USDA data to analyze trends in the production livestock industry.<br>• Create a graph representing the USDA data on livestock production animal numbers.<br>• Make data-based investment recommendations regarding segments of the livestock production industry.<br>• Describe the various phases and economic scope of the alternative animal industry. |
| **Key Vocabulary:**<br>alternative animal, analysis, backgrounders, beef, commodity, consumer, cow/calf operation, dairy, diversified, expertise, farrow, farrow-to-finish, feeder pig, feeding lamb, feedlot, finishing, geological attributes, head, inventory, investment, market factors, monopoly, natural resources, niche market, non-commodity, population density, projection, purebred breeders, small ruminant, stock sheep, swine, trend, unconventional | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>*Classwork:* Work in groups to research and create a presentation on a leading livestock industry state that covers the history, current trends, key players, economic impact, and challenges facing that segment. **CCE4**<br><br>*Classwork:* Conduct a trend analysis of current and projected livestock | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment.<br><br>*Classwork:* Compare and contrast different livestock production systems to analyze the advantages and disadvantages of each system in terms of sustainability, animal welfare, economics and consumer preferences. **AA4** |

| | |
|---|---|
| production numbers for a specific species at the national or global level using data from reliable sources, such as the USDA, FAO, or industry reports to identify trends over the past decade and forecast future production levels. **TCC4**<br><br>*Pre-Assessment:* Gauge prior knowledge and understanding of the topic of alternative agriculture animals in the United States livestock industry. **DE4** | |

**Learning Plan**

- Students will identify the key livestock industry segments for different species of livestock. **TCC2**
- Students will create a presentation about the leading production states of specific production species. **CCE4**
- Students will analyze trends in the livestock animal production industry. **TCC4**
- Students will identify the different animals considered part of the alternative livestock industry. **DE4**
- Students will evaluate their role, and the role of agriculture, in the sustainability of the world around them. **DE4**

**Teacher Resources:**
Teacher Created Resources
Modern Livestock and Poultry Production 9th Edition textbook

# Unit 2 - BIOSECURITY FUNDAMENTALS

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Framework**

**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from local, tribal, state, national, and global perspectives.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.02.02** Analyze procedures that ensure that animal products are safe for consumption.
**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.
**AS.07.01** Design programs to prevent animal diseases, parasites, and other disorders and ensure animal welfare.
**AS.07.02** Analyze biosecurity measures utilized to protect the welfare of animals and health of humans on local, state, national, and global level.
**AS.08.02** Evaluate the effects of environmental conditions on animals.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies when interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.05.02** Make, defend, and evaluate decisions at work and in the community using information about the potential environmental, social, and economic impacts.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals, and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**BS.01.02** Evaluate the roles, scope, and implications of regulatory agencies on applications of biotechnology in agriculture and the protection of public interests (e.g., health, safety, environmental issues, etc.).
**BS.02.01** Read, document, evaluate, and secure accurate laboratory records of experimental protocols, observations, and results.
**BS.02.03** identify and apply standard laboratory procedures and equipment maintenance to create and maintain reliable data.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,and information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSF.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.HSA.CED.A.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.

**Next Generation Science Standards**

**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TI3(9-12):** I can formulate and investigate probing questions to further my learning.
**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**TCC4(9-12):** I can integrate my learning to adapt to experiences in the classroom, career and life.
**DE1(9-12):** I can acknowledge, process, and respond appropriately to others’ comments and perspectives.
**P1(9-12):** I can self-reflect and seed feedback to build upon my strengths, apply those strengths to overcome obstacles, and share my strategies with others.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| ● Recognition of clinical signs, symptoms, and modes of transmission of common diseases prevents the spread of infection between animals and people. | ● What vaccinations must livestock animals be given?<br>● How does an “outbreak” occur?<br>● What types of diseases can be spread from livestock animals to |

| | |
|---|---|
| • Zoonotic diseases pose a potential risk to human health.<br>• Safety practices and procedures are used to control the spread of pathogenic agents.<br>• Pathogenic control differs in regions throughout the world.<br>• Good biosecurity plans minimize risks to animals and humans.<br>• Pathogenic outbreaks impact local, state, national, and global economies.<br>• Disease outbreaks may result in the mass slaughter of animals to halt epidemics and protect the greater population of animals.<br>• Good biosecurity practices minimize the risk of contracting illness through zoonotic diseases and adulterated food. | humans?<br>• Do large farming operations (CAFOs specifically) tend to promote or discourage the spread of disease?<br>• What are the biosecurity challenges that the average American farmer faces?<br>• What are the advantages and disadvantages of commercial animal husbandry regarding biosecurity issues?<br>• Given our increasingly globalized world, are people or animals at greater risk for epidemic influenza disease? |
| **Students will know...**<br>• Common signs and symptoms of sickness in animals.<br>• The methods of transmission for diseases.<br>• Zoonotic disease and its signs, symptoms, and level of contagiousness to humans.<br>• Common entry points for disease.<br>• The environmental, economic, and governmental factors affect the prevalence of pathogens and biosecurity.<br>• The factors a good biosecurity plan at the farm level must address.<br>• Why wildlife surveillance programs are needed to help prevent outbreaks in domestic animals.<br>• The importance of quarantine and disease monitoring to prevent disease spread. | **Students will be able to...**<br>• Use reliable resources to research common diseases that affect livestock animals.<br>• Identify diseases based on their transmission methods.<br>• Create educational materials to educate themselves and others on methods to prevent the spread of zoonotic disease.<br>• Recognize and implement common disease prevention protocols.<br>• Evaluate the quality of written biosecurity plans.<br>• Determine how breeches in biosecurity can be prevented or lessened using animal husbandry or management techniques.<br>• Develop and defend a disease control program design based on a disease outbreak. |
| **Key Vocabulary:**<br>adherent, adulterant, aerobic, antimicrobial, APHIS, biosecurity, CAFO, carrier, coliform, colostrum, cross-protection, depreciation, diagnosis, diffusely, endemic, euthanasia, euthanize, fomite, host, HPAI, husbandry, immunodeficiency, indemnity, infectious disease, LPAI, microorganism, mitigation, morbidity, mortality, natural selection, necropsy, pathogen, prevalence, prognosis, quarantine, reservoir, signs, source, swill, symptoms, transmission, treatment, uremia, USDA, vector, zoonotic disease | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>*Summative:* Create a comprehensive biosecurity plan for a livestock facility, including strategies for preventing disease entry, controlling disease spread, and emergency response protocols addressing key | **Other Evidence:**<br>*Interim*: Participate in an interactive disease lab to determine the factors operating during the spread of disease and what professionals can do to counter them. **TI3, TCC4** |

| | |
|---|---|
| areas such as animal movement, visitor access, equipment sanitation, and staff training. **TCC1**<br><br>*Classwork:* Conduct a risk assessment for a fictional or real livestock operation identifying potential biosecurity threats such as disease transmission, wildlife interaction ,or human activity, and assess the likelihood and potential impact of these risks. **TI3**<br><br>*Classwork:* Analyze a real-world case study involving a biosecurity breach in a livestock operation identifying factors that led to the breach, evaluate the response, and propose alternative strategies that could have prevented the incident. **TCC4, P1, DE1** | *Interim:* Written interim (quiz) assessment.<br><br>*Interim*: Play the board game, “Chickens to the Fair,” to apply biosecurity practices to protect a poultry flock. **TCC3** |

**Learning Plan**

- Students will identify common livestock diseases that can affect production. **P1**
- Students will assess methods to protect livestock production herds and flocks from disease and transmission. **TI3**
- Students will apply biosecurity protocols to protect livestock herds and flocks from disease and transmission. **TCC3**
- Students will evaluate the economic, social, and animal welfare implications of a failure to apply biosecurity protocols. **TCC4, P1, DE1**

**Teacher Resources:**
Teacher Created Resources
USDA FHA: Health Farms, Healthy Agriculture

# Unit 3 - LIVESTOCK NUTRITION MANAGEMENT

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Framework**

**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.03.01** Analyze the nutritional needs of animals.
**AS.03.02** Analyze feed rations and assess if they meet the nutritional needs of animals.
**AS.03.03** Utilize tools, equipment, techniques, and technology to make animal nutrition decisions.
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.08.01** Design management practices related to animal agriculture to enhance the environment.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies when interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**PS.01.01** Determine the influence of environmental factors on plant growth.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.WHST.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

**ELA-LITERACY.WHST.11-12.9** Draw evidence from informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**Next Generation Science Standards**

**HS-LS4-4** Construct an explanation based on evidence of how natural selection leads to adaptation of populations.
**HS-LS4-5** Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS2-6** Evaluate claims, evidence, and reasoning that the complex interaction in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
**HS-LS2-7** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TCC1(9-12):** I can ask purposeful, insightful questions to find a variety of innovative solutions.
**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**P4(9-12):** I can take on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through personal experience that failures are more instructive than discouraging.
**AA1(9-12):** I can evaluate different approaches and justify the best pathway to success.
**AA2(9-12):** I can assess my past successes and mistakes to change my approach.

**Understandings:** Students will understand that…

- Understanding animal digestive systems allows caregivers to create balanced and appropriate rations to feed and maintain animals for food, fiber, and companionship.
- Feed materials vary based on an animal’s digestive system and nutritional requirements.

**Essential Questions:**

- Why is it important to be knowledgeable about animal digestive systems when raising and caring for animals?
- How are different nutrients essential to livestock and other agricultural animals?
- How do different classifications of livestock feedstuffs contribute

| | |
|---|---|
| • Commercial feeds come in many different forms, but all feed comprises the same six basic nutrients.<br>• Different types of livestock feeds play specific roles in animal nutrition, and their proper classification and use are crucial for maintaining livestock health and productivity.<br>• Mistakes in pasture composition can lead to poor-quality pastures that do not aid animal nutrition.<br>• Humans have raised livestock on grassy land for generations worldwide; when managed effectively, this land can be sustainable and continuously productive.<br>• Weeds steal moisture and nutrients from new seedlings, shade out other plants, decrease the nutritional value of forage, and may even kill or injure livestock or people.<br>• Nutrients are found in various livestock feedstuffs, and knowing their composition will help producers create balanced rations that meet nutritional requirements.<br>• Feedstuffs can be tested for the presence of starches, sugars, protein, and fats to locate feeds that are examples of sources of the required basic nutrients for growth.<br>• Balanced rations are essential for optimizing livestock well-being and performance while ensuring cost-effective and sustainable farming practices.<br>• Feed tags provide essential information about a food's nutritional content, ingredients, feeding directions, and safety guidelines. | to the overall nutrition and well-being of animals in the livestock industry?<br>• What methods are applied to successfully manage vegetation in a pasture grazing system?<br>• How can ecosystem and biome management support livestock requirements effectively?<br>• How can we manage weeds to protect humans and livestock?<br>• How are different nutrients essential to livestock and other agricultural animals?<br>• How can you formulate a balanced ration that meets the specific nutritional needs of different livestock species, ensuring optimal health, growth, and productivity while considering the cost, availability, and sustainability of feed ingredients?<br>• How can a feed tag be used to manage a feed plan for a livestock animal? |
| **Students will know...**<br>• The anatomy and physiology of the digestive tract of an avian, monogastric, and ruminant digestive system.<br>• The six essential nutrients in feed.<br>• Feedstuffs classification, categories, and characteristics.<br>• Nutritive characteristics of the feedstuff categories.<br>• Characteristics of various plant species suitable for pasture.<br>• Six common Connecticut plant species that are considered harmful to livestock.<br>• Thirty common feedstuffs that are used to feed livestock.<br>• Formulation equations to calculate feed ingredient proportions in a balanced ration.<br>• The information provided to a producer on the feed tag of a feed | **Students will be able to...**<br>• Compare and contrast avian, monogastric, and ruminant digestive systems.<br>• Explain the function of the six essential nutrients as they relate to monogastric and ruminant digestive systems.<br>• Visually identify different feedstuffs.<br>• Visually identify the ten key pasture species of Connecticut.<br>• Use math and problem-solving skills to determine the number of animals that can sustainably graze on 100 acres of land.<br>• Evaluate a pasture grazing system to determine improvements that can be made.<br>• Create a guide to six common poisonous plants specific to one livestock species in the Connecticut area. |

| | |
|---|---|
| bag.<br>● The legally required components of a feed tag. | ● Visually identify thirty common feedstuffs used to feed livestock.<br>● Conduct a food nutrients laboratory to identify the presence or absence of nutrients in various animal feeds.<br>● Apply mathematical skills to calculate the proportions of different feed ingredients needed to create a balanced ration.<br>● Solve practical problems related to livestock nutrition and feed formulation, considering cost, availability, and nutritional value.<br>● Apply the information provided to create a feed tag that includes all required elements. |

**Key Vocabulary:**
animal protein, anthelmintic, antibiotic, antimicrobial, balanced ration, basal metabolism, bomb calorimeter, carbohydrate, cell, chemobiotic, coccidiostat, commercial feed tag, commercial protein supplement, conception rate, crude protein, deficiency, diet, digestible energy, digestible protein, dry weight, energy feed, fat, feed additive, feed additive compendium, fetus, fiber, full feed, gross energy, growth promotant, hormone, legume, marbling, melengestrol acetate (MGA), metabolizable energy, micronutrients, mineral, $NE_m$, net energy, nitrogen-free extract (NFE), nutrient, nutrient sparing, oil, organ, ossein, osteocyte, palatable, probiotic, protein, protein supplement, quadruped, ration, subclinical disease, subtherapeutic, system, tankage, trace organic compounds, urea, vegetable protein, vitamin, withdrawal period

**Assessment Evidence**

| | |
|---|---|
| **Performance Tasks:**<br>*Interim:* Create a comprehensive guide identifying common poisonous plants found in Connecticut pastures that pose risks to livestock including images, descriptions, toxic components, symptoms of poisoning and preventative measures. **CCE4**<br><br>*Interim:* Conduct a nutrient analysis of several common feedstuffs used in livestock diets, such as corn, soybean meal, alfalfa, and mineral supplements. **TCC1, TCC3**<br><br>*Interim*: Design a feed tag for a specific livestock feed production including the product name, guaranteed analysis, ingredient list, feeding directions, warning, and company contact information. **TCC3**<br><br>*Summative*: Use the Pearson Square method or other ration formulation tools to create a balanced diet for a specific type of livestock; calculating the proportions of each feed ingredient needed to meet the animal's nutritional requirements. **P2, AA2** | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment.<br><br>*Classwork:* Identification of feedstuff components and pasture plant species. **P4**<br><br>*Classwork:* Design a comprehensive feed management plan for a livestock operation including feeding schedules, methods of feed delivery, storage considerations, and strategies for minimizing feed waste. **P4, AA1** |

| Learning Plan |
| --- |
| ● Students will label the organs of the avian, monogastric, and ruminant digestive systems. **P4**<br>● Students will create a source guide for plant species found in livestock pastures in the Connecticut area. **CCE4**<br>● Students will evaluate the nutrient content of certain feedstuff products. **TCC1, TCC3**<br>● Students will formulate a ration using the Pearson Square method. **P2, AA2**<br>● Students will identify the components of a livestock feed label. **P4, AA1** |
| **Teacher Resources:**<br>Teacher Created Resources<br>Modern Livestock and Poultry Production 9th Edition textbook |

# Unit 4 - SPECIES SPECIFIC CARE: BEEF CATTLE

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Standards**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.
**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.
**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.
**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).
**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.
**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.
**PST.04.01** Create plans for AFNR structures.
**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS3-2**
**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TI1(9-12):** I can implement a realistic plan and adapt when necessary to achieve my goals.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**TCC4(9-12):** I can integrate my learning to adapt to the experiences in the classroom, career and life.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE2(9-12):** I can honor my own feelings and show empathy toward others through my actions.
**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**Understandings:** Students will understand that...

- The beef industry comprises distinct segments, including cow-calf operations, stocker/backgrounding, feedlot finishing, and processing/packaging. Each segment plays a crucial role in the production chain, contributing to the efficient and sustainable production of beef.
- Beef cattle breeds exhibit distinct characteristics that make them suitable for various environments, management systems, and production goals. Understanding these breed-specific traits is crucial for selecting the right cattle to enhance productivity, meat quality, and adaptability in beef production operations.
- Cattle breeds have been designed through years of strategic breeding programs.
- Communication is key if producers want to get medical attention for animals in their care, describe an animal for sale or breeding, and understand where products from the animal come from. Accurately describing traits, characteristics, and markings is important for many aspects of animal production.
- The ruminant digestive system is uniquely adapted to process fibrous plant materials efficiently through a complex four-chambered stomach. Understanding this system is

**Essential Questions:**

- Why aren't all beef cattle raised on the same farm and in the same way?
- How do the specific characteristics of different beef cattle breeds influence their sustainability for various production goals and environmental conditions?
- How did the development of the Santa Gertrudis cattle breed at King Ranch demonstrate the importance of selective breeding in creating a resilient and productive cattle breed suited to specific environmental conditions?
- Why is knowledge of small ruminant external anatomy essential for effective care, management, and disease prevention in beef cattle?
- What are the key functions of each chamber in the ruminant digestive system, and how do they contribute to the efficient digestion of fibrous plant materials?
- How can producers identify, prevent, and manage common diseases and parasites in beef cattle to ensure the health and productivity of the herd?
- How can beef facilities be designed to optimize cattle health, productivity, and operational efficiency while ensuring safety and

| | |
|---|---|
| essential for optimizing feed efficiency, ensuring animal health, and improving productivity in ruminant animals.<br>● Effective disease and parasite management in beef cattle is critical for maintaining herd health, productivity, and welfare.<br>● Careful planning of facilities and equipment for beef cattle enterprises is important to the success of an operation.<br>● Effective marketing strategies for beef cattle involve understanding market trends, consumer preferences, and value-added opportunities. By applying these strategies, producers can enhance the profitability and competitiveness of their cattle in the marketplace. | sustainability?<br>● How can beef cattle producers develop and implement effective marketing strategies to maximize profitability and meet market demands? |
| **Students will know…**<br>● The characteristics of the beef industry<br>● The breeds of beef cattle, their origin, and breed characteristics.<br>● The methodology applied to create the Santa Gertrudis cattle breed at the King Ranch.<br>● External anatomy terminology used in the beef cattle industry.<br>● The parts and functions of the ruminant digestive system.<br>● The importance of maintaining healthy beef cattle.<br>● Prevention and treatment methods for beef cattle diseases and parasites common in Connecticut.<br>● The steps in planning for facilities and equipment for beef enterprises.<br>● The supply and demand cycles for beef and explain how they affect market price.<br>● The proper husbandry and handling techniques are used to prevent losses when marketing beef cattle.<br>● The use of the futures market with beef cattle. | **Students will be able to…**<br>● Trace the path of beef cattle grown in the beef industry from birth to processing.<br>● Identify the various breeds of beef cattle by viewing pictures or live animals.<br>● Create a creative project presenting student's research findings.<br>● Identify the external anatomy of cattle with correct terminology.<br>● Label the parts of the ruminant digestive system.<br>● Explain the steps in which food moves through the ruminant digestive system.<br>● Recognize and suggest controls for common nutritional health disorders of beef cattle locally.<br>● Design a beef facility, including necessary equipment, to create a sustainable beef facility.<br>● Identify and describe the market classes and grades of beef cattle. |
| **Key Vocabulary:**<br>artificial insemination, auction market, backgrounding, bovine spongiform encephalopathy (BSE), bull, bullock, burdizzo, calf, carrying capacity, castration, cattle, cattle guard, commission, cow, cow-calf system, creep feeding, dark cutting beef, demand, dewlap, dipping vat, elastrator bands, feed composition table, feeder calf, fillback period, headgate, heifer, hot carcass weight, husklage, integrated resource management (IRM), preconditioning, puberty, quality grade, rotation grazing, slaughter calf, staggy, steer, stockyard, supply, synchronization of estrus, systemic insecticide, tilting table, vealers, yardage, yearling feeder | |

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>*Interim:* Create a timeline presentation to present findings about the development of the Santa Gertrudis breed on the King Ranch. **TCC3**<br><br>*Summative:* Analyze a case study of a beef cattle program evaluating breeding goals, selection criteria and outcomes, and then suggest improvement or alternative strategies to enhance progress and herd performance. **TCC4, DE2**<br><br>*Classwork:* Design a beef cattle facility that includes pens, feeding areas, water sources, and handling systems that consider animal welfare, biosecurity, and efficient management practices. **TCC2**<br><br>*Classwork:* Using provided nutritional guidelines, students will formulate a balanced ration for a specific category of beef cattle based on body weight and production goals. **CCE4** | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment.<br><br>*Classwork:* Trace the beef supply chain from farm to table to identify various stages, including production, processing, distribution, and retail. **TI1** |
| **Learning Plan** | |
| • Students will review the most influential beef breeds currently being raised in the beef industry. **P2**<br>• Students will research a minimum of one beef cattle breed to create a presentation to present to peers. **TCC3**<br>• Students will identify the external anatomy of a beef cattle animal. **P2**<br>• Students will design cattle handling facilities using best management practices. **TCC2** | |
| **Teacher Resources:**<br>Teacher Created Resources | |

# Unit 5 - SPECIES SPECIFIC CARE: SWINE

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Standards**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.
**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.
**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.
**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).
**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.
**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing plans.

**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.
**PST.04.01** Create plans for AFNR structures.
**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS3-2**
**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitation and implications, in order to justify new conclusions.
**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**CCE2(9-12):** I can receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**AA1(9-12):** I can evaluate different approaches and justify the best pathway to success.

**Understandings:** Students will understand that...

- The swine industry comprises several interconnected segments: breeding, farrowing, nursery, finishing, and processing. Understanding each segment's role and contribution to the overall production system is crucial for optimizing efficiency, ensuring animal welfare, and meeting market demands.
- Swine breeds vary in characteristics, such as growth rate, meat quality, and adaptability to different environments. Understanding these breed-specific traits is essential for selecting the appropriate pigs to meet production goals and enhance the efficiency and profitability of swine operations.
- Communication is key if producers want to be able to get medical attention for animals in their care, describe an animal for sale or breeding, and understand where products from the animal come from. Accurately describing traits, characteristics, and markings is important for many aspects of animal production.
- The monogastric digestive system, characterized by a single-chambered stomach, is designed to process a diverse range of feedstuffs efficiently. Understanding its structure and function is crucial for optimizing nutrition, improving feed conversions, and ensuring monogastric livestock's overall health and performance.

**Essential Questions:**

- Why aren't all swine raised on the same farm and in the same way?
- How do the distinct characteristics of various swine breeds impact their suitability for different production systems and market demands?
- How does knowledge of swine external anatomy aid in assessing health, managing care, and improving overall productivity?
- What are the key components of the monogastric digestive system, and how does each component contribute to the efficient digestion and absorption of nutrients from various feed sources?
- How can recognizing the signs of common diseases and parasites in swine and implementing effective control measures improve herd health and productivity?
- How do the design and management of swine facilities and the proper selection and use of equipment impact animal welfare, production efficiency, and biosecurity in a swine operation?
- How can swine producers develop and implement marketing strategies that align with consumer preferences, market conditions, and production goals to achieve optimal profitability?

| | |
|---|---|
| • Effective management of diseases and parasites in swine requires a thorough understanding of their symptoms, transmission, and prevention strategies. Identifying and addressing these health challenges is crucial for maintaining herd health, optimizing growth, and ensuring overall productivity in swine operations.<br>• The design and management of swine facilities and the proper use of equipment are essential for ensuring animal welfare, optimizing production efficiency, and maintaining biosecurity standards. Well-designed facilities and appropriate equipment contribute to swine operations' overall health and productivity.<br>• Effective marketing strategies for swine involve understanding consumer demands, production costs, and market trends. Producers can maximize profitability and meet industry standards by targeting the right markets and employing strategic marketing practices. | |
| **Students will know...**<br>• The characteristics of the swine industry.<br>• The major breeds of swine by body characteristics.<br>• External anatomy terminology used in the swine industry.<br>• The parts and functions of the monogastric digestive system.<br>• The importance of maintaining good swine health.<br>• The causes, symptoms, prevention, and control of common swine diseases and parasites.<br>• Best management practices when designing a swine facility and selecting equipment.<br>• The three methods of marketing hogs.<br>• Grades of market hogs and feeder pigs. | **Students will be able to...**<br>• Trace the path of swine grown in the pork industry from birth to processing.<br>• Summarize the origin and development of the common breeds of swine.<br>• Identify the external anatomy of swine with correct terminology.<br>• Label the parts and functions of the monogastric digestive system.<br>• Create a presentation demonstrating the analogy between a monogastric digestive system and an amusement park.<br>• List good management practices that help to prevent swine diseases and parasites.<br>• Design a swine facility with best management practices to ensure animal welfare, optimize production, and maintain biosecurity standards. |
| **Key Vocabulary:**<br>artificial insemination (AI), behavior, biosecurity, blind spot, boar, breeding systems, by-products, carbon footprint, crossbreeding, domesticated, dominant, expected progeny difference (EPD), farrowing, farrow-to-feeder, farrow-to-finish, feed efficiency, feed ration, flight zone, gene, genetics, genotype, gestation, gilt, gross income, grow/finish, hereditary, heritage breeds, heterosis (hybrid vigor), lean, manure management plan, marbled, monogastric, organic, pasture pork, phenotype, polygastric, progeny, purebred breeding, rate of gain, rebreeding interval, recessive, sow, sustainability, terminal/parental sire, terminal crossbreeding program, trait, vertically integrated, wallowing, weaned | |

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>*Classwork:* Select and research breeds of swine creating a detailed report covering the breed's history, physical characteristics, production traits, and common uses in the swine industry. **TI2**<br><br>*Interim:* Design a modern swine production facility floor plan and written explanation that includes areas for housing, feeding, breeding, farrowing, and waste management considering animal welfare, biosecurity, environmental impact, and efficiency. **TCC2**<br><br>*Classwork:* Analyze the symptoms, identify the possible causes, suggest diagnostic tests, and recommend treatment and prevention strategies of a case study involving a health issue in a swine herd. **AA1, CCE2** | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment.<br><br>*Summative:* Written summative (test) assessment. |

**Learning Plan**

- Students will review the most influential swine breeds currently being raised in the pork industry. **TI2**
- Students will identify the external anatomy of a swine animal. **P2**
- Students will design swine handling facilities using best management practices. **TCC2**
- Students will discuss best management and sustainability strategies currently applied by producers in the pork industry. **TCC3, AA1**

**Teacher Resources:**
Teacher Created Resources

# Unit 6 - SPECIES SPECIFIC CARE: SMALL RUMINANT

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food and Natural Resources Standards**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.01.02** Assess and select animal production, marketing, and management methods based upon effectiveness and potential social and environmental impacts.
**AS.01.03** Analyze laws and sustainable practices that impact animal agriculture from a local, tribal, state, national, and global perspective.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.02.02** Analyze procedures to ensure that animal products are safe for consumption.
**AS.05.01** Design and evaluate animal housing, equipment, and handling facilities for the major systems of animal production.
**AS.05.02** Comply with government regulations and safety standards for facilities used in animal production.
**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.07.01** Design programs to prevent animal disease, parasites, and other disorders and ensure animal welfare.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.07.01** Select and implement reliable research processes and methods to generate data for decision-making in the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**ABS.02.02** Assemble, interpret, and analyze financial information and reports to monitor AFNR business performance and support decision-making (e.g., income statements, balance sheets, cash-flow analysis, inventory reports, break-even analysis, return on investments, taxes, etc.).
**ABS.04.01** Analyze characteristics and planning requirements associated with development business plans for different types of AFNR businesses.
**ABS.05.01** Determine the role of markets, trade, competition, and price in relation to an AFNR business sales and marketing

plans.
**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.
**PST.04.01** Create plans for AFNR structures.
**PST.04.02** Determine structural requirements, specifications, customer needs, and estimate costs for AFNR structures.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining what the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.RST.11-12.4** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific science or technical context relevant to grades 11-12 texts and topics.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.ID.C.7** Interpret slope (rate of change) and intercept (constant term) of a linear model in context of the data.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.IF.B.4** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
**MATH.CONTENT.IF.B.5** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
**MATH.CONTENT.IF.B.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
**MATH.CONTENT.IC.B.6** Evaluate reports based on data.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS3-2**
**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait

tend to increase in proportion to organisms lacking this trait.
**HS-ETS1-1** Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**TI4(9-12):** I can apply my strengths and anticipate challenges to reach my current and future goals.
**TCC2(9-12):** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**CCE2(9-12):** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revision for success.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**P2(9-12):** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**Understandings:** Students will understand that...

- Different sheep breeds have unique characteristics and are suited for various purposes such as wool production, meat production, and dairy. Understanding these breed-specific traits is essential for selecting the right breed to meet specific agricultural goals and optimize flock productivity.
- Goat breeds possess unique traits that make them well-suited for specific purposes such as meat, milk, and fiber production. Understanding these breed characteristics is essential for selecting the right goats to achieve desired production outcomes and to ensure optimal care and management in diverse farming systems.
- Communication is key if producers want to be able to get medical attention for animals in their care, describe an animal for sale or breeding, and understand where products from the animal come from. Accurately describing traits, characteristics, and markings is important for many aspects of animal production.
- FAMACHA is a diagnostic tool that helps small ruminant producers identify which animals need anthelmintic treatment for barber's pole worm infection.

**Essential Questions:**

- How do the unique characteristics of different sheep breeds influence their suitability for various production purposes such as wool, meat, and dairy?
- How do the specific traits of different goat breeds determine their effectiveness in meat, milk, and fiber production, and how can these traits meet specific farming goals?
- Why is knowledge of small ruminant external anatomy essential for effective care, management, and disease prevention in sheep and goats?
- How does the FAMACH system enable producers to accurately assess anemia in small ruminants and make informed decisions about parasite control?
- What are the benefits and challenges of using public lands for grazing small ruminants, and how can these practices be managed sustainably to balance agricultural needs with environmental stewardship?
- How can producers effectively market wool and mohair to maximize their value and meet the demands of diverse consumer markets?

| | |
|---|---|
| • Socioscientific issues are controversial, socially relevant, real-world problems that are informed by science and often include an ethical component.<br>• Markets for sheep, goats and the products from these animals are not as well developed as markets for other livestock. | |
| **Students will know...**<br>• The major breeds of sheep, given their origin and breed characteristics.<br>• The common breeds of goats, given their origin and breed characteristics.<br>• External anatomy terminology used in the small ruminant industry.<br>• The life cycle of the barber pole internal parasite.<br>• The FAMACHA standards determine an animal's need for a parasite treatment plan.<br>• How ranchers raise food and fiber on federally owned land.<br>• The viewpoints concerning public lands use and public lands grazing.<br>• Terminology used in marketing sheep, goats, wool and mohair.<br>• Grades of wool and mohair. | **Students will be able to...**<br>• Identify and summarize important features of various breeds of sheep by viewing pictures or live animals.<br>• Create a creative presentation to share the origins, advantages and disadvantages, and top traits of assigned sheep breeds.<br>• Identify and summarize important features of various breeds of sheep by viewing pictures or live animals.<br>• Identify the external anatomy of small ruminants with the correct terminology.<br>• Perform the FAMACHA technique to evaluate a small ruminant's barber pole parasite load.<br>• Use maps to analyze public lands in the western United States. |
| **Key Vocabulary:**<br>accelerated lambing, apparel wool, band, banding instinct, breeding sheep, browse, buck, cabrito, caping, carpet wool, cashmere, causative agent, chevon, clip, convulsion, cutability, doe, doeling, down, drench, dual-purpose breed, encephalitis, ewe, extension hurdle, feathering, grease, hank, hothouse lambs, kemp, kid, lamb, milkstone, mohair, myotonic, National Sheep Improvement Program (NSIP), native ewe, niche market, pelt, prolapsed uterus, ram, shearer lamb, spinning count, staple, tagging, toxemia, type, virus, wattle, western ewe, weather, woolen, wool top, worsted, yearling | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>*Classwork:* Research breeds of small ruminants to create a detailed comparison report that includes the history, physical characteristics, production traits, and common uses for each breed. **CCE4**<br>*Classwork:* Design a small ruminant production facility floor plan and written explanation, considering areas for housing, feeding, breeding, and healthcare to address animal welfare, biosecurity, environmental impact, and efficiency. **TCC2** | **Other Evidence:**<br>*Interim:* Written interim (quiz) assessment.<br><br>*Summative*: Develop a marketing plan for a small ruminant production including target market identification, pricing strategy, promotional methods, and distribution channels. **CCE2** |

| | |
|---|---|
| *Classwork:* Create an information brochure or poster that educates small ruminant producers on prevention, diagnosis, and treatment of a specific small ruminant health issue. **CCE4**<br><br>*Interim:* Complete the FAMACHA certification process to learn about managing parasites in small ruminants. **TI4, P2** | |

**Learning Plan**

- Students will complete FAMACHA training to receive an industry certification. **TI4, P2**
- Students will review the most influential small ruminant breeds currently being raised in the small ruminant industry. **TI2**
- Students will identify the external anatomy of the small ruminant animal. **P2**
- Students will design small ruminant handling facilities using best management practices. **TCC2**

**Teacher Resources:**
Teacher Created Resources
University of Rhode Island FAMACHA Certification online program

# Unit 7 - LIVESTOCK BREEDING & GENETICS

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food, and Natural Resource Standards**

**AS.04.01** Evaluate animals for breeding readiness and soundness.
**AS.04.02** Apply scientific principles to select and care for breeding animals.
**AS.04.03** Apply scientific principles to animal breeding.
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**AS.07.01** Design programs to prevent animal diseases, parasites, and other disorders to ensure animal welfare.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.
**BS.01.01** Investigate and explain the relationships in the timeline of developing biotechnology applications and techniques in agriculture (e.g., major innovators, historical developments, potential applications of biotechnology, etc.).
**BS.01.03** Analyze the relationships and implications of bioethics, laws, and public perceptions on applications of biotechnology in agriculture (e.g., ethical, legal, social, and cultural issues.)
**BS.03.01** Apply biotechnology principles, techniques, and processes to modify a species.
**BS.03.04** Apply biotechnology principles, techniques, and processes to enhance plant and animal care and production (e.g., selective breeding, pharmaceuticals, biodiversity, etc.).

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
**ELA-LITERACY.RST.11-12.1** Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

**ELA-LITERACY.RST.11-12.3** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSN.Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and origin of graphs and data displays.
**MATH.CONTENT.HSN.Q.A.2** Define appropriate quantities for the purpose of descriptive modeling.
**MATH.CONTENT.HSN.Q.A.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
**MATH.CONTENT.HSS.IC.B.6** Evaluate reports based on data.
**MATH.CONTENT.HSS.MD.A.3** Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
**HS-LS3-2** Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
**HS.LS4-6** Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
**HS-LS3-3** Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**TI1** I can implement a realistic plan and adapt when necessary to achieve my goals.
**TI2** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**CCE4** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**P2** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome challenges.
**P3** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
**P4** I can take-on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through personal experience that failures are more instructive than discouraging.
**AA1** I can evaluate different approaches and justify the best pathway to success.
**AA3** I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.

| | |
|---|---|
| **Understandings:** Students will understand that...<br>● Traits are passed on as genes.<br>● Mendelian genetics applies the principles of independent assortment and the law of segregation to utilize genetics to improve future animal generations effectively.<br>● A Punnett Square is a tool for predicting the traits expressed in the offspring of two parents.<br>● Breeders utilize expected progeny differences (EPD) data to select high-quality animals to breed that will assist in achieving specific management objectives in offspring.<br>● An individual's reproductive anatomy and physiology determine the methodology and management decisions in the livestock industry.<br>● Pregnancy prevention and promotion apply biotechnological approaches to reproduction involving animal science professionals.<br>● Heat detection and ovulation prediction can impact the success rate of breeding, which is a key concept in livestock production.<br>● Artificial insemination is a technique used in animal breeding for numerous reasons.<br>● Artificial insemination (AI) is a critical reproductive technology that allows for the controlled and precise introduction of superior genetic material into livestock herds. | **Essential Questions:**<br>● How are genes passed on from parent to offspring?<br>● How can the probability of an offspring having a certain trait be calculated using Punnett Square?<br>● How can producers use Expected Progeny Differences (EPD) to select an animal for breeding?<br>● How do reproductive structures influence the reproductive process?<br>● Do producers purposefully schedule animal births? Why or why not? If so, how do they do this?<br>● How does the estrous cycle affect breeding and production?<br>● How can artificial insemination enhance livestock herds' genetic quality, reproductive efficiency, and productivity?<br>● What are the essential techniques and best practices for performing artificial insemination in livestock? |
| **Students will know...**<br>● The definition and use of the codominant inheritance pattern.<br>● The importance of performing multiple trials during an experiment.<br>● The differences between complete dominance, incomplete dominance, codominance, and sex-linked traits.<br>● Common expected progeny difference traits in cattle, small ruminants, and swine.<br>● The steps of conception.<br>● Multiple types of reproductive biotechnology are used on male and female livestock species.<br>● Reproductive hormone's role and function in standing heat and ovulation in livestock species.<br>● The advantages and disadvantages of using artificial insemination. | **Students will be able to...**<br>● Predict the results of genetic crosses involving codominant traits.<br>● Use a Punnett Square to calculate the probability of offspring genotypes.<br>● Complete a Punnett Square for a monohybrid and dihybrid cross.<br>● Utilize Punnett Squares to make decisions regarding the breeding of animals.<br>● Evaluate EPD value for cattle, swine, and small ruminants to determine ideal breeding pairs.<br>● Name, locate, and describe the parts and functions of livestock animals' male and female reproductive systems - swine, cattle, and small ruminants.<br>● Describe and differentiate between heat cycle breeder types |

| | |
|---|---|
| • Reproductive technologies applied in the livestock market.<br>• Signs of early estrus, standing estrus, and late estrus.<br>• The various tools used in heat detection and artificial insemination.<br>• The signs a sow/gilt will show when it is ready to breed in standing heat. | (seasonal, opportunistic, continuous).<br>• Apply the phases of the estrous cycle to livestock production.<br>• Select appropriate sires for breeding cattle based on expected progeny and predicted transmitting ability.<br>• Perform the proper artificial insemination technique in cattle.<br>• Compare the advantages and disadvantages between natural breeding and artificial insemination. |

**Key Vocabulary:**
additive gene effect, adenine, afterbirth, agricultural biotechnology, albino, alimentary canal, allele, anaphase, antibodies, asexual reproduction, atrophy, biotechnology, bladder, bovine somatotropin, breeding value, cell membrane, cervix, chromosome, clitoris, clone, close breeding, codominance, codon, colostrum, copulation, corpora lutea, cowper's gland, crossover, cryptorchidism, cyst, cytoplasm, cytosine, deoxyribonucleic acid (DNA), deoxyribose, diffusion, diploid, dominant gene, dystocia, embryo, environment, epididymis, estrogen, estrus, fertilization, fraternally related, funnel, gamete, gene, genetic engineering, genetics, genotype, gestation, grade, grading up, guanine, haploid, heritability, heritability estimate, heterosis, heterozygous gene pair, homologous, homozygous gene pair, hybrid, identical, inbreeding, incomplete dominance, incubation, infundibulum, isthmus, linebreeding, line crossing, linkage, locus, lysosome, magnum, meiosis, metaphase, mitosis, mutation, nonadditive gene effect, nucleotide, nucleus, oocyte, oogenesis, ootid, outcrossing, ovaries, oviducts, ovulation, ovum, papilla, parturition, penis, phenotype, placenta, polled, polynucleotide, progesterone, prophase, prostate gland, protoplasm, purebred, recessive gene, recombinant bovine somatotropin (rbST), reproduction, retractor muscle, ribonucleic acid (RNA), ribosome, ridgeling, scrotum, semen, semiconservative replication, seminal vesicles, sex-influenced genes, sex-limited genes, sex-linked genes, sexual reproduction, sheath, sigmoid flexure, somatotropin, sperm, spermatic cord, spermatid, spermatocytes, spermatogenesis, spermatogonia, sterile, straight breeding, superovulation, telophase, testicles, testosterone, thymine, transgenic, umbilical cord, uracil, urethra, urine, uterus, vagina, vas deferens, vulva, zygote

**Assessment Evidence**

| | |
|---|---|
| **Performance Tasks:**<br>*Interim:* Using Punnett Square simulates the inheritance of specific traits to predict the outcomes of various breeding scenarios, focusing on traits such as coat color, horn presence, or growth rate. **AA3**<br><br>*Interim:* Participate in a hands-on workshop to learn the techniques and procedures involved in artificial insemination in livestock animals. **P3, P4**<br><br>*Summative:* Participate in a mock auction where they will evaluate and bid on livestock breeding stock based on pedigree analysis. **TI2** | **Other Evidence:**<br>*Classwork:* Analyze hormonal data to determine the correct time to breed a female livestock animal. **AA1, CCE4** |

| Learning Plan |
| --- |
| • Use Punnett Squares and probability to determine the ability of a breeding pair to create an offspring that meets management needs. **AA3**<br>• Analyze expected progeny data to determine ideal breeding pairs to meet livestock management desires. **TI1**<br>• Name, locate and describe the parts and functions of the male and female reproductive systems of livestock animals - swine, cattle, and small ruminants. **P2**<br>• Perform artificial insemination techniques accurately and with best practices. **P3, P4** |
| **Teacher Resources:**<br>Teacher Created Resources |

# Unit 8 - LIVESTOCK SELECTION & JUDGING

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Agriculture, Food, and Natural Resource Standards**

**AS.01.01** Evaluate the development and implications of animal origin, domestication, and distribution on production practices and the environment.
**AS.02.01** Explain management techniques that ensure animal welfare.
**AS.04.01** Evaluate animals for breeding readiness and soundness.
**AS.04.02** Apply scientific principles to select and care for breeding animals.
**AS.06.01** Classify animals according to taxonomic classification systems and use (e.g., agricultural, companion, etc.).
**AS.06.02** Apply principles of comparative anatomy and physiology to uses within various animal systems.
**AS.06.03** Select animals for specific purposes and maximum performance based on anatomy and physiology.
**CRP.02.01** Use strategic thinking to connect and apply academic learning, technical knowledge, and skills to solve problems in the workplace and community.
**CRP.04.01** Communicate using strategies that ensure clarity, logic, purpose and professionalism in formal and informal settings.
**CRP.04.02** Produce clear, reasoned, and coherent written and visual communication in formal and informal settings.
**CRP.04.03** Model active listening strategies with interacting with others in formal and informal settings.
**CRP.05.01** Assess, identify, and synthesize the information and resources needed to make decisions that positively impact the workplace and community.
**CRP.10.01** Identify career opportunities within a career cluster that match personal interests, talents, goals and preferences.
**CRP.12.01** Contribute to team-oriented projects and builds consensus to accomplish results using cultural global competence in the workplace and community.

**Common Core State Standards**

**ELA-LITERACY.L.11-12.6** Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.
**ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts,a nd information clearly and accurately through the effective selection, organization and analysis of content.
**ELA-LITERACY.W.11-12.9** Draw evidence from literary or informational texts to support analysis, reflection, and research.
**ELA-LITERACY.RH.11-12.7** Integrate and evaluate multiple sources of information presented in diverse media formats and media (e.g., visually, quantitatively, as well as in words) in order to address a question or solve a problem.
**MATH.CONTENT.HSS.MD.A.3** Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.

**Next Generation Science Standards**

**HS-LS1-2** Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions

within multicellular organisms.
**HS-LS3-2** Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
**HS-LS3-3** Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in population.
**HS-LS4-3** Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
**HS-ETS1-2** Design a solution to a complex real-world problem by breaking it down into small, more manageable problems that can be solved through engineering.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**TI2(9-12):** I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**TCC3(9-12):** I can integrate relevant information to produce multiple valid solutions.
**CCE1(9-12):** I can initiate discussion with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.
**CCE3(9-12):** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**CCE4(9-12):** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.

**Understandings:** Students will understand that…

- Livestock evaluation is integral to improving animal quality and production efficiency.
- Understanding key terms and concepts is essential for effective evaluation.
- Conformation and anatomical features are crucial in assessing livestock quality and suitability.
- Each livestock species has specific conformation standards that influence evaluation.
- Evaluating cattle requires an understanding of breed-specific traits and general conformation standards.
- Accurate cattle evaluation involves applying established criteria to assess physical and performance traits.
- Sheep and pigs have unique evaluation criteria that must be understood for accurate assessment.
- Different livestock species require distinct approaches to evaluation based on their specific traits.
- Practical application of livestock evaluation skills enhance understanding and proficiency.

**Essential Questions:**

- Why is livestock evaluation critical in agricultural practices?
- What are the fundamental terms and concepts used in livestock evaluation?
- How do anatomical features contribute to effective livestock evaluation?
- What are the conformation standards for different livestock species?
- What criteria are used to evaluate cattle effectively?
- How do breed standards influence cattle evaluation?
- What are the key evaluation criteria for sheep and pigs?
- How do evaluation methods differ among various livestock species?
- How can evaluation skills be applied in real-world scenarios?
- What insights can be gained from reflecting on the evaluation process and feedback?

| | |
|---|---|
| • Reflecting on evaluation performance is important for identifying areas of strength and improvement. | |
| **Students will know...**<br>• The definition and significance of livestock evaluation.<br>• Basic terminology and concepts related to livestock evaluation.<br>• The key anatomical features and conformation standards for various livestock species.<br>• How different anatomical features impact overall livestock quality.<br>• The breed-specific evaluation criteria and standards for cattle.<br>• How to assess cattle based on conformation and performance traits.<br>• The evaluation criteria and standards for sheep and pigs.<br>• How to assess and compare different species using appropriate evaluation methods.<br>• How to effectively apply evaluation skills in a practical setting.<br>• The importance of reflection and feedback in improving evaluation practices. | **Students will be able to...**<br>• Define and use key terms associated with livestock evaluation.<br>• Explain the role and importance of livestock evaluation in agricultural practices.<br>• Identify and describe the anatomical features of different livestock species.<br>• Use conformation standards to evaluate the physical qualities of livestock.<br>• Apply breed-specific evaluation criteria to assess cattle.<br>• Use evaluation forms to systematically document and justify assessments of cattle.<br>• Conduct evaluations of sheep and pigs using specific criteria.<br>• Compare and contrast evaluation approaches for different livestock species.<br>• Demonstrate livestock evaluation skills through practical challenges.<br>• Reflect on and evaluate their performance, incorporating feedback to enhance their evaluation abilities. |
| **Key Vocabulary:**<br>breed, carcass, conformation, desirable traits, economics, evaluation, fat thickness, finish, frame score, genetics, growth rate, judging, loin eye area, market readiness, muscling, palatability, performance, quality grade, ribeye area, soundness, structural correctness, temperament, type, yield grade | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>*Classwork:* Evaluate and rank a class of four animals based on specific criteria such as structure, muscling, and overall conformation. **TCC3, CCE1**<br><br>*Classwork:* Identify various livestock breeds and describe their key characteristics, including strengths, weakness, and common uses. **CCE1**<br><br>*Interim*: Organize and participate in a livestock evaluation mock contest. **TI2, CCE3** | **Other Evidence:**<br>*Classwork:* Written formative (classwork/homework) assessment. |

| | |
|---|---|
| *Summative:* Demonstrate livestock evaluation understanding and communication skills by presenting oral reasons for their rankings of a class of livestock. **CCE4** | |
| **Learning Plan** | |
| • Students will evaluate live animals for desirable traits such as, but not limited to, conformation, growth rate, market readiness, performance and structural correctness. **CCE1**<br>• Students will perform a set of oral reasons to a group of three or more peers or educational staff. **CCE4** | |
| **Teacher Resources:**<br>Teacher Created Resources | |

# VETERINARY SCIENCE YEAR A CURRICULUM- ANIMAL ANATOMY AND PHYSIOLOGY
# OPT: UCONN ECE ANSC 1676 INTRODUCTION TO COMPANION ANIMALS

| | |
|---|---|
| **Grade Levels: 11/12, UConn ECE** | **Curriculum Author:** Jennifer Jedd |

**Course Description:** This course is designed for students who show an interest in the animal science field, as assistants or technicians, or college bound students in any animal science field. This course acquaints the student with the skills of small and large animal care, first aid, animal behavior and restraint, small animal grooming, and parasitology. It also includes an investigation of animal health and disease, alternative veterinary medicine, animal anatomy and physiology, animal nutrition, animal reproduction and genetics, and animal identification. Upon successful completion of the course, students will receive credit for UConn ANSC 1676 Introduction to Companion Animals. Evaluation will be done by tests, quizzes, projects, participation, and work experience.

Skills: Students will acquire skills in animal terminology, restraint and handling of large and small species, some reptile and amphibians, disinfection, identification of breeds of companion, livestock and exotic animals, first aid surgical tools, and performing a veterinary physical exam. Students will also be able to identify major structures and functions of the primary organ systems, prepare and analyze nutritional contents of animal rations, and gain skills in animal breeding, neonatal care, and management. Skills will be practiced through hands-on work with small animals and exotics, laboratory experience, and specimen dissection.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner "I Can" Statements** |
| Introduction to Veterinary Anatomy, Laboratory Norms | Each of our animals has specific care requirements dependent upon the anatomy and physiology of their species and breed that must be adhered to in order to ensure the animal's health and quality of life | What general and species-specific care do animals need, and why is it important to care for them properly? | **AA2(9-12), AA3(9-12), CCE2(9-12), DE4(9-12), TCC4(9-12)** |
| Integumentary System | The integumentary system, made up of the skin and other body coverings, mainly protects the animal from outside contamination, and we evaluate multiple items including the presence of exterior wounds or parasites, and we utilize procedures such as suturing, skin scraping, microscopic identification, and other procedures to identify issues and identify potential methods of remediation such as antiparasitics and sutures. | What is the integumentary system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | **CCE2(9-12), CCE3(9-12), P1(9-12), P3(9-12), TCC2(9-12), TCC3(9-12)** |
| Digestive System | The digestive system, made up of the stomach and additional organs that help digest and absorb food and water, provides nutrition to the animal to ensure maintenance and additional functions depending on the animal's purpose and life stage, and we evaluate multiple items including the body condition score, nutrient evaluation, and presence of parasites, and we utilize procedures such as | What is the digestive system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues, and how do we identify an appropriate diet to feed an animal? | **AA1(9-12), AA2(9-12), AA4(9-12), CCE3(9-12), DE1(9-12), P2(9-12), P3(9-12), TCC2(9-12), TCC4(9-12), TI3(9-12)** |

| | | | |
|---|---|---|---|
| | fecal testing and microscopic identification, feed analysis, FAMACHA tests, and other procedures to identify issues and identify potential methods of remediation such as antiparasitics and adjustments to feed rations. | | |
| Musculoskeletal System | The musculoskeletal system, made up of the muscles, bones, tendons, ligaments, and other connective tissues, mainly provides support and motion for an animal, and we evaluate multiple items including gait, and external evaluation, and we utilize procedures such as lameness examinations and medical imaging, and other procedures to identify issues and identify potential methods of remediation such as alternative therapies, and emergency splinting. | What is the musculoskeletal system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | **AA1(9-12), DE2(9-12), TCC2(9-12), TCC4(9-12), TI1(9-12), TI3(9-12)** |
| Cardiovascular System | The cardiovascular system, made up of the heart, blood, and blood vessels, mainly ensures the transport of oxygen and nutrients and the removal of waste at the cellular level, and we evaluate multiple items including blood evaluation and vital signs, and we utilize procedures such as TPR, blood smears and hematocrit, blood pressure, blood typing, EKG evaluation, and other procedures to identify issues and identify potential methods of remediation such as CPR and First Aid administration, veterinary triage, and bandaging. | What is the cardiovascular system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | **AA4(9-12), CCE2(9-12), CCE3(9-12), DE2(9-12), DE4(9-12), P4(9-12), TCC2(9-12), TCC3(9-12), TI3(9-12)** |

| | | | |
|---|---|---|---|
| Respiratory System | The respiratory system, made up of the lungs and airways, allows exchange of oxygen and other gasses at the cellular level, and we evaluate multiple items including vital signs and blood oxygen levels, and we utilize procedures such as lung capacity, respiratory sound evaluation, and other procedures to identify issues and identify potential methods of remediation such as proper intubation and anesthesia in the surgical setting. | What is the respiratory system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | **AA1(9-12), CCE4(9-12), DE2(9-12), DE4(9-12), TCC2(9-12), TCC3(9-12), TI3(9-12)** |
| Renal System | The renal system, made up of the skin and other body coverings, mainly ensures the body's homeostatic state, and we evaluate multiple items including urine collection and urinalysis, and we utilize procedures such as urine culture and a variety of additional urine tests to identify issues and identify potential methods of remediation such as diabetic treatment. | What is the renal system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | **CCE3(9-12), DE4(9-12), TCC2(9-12), TCC4(9-12), TI3(9-12)** |
| Immune System | The immune system, made up of lymph and the lymphatic vessels and nodes, mainly protects the animal from microbial contamination, and we evaluate multiple items including WBC levels and deviations from normal health in all other parts of the body, and we utilize procedures such as microscopic identification, the ELISA test, and other procedures to identify issues and identify potential methods of remediation and | What is the immune system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | **AA1(9-12), CCE3(9-12), CCE4(9-12), DE1(9-12), TCC2(9-12), TCC3(9-12), TCC4(9-12), TI2(9-12), TI3(9-12)** |

| | | | |
|---|---|---|---|
| | prevention such as the creation of biosecurity plans, vaccination protocols, and preventing antibiotic and antiparasitic resistance by proper use of veterinary medications. | | |
| Systems Dependency; Animal Selection, Evaluation, and Showmanship | An animal's overall health and conformation is evaluated against a breed standard which can be done on a competitive level or by a potential purchaser who will evaluate the animal's strengths and weaknesses based on the overall function of the animal and the severity of any defects. Being able to select and justify your selection is an important item to be able to communicate in the animal industry. | How do I evaluate the success of all of the animal's body systems working together, and what impact does proper anatomy, conformation, and physiology have upon the value of the animal? | **AA4(9-12), CCE2(9-12), CCE4(9-12), DE2(9-12), DE4(9-12), P3(9-12), P4(9-12), TCC2(9-12), TCC4(9-12), TI3(9-12)** |

# Unit 1 - Introduction to Veterinary Anatomy, Laboratory Norms

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **CT-FS.01.01.** Understand the concepts and procedures of handling contaminants, chemicals and related equipment in an agricultural setting.
- **CT-FS.05.01.** Apply safety/health practices to AFNR worksites.
- **CT-FS.05.03.** Follow appropriate procedures in case of an emergency.
- **CT-FS.06.01.** Evaluate and select the appropriate tool to perform a given task.
- **CT-FS.06.02.** Use appropriate protective equipment and handle AFNR tools and equipment to demonstrate safe and proper use of the tools and equipment.
- **CT-FS.06.03.** Maintain tools for efficient use.
- **CT-AS.01.03.** Identify breeds and types of companion, production and/or lab animals.
- **CT-LS.02.03.** Develop awareness and apply skills necessary for achieving career success.
- **CT-LS.03.02.** Analyze situations and execute an appropriate course of action.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**AA2(9-12) :** I can assess my past successes and mistakes to change my approach.
**AA3(9-12) :** I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.
**CCE2(9-12) :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**DE4(9-12) :** I can work respectfully with all members of my community and support the needs of others.
**TCC4(9-12) :** I can integrate my learning to adapt to experiences in the classroom, career and life.

**Understandings:** Students will understand that...

- Each of our animals has specific care requirements that must be adhered to in order to ensure the animal's health and quality of life
- There are hazards in the small animal laboratory that will require specific response protocols

**Essential Questions:**

- What general and species-specific care do animals need, and why is it important to care for them properly?
- What happens when there is a safety situation in the small animal lab?
- Why is it important to know each body system in an animal and

| | |
|---|---|
| • Knowing the major body systems of an animal is essential to being able to determine the overall health of an animal, and is also key in determining deviations from health<br>• Maintaining accurate records helps to ensure the health of an animal and the quality of the laboratory setting by being able to evaluate history and also because there are many people involved in the health of the animals, so quality records reduces the chance of communication errors<br>• An important quality is to be able to evaluate a need and be able to find the resources to act upon a need<br>• In life, there will be situations in which a person needs to work independently, as a team, or in a leadership role<br>• Proper use of the microscope is important in maintaining the quality of the piece, and being able to use it efficiently to help evaluate animal health | what impact does that knowledge have on animal health?<br>• What is the importance of detailed and accurate records in the animal laboratory?<br>• How can I be a productive asset in the workplace?<br>• What is the purpose of learning to use a microscope? |
| **Students will know...**<br>• Care requirements for each animal in the small animal laboratory<br>• How to respond to a variety of situations that can occur in the small laboratory<br>• The major body systems in an animal | **Students will be able to...**<br>• How to work independently and as a team to maintain and improve the small animal laboratory<br>• Evaluate needs in the laboratory and take initiative to address the needs<br>• Maintain records of proceedings in the laboratory<br>• Perform routine physical exams on all animals in the small animal laboratory, chart findings, and evaluate necessary changes in care<br>• Use a microscope properly |
| **Key Vocabulary:** Agency, Auscult, Cardiovascular system, Digestive system, Immune system, Initiative, Integumentary system, Microscope parts (arm, coarse and fine adjustment, eyepiece, objective, stage and clip), Musculoskeletal system, Physical examination, Renal system, Respiratory system, Stethoscope | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Routine physical exams and charting for small animals **TCC4**<br>• Routine laboratory care station rotations **TCC4** | **Other Evidence:**<br>• Small animal laboratory safety assessment **DE4**<br>• Microscope care and use laboratory activity **AA2** |

| Learning Plan |
| --- |
| Laboratory safety rules and assessment **DE4**<br>Throughout the year, students will rotate through different laboratory stations and the laboratory manager position and work with different groups of students to complete the station-specific animal care tasks. Psychomotor skill development will be attained by students becoming more efficient with tasks and becoming more independent over the course of the year. **CCE2**<br>Throughout the year, students will perform routine physical examinations on the small animals and perform health care procedures such as hair trims, nail trims, and other procedures as needed to ensure health and wellbeing of animals, and to compare and contrast nutrition, grooming, and health care needs of a variety of species. They will also fill out health charts similar to those that would be used in a veterinary practice in order to evaluate the whole health of an animal. **TCC4**<br>Animal anatomy and physiology pre-assessment and learning goals **AA3**<br>Microscope care and parts, and slide mount and examination laboratory **AA2** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Guest speakers and agricultural advisory committee and stakeholders |

# Unit 2 - Integumentary System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.02.03.a.** Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.02.a.** Explain animal production best practices that minimize health risks.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.02.01.c.** Correlate the functions of animal cell structures to animal growth, development, health, and reproduction.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.06.03.01.c.** Select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth, and reproduction.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.01.c.** Select tools, techniques, and technology to meet specific animal health management goals.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.

- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.
- **AS.07.01.04.a.** Identify characteristics of causal agents and vectors of diseases and disorders in animals.
- **AS.07.01.04.b.** Analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites, and disorders among animals.
- **AS.07.01.05.c.** Recommend surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives.
- **AS.07.02.02.a.** Identify zoonotic diseases including their historical significance and potential future implications.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**CCE2(9-12) :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE3(9-12) :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**P1(9-12)** : I can self-reflect and seek feedback to build upon my strengths, apply those strengths to overcome obstacles, and share my strategies with others.
**P3(9-12) :** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
**TCC2(9-12) :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC3(9-12) :** I can integrate relevant information to produce multiple valid solutions.

**Understandings:** Students will understand that…

- Proper form and function of all components will ensure the efficacy of the integumentary system, whose main purpose is to cover the body and provide protection
- There are a variety of diseases, parasites, and injuries that can negatively affect the integumentary system, and proper identification and treatment of the issue is necessary to ensure the health of the animal
- There are certain points of each parasite's life cycle in which treatments are more effective, and that some treatments are more effective than others. Using this knowledge can help bring parasites to a controllable level while reducing parasitic resistance
- There are a variety of diagnostic tests that can be done to determine the cause of an integumentary related illness, and

**Essential Questions:**

- What is the integumentary system and what job does it perform?
- What can cause the integumentary system to malfunction, and what do I need to do about it?
- Why is it necessary to identify parasites and understand their life cycle?
- How are diseases of the integumentary system diagnosed and treated?
- What is the purpose of suturing?

| | |
|---|---|
| being able to run a test correctly is essential in proper diagnosis to determine the course of treatment<br>● Suturing is a skill that is used by veterinarians to help body tissues heal, and takes practice to be able to do quickly and properly to maximize healing and minimize trauma to body tissue | |
| **Students will know…**<br>● Major anatomical structures and physiological functions of the integumentary system<br>● A variety of types of animal body coverings and how they grow and function<br>● The life cycles of parasites of significance in our geographical region and how to prevent them from harming our animals<br>● When to use a variety of types of diagnostic procedures<br>● Types of wounds and the care that is required for each one<br>● Which type of suture to use in which situation | **Students will be able to…**<br>● Collect fur and hair samples to mount on slides and examine under the microscope<br>● Identify key similarities and differences of ectoparasites and skin diseases in order to perform a differential diagnosis<br>● Identify major ectoparasites under the microscope<br>● Perform a variety of diagnostic tests and evaluate the results, including skin scrapings, impression smears, and fine needle aspiration<br>● Perform wound irrigation and preparation, and properly pack and bandage a wound<br>● Perform a variety of sutures and evaluate their effectiveness |
| **Key Vocabulary:** -cyte, Abrasion, Antibiotic, Antiseptic, Arrector pili muscle, Avulsion, Bandage, Bite, Bulb, Continuous, Cortex, Cuticle, Cytology, Dander, Debridement, Dermis, Differential diagnosis, Direct life cycle, Ectoparasite, Endoparasite, Fiber, Fine needle aspiration, Fur, Hair, Host, Hypoallergenic, Impression smear, Incision, Indirect life cycle, Inflammation, Integumentary system, Intermediate host, Interrupted, Keratin, Laceration, Lesion, Lice spp., Medulla, Melanin, Mite spp., Nail, Platelet, Puncture, Sebaceous gland, Shaft, Skin, Skin scraping, Stitch, Suture, Sweat gland, Throw, Tick spp., Tumor, Vibrissae, Wool | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Wound debridement and bandaging laboratory **CCE2**<br>● Differential diagnosis research and chart **CCE3**<br>● Suturing laboratory **P1, P3** | **Other Evidence:**<br>● Integumentary system anatomy and physiology assessment<br>● Microscopic Hair Collection, Mounting, and Evaluation Laboratory **TCC3**<br>● External parasite identification laboratory **TCC3**<br>● Skin scraping, impression smear, and fine needle aspiration laboratory **P3** |
| **Learning Plan** | |
| Introductory integumentary system anatomy and physiology overview **TCC2** | |

| |
|---|
| Introductory anatomy of body coverings overview **TCC2**<br>Body covering collection, mount, and microscopic evaluation laboratory **TCC3**<br>Skin disease and ectoparasite research and differential diagnosis/dichotomous key chart **CCE3**<br>External parasite identification laboratory and parasitic life cycle research project **TCC3**<br>Skin scraping and analysis laboratory **P3**<br>Introduction and overview of integumentary diseases **TCC2**<br>Impression smear and fine needle aspiration laboratory **P3**<br>External wound identification, debridement, preparation, and bandaging laboratory **CCE2**<br>Suturing laboratory (six types of sutures and suture removal) and self-evaluation **P1, P3** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes and slides, Guest speakers and agricultural advisory committee and stakeholders |

# Unit 3 - Digestive System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.01.b.** Examine characteristics of animals that developed in response to environmental and production related influences.
- **AS.01.02.03.a.** Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.03.01.01.a.** Identify essential nutrients required for animal health and analyze each nutrient's role in growth and performance.
- **AS.03.01.01.b.** Differentiate between nutritional needs of animals based on growth stages, anatomy, and/or production systems (e.g., maintenance, gestation, work, growth, etc.).
- **AS.03.01.01.c.** Develop a nutritionally balanced ration for an animal based on its production stage.
- **AS.03.02.01.a.** Compare and contrast common types of feedstuffs and their general quality and condition.
- **AS.03.02.01.b.** Evaluate the adequacy of feed rations using data from the analysis of feedstuffs, animal requirements, and performance.
- **AS.03.02.01.c.** Select appropriate feedstuffs for animals based on a variety of factors (e.g., economics, digestive system, and nutritional needs, etc.).
- **AS.03.03.02.a.** Summarize the meaning of various components of feed labels and feeding directions.
- **AS.03.03.02.b.** Apply information from a feed label and feeding directions to feed animals.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.

- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.
- **AS.07.01.04.a.** Identify characteristics of causal agents and vectors of diseases and disorders in animals.
- **AS.07.01.04.c.** Design a health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**AA1 :** I can evaluate different approaches and justify the best pathway to success.
**AA2 :** I can assess my past successes and mistakes to change my approach.
**AA4 :** I can create opportunities to extend my learning by remaining open-minded in any situation.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**DE1 :** I can acknowledge, process, and respond appropriately to others' comments and perspectives.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**P3 :** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…

- Proper form and function of all components will ensure the efficacy of the digestive system whose main purpose is to break down food into useable components and provide nutrition for the body
- There are major anatomical differences dependent upon the animal species and diet, and each animal has different nutritional needs and care that reflect the type of digestive system they have
- Dependent upon the animal's digestive system and physiology, they metabolize nutrients differently, therefore feed rations must

**Essential Questions:**

- What is the digestive system and what job does it perform?
- How do digestive systems differ and how does that affect an animal's dietary needs?
- How do I determine what to feed an animal?
- How do I know what is in animal feeds in order to select the right one for an animal?
- What can cause the digestive system to malfunction, and what do I need to do about it?
- Why is it necessary to identify parasites and understand their life cycle?

| | |
|---|---|
| be carefully formulated and balanced to ensure proper amounts of all essential nutrient intake, and to avoid toxicity<br>● Being able to accurately evaluate an animal's nutritional requirements and lifestyle and compare it to a feed label will result in the proper selection of feeds for an animal<br>● There are a variety of diseases, parasites, and injuries that can negatively affect the digestive system, and proper identification and treatment of the issue is necessary to ensure the health of the animal<br>● There are certain points of each parasite's life cycle in which treatments are more effective, and that some treatments are more effective than others. Using this knowledge can help bring parasites to a controllable level while reducing parasitic resistance<br>● There are a variety of diagnostic tests that can be done to determine the cause of a digestive related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment<br>● Dental care is essential in order to ensure that the animal can obtain the nutrition they need | ● How are diseases of the digestive system diagnosed and treated?<br>● Why is dental care important to the digestive system? |
| **Students will know...**<br>● Major anatomical structures and physiological functions of the digestive system<br>● Anatomical differences between the major types of digestive systems and how animal diets are affected by those differences<br>● How the digestive breakdown and nutrient uptake process works<br>● The major types of nutrients required in an animal's diet<br>● Classifications of vitamins and minerals<br>● What happens when too much or too little of a nutrient is consumed in a diet<br>● Nutritionally and non-nutritionally related diseases of the digestive system and the impact they have on the animal<br>● Common parasites of the digestive system and the impacts they have<br>● Anatomy of teeth and dentition variations between animals | **Students will be able to...**<br>● Dissect an animal digestive system and analyze the digesta at different locations to determine nutrient uptake<br>● Analyze and select an animal food for an animal dependent upon a variety of factors such as activity level and metabolic needs, breed and species, and owner preferences<br>● Analyze a feed label to determine components and appropriateness for an animal<br>● Calculate caloric needs for an animal's diet<br>● How to evaluate an animal's body condition score, and proper ways to change it if needed<br>● Identify common adult and larval digestive system parasites and evaluate potential methods of treatment<br>● Perform fecal grading and fecal collection for evaluation<br>● Perform a fecal smear and fecal flotation diagnostic test and identify parasitic evidence<br>● Perform a FAMACHA test and earn an industry certification |

| | |
|---|---|
| | • Perform a dental evaluation and cleaning of an animal's teeth<br>• Age small ruminants based on dentition |

**Key Vocabulary:** Abomasum, Accessory organ, Additive, Anus, Avian, Body condition score, Caloric requirement, Carbohydrate, Carnivore, Cecotrophs, Cecum, Cloaca, Colic, Colon, Crop, Crude fiber, Crude protein, Deficiency, Dentition, Dewormer, Digestibility, Digestible energy, Dry matter, Duodenum, Enamel, Enzyme, Esophagus, FAMACHA, Fecal flotation, Fecalyzer, Feed, Fiber, Formula, Gallbladder, Gizzard, Gross energy, Herbivore, Ileum, Incisor, Ingredient, Jejunum, Large intestine, Larvae, Lipids, Liver, Mastication, Metabolizable energy, Mineral, Molar, Monogastric, Net energy, Nutrient, Obesity, Omasum, Omnivore, Palatability, Pancreas, Papillae, Parasite, Parasite eggs, Pearson square, Periodontal disease, Peristalsis, pH, Pharynx, Plaque, Protein, Proventriculus, Pseudoruminant, Ration, Rectum, Reticulum, Rumen, Ruminant, Saliva, Small intestine, Tartar, Total digestible nutrients, Toxicity, Vent, Vitamin, Water, Worm spp.

## Assessment Evidence

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| • Animal digestion modeling laboratory **TI3**<br>• Pet feed tag evaluation laboratory **TCC4**<br>• Pet treat formulation and nutrient content laboratory **AA1, DE1**<br>• Fecal smear and flotation laboratory **CCE3**<br>• FAMACHA certification exam (Industry level) **AA4** | • Animal digestive system dissection and digesta analysis laboratory **TCC4**<br>• Vitamin and mineral toxicity and deficiency research **TI3**<br>• Calculations of caloric requirements and Pearson square **P2**<br>• Digestive system anatomy and physiology assessment **TCC2**<br>• Body condition scoring laboratory **AA2**<br>• Fecal collection and grading laboratory **AA4**<br>• Dental care laboratory **P3** |

## Learning Plan

Overview of digestive system types, anatomy, and physiology and related activities **TCC2**
Ruminant digestion simulation laboratory activity **TI3**
Ruminant dissection and digesta evaluation laboratory **TCC4**
Overview of feed components and how to balance feed rations **TCC2**
Vitamin and mineral toxicity and deficiency research **TI3**
Evaluating animal feed tag laboratory **TCC4**
Feed ration math activities- caloric needs and ensuring nutrient balance **P2**
Pet treat formulation, food tag math, and marketing laboratory **AA1, DE1**
Overview of nutritionally and non-nutritionally related diseases **TCC2**
Body condition scoring laboratory **AA2**
Overview of parasites in the digestive system, life cycles, and types of dewormers **TCC2**
Fecal grading and collection laboratory **AA4**
Fecal flotation and fecal smear, and parasite identification laboratory **CCE3**
FAMACHA certification course and laboratory **AA4**

| |
|---|
| Parasite research activity **TI3**<br>Overview of dental structures and importance of dental health **TCC2**<br>Dental structure laboratory **TCC2**<br>Dental cleaning laboratory **P3** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes and slides, URI Famacha course and certification program, Guest speakers and agricultural advisory committee and stakeholders |

# Unit 4 - Musculoskeletal System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites,

and physiological disorders.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**AA1 :** I can evaluate different approaches and justify the best pathway to success.
**DE2 :** I can honor my own feelings and show empathy toward others through my actions.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI1 :** I can implement a realistic plan and adapt when necessary to achieve my goals.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…
- Proper form and function of all components will ensure the efficacy of the musculoskeletal system whose main purpose is to provide structure and movement for the body
- There are a variety of diseases and injuries that can negatively affect the musculoskeletal system, and proper identification and treatment of the issue is necessary to ensure the health of the animal
- There are a variety of diagnostic tests that can be done to determine the cause of a musculoskeletal related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment
- Alternative therapies are becoming more prevalent in the treatment of animal disease, especially those related to the musculoskeletal system

**Essential Questions:**
- What is the musculoskeletal system and what job does it perform?
- What can cause the musculoskeletal system to malfunction, and what do I need to do about it?
- How are diseases of the musculoskeletal system diagnosed and treated?
- What are alternative therapies and how can they be beneficial to an animal?

**Students will know...**
- Major anatomical structures and physiological functions of the musculoskeletal system
- How muscles, bones, ligaments, and tendons work together to ensure proper movement and structure of an animal
- How incorrect structure negatively affects the movement and overall productivity and healthy life of an animal

**Students will be able to…**
- Classify bones and joints by type
- Identify and model major bones in the body
- Identify and model major muscles in the body
- Classify bone breaks by type from actual radiographs and evaluate potential treatment options
- Simulate the x-ray process

| | |
|---|---|
| • The healing process of bones<br>• Types of alternative therapies for animals and the situations that they would potentially be utilized<br>• Diseases and disorders that can negatively affect the musculoskeletal system and potential treatments | • Perform emergency splinting<br>• Evaluate an animal on structural correctness<br>• Perform a lameness exam on a horse<br>• Perform animal massage techniques |
| **Key Vocabulary:** Abduction, Adduction, Alternative therapy, Appendicular skeleton, Arthritis, Atlas, Axial skeleton, Axis, Biceps femoris, Bone, Bone marrow, Brachiocephalicus, Callus, Cardiac muscle, Carpal, Cartilage, Cervical vertebrae, Clavicle, Coccygeal vertebrae, Comminuted break, Compact bone, Complete break, Compound break, Deltoid, Diaphysis, Diarthroses, Epiphysis, Extension, Fascia, Femur, Fibula, Fissure break, Flat bone, Flexion, Gastrocnemius, Gluteus, Greenstick break, Humerus, Incomplete break, Insertion, Intercostal, Irregular bone, Joint, Keel, Lameness, Latissimus dorsi, Ligament, Long bone, Lumbar vertebrae, Mandible, Masseter, Maxilla, Metacarpal, Metaphysis, Metatarsal, Muscle, Oblique, Oblique break, Origin, Osteoblast, Osteoclast, Osteogenesis, Osteolysis, Osteoporosis, Patella, Pectoral, Pelvis, Phalanges, Psoas major, Quadriceps, Radiograph, Radius, Rib, Sacral vertebrae, Sarcomere, Scapula, Semitendinosus, Sesamoid, Short bone, Simple break, Skeletal muscle, Skull, Smooth muscle, Spiral break, Spongy bone, Sprain, Sternum, Strain, Synarthroses, Synovial fluid, Tarsal, Tendon, Thoracic vertebrae, Tibia, Transverse break, Trapezius, Triceps brachii, Ulna, X-Ray | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Chicken wing anatomy laboratory **TCC4**<br>• Pasta musculoskeletal model **TI1**<br>• Bone break laboratory **AA1** | **Other Evidence:**<br>• Musculoskeletal system anatomy and physiology assessment **TCC2**<br>• Bone break case study **TCC4**<br>• Alternative therapy research presentation **CCE4**<br>• Animal massage and myofascial release laboratory **DE2**<br>• Lameness evaluation **TCC4** |
| **Learning Plan** | |
| Overview of musculoskeletal anatomy and physiology, bone and muscle identification **TCC2**<br>Chicken wing dissection laboratory **TCC4**<br>Pasta musculoskeletal model and optional extension activities **TI1**<br>Overview of bone break types and bone repair process **TCC2**<br>Bone break laboratory **AA1**<br>Bone break case studies and X-Ray simulation **TCC4**<br>Animal conformation and lameness evaluation **TCC2**<br>Alternative therapy research presentation **TI3**<br>Animal massage and myofascial release laboratory **DE2** | |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and | |

restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Guest speakers and agricultural advisory committee and stakeholders

# Unit 5 - Cardiovascular System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites,

and physiological disorders.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**AA4 :** I can create opportunities to extend my learning by remaining open-minded in any situation.
**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**DE2 :** I can honor my own feelings and show empathy toward others through my actions.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**P4 :** I can take-on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through personal experience that failures are more instructive than discouraging.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…
- Proper form and function of all components will ensure the efficacy of the cardiovascular system whose main purpose is to ensure appropriate blood flow and oxygen and nutrient exchange to the body
- There are a variety of diseases, parasites, and injuries that can negatively affect the cardiovascular system, and proper identification and treatment of the issue is necessary to ensure the health of the animal
- There are a variety of diagnostic tests that can be done to determine the cause of a cardiovascular related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment
- Being able to accurately determine an animal's vital signs is important in being able to quickly respond to an emergency situation, and to ensuring animal health in general
- Animal health situations must be appropriately triaged in a

**Essential Questions:**
- What is the cardiovascular system and what job does it perform?
- What can cause the cardiovascular system to malfunction, and what do I need to do about it?
- How are diseases of the cardiovascular system diagnosed and treated?
- Why should an owner know how to take an animal's vital signs?
- How does a veterinarian determine the severity of an animal's health status?

| | |
|---|---|
| veterinary practice, and employees must be able to think rationally and evaluate animals to determine who must be treated first | |
| **Students will know...**<br>● Major anatomical structures and physiological functions of the cardiovascular system<br>● The path of blood flow through the heart and body<br>● Factors that affect blood pressure and how the blood pressure system works to ensure sufficient blood flow to the body<br>● Factors that affect pulse and heart rate and how changes to these affect the body<br>● Diseases and disorders that can negatively affect the cardiovascular system, potential treatments, and how to prevent them<br>● How blood types are inherited and how to determine what blood types are able to be used for an infusion<br>● The veterinary triage process and the reason it must be done | **Students will be able to...**<br>● Dissect a heart and identify major anatomical features<br>● Use a sphygmomanometer to take blood pressure readings<br>● Read and interpret an EKG<br>● Perform multiple common routes of venipuncture<br>● Perform appropriate animal restraints to ensure safety of the animal and humans<br>● Collect a blood sample from an animal<br>● Prepare a blood smear slide and analyze it<br>● Perform a hematocrit test and interpret the results<br>● Interpret blood diagnostic results<br>● Pack and bandage a wound properly<br>● Obtain a Pet CPR certification, including evaluating and responding to emergency situations, providing first aid to an animal, and giving an animal CPR |
| **Key Vocabulary:** Anemia, Antigen, Aorta, Arrhythmia, Arteriole,Artery, Atrium, Auscult, Bandage, Basophil, Blood pressure, Bradycardia, Capillary, Cardiac muscle, Cardiopulmonary resuscitation, Cardiovascular, Catheter, Centrifuge, Cephalic vein, Circulation, Collection tube, Complete blood count, Debridement, Depolarization, Diastole, Diff-Quick stain, Differential count, Diffusion, Edema, Electrocardiogram, Eosinophil, Erythrocyte, Gauge, Heart murmur, Hematocrit, Hemoglobin, Hypertension, Hypotension, Intramuscular, Intravenous, Jugular vein, Lavage, Leukocyte, Lymphocyte, Monocyte, Needle, Neutrophil, Node, Packed cell volume, Pericardium, Plasma, Platelet, PQ wave, Pulmonary artery, QRS wave, Red blood cell (RBC), Rh factor, Saphenous vein, Septum, Splint, ST wave, Stethoscope, Subcutaneous, Syringe, Systole, Tachycardia, Thrombocyte, TPR, Vacutainer, Valve, Vein, Vena cava, Venipuncture, Ventricle, Venule, Vital signs, White blood cell (WBC) | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Heart dissection laboratory **DE4**<br>● Venipuncture and injection laboratory **CCE2**<br>● Blood analysis laboratory **P4**<br>● Pet CPR and First Aid certification exam and practicum **AA4** | **Other Evidence:**<br>● Pulse and blood pressure laboratory activity **TI3**<br>● EKG analysis activity **TCC3**<br>● Blood typing scenario **CCE3**<br>● Blood diagnostic analysis **CCE3**<br>● Bandaging laboratory **DE2**<br>● Cardiovascular system anatomy and physiology assessment **TCC2** |

| Learning Plan |
| --- |
| • Overview of the cardiovascular system anatomy and physiology **TCC2**<br>• Heart dissection laboratory **DE4**<br>• Blood flow through the heart activities **TCC2**<br>• Blood pressure overview **TCC2**<br>• Blood pressure laboratory **TI3**<br>• Pulse laboratory **TI3**<br>• EKG analysis **TCC3**<br>• Overview of common cardiovascular diseases **TCC2**<br>• Venipuncture and injection and related animal restraint laboratory **CCE2**<br>• Blood collection laboratory followed by blood smear and hematocrit laboratory **P4**<br>• Blood typing laboratory **CCE3**<br>• Printed blood diagnostics analysis **CCE3**<br>• Bandaging laboratory **DE2**<br>• Pet CPR and First Aid online course, practicum, and industry certification exam **AA4**<br>• Veterinary triage activity **TCC3** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Teacher PetEmergencyEducation certification, Student access to PetEmergencyEducation.com for exam and certification, Guest speakers and agricultural advisory committee and stakeholders |

# Unit 6 - Respiratory System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites,

and physiological disorders.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).
-

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**AA1 :** I can evaluate different approaches and justify the best pathway to success.
**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE2 :** I can honor my own feelings and show empathy toward others through my actions.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TI3** : I can formulate and investigate probing questions to further my learning.

| **Understandings:** Students will understand that… | **Essential Questions:** |
|---|---|
| • Proper form and function of all components will ensure the efficacy of the respiratory system whose primary purpose is to ensure the intake of oxygen and output of waste gasses for the body<br>• There are a variety of diseases, parasites, and injuries that can negatively affect the respiratory system, and proper identification and treatment of the issue is necessary to ensure the health of the animal<br>• There are a variety of diagnostic tests that can be done to determine the cause of a respiratory related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment<br>• Gas exchange and diffusion must occur at the cellular level in the lungs in order to ensure that blood gets oxygenated and ensure the body can function<br>• Anesthesia is commonly used in the veterinary practice to perform a variety of procedures, and proper intubation and calculation of gas flow is essential to keeping an animal alive | • What is the respiratory system and what job does it perform?<br>• What can cause the respiratory system to malfunction, and what do I need to do about it?<br>• How are diseases of the integumentary system diagnosed and treated?<br>• How does oxygen get into the bloodstream?<br>• How to animals get "put under" for veterinary procedures and how do we ensure their safety? |
| **Students will know...** | **Students will be able to…** |

| | |
|---|---|
| • Major anatomical structures and physiological functions of the respiratory system<br>• How the vacuum system of respiration works<br>• How the process of diffusion and gas exchange works at the cellular level<br>• Common diseases that can affect the respiratory system, as well as potential treatments and prevention methods<br>• How anesthesia works and the potential negative effects and dangers of miscalculating gas flow | • Model the pressurized vacuum system created by the diaphragm in order to allow oxygen intake<br>• Dissect a respiratory tract and identity anatomical parts<br>• Perform a diffusion laboratory to simulate the process in the lungs<br>• Measure lung capacity<br>• Evaluate an animal's respiratory health by analyzing respiratory sounds<br>• Intubate an artificial animal model to simulate anesthesia preparation |
| **Key Vocabulary:** -itis, Alveoli, Anesthesia, Antihistamine, Auscult, Brachycephalic, Bronchus, Capillary, Carbon dioxide, Catheter, Cilia, Diaphragm, Diffusion, Dyspnea, Endoscopy, Endotracheal tube, Epiglottis, Exhalation, Hyperpnea, Hypoxia, Inhalation, Larynx, Lung, Lung capacity, Mucus, Osmosis, Oxygen, Pharynx, Pneumonia, Pulse oximeter, Respiration, Sinus, Stethoscope, Surface area, Thoracic cavity, Trachea | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Respiratory system dissection laboratory **DE4**<br>• Lung capacity laboratory **TI3** | **Other Evidence:**<br>• Respiratory system Frayer model literacy activity **TCC2, CCE4**<br>• Build a lung activity **AA1**<br>• Gas diffusion laboratory **TI3**<br>• Respiratory sound evaluation laboratory **TCC3**<br>• Respiratory system anatomy and physiology assessment **TCC2** |
| **Learning Plan** | |
| • Introduction to anatomy and physiology of the respiratory system using the literacy Frayer model **TCC2, CCE4**<br>• Build a lung activity **AA1**<br>• Respiratory system dissection laboratory **DE4**<br>• Diffusion and gas exchange laboratory **TI3**<br>• Measuring lung capacity laboratory **TI3**<br>• Introduction to respiratory diseases and case study analysis **TCC2**<br>• Respiration sounds analysis laboratory **TCC3**<br>• Anesthesia and endotracheal tube simulation activity **DE2** | |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Guest speakers and agricultural advisory committee and stakeholders | |

# Unit 7 - Renal System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.

- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…

- Proper form and function of all components will ensure the efficacy of the renal system whose major purpose is to ensure homeostasis of water, nutrients, salt, and pH in the bloodstream
- There are a variety of diseases and injuries that can negatively affect the renal system, and proper identification and treatment of the issue is necessary to ensure the health of the animal
- There are a variety of diagnostic tests that can be done to determine the cause of a renal related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment
- Agar Diffusion Tests can be used in order to find an effective antimicrobial to use in order to reduce antibiotic resistance.

**Essential Questions:**

- What is the respiratory system and what job does it perform?
- What can cause the respiratory system to malfunction, and what do I need to do about it?
- How are diseases of the respiratory system diagnosed and treated?
- How can I ensure that I am using the most effective antibiotic for an illness?

**Students will know...**

- Major anatomical structures and physiological functions of the renal system
- How the kidneys function to maintain homeostasis in the bloodstream by filtration, and how waste is excreted from the body
- Why it is important to reduce antibiotic resistance and improve an animals prognosis by testing and culturing a disease before

**Students will be able to…**

- Dissect a kidney and compare kidney structure amongst species
- Measure the specific gravity, pH, color, and other components of urine and analyze results
- Obtain a sterile urine sample
- Prepare agar plates and run an Agar Diffusion Test to determine presence of a microbial infection and how to determine an effective antimicrobial treatment

| | |
|---|---|
| administering treatment | |

**Key Vocabulary:** Albumin, Antidiuretic hormone, Antifreeze, Bowman's capsule, Catheterization, Chloride, Collecting duct, Concentration, Cortex, Cystocentesis, Dilute, Free catch, Glomerulus, Glucose, Homeostasis, Hypertonic, Hypotonic, Inoculation, Kidney, Loop of Henle, Macroscopic, Medulla, Microscopic, Negative feedback, Nephron, pH, Phosphate, Positive feedback, Refractometer, Renal artery, Renal pelvis, Renal vein, Specific gravity, Susceptibility test, Urea, Ureter, Urethra, Urinalysis, Urinary bladder, Urinary tract infection, Urine, Urine culture, Urolith, Vulva, Zone of inhibition

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| ● Urinalysis laboratory **TCC3**<br>● Urine culture laboratory **TI3**<br>● Microscopic urinalysis laboratory **CCE3** | ● Kidney dissection **DE4**<br>● Kidney filtration laboratory **TI3**<br>● Renal system anatomy and physiology assessment **TCC2** |

**Learning Plan**

- Introduction and overview of the renal system anatomy and physiology, the filtration process, and the homeostatic process **TCC2**
- Kidney dissection laboratory **DE4**
- Overview of common kidney diseases and symptoms **TCC2**
- Urinalysis laboratory **CCE3**
- Urine catch activity **TCC4**
- Urine culture laboratory **TI3**
- Microscopic urinalysis laboratory **CCE3**
- Kidney filtration laboratory **TI3**
- Urinary test results interpretation activity **CCE3**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Guest speakers and agricultural advisory committee and stakeholders

# Unit 8 - Immune System

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.02.a.** Explain animal production best practices that minimize health risks.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.

- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.
- **AS.07.01.04.a**. Identify characteristics of causal agents and vectors of diseases and disorders in animals.
- **AS.07.01.04.b.** Analyze data to evaluate preventive measures for controlling and limiting the spread of diseases, parasites, and disorders among animals.
- **AS.07.01.04.c.** Design a health maintenance and a disease and disorder prevention plan for animals in their natural and/or confined environments.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).
- **AS.07.02.01.a.** Summarize the importance of biosecurity to the animal industry at multiple levels (e.g., local, state, national, global).
- **AS.07.02.02.a.** Identify zoonotic diseases including their historical significance and potential future implications.
- **AS.07.02.02.b.** Analyze the health risk of different zoonotic diseases to humans and identify prevention methods.
- **AS.07.02.02.c.** Evaluate the effectiveness of zoonotic disease prevention methods and procedures to identify those that are best suited to ensure public safety and animal welfare.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**AA1 :** I can evaluate different approaches and justify the best pathway to success.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE1 :** I can acknowledge, process, and respond appropriately to others' comments and perspectives.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI2** : I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…

- Proper form and function of all components will ensure the efficacy of the immune system whose main purpose is to identify and destroy abnormalities in the body
- There are a variety of diseases and injuries that can negatively affect the immune system, and proper identification and

**Essential Questions:**

- What is the immune system and what job does it perform?
- What can cause the immune system to malfunction, and what do I need to do about it?
- How are diseases of the immune system diagnosed and treated?

| | |
|---|---|
| treatment of the issue is necessary to ensure the health of the animal<br>● There are a variety of diagnostic tests that can be done to determine the cause of an immune related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment | |
| **Students will know...**<br>● Major anatomical structures and physiological functions of the immune system<br>● The difference between bacteria and viruses<br>● How bacteria, viruses, and other small organisms are passed to each other to potentially cause illness<br>● How immunization works and its benefits to working with livestock (and dewormers)<br>● How antibiotic resistance works<br>● Foods, medications, chemicals, etc that are not meant for dogs and cats can have serious long term and short time with them.<br>● What cancer is and how it works<br>● A variety of common diseases in addition to those discussed in other units, how they affect an animal and potential treatments and prevention methods | **Students will be able to...**<br>● Dissect a spleen and identify anatomical parts<br>● Identify the four shapes of bacteria under a microscope<br>● Identify common symptoms of illness in animals and create a treatment plan<br>● Identify bacteria and diseases as infectious or non-infectious, and contagious or non-contagious<br>● Utilize a scenario to mathematically model the spread of a viral disease and offer feedback on how to correct a situation and prevent a situation from happening again<br>● Research and present a disease to their classmates<br>● How to deworm animals and how to select the correct product for your/your animal's needs<br>● Model a biological outbreak<br>● Create a biosecurity plan<br>● How to vaccinate livestock, and the difference between male and female, and also to go over with the first headline here |
| **Key Vocabulary:** Active immunity, Allergen, Antibiotic, Antibody, Antigen, B cell, Bacillus, Bacteria, Biosecurity, Coccus, Contagious, Control point, Dewormer, Direct contact, Disease, Drench, ELISA Test, Fine needle aspirate, Fomite, Fungus, Gram stain, Herd immunity threshold, Immune system, Immunity, Immunoglobulin, Impression smear, Indirect contact, Infectious, Inflammation, Inoculate, Isolation, Killed vaccine, Lymph, Lymphatic system, Lymphocyte, Mathematical model, Modified live vaccine, NSAID, Outbreak, Passive immunity, Pathogen, Phagocytosis, Postulate, Prion, Protozoa, Resistance, Risk factor, Spirilla, Spleen, T cell, Vaccination, Vaccine, Vector, Virus, White blood cells | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Spleen dissection, fine needle aspirate, and impression smear laboratory **CCE2**<br>● Bacterial inoculation and antibiotic resistance laboratory **TI3**<br>● Biosecurity plan project and presentation **CCE3** | **Other Evidence:**<br>● ELISA Test laboratory **TCC4**<br>● Mathematical modeling of disease spread activity **AA1, TCC3**<br>● Zoonotic disease research project and gallery walk **TI3**<br>● Immune system disorder case study activity **TI3**<br>● Immune system anatomy and physiology assessment **TCC2** |

| Learning Plan |
| --- |
| • Overview of anatomy and physiology of the immune and lymphatic systems including the spleen **TCC2**<br>• Spleen dissection, fine needle aspirate, and impression smear laboratory **CCE2**<br>• Bacteria and virus identification and research **TI2**<br>• ELISA Test simulation laboratory **TCC4**<br>• Disease transmission types introduction and research **TCC2**<br>• Mathematical modeling flu spread activity **AA1, TCC3**<br>• Zoonotic disease research and gallery walk **TI3**<br>• Mystery disease activity **TI3**<br>• Dewormer and antiparasitic activity **TCC4**<br>• Immune system disorder case studies activity **TI3**<br>• Bacterial inoculation and antibiotic resistance laboratory **TI3**<br>• Pathogenic outbreak and effects case study **CCE4**<br>• Biosecurity plan creation project **CCE3**<br>• Animal poisons activity **CCE4**<br>• Introduction to cancer **DE1** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Guest speakers and agricultural advisory committee and stakeholders |

# Unit 9 - Systems Dependency; Animal Selection, Evaluation, and Showmanship

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.01.b.** Examine characteristics of animals that developed in response to environmental and production related influences.
- **AS.02.01.01.b.** Analyze programs that ensure the welfare of animals (e.g., prevent abuse or mistreatment).
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.06.01.03.a.** Summarize common classification terms utilized in animal systems (e.g., external and internal body parts, maturity, mature male, immature female, animal products, breeds, etc.).
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.06.03.01.c.** Select animals to maximize performance based on anatomical and physiological characteristics that affect health, growth, and reproduction.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.01.c.** Select tools, techniques, and technology to meet specific animal health management goals.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.05.b.** Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**AA4 :** I can create opportunities to extend my learning by remaining open-minded in any situation.
**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.

**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE2 :** I can honor my own feelings and show empathy toward others through my actions.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**P3 :** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
**P4 :** I can take-on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through personal experience that failures are more instructive than discouraging.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that...

- Animals have a variety of qualities that make them unique and desirable to different audiences, and they usually require additional care tailored to their species in order to ensure the utmost health and quality of life
- Animals are conformed differently and understanding all conformation differences of the animal and their differing needs due to those differences will ensure that the owner can provide the best care possible to the animal
- It is important to know the ideal animal of a species in order to evaluate an animal in order to determine if the animal is going to fit the owner's needs and wants, and ensure the animal will live in a good state of health and pass beneficial qualities to offspring if that is the owner's plan
- Being able to communicate one's opinions in an industry specific manner and be able to back up an opinion with factual evidence will improve one's status in an industry
- Showing and presenting an animal properly involves doing research on the animal's breed standard in order to learn the breed standards set by a breed association to choose and present an animal properly, as well as being able to evaluate an animal's faults and attempting to correct them in the ring and be able to show the animal in the most correct way possible in order to achieve the highest placing possible in a show setting, in order to make a sale or make breeding decisions, etc.
- One Health is a modern approach to healthcare focusing not

**Essential Questions:**

- Why do different species and breeds of small animals exist and why is it important to research if they need any special care?
- Why is it important to be able to understand an animal's body system?
- Why do I need to know what an animal of a certain breed is supposed to look like?
- Why do I need to be able to communicate effectively?
- Why should I learn how to show an animal?
- What is One Health and why is it important to the animal industry?

| | |
|---|---|
| only on the health of animals, but also the health of humans, plants, and the earth, and how those four factors are interconnected and that healthcare approaches should be taken with all four factors in mind, not just one. | |
| **Students will know...**<br>● Differences in anatomy amongst animals of different species and breeds<br>● How to care for animals and ensure unique needs are met<br>● How to practice the One Health approach in the animal industry, and how the effects of a proper approach carry into the human, plant, and environmental health sectors<br>● Industry connections to the study of companion animal science | **Students will be able to…**<br>● Participate respectfully when a guest speaker is presenting<br>● Perform an exploratory gross dissection of an animal and compare anatomical features of that animal with other dissected specimens in the room, and evaluate the unique abilities of that animal based on its anatomical features<br>● Learn the breed standards for a breed of animal and be able to judge a class of four animals of that breed, place them, and give a set of reasons (evidence) as to why they placed the class the way that they did<br>● Select, evaluate, and show an animal based on the breed and species standards |
| **Key Vocabulary:** Adaptation, Comparative anatomy, Conformation, Evaluation, Grant, Gross anatomy, Homeostasis, One Health, Reasons, Selection, Showmanship, Species-specific | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Gross animal dissection laboratory **DE4**<br>● Animal conformation and evaluation and reasons **TCC4, CCE2, P3, P4**<br>● Animal body systems comprehensive project **CCE4**<br>● *UConn Companion Animal Industry Connection reflection paper (UConn ECE students only) **AA4, CCE4, TCC4** | **Other Evidence:**<br>● Species specific adaptations activity **TCC2**<br>● Guest speaker reflections **TI3**<br>● Mock animal show **TCC4, CCE2, DE2** |
| **Learning Plan** | |
| ● Species specific adaptations overview and activity **TCC2**<br>● Gross animal dissection laboratory- choice of species **DE4**<br>● Variety of guest speakers focusing on exotic pet species adaptations **TI3**<br>● Animal body systems comprehensive project **CCE4**<br>● Animal conformation and evaluation and introduction to judging **TCC4, CCE2, P3, P4**<br>● Small animal showmanship and mock show **TCC4, CCE2, DE2** | |

| |
|---|
| • Animal industry participation and reflection **AA4, CCE4, TCC4** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Microscopes, Industry guest speakers and locations (Shelter, animal show, etc.), Guest speakers and agricultural advisory committee and stakeholders |

# VETERINARY SCIENCE YEAR B CURRICULUM
# BUSINESS AND HOSPITAL MANAGEMENT, REPRODUCTION, GENETICS, AND ANIMAL BEHAVIOR AND TRAINING
# UCONN ECE: ANSC 1602

| | |
|---|---|
| **Grade Level(s): 11/12, UConn ECE** | **Curriculum Author(s):** Jennifer Jedd |

**Course Description:** This course is designed for students who show an interest in the animal science field, as assistants or technicians, or college bound students in any animal science field. This course acquaints the student with the skills of office management, business planning, animal hospital operation, career planning, veterinary math and pharmacology, and animal reproductive anatomy and physiology. The second half of the year will focus on the UConn course, and consists of the nervous system anatomy and physiology, and the study of animal behavior and training. Upon optionally enrolling and successful completion of the course, students will receive credit for UConn ANSC 1602, Introduction to Animal Behavior. Evaluation will be done by tests, quizzes, projects, participation, and work experience.

Skills: Students will acquire skills in animal terminology, restraint and handling of large and small species, some reptile and amphibians,

disinfection, identification of breeds of companion, livestock and exotic animals, surgical tools, and performing a veterinary physical exam. Students will learn how to work with others in a business setting, do career planning, learn how to do veterinary math, and perform reproductive procedures and predict traits of animals based on genetic inheritance. Students will also be able to identify major structures and functions of the reproductive and nervous systems, gain skills in animal breeding, neonatal care, and management. Students will be able to analyze animal behaviors and create training plans based on the owner's needs and animal's ability. Skills will be practiced through hands-on work with small animals and exotics, laboratory experience, and specimen dissection.

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner "I Can" Statements** |
| Laboratory Skills in the School Laboratory | How can I ensure a safe and healthy laboratory environment for myself and for the animals that reside there? | A full hazard analysis of an area, along with the development of protocols to ensure health and cleanliness will ensure the safety of all laboratory participants and the animals. | **CCE2, DE4, P2, TCC4** |
| Office Skills: Safety, Cleaning, and Communication | How do I ensure that I am a physically and mentally safe and effective team member in the workplace? | Reducing and potentially eliminating workplace hazards, and ensuring that I practice high quality client and coworker communication skills, that I perform my roles and do not hesitate to help others with their roles as needed, and keeping accurate records in the workplace will ensure that I am an effective team member | **CCE2, CCE3, CCE4, DE1, DE4, P2, TCC3, TCC4, TI3** |
| Business Planning | How can I create a successful business in the animal field? | Obtaining industry certifications, performing extensive research of the industry and market, staying educated on trends and consumer preferences, and ensuring positive mental health are key steps to ensuring a successful business in the animal industry. | **CCE1, CCE2, DE2, DE3, P2, TCC2, TCC4, TI2** |
| Hospital Procedures | How do I ensure that a hospital is clean and that surgeries will be successful with minimal issues? | Ensuring aseptic technique and proper sanitation methods are followed, that the correct equipment is used and prepared and stored properly, and having an understanding of all surgery | **CCE2, CCE4, P2, TCC2, TCC3, TCC4** |

| | | | |
|---|---|---|---|
| | | procedures and being able to efficiently perform those procedures will ensure a clean hospital and minimize risk to patients. | |
| Posology and Pharmacology | How is medication dosed and administered to a client and their owner? | Mathematical formulas and conversion factors are used to determine the amount of medication given to a patient, and a protocol is determined for how the medication must be administered, and this information is conveyed specifically to the nursing team or client in order to ensure that the animal receives the correct amount of medication and prevent under- or over- dosing which could be harmful. | **CCE2, P2, TCC3, TCC4** |
| Career Planning | How do I ensure success in my post high school learning path? | Ensuring that a student's resume is up to date, they have practiced interviewing, and that they create a plan for postsecondary education with an idea of what they will do for a career, will ensure that a student is successful after they graduate high school | **AA1, CCE2, P1, P2, P3, TCC4** |
| Reproductive System | What is the reproductive system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | The reproductive system, made up of organs that produce sex cells, and in females, can carry and nourish young, allow the animal to pass on its genetics and continue its species survival, and we evaluate multiple items including breeding soundness examinations and examinations of the sex cells, and we utilize procedures such as microscopic identification, reproductive inhibition or accentuation | **CCE2, CCE4, DE4, P2, TCC3, TCC4** |

| | | | |
|---|---|---|---|
| | | methods, and how to modify the breeding cycle, as well as how to care for neonatal animals in order to ensure the quality of animals that are being bred | |
| Animal Genetics | How can I ensure that an animal I breed will be healthy and have the traits I am looking for? | Having an understanding of how genetics works, including basic Mendelian genetics, to more advanced genetic heredity, as well as understanding potential errors and epigenetic factors that can affect a hereditary pattern, as well as analyzing various records, will help to make a breeding decision to increase the probability that certain traits will be passed down to an animal's offspring | **AA2, CCE1, CCE2, CCE3, P2, P3, P4, TI2, TCC3, TCC4** |
| Nervous System | What is the nervous system, what job does it perform, and how can we ensure that it is properly functioning and identify and remedy any issues? | The nervous system, made up of the nerves, spinal cord, brain, and eyes, controls the entire voluntary and involuntary functioning of an animal's body, and we evaluate multiple items including a nervous system and behavioral physical examination in order to identify issues and identify potential methods of remediation and prevention such as hormonal treatments in order to ensure a high quality of life and functionality for an animal | **CCE2, CCE4, DE4, P2, TCC3, TCC4** |
| Animal Behavior | What is animal behavior, and why is the study of animal behavior beneficial to the raising and keeping of animals, both wild and domesticated? | Being able to understand animal behavior means being able to understand if an animal is happy and comfortable in its own environment. The animal's environment and routine | **CCE1, CCE2, CCE4, DE1, P2, TCC3, TCC4, TI3** |

| | | | |
|---|---|---|---|
| | | can be modified and enhanced in order to allow the animal to show its natural behaviors that it normally would in the wild, and will increase the animal's physical and mental health, and increase its overall quality of life and lifespan, therefore increasing its usefulness to humans in some way. | |
| Animal Training | What is animal training and enrichment, and how is it used to ensure animal welfare when using animals? | Animal training is the modification of an animal's natural behaviors through a variety of training methods in order to achieve a desired result. Following animal welfare laws and standards will ensure the safety and wellbeing of an animal and human who are a training team. If an animal is content and has a trainer it can trust, the animal will respond to the trainer. If the trainer ensures that the animal is well kept, keeps the animal stimulated, and creates a reasonable training plan, the animal is likely to respond appropriately to the training methods and the human will achieve the desired results. | **AA1, AA2, AA3, CCE2, CCE3, DE3, P2, TCC1, TCC3, TI1** |

# Unit 1 - Laboratory Skills in the School Laboratory

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.02.03.a.** Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **CRP.04.01.02.b.** Demonstrate personal ability to speak with clarity, logic, purpose, and professionalism in formal and informal settings (e.g., speeches, interviews, presentations, oral reports, etc.).
- **FPS.03.03.02.a.** Identify emergency response procedures for health and safety issues at AFNR workplaces.
- **FPS.03.04.01.b.** Demonstrate adherence to protective equipment requirements when using various AFNR tools and equipment.
- **FPS.03.04.02.c.** Choose appropriate tools and equipment to safely complete AFNR tasks.
- **CRP.01.01.01.a.** Describe personal responsibility and explain how it applies in the workplace and community (e.g., make educated choices, listen and follow directions, ask for help when needed, meet expected standards, etc.).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

| **Understandings:** Students will understand that... | **Essential Questions:** |
|---|---|
| ● There are hazards in the small animal laboratory that will require specific response protocols and the goal is to try to minimize or reduce those hazards<br>● There are a variety of levels of cleaning that can be done, and each one is done for a certain reason<br>● Being able to conduct a veterinary visit correctly ensures that you have fully evaluated an animal for health, and will ensure that your client is satisfied with your service, which reflects in a positive manner to your business' success<br>● Maintaining accurate records helps to ensure the health of an animal and the quality of the laboratory setting by being able to evaluate history and also because there are many people involved in the health of the animals, so quality records reduces the chance of communication errors<br>● An important quality is to be able to evaluate a need and be able to find the resources to act upon a need<br>● In life, there will be situations in which a person needs to work independently, as a team, or in a leadership role<br>● There are many roles in the veterinary office who perform their own duties, and the main goal is to ensure the client is happy when they leave in order for the business to keep a high rating.<br>● By law, all veterinarians need to have a Veterinarian-Client-Patient Relationship (VCPR) between the owner, client, and patient | ● What happens when there is a safety situation in the small animal lab?<br>● Why is a physical exam the central point of a veterinary visit?<br>● What is the importance of detailed and accurate records in the animal laboratory?<br>● How can I be a productive asset in the workplace? |
| **Students will know...**<br>● Care requirements for each animal in the small animal laboratory<br>● How to chart and record findings form performing a physical exam and how to organize the information<br>● How to respond to a variety of situations that can occur in the small laboratory | **Students will be able to...**<br>● How to work independently and as a team to maintain and improve the small animal laboratory<br>● Evaluate needs in the laboratory and take initiative to address the needs<br>● Maintain records of proceedings in the laboratory<br>● Perform routine physical exams on all animals in the small animal laboratory, chart findings, and evaluate necessary |

| | |
|---|---|
| | changes in care |

**Key Vocabulary:** Agency, Auscult, AVMA, Biological hazard, Chemical hazard, Clean, Client, Disinfect, Ergonomic hazard, Filing system, Globally harmonized system (GHS), Initiative, Logbook, Medical record, OSHA, Phone triage, Physical examination, Physical hazard, Probing question, Receptionist, Safety data sheet (SDS), Safety hazard, Sanitize, Scheduling, SOAP exam, Stethoscope, Veterinarian-Client-Patient Relationship (VCPR), Veterinarian, Veterinary assistant, Veterinary technician, Workplace hazard

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| ● Routine physical exams and charting for small animals **CCE2**<br>● Routine laboratory care station rotations **TCC4** | ● Small animal laboratory safety assessment **DE4** |

**Learning Plan**

Laboratory safety rules and assessment **DE4**
Throughout the year, students will rotate through different laboratory stations and the laboratory manager position and work with different groups of students to complete the station-specific animal care tasks. Psychomotor skill development will be attained by students becoming more efficient with tasks and becoming more independent over the course of the year. **CCE2**
Throughout the year, students will perform routine physical examinations on the small animals and perform health care procedures such as hair trims, nail trims, and other procedures as needed to ensure health and wellbeing of animals, and to compare and contrast nutrition, grooming, and health care needs of a variety of species. They will also fill out health charts similar to those that would be used in a veterinary practice in order to evaluate the whole health of an animal. **TCC4**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 2 - Office Skills: Safety, Cleaning, and Communication

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.02.03.a.** Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.01.03.01.a.** Identify the types of laws pertaining to animal production, marketing, and management.
- **AS.01.03.01.b.** Analyze the roles of state and federal agencies and how they govern animal industries, international trade, and animal production policies.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.07.01.05.b.** Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures.
- **AS.07.02.01.b.** Analyze procedures at the local, state, and national levels to ensure biosecurity of the animal industry.
- **CRP.04.01.02.b.** Demonstrate personal ability to speak with clarity, logic, purpose, and professionalism in formal and informal settings (e.g., speeches, interviews, presentations, oral reports, etc.).
- **CRP.04.02.02.b.** Compose clear and coherent written documents and visuals (e.g., agendas, audio-visuals, drafts, forms, etc.) that are adapted to the audience's needs in both formal and informal settings.
- **CRP.04.03.01.b.** Apply active listening strategies (e.g., be attentive, observe non-verbal cues, ask clarifying questions, etc.).
- **CRP.09.02.01.a.** Identify the personal management skills necessary to function effectively in the workplace (e.g., time management, planning, prioritizing, etc.).
- **CRP.09.03.02.c.** Model purposeful behaviors that contribute to positive morale and culture in the workplace and community (e.g., effectively communicating, recognizing accomplishments of others, etc.).
- **FPS.01.02.01.b.** Demonstrate appropriate use of technologies in AFNR workplace scenarios.
- **FPS.03.01.01.a.** Identify implications of regulatory, safety and health standards on AFNR systems (e.g., SDS, bio-terrorism, etc.).
- **FPS.03.01.01.b.** Explain a health, safety and environmental procedure to comply with regulatory and safety standards.
- **FPS.03.01.02.a.** Summarize the importance of safety, health, and environmental management in the workplace.
- **FPS.03.03.03.b.** Discuss first aid knowledge and procedures relevant to AFNR workplaces.
- **FPS.03.03.04.b.** Select appropriate responses for different levels of contamination or injury at an AFNR workplace.

- **FPS.03.04.01.a.** Identify the appropriate protective equipment for the safe use and operation of specific tools and equipment (e.g. PPE, etc.).
- **FPS.03.04.01.b.** Demonstrate adherence to protective equipment requirements when using various AFNR tools and equipment.
- **FPS.03.04.02.a.** Identify standard tools, equipment, and safety procedures related to AFNR tasks.
- **FPS.03.04.02.b.** Demonstrate the set up and adjustment for tools and equipment related to AFNR tasks.
- **FPS.03.04.03.a**. Outline operating instructions related to operation, storage, and maintenance of tools and equipment-related AFNR tasks.
- **FPS.03.04.03.b.** Demonstrate appropriate operation, storage, and maintenance techniques for AFNR tools and equipment.
- **ABS.01.03.01.a.** Identify examples of management skills used to organize an AFNR business (e.g., management types, organizational structures, time management techniques, conducting business agreements, etc.).
- **ABS.01.03.01.b.** Apply management skills used to organize an AFNR business (e.g. management types, organizational strategies, time management techniques, etc.).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to...

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE1 :** I can acknowledge, process, and respond appropriately to others' comments and perspectives.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…

- Cleanliness is an important factor of a veterinary facility in order to maintain a professional atmosphere and to maintain sterility and health for the animals
- Identifying, ensuring awareness, creating and following protocols, and reducing hazards is the ultimate goal in each workplace in order to ensure safety of humans and animals
- Practicing high quality client communication and customer service is paramount to the success of a business and ensuring the health of the animal patient
- There are a variety of roles in a business setting which are all

**Essential Questions:**

- Why is cleaning an essential job to do correctly in a veterinary hospital?
- How do I remain safe in the workplace?
- What purpose does communication serve in the workplace?
- How does a business determine what needs to be done and who will do it?
- What purpose do records serve in a veterinary office?

| | |
|---|---|
| responsible for fulfilling different business needs, and being able to fulfill those roles as well as work as a team will ensure that a business runs smoothly and effectively<br>● Recordkeeping and storing of those records, in addition to other managerial tasks such as scheduling, is vital to the veterinary office and so each animal has a history to refer back to when determining an animal's health status | |
| **Students will know…**<br>● The differences between cleaning, sanitizing, and disinfecting<br>● The six types of hazards in the workplace<br>● The purpose and information that can be found on an SDS sheet<br>● The difference between probing and non-probing questions<br>● The roles in a veterinary office and how they work together to create a productive clinic<br>● The purpose of a Veterinarian-Client-Patient Relationship (VCPR) and the legalities associated with it<br>● The different types of schedules that can be used in the veterinary office | **Students will be able to…**<br>● Choose the correct cleaning method and perform it when needed in the laboratory setting<br>● Identify potential hazards and create a hazard management and/or reduction plan for the animal laboratory<br>● Read and interpret an SDS sheet<br>● Communicate with clients in a variety of formats including in person, over the phone, and over email<br>● Triage patients based on emergent status<br>● Complete a variety of forms common in a veterinary office including intake, messages, and more<br>● Ask appropriate probing and non-probing questions to clients to glean information about an animal<br>● Complete a SOAP examination and chart appropriate findings<br>● Work well with others and also work well self-driven<br>● Fill out medical files and file them in a variety of methods as used in the industry<br>● Utilize a variety of scheduling systems and create a mock schedule for a veterinary office |
| **Key Vocabulary:** Alphabetical filing, Assessment, Biological hazard, Chemical hazard, Chemical pictogram, Clean, Client education, Disinfect, Ergonomic hazard, Fixed office scheduling, Flow scheduling, Globally harmonized system, Hazard, History, Intake, Logbook, Medical record, Non-probing question, Numerical filing, Objective, OSHA, Physical hazard, Plan, Probing question, Problem oriented medical record, Receptionist, Safety hazard, Sanitize, SDS sheet, Signalment, Source oriented medical record, Subjective, Triage, VCPR (Veterinarian, client, patient relationship), Veterinarian, Veterinary assistant, Veterinary technician, Wave scheduling, Workplace hazard | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● SOAP Veterinary Examination **TI3** | **Other Evidence:**<br>● Laboratory Hazard Analysis **TCC3** |

| | |
|---|---|
| • Veterinarian-Client-Patient Relationship (VCPR) Project **DE4** | • SDS Analysis **TCC3**<br>• Form completion: Intake, Phone message, Medical record, Medical chart, Chart filing **CCE3**<br>• Content-based written assessment on key vocabulary and concepts **P2**<br>• Laboratory participation, effort, and performance **CCE2** |

**Learning Plan**

- Cleaning, sanitizing, and disinfecting activity **TCC4**
- Workplace safety scenarios and laboratory hazard hunt **TCC3**
- SDS reading and literacy activity **TCC3**
- SDS Interpretation sheet **TCC3**
- Phone and in person client communication scenarios and role playing **CCE4**
- Probing and non-probing question scenarios and role playing **TI3**
- SOAP Literacy activity and performing a SOAP examination **TI3**
- Veterinary team roles and personality assessment **DE1**
- Veterinary client patient relationship and project **DE4**
- Medical chart interpretation and completion, and filing of medical records **CCE3**
- Scheduling appointments scenario **TCC3**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 3 - Business Planning

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.02.01.a.** Define terms and methods related to animal production, marketing, and management (e.g., sustainable, conventional, responsibly sourced, quality assurance, natural, organic, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.01.03.01.a.** Identify the types of laws pertaining to animal production, marketing, and management.
- **AS.01.03.01.b.** Analyze the roles of state and federal agencies and how they govern animal industries, international trade, and animal production policies.
- **AS.02.01.01.b.** Analyze programs that ensure the welfare of animals (e.g., prevent abuse or mistreatment).
- **AS.02.01.02.a**. Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.05.01.01.a.** Describe the types of facilities needed to house and produce animal species in a safe, efficient, and humane manner.
- **AS.05.01.01.b.** Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable, and efficient use of the facility.
- **AS.05.01.01.c.** Design an animal facility focusing on animal requirements, economic efficiency, sustainability, safety, and ease of handling.
- **AS.05.02.01.b.** Analyze animal facilities to determine if industry standards have been met.
- **AS.05.02.02.b**. Analyze laws pertaining to animal systems.
- **ABS.01.02.01.c.** Create statements of purpose for AFNR businesses.
- **ABS.01.02.02.a.** Identify the meaning and importance of S.M.A.R.T. goals and objectives in AFNR business enterprises.
- **ABS.01.02.02.b.** Prepare short-term, intermediate, and long- term S.M.A.R.T. goals and objectives that are consistent with the statements of purpose for an AFNR business.
- **ABS.01.03.01.b.** Apply management skills used to organize an AFNR business (e.g. management types, organizational strategies, time management techniques, etc.).
- **ABS.02.02.01.a.** Compare and contrast the different types of financial reports (e.g., income statements, cash flow statements, equity statements, etc.) and their frequency of use (e.g., daily, weekly, monthly, quarterly, annual) for monitoring AFNR business performance.
- **ABS.02.02.01.b.** Prepare financial reports to describe the performance of AFNR businesses (e.g., balance sheet, income statement,

statement of cash flows, statement of equity, etc.).

- **ABS.03.01.01.a.** Identify components of cash budgets (e.g., anticipated revenue, production costs, overhead costs, profit, etc.).
- **ABS.04.01.03.a.** Identify the information needed to complete an AFNR business plan (e.g., S.M.A.R.T. goals and objectives, needs assessment, cash flow projection, etc.).
- **ABS.04.01.03.b.** Prepare a business plan for an AFNR business.
- **ABS.04.02.01.a.** Define the components of operational plans in AFNR businesses (e.g., location, supply and inventory management, production and distribution, organization structure, etc.).
- **ABS.05.01.02.a.** Summarize different forms of market competition found in AFNR businesses (e.g., direct competitors, indirect competitors, replacement competitors, etc.).
- **ABS.05.03.01.a.** Explain marketing principles used in AFNR businesses (e.g., 4 P's-product, place, price, promotion, attention, interest, desire, action, etc.).
- **ABS.05.03.03.a.** Summarize the purpose, components, and process to develop marketing plans for AFNR businesses.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**CCE1 :** I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.
**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**DE2 :** I can honor my own feelings and show empathy toward others through my actions.
**DE3 :** I can recognize my triggers, use appropriate coping strategies, and access relevant resources to help regulate my emotional response.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI2** : I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.

**Understandings:** Students will understand that…

- Performing a Fear Free animal procedure will take more time but the client will be better educated and able to care for their pet, and the pet will be less stressed, resulting in easier handling, increased safety for all, and more accurate data that is taken
- Before starting a business, data must be gathered and you should investigate and analyze a variety of businesses so you

**Essential Questions:**

- Why is the Fear Free method becoming more prevalent in the veterinary field as opposed to the "traditional" approach?
- What should be done before starting your own business?
- Can veterinarians do whatever they want?
- Why does a veterinarian need to stay educated on animal trends and how are they going to shift the culture back to the veterinarian knowing best as opposed to the client?

| | |
|---|---|
| can use the best ideas to propose and create a business that will be successful<br>● Laws and ethics must be adhered to as outlined in the moral oath taken by veterinarians<br>● There are many controversial topics in the animal industry, and a veterinarian must be well educated on them in order to convey appropriate and understandable messages about those topics to their clients<br>● Euthanasia is an unfortunate reality in the animal care field, and understanding how to minimize the need and evaluate a variety of alternatives, as well as understanding the stages of grief to be able to counsel clients is essential to preventing burnout and mental stress loads on yourself and your staff<br>● Preventative health will reduce stress and increase health for yourself and the pet and result in higher quality veterinary visits | ● Why is being a veterinarian so emotionally heavy, and how can a veterinarian combat those feelings and stay emotionally healthy?<br>● What purpose does preventative health serve for an animal? |
| **Students will know...**<br>● The Fear Free method and ideals<br>● The major parts of a business plan: executive summary, industry/target market/competitor analysis, product or service description, marketing methods, layout, SWOT analysis<br>● Laws that must be followed by veterinarians, and how to avoid situations that clients may put them in that may deviate from the law or ethical issues<br>● Timely controversial issues in the veterinary field<br>● The stages of grief that an owner goes through and how to work with people in certain stages | **Students will be able to…**<br>● Perform a Fear Free animal groom<br>● Perform a Fear Free animal physical examination<br>● Interact with local business owners to perform an analysis of dog businesses in the area<br>● Create a business plan comprised of a variety of components<br>● Present their business plan to potential investors<br>● Research a current controversial issue in the field of animal science and create a speech or agriculture issue skit relating to that topic for a presentation<br>● Analyze resources to determine validity and potential bias |
| **Key Vocabulary:** Acceptance, American Veterinary Medical Association, Anger, Bargaining, Behavior, Body Language, Business plan, Competitor analysis, Conditioning, Controversy, Counter-Conditioning, Denial, Diagnose, Ethics, Euthanasia, Executive summary, FAS (Fear, Anxiety, Stress), Fear Free, Fear-based aggression, Fixed cost, Gentle Control, Guilt, Marketing, Markup, Niche, Oath, Overhead, Perception, Preventative care, Pricing strategy, Product, Punishment, Reinforcement, Restraint, Sensory system, Service, Stress, SWOT analysis, Target market, Variable cost, Welfare | |
| **Assessment Evidence** | |
| **Performance Tasks:** | **Other Evidence:** |

| | |
|---|---|
| • Fear Free Industry Based Assessment and Fear Free Grooming and animal examination practicum **TCC4**<br>• Creation of an animal related business plan **TI2**<br>• Agricultural Issues project and presentation revolving around an animal related issue **CCE1** | • Business research project **TI2**<br>• Content-based written assessment on key vocabulary and concepts **P2**<br>• Laboratory participation, effort, and performance **CCE2** |

**Learning Plan**

- Take an industry based online training and complete quizzes given by the industry required for certification **TCC4**
- Outline the steps for and perform a Fear Free animal grooming appointment **CCE2**
- Outline the steps and perform a Fear Free animal physical examination **TCC2**
- Visit a variety of animal related businesses and create a business analysis for use in the animal business project **TI2**
- Animal business plan creation and proposal **TI2**
- Veterinary Laws, Ethics, and the Oath **DE2**
- Speech or Agricultural Issues project revolving around an animal issue, either project in the style of the FFA competition **CCE1**
- Euthanasia determination activity and the stages of owner grief activity **DE3**
- Preventative health care plan creation **TCC2**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 4 - Hospital Procedures

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.a.** Summarize major components of animal industrial systems (e.g., livestock, small animal, research, etc.).
- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.a**. Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.01.c.** Select tools, techniques, and technology to meet specific animal health management goals.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).
- **AS.07.01.05.b.** Assess the safety and effectiveness of facilities and equipment used for surgical and nonsurgical veterinary treatments and procedures.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.

**TCC2 :** I can evaluate evidence from multiple perspectives, and recognize their limitations and implications, in order to justify new conclusions.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

**Understandings:** Students will understand that...

- Aseptic technique and proper sanitation at the surgical site is essential to ensuring that an animal can heal correctly afterward without any resounding issues
- Proper storage, preparation, and handling of equipment will result in equipment that is clean, in good condition for use, and ready to use at any given time
- Surgery preparation procedures must be followed in order to avoid bringing external contamination into the operating room and potentially contaminating the surgical site
- Mathematical calculations along with observation will ensure the effectiveness of animal sedation and other medication administration methods to ensure that the proper amount is given, or the animal could suffer catastrophic damage
- Proper identification of surgical instruments will ensure they are used properly and make it into the correct packs in order to ensure an efficient surgery

**Essential Questions:**

- How is cleanliness ensured at the surgical site?
- What constitutes proper keeping of veterinary tools?
- How does a veterinarian prepare their own body and self for surgery?
- How do I ensure that I administer the proper amount of medication to an animal?
- How do I identify veterinary tools?

**Students will know...**

- The purpose of aseptic technique at the surgical site
- ‘Processes and procedures used to ensure that supplies are prepared, stored, and processed in an orderly fashion
- Animal vital sign ranges
- The purpose of fluid therapy and IV administration
- A variety of types of surgical equipment

**Students will be able to...**

- Prepare a surgical site in accordance with aseptic technique
- Fold and unfold surgical gowns and outfit packs
- Take, monitor, and chart animal vital signs
- Perform surgical skills: Surgical pack preparation, and tool identification, Folding drapes, Wrapping and Unwrapping surgical packs, Folding and wrapping surgical gowns, Preparation of operative site, Counted brush stroke scrubbing method, Gowning for surgery, Open gloving method, Anal gland expression, Administering enema, Palpate and express the urinary bladder, Use of an oral speculum and stomach tube in small ruminants, Administration of an Endotracheal tube, Hooking up to and utilizing an anesthesiology machine
- Calculate the appropriate amount and rate of sedative or IV fluid to administer to an animal

| | |
|---|---|
| | • Identify by sight multiple types of veterinary surgical equipment and know their use |

**Key Vocabulary:** Acid-base balance, Anal sac expression, Anesthesiology machine, Antiseptic, Aseptic technique, Bandaging, Contemporary pain scale, Counted brush stroke scrubbing method, Electrolytes, Endotracheal tube, Enema, Flow rate, Fluid therapy, Gloving, Groove director, Hemostatic forceps (Kelly, Mosquito, Crile, Carmalt) , Instrument pack, IV catheterization, Nasogastric intubation, Needle holder (Mayo-Hegar, Olsen-Hegar), Nosocomial infection, Operative site, Oral speculum, Retractor (Senn, Holman, Gelpi, Weitlaner, Balfour, Finochietto), Sanitation, Scalpel (blade and handle), Scissors (Mayo, Metzenbaum, suture, bandage), Scrubbing, Spay hook, Sterilize, Surgical drape, Surgical nurse, Thumb tissue forceps (Rat tooth, Adson Brown), Tissue forceps (Allis, Sponge, Babcock), Total body water, Towel clamp (Backhaus, Jones), Water loss

## Assessment Evidence

**Performance Tasks:**

- Surgical practicum where students will perform all of the items above as in the surgical setting from scrubbing to gowning and surgical preparation, as well as wrapping and folding equipment **TCC4**

**Other Evidence:**

- Veterinary math and fluid setup practicum **TCC3**
- Veterinary tool identification practicum **TCC2**
- Content-based written assessment on key vocabulary and concepts **P2**
- Laboratory participation, effort, and performance **CCE2**

## Learning Plan

- Surgical sanitation and aseptic technique literacy activities **CCE4**
- Perform a variety of surgical skills in accordance with the National FFA Veterinary Science CDE Practicums: Surgical pack preparation, and tool identification, Folding drapes, Wrapping and Unwrapping surgical packs, Folding and wrapping surgical gowns, Preparation of operative site, Counted brush stroke scrubbing method, Gowning for surgery, Open gloving method **TCC4**
- Additional procedures helpful in the veterinary setting: Anal gland expression, Administering enema, Palpate and express the urinary bladder, Use of an oral speculum and stomach tube in small ruminants, Administration of an Endotracheal tube, Hooking up to and utilizing an anesthesiology machine **TCC4**
- IV, Anesthesia, and Fluid Therapy math applications **TCC3**
- Set up an IV site **CCE2**
- Identification of surgical instruments and their purposes **TCC2**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 5 - Posology and Pharmacology

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.02.03.a.** Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.02.a.** Explain animal production best practices that minimize health risks.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.01.c**. Select tools, techniques, and technology to meet specific animal health management goals.
- **AS.07.01.03.c.** Treat common diseases, parasites, and physiological disorders of animals according to directions prescribed by an animal health professional.
- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).
- **AS.07.01.05.c.** Recommend surgical and nonsurgical veterinary treatments and procedures to meet specific animal health care objectives.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

| | |
|---|---|
| **Understandings:** Students will understand that…<br>● Proper calculation of a dose of medication is essential to the animal's health and prevention of bacterial and parasitic resistance<br>● Both overdosing and underdosing could be harmful to the animal<br>● Since the United States uses the customary, and not the metric system, conversion calculations are necessary as the majority of veterinary medicine is done using metric since it is more accurate and easier to convert within the system<br>● Understanding the different methods of administering medication will allow the pharmacist to determine the most effective route of administration, and the veterinarian and/or owner must be able to perform those administration methods<br>● It is important for all parties to be able to read and write an accurate medication label to ensure that medication is given appropriately | **Essential Questions:**<br>● What happens if a dosage is incorrect?<br>● What types of measuring systems are used and how does one determine what system to use?<br>● How is medication actually given to the animal?<br>● How does a veterinarian communicate medication administration instructions to an owner? |
| **Students will know…**<br>● Conversion factors<br>● Types of medication administration<br>● Abbreviations used in pharmacology | **Students will be able to…**<br>● Calculate medication doses, including the conversion of any measurements needed<br>● Read, interpret, and write a prescription label<br>● Administer medication through a variety of routes<br>● Use a pill counting tray to fill a prescription |
| **Key Vocabulary:** Active ingredient, Aspirate, Body weight, Celsius, Concentration, Customary measuring, Dimensional analysis, Dosage, Duration, Expiration date, Farenheit, Gram (and metric derivatives), Injectable, Liter (and metric derivatives), Local administration, Medication administration route, Medication label, Metric system, Oral, Pill counter, Syringe and needle, Systemic administration ,Topical, Withdrawal time | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Practicum: Medication administration: Injectable, Topical, Oral **TCC4**<br>● Pill counting and prescription filling including writing a prescription label using appropriate abbreviations **TCC4** | **Other Evidence:**<br>● Math conversion factors practice **TCC3**<br>● Content-based written assessment on key vocabulary and concepts **P2**<br>● Laboratory participation, effort, and performance **CCE2** |
| **Learning Plan** | |

- Introduction to veterinary math and conversion factors and dosage calculation **TCC3**
- Translating the dosages to a medication label, and filling the medication container appropriately to communicate the instructions to the owner **TCC4**
- Proper administration methods and animal restraints to ensure safety of the animal and the human **TCC4**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 6 - Career Planning

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **CRP.04.01.02.a.** Identify strategies for speaking with clarity, logic, purpose, and professionalism in a variety of situations in formal and informal settings.
- **CRP.04.01.02.b.** Demonstrate personal ability to speak with clarity, logic, purpose, and professionalism in formal and informal settings (e.g., speeches, interviews, presentations, oral reports, etc.).
- **CRP.09.01.02.b.** Conduct a self-assessment of personal ethical and effective leadership characteristics (e.g., relates to others, focused, integrity, etc.) and reflect upon the results to identify opportunities for improvement.
- **CRP.10.01.01.a.** Identify personal interests, talents, goals, and preferences for potential careers.
- **CRP.10.01.01.c.** Plan a career path based on personal interests, goals, talents, and preferences.
- **CRP.10.01.02.b.** Compare and contrast skills needed for potential careers with personal interests, talents, goals and preferences.
- **CRP.10.01.02.c.** Match potential career opportunities in career clusters with personal interests, talents, goals and preferences.
- **CRP.10.02.01.b.** Analyze the steps to meet career advancement requirements for potential careers.
- **CRP.10.02.01.c.** Devise plans to complete the requirements for career advancement.
- **CRP.10.04.02.b.** Demonstrate the skills needed to complete common processes for pursuing a career (e.g., ability to communicate about past experiences, ability to articulate one's goals and career objectives, etc.).
- **FPS.05.01.02.c.** Design a personal plan for attaining the required education, training, and experiences for a career in an AFNR pathway.
- **FPS.05.01.03.a.** Describe specific tools (e.g., resumes, portfolios, cover letters, etc.) and processes (e.g., interviews, applications, etc.) needed to pursue a career in an AFNR pathway.
- **FPS.05.01.03.b.** Communicate personal goals, experiences, education, and skills utilizing specific tools (e.g., resumes, portfolios, cover letters, etc.) and processes (e.g., interviews, applications, etc.) for an AFNR career.
- **FPS.05.02.01.b.** Assess how personal skills align with potential career opportunities in AFNR pathways.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**AA1 :** I can evaluate different approaches and justify the best pathway to success.

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**P1** : I can self-reflect and seek feedback to build upon my strengths, apply those strengths to overcome obstacles, and share my strategies with others.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**P3 :** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

| **Understandings:** Students will understand that… | **Essential Questions:** |
|---|---|
| • An up to date, accurate, easy to read, attractive resume with good descriptor vocabulary will set them apart in the job application process<br>• It is important to practice interviewing before the real thing, and to ensure that you have a strategy for answering a question<br>• It is important to have a plan, even if it changes, so that a goal can be accomplished in an efficient manner<br>• There are hundreds of careers in the small animal industry: some that are not here yet, and everything in regular human life has an agricultural counterpart, such as research, marketing, business, law, and medicine. | • How do I improve my resume to increase my chances of getting the career I want?<br>• How do I succeed in my job interview?<br>• How do I ensure success in my post high school learning path?<br>• What careers are available in the small animal industry? |
| **Students will know...**<br>• The importance of an up to date resume in the job search<br>• Common interview questions<br>• What a postsecondary plan of study is<br>• Veterinary schools (and other schools to achieve their goal) in the USA | **Students will be able to...**<br>• Update and reformat their resume for use after high school<br>• Answer interview questions and present themselves well to a potential employer<br>• Create a postsecondary plan of study for when they are out of high school in order to ensure they create a path and do not miss anything |
| **Key Vocabulary:** Career, Interview, Job, Postsecondary, Resume | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Resume creation **P1**<br>• Job interview practicum **P3**<br>• Postsecondary plan of study assignment **AA1** | **Other Evidence:**<br>• Animal science career research project **TCC4**<br>• Content-based written assessment on key vocabulary and concepts **P2**<br>• Laboratory participation, effort, and performance **CCE2** |

| Learning Plan |
| --- |
| • Update and peer edit their resumes, and ultimately edit their resume with their teacher and save it in a location that they can access it after graduation **P1**<br>• Practice and formulate answers to common interview questions, and practice answering interview questions **P3**<br>• Research and present about a career available in the small animal industry **TCC4**<br>• Create a plan for postsecondary planning, no matter the path they plan on taking, utilizing appropriate websites and literature **AA1** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders |

# Unit 7 - Animal Reproductive System

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.04.01.01.a.** Identify the male and female reproductive organs of the major animal species.
- **AS.04.01.01.b.** Analyze the functions of major organs in the male and female reproductive systems.
- **AS.04.01.02.a** Identify how age, size, life cycle, maturity level, and health status affect the reproductive efficiency of male and female animals.
- **AS.04.01.02.b.** Describe factors that lead to reproductive maturity.
- **AS.04.01.02.c.** Evaluate animals for reproductive readiness.
- **AS.04.01.03.b.** Evaluate reproductive disorders that occur in animals.
- **AS.04.02.04.a.** Summarize different needs of breeding animals based on reproductive stage (e.g., newborn, parturition, gestation, gestation lengths, etc.).
- **AS.04.03.01.a.** Identify natural and artificial breeding methods (e.g., natural breeding, artificial insemination, estrous synchronization, flushing, cloning, etc.).
- **AS.04.03.01.b.** Calculate the potential economic benefits of natural versus artificial breeding methods.
- **AS.04.03.02.a.** Describe the process and materials used in artificial insemination.
- **AS.04.03.02.b.** Demonstrate artificial insemination techniques.
- **AS.04.03.03.a.** Summarize the advantages and disadvantages of major reproductive management practices, including estrous synchronization, superovulation, flushing, and embryo transfer (e.g., cost, labor, equipment, etc.).
- **AS.04.03.03.b.** Analyze the processes of major reproductive management practices, including estrous synchronization, superovulation, flushing, and embryo transfer.
- **AS.04.03.03.c.** Create a breeding plan that outlines procedures for estrous synchronization, superovulation, flushing, embryo transfer, and other reproductive management practices given a scenario.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**AA4 :** I can create opportunities to extend my learning by remaining open-minded in any situation.
**CCE1 :** I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

**Understandings:** Students will understand that…

- Proper form and function of all components will ensure the efficacy of the reproductive system whose main purpose is to ensure that the animal is able to produce healthy haploid cells, successfully breed, and carry, deliver, and rear offspring in order to ensure the continuity of their species
- There are a variety of diseases and injuries that can negatively affect the reproductive system, and proper identification and treatment of the issue is necessary to ensure the health of the animal
- There are a variety of technologies and methods that can be used to alter the reproductive process in order to enhance, decrease, or alter the timing in order to fit the needs of the entity in charge of the animals
- There are a variety of diagnostic tests that can be done to determine the cause of a reproductive related illness, including breeding readiness exams, sperm testing, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment

**Essential Questions:**

- What is the reproductive system and what job does it perform?
- What can cause the reproductive system to malfunction, and what do I need to do about it?
- How and why would humans want to alter different aspects of the reproductive system?
- How are diseases of the reproductive system diagnosed and treated?

| **Students will know...** | **Students will be able to…** |
|---|---|
| • Major anatomical structures and physiological functions of the male and female reproductive systems<br>• How humans can physically and chemically alter reproductive organs and physiology to achieve a desired result<br>• How eggs and sperm develop and mature<br>• Hormones and functions and timing of the estrous cycle and how to predict breeding times<br>• Animals have different estrous cycles depending on their species<br>• How pregnancy and parturition affects the body and the hormonal and physical changes associated with that process<br>• A variety of methods used to predict pregnancy and how to select the one that would be most effective for a variety of scenarios<br>• A variety of malformations and malfunctions of the reproductive system and how they affect the process | • Evaluate breeding readiness of male and female animals<br>• Evaluate semen quality under the microscope<br>• Perform dissections of the male and female reproductive systems<br>• Perform artificial insemination on an animal model<br>• Administer neonatal care to animals available in the laboratory<br>• Estimate the age of neonatal animals based on developmental characteristics |

**Key Vocabulary:** Acrosome, Altricial, Amniotic sac, Anestrus, Artificial breeding, Artificial insemination, Bulbourethral gland, Caruncle, Castrate, Cervix, Chromosome, Clone, Contraction, Copulation, Corpus albicans, Corpus luteum, Cryptorchid, Cull, Cyst, Diestrus, Dilation, Dystocia, Ejaculation, Embryo, Endocrine system, Epididymis, Estrogen, Estrous cycle, Estrus, Fallopian tube, Fertility, Fetus, Follicle, Follicle stimulating hormone, Glans penis, Gonadotropin releasing hormone, Heat, Hormone, Hypothalamus, Immunocontraceptive, In vitro fertilization, Infundibulum, Libido, Ligament, Luteinizing hormone, Maturity, Meconium, Metestrus, Morbidity, Morphology, Mortality, Motility, Mucus discharge, Natural breeding, Negative feedback, Neuter, Ovariohysterectomy, Ovary, Oviduct, Ovulation, Oxytocin, Palpation, Parturition, pH, Placenta, Polyestrous, Precocial, Preovulatory follicle, Primary abnormality, Primary follicle, Primordial follicle, Proestrus, Progesterone, Prostate gland, Pseudopregnancy, Radiograph, Reproductive system, Scrotum, Secondary abnormality, Secondary follicle, Selective breeding, Seminiferous tubules, Sexually transmitted disease, Sigmoid flexure, Sonar, Spay, Sperm cell, Sterilize, Tertiary follicle, Testicle, Transgenic, Ultrasound, Umbilical cord, Urinary bladder, Uterine horn, Uterus, Vagina, Vas deferens, Vulva

**Assessment Evidence**

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| • Estrous cycles bracelet and research project **CCE3**<br>• Semen evaluation laboratory **TCC4** | • Uterus dissection laboratory **DE4**<br>• Testicle dissection laboratory **DE4**<br>• Pregnant cat dissection laboratory **DE4**<br>• Breeding readiness and soundness examinations on live animals **TCC4**<br>• Reproductive issues and artificial modification activity **AA4** |

| | |
|---|---|
| | • Content-based written assessment on key vocabulary and concepts **P2**<br>• Laboratory participation, effort, and performance **CCE2** |

**Learning Plan**

- Introductory lessons to the anatomy and physiology of the male and female reproductive systems **TCC3**
- Breading readiness and soundness examinations on live animals **TCC4**
- Testicle dissection laboratory **DE4**
- Microscopic semen evaluation **TCC4**
- Immunocontraceptive research poster project **CCE1**
- Female reproductive tract dissection laboratory **DE4**
- Introduction to the breeding and hormonal cycle **TCC3**
- Artificial insemination activity on a model animal
- Follicular development project and literacy activity
- Estrous cycles bracelet and research project **CCE3**
- Introduction to pregnancy and parturition **TCC3**
- Pregnant cat dissection **DE4**
- Pregnancy determination activity **TCC4**
- Reproductive biotechnology research activity **AA4**
- Introduction to spay/neuter processes **TCC3**
- Introduction to reproductive issues and activity **TCC3**
- Introduction to birthing and neonatal care **TCC3**
- Neonatal animal care in the lab as we are able (most likely cats and rabbits)
- Ruminant tube feeding laboratory **TCC4**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 8 - Animal Genetics

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.04.02.01.a.** Summarize genetic inheritance in animals.
- **AS.04.02.01.b.** Analyze how genetics can optimize economic, ecological, health, and welfare outcomes.
- **AS.04.02.01.c.** Evaluate breeding systems based on the principles of genetics.
- **AS.04.02.02.a.** Define inheritance and terms related to inheritance in animal breeding (e.g., dominate, codominant, recessive, homozygous, heterozygous, etc.).
- **AS.04.02.02.b.** Demonstrate how to determine the probability of one or more traits.
- **AS.04.02.02.c.** Justify the selection of breeding pairs to achieve a desired outcome.
- **AS.04.02.03.a.** Identify genetic defects that affect animal performance.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**AA2 :** I can assess my past successes and mistakes to change my approach.
**CCE1 :** I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.
**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**P3 :** I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
**P4 :** I can take-on challenges and continuously engage in my own long-term strategies to overcome them to demonstrate through personal experience that failures are more instructive than discouraging.
**TI2** : I can evaluate my objectives and a variety of credible resources to find the best solutions for any challenge.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

| | |
|---|---|
| **Understandings:** Students will understand that…<br>● Mendelian inheritance is the most basic of all inheritance methods, and there are many factors involved with how genes are inherited between generations<br>● Once the inheritance methods are known, probability of certain traits being passed on can be calculated using a variety of methods depending on inheritance type<br>● A variety of types of errors can occur in the DNA decoding and recoding process which can result in mutations that may have a positive effect, negative effect, or no apparent effect on the animal<br>● Many aspects of an animal need to be evaluated before breeding including EPD's, pedigrees, and anatomy and physiology<br>● Humans have modified animal selection in domesticated (and some wild) animals to improve the breed or to minimize the chance of inbreeding | **Essential Questions:**<br>● How are genes and traits passed down from animal to animal?<br>● How can we predict what genetic qualities an animal will have from a breeding?<br>● Why does the inheritance process not always work correctly?<br>● How do we evaluate which animals we are going to breed?<br>● Why do we study genetics? |
| **Students will know...**<br>● The basic Mendelian genetic heritability pattern<br>● Qualities that can be passed down by basic Mendelian inheritance<br>● The different types of genetic mutations that can occur<br>● Inheritance is also affected by epigenetics<br>● The difference between natural and artificial selection,<br>● How the process of natural selection works in a truly wild setting | **Students will be able to...**<br>● Calculate simple Mendelian inheritance using punnett squares<br>● Locate and identify a variety of common types of genetic mutations and predict how they will affect a genetic sequence<br>● Read, evaluate, and create an animal pedigree<br>● Determine when a certain breeding system will be used in order to achieve a certain goal<br>● Evaluate large animals based on their EPD's, or expected progeny differences, and make breeding decisions based on that information |
| **Key Vocabulary:** Allele, Artificial selection, Charles Darwin, Chromosome, Close breeding, Codominance, Crossbred, Dam, Deletion, Dihybrid cross, DNA, Dominant, Epigenetics, Epigenome, Expected progeny difference (EPD), Frameshift, Gene, Gene pool, Genetic drift, Genotype, Grading up, Grand-dam, Grand-sire, Gregor Mendel, Heritability, Heritage breed, Heterosis, Heterozygous, Homozygous, Hybrid, Hybrid vigor, Inbreeding, Incomplete dominance, Insertion, Line breeding, Maternal, Meiosis, Mendelian inheritance, Mitosis, Monohybrid cross, Mutation, Natural selection, Neoplasia, Outcrossing, Paternal, Pedigree, Performance data, Phenotype, Point mutation, Principle of independent assortment, Principle of segregation, Probability, Punnett square, Qualitative, Quantitative, Ratio, Recessive, Scrapie, Selective breeding, Sex Linked Trait, Silent mutation, Sire, Straight breeding, Trait, Transcription, Translation, Variation | |

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>● Mono- and di- hybrid cross genetics project **P3**<br>● Animal pedigree creation using different forms of breeding systems **TI2**<br>● EPD scenario, analysis, and cattle auction activity **P4** | **Other Evidence:**<br>● Scrapie disease punnett square literacy and application activity **TCC4**<br>● DNA mutation laboratory **TCC4**<br>● Natural selection organism design challenge project **CCE3**<br>● Artificial selection research project **CCE1**<br>● Content-based written assessment on key vocabulary and concepts **P2**<br>● Laboratory participation, effort, and performance **CCE2** |

**Learning Plan**

- Cell cycle review from previous biology courses **AA2**
- Introduction to Mendelian genetics **TCC3**
- Mendelian inheritance activity **TCC3**
- Introduction to punnett squares **TCC3**
- Scrapie disease punnett square literacy and application activity **TCC4**
- Mono- and di- hybrid cross genetics project **P3**
- Introduction to genetic mutations **TCC3**
- DNA mutation decoding activity **TCC3**
- DNA mutation laboratory **TCC4**
- Introduction to epigenetics **TCC3**
- Epigenetics activity **TCC3**
- Introduction to animal breeding systems **TCC3**
- Animal pedigree creation using different forms of breeding systems **TI2**
- Introduction to EPD's **TCC3**
- EPD scenario, analysis, and cattle auction activity **P4**
- Introduction to natural selection **TCC3**
- Natural selection organism design challenge project **CCE3**
- Artificial selection research project **CCE1**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 9 - Animal Nervous and Endocrine Systems

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- **AS.01.01.02.b.** Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- **AS.01.02.03.b.** Execute effective record keeping and documentation practice for animal enterprises.
- **AS.02.01.02.a.** Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- **AS.02.01.02.b.** Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- **AS.02.01.02.c.** Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- **AS.02.02.01.b.** Utilize technology and equipment to perform animal husbandry and welfare procedures and techniques.
- **AS.02.02.01.c.** Recommend the use of specific techniques used to perform animal husbandry and welfare procedures.
- **AS.06.01.03.b.** Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- **AS.06.01.03.c.** Communicate knowledge of animal systems with proper classification terms to others in an effective and accurate manner.
- **AS.06.02.03.a.** Identify the properties, locations, functions, and types of animal cells, tissues, organs and body systems.
- **AS.06.02.03.b.** Compare and contrast animal cells, tissues, organs, body systems types, and functions among animal species.
- **AS.06.02.03.c.** Apply knowledge of anatomical and physiological characteristics of animals to make production and management decisions.
- **AS.06.03.01.a.** Identify optimal anatomical and physiological characteristics according to established breed standards.
- **AS.06.03.01.b.** Compare and contrast desirable anatomical and physiological characteristics of animals within and between species.
- **AS.07.01.01.a** Identify specific tools, techniques, and technology used in animal health management.
- **AS.07.01.01.b.** Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- **AS.07.01.02.a.** Explain methods of determining animal health and disorders.
- **AS.07.01.02.b.** Perform simple health-check evaluations on animals.
- **AS.07.01.02.c.** Determine when an animal health concern needs to be referred to an animal health professional.
- **AS.07.01.03.a.** Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- **AS.07.01.03.b.** Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.

- **AS.07.01.05.a.** Explain the clinical significance of common veterinary methods and treatment (e.g., aseptic techniques, antibiotic use, wound management, etc.).

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE4 :** I can work respectfully with all members of my community and support the needs of others.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.

**Understandings:** Students will understand that…

- Proper form and function of all components will ensure the efficacy of the nervous and endocrine systems whose main purpose is to provide communication and be the command center to all areas of the body based on signals it receives and interprets, and provide a way for the body to respond to those signals
- There are a variety of diseases and injuries that can negatively affect the nervous and endocrine system, and proper identification and treatment of the issue is necessary to ensure the health of the animal
- There are a variety of diagnostic tests that can be done to determine the cause of a nervous system and endocrine system related illness, and being able to run a test correctly is essential in proper diagnosis to determine the course of treatment
- Hormones are present in the body in different levels and the ultimate goal for most of them is to maintain homeostasis in the body, or to reproduce to ensure the passing on of genetic material and creation of the next generation of a species

**Essential Questions:**

- What are the nervous and endocrine systems and what job do they perform?
- What can cause the nervous system and endocrine system to malfunction, and what do I need to do about it?
- How are diseases of the endocrine and nervous systems diagnosed and treated?
- What is the purpose of hormones in the body?

**Students will know...**

- Major anatomical structures and physiological functions of the nervous and endocrine systems

**Students will be able to…**

- Dissect a brain and identify all anatomical parts
- Dissect an eye and identify all anatomical parts

| | |
|---|---|
| • How the brain, nerves, eyes, sensory organs, and endocrine system work together to ensure homeostasis and safety to the body<br>• Where hormones are produced, what they affect, and how they affect the body<br>• Diseases and disorders that can affect the nervous and endocrine systems and potential treatments | • Evaluate a live animal's peripheral nervous system during a physical examination<br>• Spread awareness about the importance and function of the rabies vaccine by creating a social media campaign<br>• Identify various types of feedback systems that are essential to an animal's well-being |
| **Key Vocabulary:** Adrenal gland, Adrenaline, Amygdala, Antidiuretic hormone, Autonomic, Axon terminal, Brain, Brainstem, Calcitonin, Cell body, Central nervous system, Cerebellum, Ciliary body, Concussion, Cornea, Corpus callosum, Corticosterone, Cortisol, Dendrite, Diabetes, Encephalitis, Epinephrine, Estrogen, Freemartin, Frontal lobe, Glucagon, Hemisphere, Hippocampus, Homeostasis, Hormone receptor, Hypothalamus, Input, Insulin, Integration, Interneuron, Involuntary, Iris, Medulla, Melatonin, Motor neuron, Myelin sheath, Negative feedback system, Nerve, Neuron, Norepinephrine, Nucleus, Optic nerve, Output, Ovaries, Pancreas, Parasympathetic, Parathyroid gland, Parathyroid hormone, Peripheral nervous system, Pineal gland, Pituitary gland, Positive feedback system, Potent, Progesterone, Pupil, Rabies, Reaction, Reflex, Retina, Sclera, Sensation, Sensory neuron, Somatic, Spinal cord, Stroke, Sympathetic, Synapse, Tapetum lucidum, Tear gland, Temporal lobe, Testes, Testosterone, Thalamus, Thymosin, Thymus gland, Thyroid gland, Thyroxin, Transmission, Vitreous humor, Voluntary | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Peripheral nervous system functionality evaluations on live animals **TCC4**<br>• Creation of a graphic organizer about the endocrine system and all hormones involved and how they affect each other **CCE4** | **Other Evidence:**<br>• Brain dissection laboratory **DE4**<br>• Eye dissection laboratory **DE4**<br>• Nervous system disorder and case study evaluations **TCC4**<br>• Content-based written assessment on key vocabulary and concepts **P2**<br>• Laboratory participation, effort, and performance **CCE2** |
| **Learning Plan** | |
| • Introduction to the anatomy and physiology of the nervous system **TCC3**<br>• Brain dissection laboratory **DE4**<br>• Nervous system disorder and case study evaluations **TCC4**<br>• All about Rabies **TCC3**<br>• Nervous system reaction time activities **TCC4**<br>• Eye dissection laboratory **DE4**<br>• Peripheral nervous system functionality evaluations on live animals **TCC4**<br>• Introduction to the anatomy and physiology of the endocrine system **TCC3**<br>• Types of feedback systems activity **TCC3**<br>• Creation of a graphic organizer about the endocrine system and all hormones involved and how they affect each other **CCE4** | |

| |
|---|
| • Introduction to malfunctions of the endocrine system and research activity **TCC3** |
| **Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders |

# Unit 10 - Animal Behavior

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- AS.01.01.01.a. Summarize the origin, significance, distribution, and domestication of different animal species.
- AS.01.01.01.b. Examine characteristics of animals that developed in response to environmental and production related influences.
- AS.01.01.01.c. Evaluate the implications of animal characteristics on production practices and the environment.
- AS.01.02.03.a. Summarize the types, purposes, and characteristics of effective record keeping and documentation practices for animal enterprises (e.g., breeding and genetic improvement, medical treatment, financial, legal requirements, etc.).
- AS.01.02.03.b. Execute effective record keeping and documentation practice for animal enterprises.
- AS.01.03.01.a. Identify the types of laws pertaining to animal production, marketing, and management.
- AS.02.01.01.a. Explain the difference between animal welfare and animal rights.
- AS.02.01.01.b. Analyze programs that ensure the welfare of animals (e.g., prevent abuse or mistreatment).
- AS.02.01.02.a. Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- AS.02.01.02.b. Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- AS.02.01.02.c. Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- AS.06.01.02.a. Compare and contrast major uses of different animal species (e.g., agricultural, companion, etc.).
- AS.06.01.02.b. Analyze the economic value of animals for various applications in the agriculture industry.
- AS.06.01.03.b. Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.
- AS.07.01.01.a Identify specific tools, techniques, and technology used in animal health management.
- AS.07.01.01.b. Demonstrate the proper use and function of specific tools, techniques, and technology related to animal health management.
- AS.07.01.03.a. Summarize the characteristics of wounds, common diseases, parasites, and physiological disorders that affect animals.
- AS.07.01.03.b. Analyze illnesses and disorders of animals based on symptoms and problems caused by wounds, diseases, parasites, and physiological disorders.
- AS.07.01.03.c. Treat common diseases, parasites, and physiological disorders of animals according to directions prescribed by an animal health professional.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

**CCE1 :** I can initiate discussions with my peers and teachers about a variety of topics, respecting differing viewpoints, actively listening to others, and responding thoughtfully with peer-reviewed evidence that is free of bias.
**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE4 :** I can communicate and express my understanding in an authentic, respectful and relevant way, using the most effective mode of expression.
**DE1 :** I can acknowledge, process, and respond appropriately to others' comments and perspectives.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TCC4 :** I can integrate my learning to adapt to experiences in the classroom, career and life.
**TI3** : I can formulate and investigate probing questions to further my learning.

**Understandings:** Students will understand that…

- There are a variety of note-taking methods and ways to organize your information for improved comprehension, and it is important to experiment and decide what works for you
- There are factors that allowed certain animals to be domesticated and this process happened in different ways at different points in history in different locations on the globe
- Animal behaviors can be categorized into a few basic categories, and it is important to be able to identify, observe, and quantify observation results in order to compare the behaviors to "normal" behaviors so that the animal is free to exhibit the behaviors it needs to feel comfortable
- Animals have differing levels of consciousness, and the nervous systems regulate the body's reaction to environmental, mental, and social stimuli, which is animal behavior
- In order to perform research, one has to be familiar with the scientific method and also be able to evaluate related literature to ensure that the scientific inquiry is going to contribute something new to the science of animal behavior. It is important to read and be critical of scientific articles.
- There are many careers related to animal behavior and many important people who have influenced the field of animal behavior.

**Essential Questions:**

- How do I organize the information I am receiving in order to better process and retain it?
- Why are some animals domesticated and others are not? How did this process occur?
- How do you research and record data on animal behavior, and why do we do it?
- What actually is animal behavior?
- How is the scientific method used in the study of animal behavior?
- What can I do with my knowledge of animal behavior moving forward?

| **Students will know…** | **Students will be able to...** |
|---|---|
| • How the process of domestication occurred throughout the world and over many different species<br>• The history of the science of animal behavior<br>• How natural selection relates to behavior<br>• Behaviors that are specific to certain species<br>• The contributions made by many researchers to the field of animal behavior, especially Dr. Temple Grandin | • Take notes using a variety of methods in order to find the types that work best for them to help with any post-secondary educational needs<br>• Identify the major groups of animal behaviors and their purposes<br>• Analyze live wild and domestic animals and collect data on behaviors performed in an ethogram<br>• Analyze the data and create professional recommendations for the animal based on their behavior analysis and comparison to "normal"<br>• Analyze and critique a scientific article<br>• Pose a scientific inquiry question and create a laboratory experiment to answer that question, collect data, and analyze it in order to draw a conclusion |

**Key Vocabulary:** -gamy, -gyny, Abstract, Adaptation, Aggression, Agonistic, Alpha, Altruism, Animal rights, Animal welfare, Aristotle, Auditory, Behavior, Beta, BF Skinner, Cognition, Communal, Communication, Conflict behavior, Consciousness, Dominance, Eliminative, Ethogram, Ethology, Expression, Flight zone, Gregarious, Grooming, Hibernation, Hierarchy, Hormones, Implications, Imprinting, Ingestive, Innate behaviors, Instinct, Investigative, Karl Von Frisch, Kinesis, Konrad Lorenz, Learned behaviors, Materials and methods, Migration, Mono-, Mother-young, Negative taxis, Niko Tinbergen, Olfactory, Omega, Orienteering, Pheromone, Point of balance, Poly-, Positive taxis, Quantify, REM Sleep, Research objective, Results and discussion, Scientific article, Sexual, Shelter-seeking, Sleep and rest, Social, Socialization, Solitary, Stress, Subjective, Submissive, Subordinate, Tactile, Temple Grandin, Territory, Visual

## Assessment Evidence

| **Performance Tasks:** | **Other Evidence:** |
|---|---|
| • Perform ethograms on a variety of domestic and wild animals, quantify and disseminate data, and propose recommendations based on findings for how to improve the animal's welfare **TCC4**<br>• Behavior scientific article review assignment **CCE1**<br>• Pill bug inquiry laboratory **TI3** | • Temple Grandin video analysis **DE1**<br>• Careers in animal behavior research presentation **TCC4**<br>• Animal domestication and unique behaviors research project **CCE1**<br>• Content-based written assessment on key vocabulary and concepts **P2**<br>• Laboratory participation, effort, and performance **CCE2** |

## Learning Plan

Through this unit students will also be exposed to a variety of note taking methods including Cornell notes, boxing, graphic organizers, and more in order to help them determine a process that will work for them in the post-secondary setting **CCE4**
Animal domestication and unique behaviors research project **CCE1**

Introduction to animal behavior and history of animal domestication- station rotation activity **TCC3**
Natural selection related to behavior- Pepper moth online activity **TCC4**
Introduction to the major types of behavior and observing each of these behaviors in live animals: Communication, Ingestive, Eliminative, Sexual, Mother-young, Agonistic, Gregarious, Social, Shelter-seeking, Investigative, Sleep and rest **TCC3**
Introduction to species specific behaviors **TCC3**
Behavior scientific article review assignment **CCE1**
Pill bug inquiry laboratory **TI3**
Perform ethograms on a variety of domestic and wild animals, quantify and disseminate data, and propose recommendations based on findings for how to improve the animal's welfare **TCC4**
Temple Grandin video analysis **DE1**
Careers in animal behavior research presentation **TCC4**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# Unit 11 - Animal Training and Enrichment

**Desired Results - Goals, Transfer, Meaning, Acquisition**

**Established Goals:**

**Connecticut Agriculture, Food, and Natural Resources Content Frameworks:**

- AS.01.01.02.b. Analyze the development of a variety of animal industries, technological advancements, research, and engineering practices and how they influenced products, services, and careers.
- AS.01.02.03.b. Execute effective record keeping and documentation practice for animal enterprises.
- AS.01.03.01.a. Identify the types of laws pertaining to animal production, marketing, and management.
- AS.01.03.01.b. Analyze the roles of state and federal agencies and how they govern animal industries, international trade, and animal production policies.
- AS.01.03.01.c. Evaluate the impact of laws pertaining to animal agriculture (e.g., pros, cons, effect on individuals, effect on businesses, etc.).

- AS.02.01.01.a. Explain the difference between animal welfare and animal rights.
- AS.02.01.01.b. Analyze programs that ensure the welfare of animals (e.g., prevent abuse or mistreatment).
- AS.02.01.01.c. Design quality-assurance programs and procedures for animal production.
- AS.02.01.02.a. Identify the challenges involved in working with animals and the various resources available (e.g., variety of tools, technology, equipment, facilities, animal behavior signals, etc.).
- AS.02.01.02.b. Analyze animal welfare procedures used to ensure safety and minimize stress during management practices.
- AS.02.01.02.c. Design safety procedures and plans for working with different species of animals based on animal behaviors and economical impact.
- AS.05.01.01.a. Describe the types of facilities needed to house and produce animal species in a safe, efficient, and humane manner.
- AS.05.01.01.b. Critique designs for an animal facility and prescribe alternative layouts and adjustments for the safe, sustainable, and efficient use of the facility.
- AS.05.01.02.b. Analyze the use of modern equipment, technology, and handling facility procedures to determine if they enhance the safe, economic, and sustainable production of animals.
- AS.05.02.01.a. Summarize the general standards that must be met in facilities for animal production (e.g., environmental, local zoning considerations, construction, etc.).
- AS.05.02.01.b. Analyze animal facilities to determine if industry standards have been met.
- AS.05.02.01.c. Create facility designs to ensure they meet standards for the legal, safe, ethical, economical, and efficient production of animals.
- AS.06.01.03.b. Analyze the visual characteristics of an animal or animal product to select correct classification terminology when referring to companion and production animals.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... (“I can” statements to be demonstrated)

**AA1 :** I can evaluate different approaches and justify the best pathway to success.
**AA2 :** I can assess my past successes and mistakes to change my approach.
**AA3 :** I can adjust my expectations and behaviors to succeed in a changing and unpredictable environment.
**CCE2 :** I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.
**CCE3 :** I can show initiative in prompting group discourse and fostering collaboration among others, providing actionable feedback, and working with others to solve problems and/or design products.
**DE3 :** I can recognize my triggers, use appropriate coping strategies, and access relevant resources to help regulate my emotional response.
**P2 :** I can strengthen my weaknesses by identifying, initiating, and practicing appropriate strategies to become confident in my ability to overcome my challenges.
**TCC1** : I can ask purposeful, insightful questions to find a variety of innovative solutions.
**TCC3 :** I can integrate relevant information to produce multiple valid solutions.
**TI1 :** I can implement a realistic plan and adapt when necessary to achieve my goals.

| | |
|---|---|
| **Understandings:** Students will understand that…<br>● Animal rights and welfare are two opposite views and it is important to be able to classify animal needs as rights or welfare<br>● There are a variety of training methods that can be used together or separately in a variety of situations. It is up to the owner and trainer to create a plan that will use the appropriate method for what needs to be done with the animal<br>● Animal enrichment and stimulation is important to ensuring animal welfare and allowing them to most closely mirror their natural behaviors and needs, and data collection and interpretation is vitally important to determine an animal's needs and wants<br>● The USDA has oversight on animal welfare and creates laws and regulations to ensure that animal's needs are met, and all animal facilities must abide by these rules or risk legal consequences | **Essential Questions:**<br>● What is the difference between animal rights and animal welfare?<br>● How do I train my animal?<br>● How do we ensure that animals are happy and have their needs met?<br>● Does the government have a role in animal welfare? |
| **Students will know…**<br>● The difference between animal rights and welfare<br>● How animals learn and comprehend what is around them<br>● Why animal enrichment and stimulation is important to their health<br>● The USDA is the governing agency over animal welfare and they have a book publication for use to ensure that animal facilities meet minimum requirements for animal welfare | **Students will be able to...**<br>● Choose from a variety of training methodologies to create a plan for their own animal to learn new behaviors, and to keep a log of the progress. Students will present this project at the end of the year<br>● Debate regarding an issue of animal rights and welfare<br>● Create a behavior modification plan for a poorly behaved animal<br>● Evaluate the animal lab's facilities against the USDA's requirements<br>● Create an animal enrichment plan and materials for an animal in the small animal laboratory, and for sale<br>● Observe wild animals and analyze environment and behaviors and use that information to create an enrichment plan and offer recommendations for improving the animal's environment<br>● Calculate an animal's space requirement |
| **Key Vocabulary:** Adapt, Animal rights, Animal welfare, Antecedent, Behavior, Behavior chain, Behavior marking, Classical conditioning, Clicker training, Conceptual learning, Consequence, Counterconditioning, Cue, Desensitization, Enrichment, Ethics, Ethogram, Extinction, FAS (Fear, anxiety, stress), Habituation, Imprinting, Insight learning, Latent learning, Law, Learning, Negative reinforcement, Operant conditioning, Positive, reinforcement, Reward, Shaping, Stimulation, Stimulus, Target training, USDA | |

| Assessment Evidence | |
|---|---|
| **Performance Tasks:**<br>● Animal training plan, log, and presentation **AA1, AA2, AA3, TI1**<br>● Zoo animal behavioral observation project **TCC4**<br>● Zoo animal enclosure and enrichment plan creation **CCE3** | **Other Evidence:**<br>● Animal rights and welfare debate **DE3**<br>● Observation and data collection for a misbehaving animal and creation of an animal behavioral modification plan utilizing training methods **TCC1, CCE2**<br>● Content-based written assessment on key vocabulary and concepts **P2**<br>● Laboratory participation, effort, and performance **CCE2** |

**Learning Plan**

- Throughout the unit- animal training plan- the student will choose 2-3 behaviors to train their animal with and log the process daily and continuously adapt the plan until the animal succeeds, and check-ins throughout the unit, and a final presentation summarizing the new behaviors and the training process **AA1, AA2, AA3, TI1**
- Introduction to animal rights and welfare **TCC3**
- Animal rights and welfare debates **DE3**
- Introduction to animal learning and comprehension **TCC3**
- Animal Training Types research project and presentation
- Overview of the process of animal training **TCC3**
- Observe poor examples of animal behavior and create a potential modification plan for that animal based on training theory and techniques **TCC1, CCE2**
- Introduction to enrichment and stimulation and its importance in animal welfare **TCC3**
- Utilize the USDA book for animal care to evaluate the small animal laboratory for animal welfare **TCC4**
- Create an animal enrichment plan for an animal in the small animal laboratory **TCC4**
- Observe wild animals in an artificial environment, take data using an ethogram, and compare the behaviors and environment to its natural behaviors and environment and create recommendations based on those animals behaviors. Also research and identify types of enrichment used in enclosures **TCC4**
- Research a zoo animal, utilize the USDA blue book to create a zoo enclosure to meet all of the animal's behavioral needs, and create an enrichment plan for that animal **CCE3**
- Create snuffle mats and other pet enrichment items to sell at the school holiday sales **CCE3**

**Teacher Resources:** Teacher created materials, Rubrics from FFA Veterinary Science CDE, Live and artificial animal models, Veterinary and restraint tools, Cornell Veterinary Science 9-12 Classroom Curriculum 2nd ed., Guest speakers and agricultural advisory committee and stakeholders

# 10th Grade Nursery Landscape CURRICULUM

| | |
|---|---|
| | |
| **Grade Level(s): 10** | **Curriculum Author(s):** Jen Plasky |
| **Course Description:** This is an introductory course for students interested in careers within the landscape industry. Topics include an introduction to the landscape industry and careers, plant identification, landscape equipment operation, and introductory landscape design/installation/maintenance. | |

| Year At A Glance | | | |
|---|---|---|---|
| **Unit Title** | **Overarching Essential Question** | **Overarching Enduring Understanding** | **Vision of A Learner "I Can" Statements** |
| Intro to Nursery Landscape Industry & Careers | What careers are available in the nursery landscape industry? | There are many aspects of the nursery landscape industry that can match a student's interests and work preferences. Post secondary education is dependent on the type of position. | TI4(9-12); TCC4(9-12) |
| Landscape Design | How can the elements and principles of design be applied to enhance the outdoor space? | A well designed landscape can increase the value and usage of an outdoor space. Proper landscape drawing assists in the sales and installation process. | P3(9-12); TCC3(9-12); CCE2(9-12) |
| Plant Identification | What features can I use to identify plants? | Different plants have different features that identify them during the active growth season and winter. | TI4(9-12) |
| Landscape Maintenance & Installation | What actions are necessary to properly maintain a landscape? | Landscape maintenance activities include weed removal, watering, mulching, edging, mowing, fertilizing, pruning, and winterization. | TI1(9-12); DE4(9-12) |
| Landscape Equipment Operation | How do you properly operate mowers, blowers, and weed whackers? | Each piece of equipment has its own dangerous areas. | CCE2(9-12) |

# Unit 1 - Introduction to the Nursery Landscape Industry & Careers

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

- **FPS.05.02.** Examine and choose career opportunities that are matched to personal skills, talents, and career goals in an AFNR pathway of interest.
- **CRP.10.03.** Develop relationships with and assimilate input and/or advice from experts to plan career and personal goals in a chosen career area.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

- TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.
- TCC4(9-12): I can integrate my learning to adapt to experiences in the classroom, career and life.

**Understandings:** Students will understand that…

- The nursery landscape industry makes up over half of CT agriculture, with the largest amount of employment opportunities
- Wholesale nurseries produce trees, shrubs, and perennials. Retail nurseries (garden centers) will have annuals and other gardening supplies as well.
- Landscape includes design, installation, maintenance of garden beds, pruning of trees and shrubs, spring & fall clean-up, and lawn care/maintenance
- There are different job opportunities at every level which require various educational requirements

**Essential Questions:**

- What local nurseries exist in our area?
- What large nursery landscape companies exist in Connecticut?
- Where can I learn about job openings in the landscape industry?
- What educational path do I need to pursue my career interests?

**Students will know…**

- The differences and similarities between the nursery landscape industry and greenhouse/floriculture industry
- Post-secondary education depends on the role. Positions of leadership/management typically require experience and a 2-4 year degree. Horticultural internships and certificate programs, accompanied by a 2-4 year degree in business, is

**Students will be able to…**

- Identify nursery landscape businesses in Connecticut and discuss the products/services they sell
- Identify where employment positions can be found
- List internship opportunities in nursery landscape
- Align personal interests and strengths to specific positions in the industry

| | |
|---|---|
| recommended for those who wish to own or manage a business.<br>● Specific job titles, duties, experience/educational requirements, and salaries within the landscape industry<br>● Where and when to find horticultural job opportunities and internships<br>● There are horticulture industry job boards, as well as general boards like Indeed. An active LinkedIn account will allow recruiters to reach out to discuss job openings. Attending industry events/meetings will develop relationships with industry professionals who may have/know of job opportunities.<br>● Setting up job alerts and reading through the job openings will offer information on salaries and duties within different positions. | |
| **Key Vocabulary:** job board, green industry, benefits, salary range, recruiter, CNLA | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Complete self-assessment of attributes, personality type, preferred work environment, salary range based on lifestyle<br>● Job alert/job posting reflection assignment | **Other Evidence:**<br>● Reflection assignments<br>● Quizzes<br>● Article reviews |
| **Learning Plan** | |
| **TI4(9-12); TCC4(9-12)**<br>● Discuss importance of matching personal characteristics, interests, and work environment preferences to the right job<br>○ Complete self-assessment assignment<br>● Overview of types of positions in the landscape industry<br>● Review job board postings<br>○ Create a list of nursery landscape positions of interest<br>● Guest speakers/business tours of local nursery landscape companies | |
| **Teacher Resources:** www.hortjobs.com, www.hirehorticulture.com, www.cnla.biz, indeed.com, longwoodgardens.org, careers.siteone.com, https://www.easternland.com/careers/, pridescorner.com, https://www.monrovia.com/internship, https://www.yardscapeslandscape.com/summer-internships/ | |

# Unit 2 - Landscape Design

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

- **PS.04.01.01.b.** Demonstrate proper use of plants in their environment (e.g.heat tolerant and shade plants in a landscape design, etc.).
- **PS.04.01.01.c.** Create a design plan by selecting plants based on design elements and environmental conditions.
- **PS.04.02.01.c.** Propose suggestions for improvement of a design.
- **CRP.04.02.02.b.** Compose clear and coherent written documents and visuals (e.g., agendas, audio-visuals, drafts, forms, etc.) that are adapted to the audience's needs in both formal and informal settings.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)

- P3(9-12): I can accept constructive feedback and use setbacks to adjust my learning journey in order to reach my goals.
- TCC3(9-12): I can integrate relevant information to produce multiple valid solutions.
- CCE2(9-12): I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.

**Understandings:** Students will understand that…

- Soil, sunlight, water availability, and climate must be evaluated to ensure appropriate plant choices and sustainable design outcomes.
- Addressing factors like poor drainage, erosion, or limited access during planning helps ensure functionality, longevity, and customer satisfaction.
- Integrating healthy or valuable existing elements into a new plan supports sustainability, preserves site character, and reduces costs.
- Designing with the end user in mind ensures that the landscape is not only beautiful but also functional, accessible, and aligned with client goals.

**Essential Questions:**

- How do growing conditions at a site influence plant selection and placement in a landscape design?
- What site-specific challenges must be considered during the design process?
- How can existing plants or features be incorporated into a new design?
- Why is it important to understand how the client plans to use the space?

**Students will know...**

**Students will be able to...**

| | |
|---|---|
| • Many landscape areas lack a well defined focal area and/or have incorrect focal area set-up.<br>• All lines need to lead to/from the focal area.<br>• All plant materials should be grouped.<br>• Color should be limited to 1-2 colors.<br>• The space needs to be designed to meet the use and design preferences of the client.<br>• Growing conditions and area challenges will dictate design options.<br>• Types of questions to ask a client to determine preferences | • Create a landscape design applying the elements and principles of design<br>• Create a hand-drawn, plan view landscape design<br>• Create a focal area<br>• Utilize grouping, repetition, and space to create line that leads to the focal area<br>• Select landscape drawing tools to create a plan view drawing<br>• Set up a foundation planting design<br>• Evaluate a landscape site for growing conditions |
| **Key Vocabulary:** Focal area, positive space, negative space, dynamic line, static line, symmetrical, asymmetrical, unity, monochromatic, analogous, complementary, grouping, repetition, scale, proportion, elevation view, plan view, perspective view | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Assess images of landscape designs & provide design feedback<br>• Site assessment lab<br>• Client question assignment<br>• Foundation planting design set-up<br>• Landscape plan view drawing | **Other Evidence:**<br>• Quizzes |
| **Learning Plan** | |
| **P3(9-12); TCC3(9-12); CCE2(9-12)**<br>• Discuss Elements & Principles of Landscape Design<br>  ○ Image assessment assignments<br>• Review growing challenges and other challenges of landscape design areas<br>  ○ Site Assessment lab<br>• Discuss types of landscape clients and common client questions/concerns<br>  ○ Client question assignment<br>• Demonstrate use of landscape drawing tools and methods<br>  ○ Create landscape plan view drawing | |
| **Teacher Resources:** The AIFD Guide to Floral Design (reference for Elements/Principles of Design) | |

# Unit 3 - Plant Identification

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**

- **PS.01.01.01.a** Identify the major structures and functions of plant cells, tissues, and organs.
- **PS.01.01.02.a** Identify the components and their functions of plant systems (e.g., root, shoot, reproductive).
- **PS.01.01.02.b.** Determine the optimal environmental conditions for plant growth.
- **PS.01.03.01.a** Describe how plants are classified (taxonomy) based on shared characteristics.
- **PS.01.03.02.a** Explain the importance of using a scientific classification system.
- **PS.03.01.01.a** Identify and classify plants using common and scientific names.
- **PS.03.01.02.a** Describe distinguishing characteristics of plant varieties and cultivars.
- **ESS.03.01.01.a** Distinguish between native, non-native, and invasive species.
- **ESS.03.01.02.a** Explain the value of native plant species in landscape and environmental systems.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)
TI4(9-12): I can apply my strengths and anticipate challenges to reach my current and future goals.

**Understandings:** Students will understand that...

- Leaves, stems, flowers, growth habits, and bark are key traits used to accurately identify plants and understand their characteristics and uses.
- Scientific names provide universal, precise identification, while common names vary by region and can lead to confusion. Both are important for communication in the plant industry.
- Understanding a plant's origin involves researching its historical growth range, ecological relationships, and human influence on its distribution.
- Plant hardiness depends on cold tolerance, dormancy patterns, and regional climate zones. Selecting appropriate species ensures successful growth and sustainability.

**Essential Questions:**

- What physical features help identify different types of plants?
- Why do plants have both Latin (scientific) and common names?
- How can you tell if a plant is native to a region or introduced through cultivation?
- What factors determine whether a plant can survive and grow again after winter?

**Students will know…**

- How native plants differ from cultivars and nativars

**Students will be able to...**

- Identify 30-40 landscape plants by common name and genus

| | |
|---|---|
| • The 3 hardiness zones in Connecticut<br>• Different plants have different features that identify them<br>• Latin names are universal; common names change based on region<br>• True native plants do not have any human breeding interference<br>• The categorization of annual vs perennial changes based on hardiness zones | • Determine if a plant is hardy for a zone<br>• Discuss the importance of using native plants in landscape designs<br>• identify a plant in the active growing and dormant seasons for site analysis prior to a landscape design plan and/or maintenance contract<br>• Use leaf/bud arrangement, bark, lenticels, leaf margins, and other features to identify common landscape plants |
| **Key Vocabulary:** opposite, alternate, smooth margin, serrated margin, lenticels, pubescence, leaf scar, woody, herbaceous, deciduous, evergreen, broadleaf evergreen, tree, shrub, perennial, annual, hardiness zone, variety, cultivar, native, nativar | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Organize plant samples into categories<br>• ID practice quizzes | **Other Evidence:**<br>• ID Quizzes<br>• Article Reviews |
| **Learning Plan** | |
| **TI4(9-12)**<br>Discussion of Plant ID Terminology & Hardiness Zones<br>Hardiness Zone assignment<br>Native Plant Discussion<br>Articles<br>Plant ID Labs<br>Categorize Plant ID samples<br>ID Quizzes | |
| **Teacher Resources:** Manual of Woody Plants by Michael Dirr | |

# Unit 4 - Landscape Maintenance & Installation

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**
**PST.01.01.01.a** Identify tools, equipment, and procedures used in construction and maintenance projects.
**PS.01.01.02.a**. Identify the effects of environmental conditions (e.g., air movement, temperature, humidity, etc.) on plant growth.
**PS.01.01.03.c.** Recommend modifications to water for desired plant growth.
**PS.01.04.** Develop and implement a nutrient management and/or fertilizer plan for specific plants or crops.
**PS.03.04.01.a** Identify and describe plant water requirements and apply irrigation practices appropriately.
**PS.03.04.03.a** Describe methods of plant maintenance and perform routine care practices.
**PS.04.02.02.b.** Demonstrate the use of tools used for creating designs.
**CS.01.01.01.a** Identify personal strengths and demonstrate behaviors that promote effective teamwork.
**CRP.09.02** Implement personal management skills to function effectively and efficiently in the workplace (time management, planning, prioritizing, etc)

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)
TI1(9-12): I can implement a realistic plan and adapt when necessary to achieve my goals.
DE4(9-12): I can work respectfully with all members of my community and support the needs of others.

**Understandings:** Students will understand that...
- Proper planning and material staging increase efficiency, reduce waste, and help ensure installations are completed accurately and on schedule.
- Newly installed landscapes require more frequent, controlled watering to support root establishment, while established landscapes rely on less frequent, deep irrigation to maintain plant health.
- Routine maintenance tasks—such as pruning, mulching, fertilizing, and pest control—are essential for sustaining plant health and visual appeal in residential and commercial landscapes.
- Collaboration, communication, and task coordination are key to

**Essential Questions:**
- How can materials be organized and laid out to ensure accurate and efficient landscape installation?
- How does irrigation scheduling differ between new and established landscapes?
- What actions are required to properly maintain a healthy and attractive landscape?
- How can effective teamwork contribute to successful landscape installation and maintenance?

| | |
|---|---|
| completing complex landscape projects efficiently and professionally. | |
| **Students will know…**<br>● Layout and spacing of plant materials according to a landscape plan<br>● The personal safety and plant health care consequences pertaining to performing landscape maintenance tasks incorrectly.<br>● The tools and equipment needed to perform each landscape maintenance task.<br>● Proper height to cut a lawn based on the season<br>● Factors that determine the frequency in which mowing is needed.<br>● Basic lawn care principles<br>● The placement order and spacing accuracy in which plants are installed determines efficiency and minimizes damage to plant materials.<br>● Frequency of irrigation depends on weather conditions and plant type.<br>● Newly installed plants should not dry out in order to avoid stress.<br>● After the first 2-4 weeks, plants should be watered deeply and less frequently to discourage shallow root systems<br>● Working on a landscape team involves being clear on the role, staying on task, working efficiently and safely, helping other team members when needed, and being observant and detail-oriented.<br>● Landscape maintenance activities include weed removal, watering, mulching, edging, mowing, fertilizing, pruning, and winterization. | **Students will be able to...**<br>● Work effectively as part of a landscape maintenance/installation crew<br>● Install landscape plants and materials according to a plan<br>● Care for plant materials<br>● Monitor time and properly perform tasks on a landscape installation crew<br>● Select and safely use landscape equipment and tools appropriate for the job<br>● Perform common landscape maintenance activities (weeding, watering, mulching, pruning, edging, mowing, fertilizing, fall/spring clean up, winterization) |
| **Key Vocabulary:** mycorrhizae, slow release fertilizer, organic fertilizer, synthetic fertilizer, lopper, hand pruner, spring rake, bow rake | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>● Landscape Installation Labs | **Other Evidence:**<br>● Quizzes |

| | |
|---|---|
| • Landscape Maintenance Labs | • Article Reviews |

**Learning Plan**

**TI1(9-12); DE4(9-12)**

- Discuss & demonstrate edging, fertilizing, and mulching
  - Edging & mulching lab
- Discuss and demonstrate pruning
  - Pruning lab
- Discuss how to layout and space plant materials in a landscape installation..
  - Installation Lab. Rubric assessment.
- Discuss how to determine water needs
  - Create a watering schedule

**Teacher Resources:** www.gogreenius.com

- Local landscape company field trips/guest speakers

# Unit 5 - Landscape Equipment Operation

## Desired Results - Goals, Transfer, Meaning, Acquisition

**Established Goals:**
**PS.03.04.03.a** Describe methods of plant maintenance and perform routine care practices.
**FPS.03.04.** Use appropriate protective equipment and demonstrate safe and proper use of AFNR tools and equipment.
**FPS.03.04.03.b.** Demonstrate appropriate operation, storage, and maintenance techniques for AFNR tools and equipment.
**PST.02.02.** Operate machinery and equipment while observing all safety precautions in AFNR settings.
**PST.02.01.01.a** Identify safety hazards and demonstrate safe operation of tools and equipment.
**PST.02.03.02.a** Identify signs of mechanical failure and perform basic troubleshooting.
**PST.02.01.02.a** Demonstrate the proper use and maintenance of basic landscaping equipment and tools.

**Vision of A Learner Attributes:** Students will be able to independently use their learning to... ("I can" statements to be demonstrated)
CCE2(9-12): I can give and receive actionable and relevant feedback with openness to be able to determine meaningful revisions for success.

**Understandings:** Students will understand that...
- Following proper safety protocols prevents injury, reduces equipment damage, and ensures a professional work environment.
- Recognizing early warning signs—such as strange noises, vibrations, or performance issues—helps prevent accidents, minimize downtime, and reduce repair costs.
- Mastering proper operating techniques for power tools ensures efficiency, protects the operator and surroundings, and contributes to high-quality landscaping outcomes.
-

**Essential Questions:**
- What safety procedures must be followed when using different types of landscape equipment?
- What are common signs that landscape equipment may be malfunctioning?
- How do you safely and effectively operate common landscape tools like mowers, blowers, and string trimmers?

**Students will know…**
- What to check if a piece of equipment is not starting properly
- Each piece of equipment has its own dangerous areas.
- Inspecting equipment prior to use can prevent accidents.

**Students will be able to…**
- Properly use all of the school lawn mowers, weed whackers, and leaf blowers
- Restring a weed whacker

| | |
|---|---|
| • Ceasing to use equipment if a piece is damaged or missing is important for safety. Unusual noises should be investigated immediately. | • Refuel the mowers, weed whackers, and blowers<br>• Check the oil level on mowers<br>• Discuss routine maintenance required for the equipment<br>• Start, operate, and shut off equipment |
| **Key Vocabulary:** 2 cycle, sulky, choke, throttle, pull cord, EPO (emergency power off) switch | |
| **Assessment Evidence** | |
| **Performance Tasks:**<br>• Mowing Labs | **Other Evidence:**<br>• Quizzes<br>• Article Reviews |
| **Learning Plan** | |
| **CCE2(9-12)**<br>Demonstration operation of weed whacker & blower<br>Demonstration how to refuel weed whacker & blower<br>Demonstrate how to restring weed whacker<br>• Weed whacking maintenance lab<br>Demonstrate how to use mowers<br>Demonstration how to refill mowers & check oil level<br>• Mowing labs<br>Mowing & weed whacking labs | |
| **Teacher Resources:**<br>• Equipment Owner's Manuals<br>• www.gogreenius.com | |

# Regional School District 14 Textbook Adoption Proposal Form

**Instructions -** After the text selection process is finished, please submit the following to the Director of Teaching and Learning for the chosen text:

- Completed adoption proposal form
- A copy of the cost proposal/quote from the vendor
- 1-3 copies of the Student Textbook and the Teacher's Guide for review.

| | |
|---|---|
| School/Grade/Department: NHS Math Department | Date: 5/2/25 |
| Evaluating Team Members: Shannon Belanger & Raymond Robillard | |
| **Textbook Information** | |
| Title of the Proposed Textbook:<br>Financial Algebra: Advanced Algebra with Financial Applications<br>ISBN: 979-8-214-07608-9 | Edition: 3rd edition |
| Author(s)/Editors: Robert Gerver and Richard Sgroi | |
| Publisher (please include name of contact person, address, phone, and fax):<br>Cengage, Justine Farrell, justine.farrell@cengage.com, 888-915-3276 | |
| Text Readability Level: 1000 Lexile | Copyright Year: 2025 |
| Is this a more current edition of an approved text already in use? (If yes, please include the title, copyright date, and publisher of the text being replaced). No, this is a new text book. | |
| **Proposed Textbook Cost** | |
| Cost of The Proposed Text: *(Textbook and 6-year digital access)* | $179.00 |
| Number of Texts Requested: | x 40 |
| Teacher Materials: *(Annotated Instructor's Edition x 3 and Student Workbooks for Teacher Reference x 6)* | + 879.00 |
| Approximate Cost of Shipping: | + 803.90 |
| Total Cost: *Please see attached quote* | $8,842.90 |
| **Additional Information Required** | |
| Titles of Other Texts Reviewed: Financial Algebra: Advanced Algebra with Financial Applications 2nd edition | |

| |
|---|
| Advantages of The Proposed Text: The 3rd edition includes updated technical content for currency and relevancy and to reflect the latest statistics, data, prices/fees, rates, tax tables, and other finance-related data, revisions of content to reflect current and relevant financial information, the consideration of standards, and the refinement of pedagogical features of enrich learning experiences. The 3rd edition also includes an increased emphasis on the concepts that drive math comprehension, including: identifying both math and financial concepts addressed in each chapter; learning objectives; and "reality check" questions to encourage students to be actively involved in applying mathematical ideas to their everyday lives. A streamlined companion site for teachers that offers valuable resources has also been made available with the most recent edition updates. |
| Other School Districts Utilizing The Proposed Text:<br>The following CT districts are planning on adopting the 3rd edition for next school year: RHAM, Ledyard, and Haddam-Killingworth. There are several CT schools using older editions of this textbook. Examples include: Canton, Lyman Hall, Stafford, Stonington, and Westbrook. |

| Evaluation of The Proposed Textbook | | | |
|---|---|---|---|
| **Content -** Please place an "x" in the appropriate rating. | **Yes** | **No** | **N/A** |
| 1. Are the instructional goals clearly stated in terms of what students should know and be able to do? | x | | |
| 2. Does the content align with the state and district curriculum standards? | x | | |
| 3. Does the content challenge students of varying levels? | x | | |
| 4. Is the content age appropriate in terms of interests, concepts, etc.? | x | | |
| 5. Does the content reflect recent scholarship in this subject area? | x | | |
| 6. Are there connections made within and across content areas? | x | | |
| 7. Are gender, racial, ethnic, religious, and socio-economic groups, past and present, accurately and fairly represented? | x | | |
| 8. Does the content (both pictorial and written) reflect the pluralistic, multi-ethnic nature of our global society? | x | | |
| 9. Are all sides of a controversial issue treated objectively? | x | | |
| Please provide a brief explanation any "no" responses above: | | | |
| **Assessment of Student Learning -** Please place an "x" in the appropriate rating. | **Yes** | **No** | **N/A** |

| | | | |
|---|---|---|---|
| 1. Are there formal and informal assessment practices integrated throughout the text? | x | | |
| 2. Do the assessments provide a balanced profile of students' acquisition of skills, knowledge, understanding, and their ability to apply their learning to real world situations? | x | | |
| 3. Will the assessments provide meaningful feedback to teachers to improve instruction and learning? | x | | |
| Please provide a brief explanation any "no" responses above: | | | |
| **Instructional Support -** Please place an "x" in the appropriate rating. | **Yes** | **No** | **N/A** |
| 1. Are there up-to-date reference sources listed? | x | | |
| 2. Is there a focus on higher level thinking skills? | x | | |
| 3. Are the units and lessons organized in a manner that are easy to use? | x | | |
| 4. Do the activities engage students in problems and questions before solutions and answers are introduced? | x | | |
| 5. Do the materials allow for a variety of activities that address different learning styles? | x | | |
| 6. Do the materials provide ways of building students' competency with the Vision of A Learner attributes? | x | | |
| 7. Do the materials provide opportunities for parents and community members to be involved in learning activities? | x | | |
| 8. Are the typeface, type size, illustrations, and visual aids suitable for the students who will be using this text? | x | | |
| 9. Is the text/supplemental material available in different languages? | x | | |
| 10. Is the text/supplemental material available on audiobook? | x | | |
| 11. Do the instructional methods reflect current learning theory and pedagogy? | x | | |
| 12. Are the authors (contributors) recognized for their expertise in this subject area and their experience with students at a similar level to those who will be utilizing this text? | x | | |
| Please provide a brief explanation any "no" responses above: | | | |

Overall Summary and Rationale for Utilizing This Textbook:

As we prepare to launch the new course, providing students with a comprehensive, well-structured textbook is essential for ensuring their academic success. Here's why investing in a textbook is a beneficial decision:

1. A textbook serves as a roadmap for the course, offering students a clear and organized path through the material. It helps align the course objectives with the content, ensuring that students stay on track and can easily follow the progression of topics.

2. Textbooks are typically written by experts in the field and are designed to cover all the essential topics students need to master. By choosing a textbook, we ensure that no critical content is overlooked, and students receive a complete understanding of the subject matter. Additionally, textbooks often provide supplementary materials like case studies, problem sets, and reference lists that enrich the learning experience.

3. While classwork materials are vital for active learning, textbooks provide students with the ability to review and study at their own pace. Students can revisit complex concepts, read ahead, or reinforce their understanding outside of scheduled class time.

4. While there is an initial cost for purchasing the textbook, this is a one-time expense that provides students with a valuable resource they can reference throughout the year and can be used for many years to come.

5. Textbooks often include different types of content—diagrams, charts, case studies, and text—allowing students with different learning preferences to engage with the material in ways that work best for them. Visual learners benefit from illustrations and diagrams, while those who prefer reading can delve into the text for a deeper understanding. Additionally, the digital component does offer audio text support.

In conclusion, a carefully selected textbook is a crucial investment for the success of both instructors and students in the new course. It provides a structured, reliable, and comprehensive foundation for learning, helps support diverse student needs, and fosters a deeper understanding of the subject matter. By ensuring all students have access to the same high-quality resource, we are setting them up for success and equipping them with the tools they need to thrive academically.

| Approval Signatures | |
|---|---|
| Department Chairperson: M S Bely | Date: 5/2/25 |
| Principal: | Date: |
| Director of Teaching and Learning: | Date: 5/2/25 |

NATIONAL GEOGRAPHIC LEARNING | Cengage

Company Address 10650 Toebben Drive
Independence, Kentucky 41051
United States

Created Date 12/17/2024
Expiration Date 12/31/2025

Quote Number 00000324

**Prepared By:**
Justine Farrell
justine.farrell@cengage.com

**Presented To:**
Shannon Belanger
2032632186
2032633570

**Bill To:**
NONNEWAUG HIGH SCHOOL

**Ship To:**
NONNEWAUG HIGH SCHOOL
5 MINORTOWN RD
WOODBURY, Connecticut 06798
United States

| Product | ISBN | Sales Price | Quantity | Total Price |
|---|---|---|---|---|
| Financial Algebra: Advanced Algebra with Financial Applications, 3rd., Annotated Instructor's Edition | 9798214076096 | USD 235.00 | 3.00 | USD 705.00 |
| K12 Print + Digital Bundle: Financial Algebra: Advanced Algebra with Financial Applications, 3rd Student Edition + MindTap 6-year access | 9798214368795 | USD 179.00 | 40.00 | USD 7,160.00 |
| Student Workbook for Gerver's Financial Algebra: Advanced Algebra with Financial Applications, 3rd | 9798214076119 | USD 29.00 | 6.00 | USD 174.00 |

| | |
|---|---|
| Subtotal | USD 8,039.00 |
| Total Price | USD 8,039.00 |
| Shipping and Handling | USD 803.90 |
| Grand Total | USD 8,842.90 |

Total Savings:
USD 0.00

## Accept Quote

Order Creation Link https://cengageorg.my.site.com/Service/s/k12-order?orderId=00000324

## Terms & Conditions

*This Quote shall be deemed accepted by Customer upon Cengage receiving (i) any written confirmation indicating acceptance, or (ii) a Customer Purchase Order. Any terms or conditions contained in any written confirmation or Customer Purchase Order will have no force and effect and will not amend or modify this Quote. Once confirmed, your invoice will be sent on the start date of your purchase. Notwithstanding anything in the Terms (defined below),invoices are due and payable within thirty (30) days from your receipt of the applicable invoice. This Quote shall be governed by the terms and conditions for Gale Products and Services found at https://support.gale.com/terms/ (the "Terms"), except (i) where Customer has a written sales agreement executed by Cengage for the Offerings referenced herein, in which case such written sales agreement will govern, or (ii) as otherwise set forth herein. Customer acknowledges that all terms and pricing under this Quote are confidential in nature and may not be duplicated or disclosed by Customer to any third party without the prior written consent of Cengage Learning, Inc.*
*Customer is not to include additional terms or edit this Quote in any manner. If Customer wishes to negotiate terms, please reach out to Gale to obtain the proper agreement.* https://www.cengagegroup.com/legal/terms-k-12/

© 2019 Gale, A Cengage Company

TERMS OF USE | PRIVACY

Company Address 10650 Toebben Drive
Independence, Kentucky 41051
United States

*All information embodied in this document is strictly confidential and may not be duplicated or disclosed to third parties outside recipient's organization without prior written consent of Cengage Learning.*

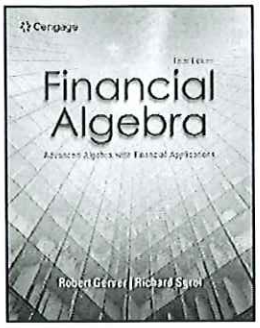
## Additional Information

**Sales Rep's Comment**

© 2019 Gale, A Cengage Company

TERMS OF USE | PRIVACY

NATIONAL GEOGRAPHIC LEARNING | Cengage




# Financial Algebra: Advanced Algebra with Financial Applications

Third Edition ©2026

## Robert Gerver, Richard Sgroi

**A perfect resource for 3rd or 4th-year alternative math courses**

*Financial Algebra* offers high school students an opportunity to view the world of finance through a mathematical lens. The mathematical formulas, functions, and pictorial representations used assist students in making sense of the financial world around them and equip them with the ability to make sound financial decisions. The overarching purpose of the course is to develop mathematically proficient students who can apply mathematics to solve real world problems that arise at home, at school, in society, and in the workplace.

This new 3rd Edition of *Financial Algebra: Advanced Algebra with Financial Applications* includes:

- Updated technical content for currency and relevancy and to reflect the latest statistics, data, prices/fees, rates, tax tables and other finance-related data
- Answer keys to tax filing problems will be revised each year using current tax forms, tables, and regulations - and available digitally as a downloadable resource each year
- Financial content added to comply with state standards for finance courses:

50-30-20 Rule
529 Plan
annuities
annuity
automobile lease
average indexed monthly earnings (AIME)
bankruptcy
bend points
bitcoin
braking time
churning
commercial driver's license
consolidation
contribution matching
co-payments
coupon rate
credit limit
cryptocurrency
cusp
deductibles
doing business as (DBA)
effective tax rate
emergency fund
encryption
equiprobable outcomes
escrow
express warranty
extended warranty
Federal Direct Consolidation Loan
finance charge
finite arithmetic sequence
fraud protection
free checking account
full warranty
geometric solids
high-yield interest accounts
human resources (HR)
identity fraud
identity theft
implied warranty
infinite arithmetic sequence
inflation
inheritance
Initial Public Offering (IPO)
interest-bearing checking account

kilowatt hours per 100 miles (KWh/100)
lessee
lessor
lifeline checking account
limited warranty
linear depreciation
liquidity
lump sum payment
marginal tax rate
market basket
markup
Medicare Advantage plans
miles per gallon equivalent (MPGe)
mobile payment apps
monthly compounding
mutual funds
no-load mutual funds
online checking account
origination fee
par value
peer to peer (P2P)
per loan weigh factor
perception time
perception-reaction time
placebo
planned obsolescence
price-earnings ratio
primary insurance amount (PIA)
promissory note
qualified educational costs
refinance
rent-burdened
retail price
retirement savings proportional withdrawal approach
retirement savings traditional withdrawal approach
satoshi
schedule D
scholarships
secured loans
Securities and Exchange Commission (SEC)
securities industry
split-adjusted share price
streaming services
student checking account
time value of money
traditional checking account
unsecured loans
virtual assistant
warranty
warranty expiration date
weighted average
wholesale price
work from home (WFH)

- An increased emphasis on the concepts that drive math comprehension. These include:
    - Identifying both math and financial concepts that are addressed in each chapter as part of the Table of Contents
    - The addition of Learning Objectives that address the math and financial concepts that are covered in each lesson
    - The addition of assessment questions that evaluate student knowledge of the math and financial concepts introduced in each lesson. These question types assess student knowledge of the Learning Objectives and appear at the end of each lesson chapter reviews. These are in the Testbanks and in the digital solution as well.
- A combined English/Spanish Glossary/Glosario to support English Language Learners
- For teachers, a streamlined Companion Site that offers valuable resources and teaching tools, including:
    - New Guided Practice for Students
    - New Guide to Teaching Online

*An optional policy to consider.*

# Instruction/Personnel - Certified-Non-Certified

## Electronic Resources

## Generative AI (Artificial Intelligence)

The Board of Education is committed to providing our students with the most innovative and effective educational experiences to foster high levels of learning and opportunities for self-expression. As our schools prepare students for a future that demands adaptability, critical thinking and digital literacy, we recognize the potential of generative Artificial Intelligence (AI) and other related technology tools.

As with all technologies, users must be mindful of and adhere to all considerations ensuring responsible and ethical use, especially as it relates to mitigating bias, promoting transparency, and ensuring the benefits of AI are accessible to all students.

While ensuring the responsible use for those interacting with and creating content from generative AI technologies, the Board underscores its commitment to fostering a dynamic and engaging learning environment that leverages the advances in AI to enhance student learning outcomes and equip students with the skills and dispositions needed for success in the digital age.

(cf. 6141.321 – Student Responsible Use of the Internet)
(cf. 5121.3 – Academic Dishonesty/Plagiarism)
(cf. 6162.51 – Surveys of Students (Student Privacy))

Policy adopted:
cps 8/23

# Region 14 Schools
# AI Information and Guidelines

Region 14's Vision of A Learner statement emphasizes the importance of ensuring that our students are future-ready: prepared to take advantage of the opportunities and face the challenges of the 21st Century. It has been said, "AI will not replace humans in the workplace, but humans who effectively use AI will certainly replace those who do not." As such, Region 14 recognizes our responsibility to our students to incorporate AI into teaching and learning ethically, responsibly, and effectively while continuing to develop our students' content area knowledge and skills and their ability to demonstrate the Vision of A Learner attributes.

Following are examples of ethical, responsible, and effective use of AI in teaching and learning that can further contribute to students' and faculty's development of the Vision of a Learner attributes and help prepare students to excel in their post-secondary pursuits.

**Thinking Critically and Creatively**



- ★ Refining your ideas and comparing them with others for originality of concept and content
- ★ Brainstorming multiple approaches to solving a problem and then evaluating which is most effective and why
- ★ Asking AI to explain a concept in different ways to spark deeper understanding
- ★ Evaluating the accuracy of AI generated materials to ensure the information is credible and represents multiple perspectives

**Communicating and Collaborating Effectively**



- ★ Asking AI to provide specific feedback on a writing piece related to content, tone, intent, and meeting of requirements "without providing new content" to replace your own
- ★ Collaborating with peers around AI output to review the accuracy and applicability of the response to the task
- ★ Refining requests of AI to improve the responses it provides and to learn to develop more effective prompts
- ★ Analyzing and discussing a source or text and then confirming your understanding with AI

**Demonstrating Empathy**



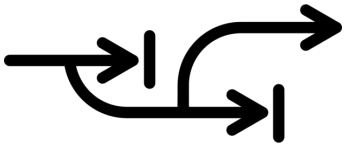
- ★ Recognizing that AI responses are generated based on electronically available content that reflect the opinions, values, and biases of their sources and the need to consider multiple perspectives, including those that may be underrepresented or misrepresented
- ★ Curating a list of resources from diverse viewpoints that can be used as a foundation for further research

**Persevering**



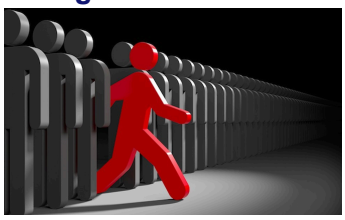
- ★ Asking AI to develop practice questions/tasks to review for a test or improve skills in a given area
- ★ Engaging in subject-specific learning and practice through platforms like Khan Academy and IXL that leverage AI to provide students with personalized learning experiences

**Adapting and Adjusting**



- ★ Editing and revising a written response after analyzing AI's feedback and determining which suggestions are most beneficial to meet the purpose and intended outcome of the task
- ★ Developing a list of alternative strategies for completing a task or responding to situations
- ★ Responding to AI generated reflection prompts that encourage deeper thinking and the generation of new ideas

**Taking Initiative**



- ★ Generating a list of research topics and summarizing key points to decide on which to focus for a project or paper
- ★ Developing a time management plan for completion of projects within a specific timeframe
- ★ Asking AI questions that spark curiosity and then continuing to develop knowledge by allowing it to respond to suggested related questions
- ★ Utilizing AI as a think partner rather than a thought generator

## Inappropriate and Unethical Use of AI

AI is a wonderful tool, but an overreliance on it as a resource significantly impacts the development of the skills and knowledge necessary to be successful both in school and in life. While it is not possible to provide an all-inclusive list of inappropriate uses of AI, the following examples when contrasted with the ethical, responsible, and effective uses listed above provide guideposts between which appropriate use would fall.

- ➔ Utilizing AI to complete an assignment or project without first checking with the teacher to know if AI usage is allowed
- ➔ Submitting AI-generated work as your own without disclosing AI as the source (plagiarism)
- ➔ Including AI-generated information in your work without researching further to determine if the information is accurate and/or without checking the sources cited by AI (plagiarism)
- ➔ Utilizing AI to generate and spread false information or cause harm to a person or group of people
- ➔ Including personally identifiable information about others in AI prompts
- ➔ Translating your own words from English to the target language to submit as your own work in a World Language class

## How to Avoid Plagiarism

Submitting or presenting any content as your own whether intentionally or accidentally without citing your sources is plagiarism.

- ➔ Always cite your sources utilizing the citation method required for the course.
- ➔ If you have been given permission to use AI, credit the AI site as the source of the generated material.
- ➔ Paraphrased or rearranged information or content from other sources still needs citations.

AI-generated feedback may be helpful in the writing process; however, utilizing AI-generated text that results from the feedback would be considered plagiarism.

- ➔ Actionable feedback to inform revisions from AI can be easily obtained with the prompt, "please read this paper and provide feedback on content, tone, and perceived intent without providing specific new content to replace mine."

## Student Data Privacy

Region 14 is committed to maintaining the privacy of our students. Through students' school accounts, they will only have access to AI platforms that have contractually pledged compliance with the CT Student Data Privacy regulations.

# FIELD TRIP REQUEST FORM

Revised 2/7/2025

RECEIVED
MAY 07 2025

**Procedural Guidelines: Field trips are covered under Board policy 6153. Field trips should support course or club curriculum. The following parameters will be applied to all field trips:**

- Three weeks prior to the field trip (or six weeks prior to an out of state overnight trip) submit this field trip request form with a curriculum justification statement and a proposed roster of students.
- Upon approval of the trip, formalize all arrangements for transportation and other costs.
- Ensure that all students and parents complete and sign the permission form.
- Provide alternative plans for students who are not attending the field trip.
- Submit a final roster of participating students to all faculty and administrators at least 7 **calendar days** prior to trip. The list cannot be changed after this point. (There are no refunds after this point.)
- Blackout dates apply including: first week of each semester, last week of each quarter, week before, during and after Smarter Balance; exam week; last week of April; the month of June. SAT & PSAT (see your school administrator for more information).
- On the morning of the trip, submit the final roster and a copy of every permission form to the attendance secretary.
- Keep the original permission forms in your possession throughout the trip.
- Students will be allowed to take 5 field trip days per marking period/ 12 trip days per year. It is both the student's and the sponsoring teacher's responsibility to know this. The main office will publish a field trip attendance report upon request.

---

## Field Trip Request Form

| Date of Request: | Title and Destination of Trip: | Date of Trip: |
|---|---|---|
| 5/5/2025 | National FFA Convention Indianapolis, IN | 10/26/25 - 11/2/25 - flexible |
| **Sponsoring Department:** Ag | **Person in Charge:** J. Jedd | **Is this an overnight trip?** YES X No_____ |
| **Number of Students:** ? <br> **Number of Busses** Other | **Number of Chaperones:** ? | **Names:** ? |
| **Type of Trip:** <br> Educational [X] Recreational [ ] | **Time of Departure:** _____ <br> **Time to Arrive:** _____ TBD | **Time of Expected Return:** |
| **Mode of Transportation:** TBD ↓→ | **Cost of Transportation:** | **Cost of Food:** |
| **Cost of Lodging:** | **Other Costs:** | **Other Costs:** |
| **Total Cost of Trip:** | **Source of Revenue:** | **Student Cost:** |

**Cost Checklist:**

_____ *Transportation*
_____ *Food*
_____ *Lodging*
_____ *Other*
$_____ *Total*

**Checklist:**

| | | |
|---|---|---|
| ____ Yes | ____ No | *Cafeteria Notified* |
| ____ Yes | ____ No | *Substitute Arranged* |
| ____ Yes | ____ No | *Master Calendar Notated* |
| ____ Yes | ____ No | *Plans Made for Non-Attendees* |
| ____ Yes | ____ No | *Tracphones needed* _____ *# of phones* |

**Signature of Person in Charge of the Field Trip:** _____

**Date of Signature:** 5/5/2025

# FIELD TRIP APPROVAL PROCESS

| | Approved | Not Approved | Date |
|---|---|---|---|
| Department Chair | | | 5/5/2025 |
| Principal | MK | | 5/5/2025 |
| Superintendent | | | 5/6/25 |
| Board of Education (For overnight, out-of-state trips) | | | |

**IN-STATE DAY TRIPS**
**OUT-OF-STATE DAY TRIPS**
**IN-STATE OVERNIGHT TRIPS**

**Approved by Principal**

**Approved by Superintendent**

**OUT-OF-STATE OVERNIGHT TRIPS**

**Approved by Principal**

**Approved by Superintendent**

**Approved by Board of Education**

## USE OF ALL STAR TRANSPORTATION

When the field trip is approved, the main office secretary will fax this form to All Star Transportation at (203) 263-0841.

Date of Trip: _____ Destination: _____

Departure Time: _____ Time to arrive at event: _____ Time to leave event: _____ Return Time: _____

Number of Students and Chaperones: _____ Number of Busses needed _____

Secretary's Signature: _____

**TEACHER IN CHARGE MUST EMAIL CATHERINE.GOODFIELD@ALL-STARTRANSPORTATION.COM, SHE WILL THEN RESPOND WITH A PRICE QUOTE AND ESTIMATED TIME AND MILEAGE OF EACH TRIP. ALSO, WHEN A FIELD TRIP IS CANCELED, THE PERSON IN CHARGE OF THE TRIP MUST NOTIFY THE TRANSPORTATION COMPANY.**

## Field Trip Permission Form Parent Section

Dear Parent or Guardian: A field trip has been planned involving your child. If you approve of your child's participation, please complete the following information.

Field Trip date: 10/26/25 - 11/1/2025 Destination: National FFA convention Indianapolis, IN

Mode of Transportation: TBD Cost to Student: TBD

Departure Time: TBD Return Time: TBD

Overnight: Yes X No____ (If yes, roommates will be assigned; students' requests will be considered.)

My son/daughter _____ has my permission to go on the described field trip. I give my permission for emergency medical care if the need should arise. The trip sponsor should know about the following medical conditions (if applicable):

_____.

Here is the emergency contact and any other additional medical information that may assist in caring for my son/daughter:

_____.

I understand that field trip arrangements are based on the number of students who choose to participate. Students may receive a refund if they cancel their reservations eight or more days before the field trip date. Refunds cannot be given after that time.

Parent Signature: _____ Date: _____

## Field Trip Permission Form Student Section

I understand that I am responsible for obtaining permission from teachers to attend this field trip. I am responsible for all work missed during this activity, making prior arrangements for missed tests and quizzes, obtaining class notes, and completing missed homework. I also understand that I am responsible to follow the rules established by the school and the organization hosting the field trip.

Student's Signature: _____ Date: _____

Principal's Signature: _____

The National FFA Convention Field Trip is an annual event for the agriculture department.

Teams can qualify through state competition through June 2025, which means that the trip details (i.e. cost, travel method, dates) cannot specifically be determined until June.

It is imperative that we know if we are allowed to go, and any stipulations that might be necessary, at this time so that we are able to plan this trip accordingly.

Cost is factored by determining the number of student teams who qualified, and doing a cost analysis between renting a Coach Bus or flying, and the length of the trip is also modified upon the results of the cost analysis.

The chapter through fundraising, and the Woodbury FFA Family Friends and Alumni group helps to offset these costs.

While at convention, student teams compete. While not competing, or for students who are attending as delegates of our officer team, students participate in community service events, student workshops to develop themselves as leaders or to find ideas to take back home to our chapter, and to make college and career connections through the agriculture college and career expo.

The convention itself is from Tuesday October 28 through Saturday November 1, with the additional days being devoted to travel and potential educational stops.

Final trip details will be submitted as soon as possible.