



---

# Park Hill School District

---

Building Successful Futures • Each Student • Every Day

## **High School Human Anatomy and Physiology Curriculum**

**Course Description:** Human Anatomy and Physiology explores the inner workings of the human body and focuses on anatomical and medical terminology. This course is the perfect foundation for students wanting to expand their vocabularies and learn about the body and its levels of organization, as well as the cooperation required between those levels. The text used in this course is written at the college level and should facilitate a smooth transition for students pursuing a postsecondary education. Students will round out the semester with a dissection unit where they observe structures closely analogous to the human body in a preserved adult cat. This dissection will focus on our primary units of study for the semester: histology, blood, the cardiovascular system, the skeletal system, the digestive system, and the reproductive system. Students will dissect, observe, and have hands on experience seeing what these systems look like in an actual specimen.

**Scope and Sequence:**

<b>Timeframe</b>	<b>Unit</b>	<b>Instructional Topics</b>
12-13 days	Language of Anatomy	Topic 1: Anatomy and Physiology Topic 2: Body Systems Topic 3: Language of Anatomy Topic 4: Homeostasis and Feedback
10 days	Histology	Topic 1: Epithelial Tissue Topic 2: Connective Tissue Topic 3: Muscle Tissue Topic 4: Neural Tissue
7 days	Blood	Topic 1: Composition of Blood Topic 2: Function of Blood Topic 3: Blood Disorders Topic 4: Homeostasis of Blood via Hemostasis and Hematopoiesis
8 days	Cardiovascular System	Topic 1: Parts of the Heart Topic 2: Pathway of Blood Topic 3: Electrical Currents of the Heart Topic 4: Heart Disease
15 days	Skeletal System	Topic 1: Appendicular and Axial Skeleton Topic 2: Classification and Structure of Bone Topic 3: Bone Identification
10 days	Digestive System	Topic 1: Accessory Structures vs. Alimentary Topic 2: Digestion of Macromolecules Topic 3: Microscopic Anatomy
10 days	Reproductive System	Topic 1: Sexual Development of a Fetus Topic 2: Male and Female Reproductive Anatomy Topic 3: Changes During Pregnancy

# Unit 1: Language of Anatomy

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Language of Anatomy

**Length of Unit:** 12-13 days

**Overview of Unit:** Students learn the jargon of anatomy in order to identify the regions of the body, the directional terms, and the cavities of the body. Students also are introduced to similarities and differences between anatomy and physiology, how they are related, and what differentiates the two.

## **Priority Standards for unit:**

- 1.12 Identify body planes, directional terms, cavities, and quadrants.
  - a. Body planes (sagittal, mid-sagittal, coronal/frontal, transverse/horizontal)
  - b. Directional terms (superior, inferior, anterior/ventral, posterior/dorsal, medial, lateral, proximal, distal, superficial, and deep)
  - c. Cavities (dorsal, cranial, spinal, thoracic, abdominal, and pelvic)
  - d. Quadrants (upper right, lower right, upper left, and lower left)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

## **Supporting Standards for unit:**

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- 9-12-LS1 -2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]

- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

<b>Unwrapped Concepts (Students need to know)</b>	<b>Unwrapped Skills (Students need to be able to do)</b>	<b>Bloom's Taxonomy Levels</b>	<b>Webb's DOK</b>
body planes	Identify	Remember	1
directional terms	Identify	Remember	1
cavities	Identify	Remember	1
quadrants	Identify	Remember	1
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. How are anatomy and physiology related and how are they separate as branches of science?
2. How is anatomical vocabulary used to describe locations of organs, direction on the body, as well as body regions and planes of dissection?
3. How does each body system work to maintain homeostasis (life) in the human body?
4. How do positive and negative feedback models control various conditions in the body necessary for life?

**Enduring Understanding/Big Ideas:**

1. Anatomy is the knowledge of the different structures in the body and physiology is the understanding of how those different parts work together in harmony to maintain homeostasis.
2. The body is divided into cavities, regions, and directions. Cavities are spaces in the body in which organs, tissues, and other structures reside. Regions are subdivisions of those cavities that further separate the organs of the body into systems and locations. Common language terms (distal/proximal, anterior/posterior, etc.) are used so that *all* professionals are speaking about the same regions of the body.
3. All of the organ systems work together to maintain homeostasis. For example, the nervous system is responsible for detecting changes to the body's status quo and sending signals to the different organ systems in order to correct the unwanted changes. When we

consume food, our blood sugar is raised after the digestive process begins. The nervous system detects this change and signals the endocrine system to release insulin.

4. Negative feedback is how the body maintains homeostasis. Our body has a ‘normal’ range for a wide variety of measurements and when the reading is off, the nervous system sends signals for the body to correct the change. For example, when we consume food, our blood sugar is raised after the digestive process begins. The nervous system detects this change and signals the endocrine system to release insulin.

**Unit Vocabulary:**

<b>Academic Cross-Curricular Words</b>	<b>Content/Domain Specific</b>
	<p style="text-align: center;"> Dorsal  Lateral  Proximal  Distal  Superior  Inferior  Anatomy  Physiology  Histology  Pathology  Complementarity  Tissues  Integumentary  Skeletal  Muscular  Nervous  Cardiovascular  Lymphatic  Respiratory  Digestive  Urinary  Reproductive  Homeostasis  Receptor  Effector  Positive Feedback  Negative Feedback  Anterior  Posterior </p>

	Medial Superficial Deep Axial Appendicular Sagittal Transverse Frontal Coronal Oblique Cranial Cavity Ventral Cavity Thoracic Plural Mediastinum Pericardial Abdominal
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Resources for Vocabulary Development:** Textbook and Online Resources

## Topic 1: Anatomy and Physiology

### **Engaging Experience 1**

**Title:** Anatomy and Physiology Case Studies

#### **Standards Addressed**

*Priority:*

- 1.12 Identify body planes, directional terms, cavities, and quadrants.
  - a. Body planes (sagittal, mid-sagittal, coronal/frontal, transverse/horizontal)
  - b. Directional terms (superior, inferior, anterior/ventral, posterior/dorsal, medial, lateral, proximal, distal, superficial, and deep)
  - c. Cavities (dorsal, cranial, spinal, thoracic, abdominal, and pelvic)
  - d. Quadrants (upper right, lower right, upper left, and lower left)

**Suggested Length of Time:** 20 minutes

**Detailed Description/Instructions:** Students are provided case study scenarios and they determine if the scientist is conducting an anatomical or physiological study.

**Bloom's Levels:** Understand

**Webb's DOK:** 2

## Topic 2: Body Systems



### **Engaging Experience 1**

**Title:** Body System Chart

**Suggested Length of Time:** 1 class period

### **Standards Addressed**

#### *Priority:*

- 1.12 Identify body planes, directional terms, cavities, and quadrants.
  - a. Body planes (sagittal, mid-sagittal, coronal/frontal, transverse/horizontal)
  - b. Directional terms (superior, inferior, anterior/ventral, posterior/dorsal, medial, lateral, proximal, distal, superficial, and deep)
  - c. Cavities (dorsal, cranial, spinal, thoracic, abdominal, and pelvic)
  - d. Quadrants (upper right, lower right, upper left, and lower left) *Supporting:*
- 1.13 Analyze basic structures and functions of human body systems

#### *Supporting:*

- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students are tasked to identify the function, location, and organs involved in each body system, then to re-enforce knowledge, they are asked to draw a picture.

**Bloom's Levels:** Create

**Webb's DOK:** 2



## Topic 3: Language of Anatomy

### **Engaging Experience 1**

**Title:** Simon Says

**Suggested Length of Time:** 30 minutes

### **Standards Addressed**

*Priority:*

- 1.12 Identify body planes, directional terms, cavities, and quadrants.
  - a. Body planes (sagittal, mid-sagittal, coronal/frontal, transverse/horizontal)
  - b. Directional terms (superior, inferior, anterior/ventral, posterior/dorsal, medial, lateral, proximal, distal, superficial, and deep)
  - c. Cavities (dorsal, cranial, spinal, thoracic, abdominal, and pelvic)
  - d. Quadrants (upper right, lower right, upper left, and lower left)

**Detailed Description/Instructions:** The classic childhood game of Simon Says, however instead of ‘Simon says touch your nose’, Simon might say ‘touch your Nasal Cavity’. Or ‘Simon says touch a body part inferior of your cervical region’. Play the game 3-4 times awarding prizes to whoever wins.

**Bloom’s Levels:** Apply

**Webb’s DOK:** 2

## Topic 4: Homeostasis & Feedback

### **Engaging Experience 1**

**Title:** Homeostatic Graph Analysis

**Suggested Length of Time:** 30 minutes

### **Standards Addressed**

#### *Priority:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

#### *Supporting:*

- 9-12-LS1 -2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]

**Detailed Description/Instructions:** Students are given data sets measuring different readings from a body, for example, blood glucose level over time. Students then analyze the graphs and try and determine if the data is demonstrative of a positive or negative feedback loop.

**Bloom's Levels:** Apply


**Webb's DOK:** 3

## Engaging Scenario

**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Veggisection - students will bring in a potato or apple and will give it anatomical direction by using craft materials to create arms, legs, and face. Students will create flags with various body regions (provided on paper) glued to toothpicks. They will place each flag in the correct location on their veggie. They will then complete a set of four surgical incisions in the correct region using the correct dissection planes. Each incision will be marked with a colored toothpick. The toothpick must also be projecting in the correct anatomical direction.

## Summary of Engaging Learning Experiences for Topics

<b>Topic</b>	<b>Engaging Experience Title</b>	<b>Description</b>	<b>Suggested Length of Time</b>
Anatomy and Physiology	Anatomy and Physiology Case Studies	Students are provided case study scenarios and they determine if the scientist is conducting an anatomical or physiological study.	20 minutes
Body Systems	Body System Chart 	Students are tasked to identify the function, location, and organs involved in each body system, then to re-enforce knowledge, they are asked to draw a picture.	1 class period
Language of Anatomy	Simon Says	The classic childhood game of Simon Says, however instead of ‘Simon says touch your nose’, Simon might say ‘touch your Nasal Cavity’. Or ‘Simon says touch a body part inferior of your cervical region’. Play the game 3-4 times awarding prizes to whoever wins.	30 minutes
Homeostasis and Feedback	Homeostatic Graph Analysis	Students are given data sets measuring different readings from a body, for example, blood glucose level over time. Students then analyze the graphs and try and determine if the data is demonstrative of a positive or negative feedback loop.	30 minutes

## Unit 2: Histology

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Histology

**Length of Unit:** 10 days

**Overview of Unit:** Students learn about anatomy at a microscopic level as the different types of tissues found in the body are explored. Students learn about the four major classifications of tissues and their many subsequent divisions. Finally, they will learn how the structure of each of these different classifications allows each cell and tissue type to perform the tasks required of them by the body and how those unique structural components allow that to occur.

### Priority Standards for unit:

- 1.11 Identify basic levels of organization of the human body.
  - a. Chemical
  - b. Cellular
  - c. Tissue
  - d. Organs
  - e. Systems
  - f. Organism
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

### Supporting Standards for unit:

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- 1.13 Analyze basic structures and functions of human body systems
  - c. Integumentary (layers, structures and functions of skin)
- 9-12-LS1 -2 Develop and use a model to illustrate the hierarchical organization of

interacting systems that provide specific functions within multicellular organisms.  
 [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]

- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

<b>Unwrapped Concepts (Students need to know)</b>	<b>Unwrapped Skills (Students need to be able to do)</b>	<b>Bloom's Taxonomy Levels</b>	<b>Webb's DOK</b>
basic levels of organization of the human body. a. Chemical b. Cellular c. <b><u>Tissue</u></b> d. Organs e. Systems f. Organism	Identify	Remember	1
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. How does the structure of an epithelium fit its function?
2. How is connective tissue categorized and what is the function of each category of CT?
3. How does muscle tissue vary by location and function?
4. How does nervous tissue serve as the fast-acting control center of the body?

**Enduring Understanding/Big Ideas:**

1. Epithelial tissue lines surfaces in or on the body. If the surface is an area that needs protection from chemicals or abrasion, the tissue must be stratified. If the epithelium is designed for filtration or permeability it will be simple
2. Connective tissue is divided into proper, supportive, and fluid. CT Proper can be loose or dense, and dense CT proper can be regular or irregular. The function of CT proper is to connect structures together and fill spaces between structure. Supportive CT is bone and

cartilage and functions to hold the body upright and protect internal organs. Fluid CT includes blood and lymph which serve as a highway to transport substances in the body.

3. Skeletal muscle is used to move the body and is attached to bones or other muscles. It is voluntarily controlled. Smooth muscle lines tubes and hollow organs and is not under our voluntary control. Cardiac muscle makes up the bulk of the heart. It is not voluntary and serves to pump blood into vessels.
4. Neural tissue sends signals with an electrochemical impulse. This impulse is used to cause immediate change in an organ or tissue.

**Unit Vocabulary:**

Academic Cross-Curricular Words	Content/Domain Specific
	<ol style="list-style-type: none"> <li>1. Epithelial</li> <li>2. Connective Tissue</li> <li>3. Muscle</li> <li>4. Neural</li> <li>5. Apical</li> <li>6. Basal</li> <li>7. Avascular</li> <li>8. Ennervated</li> <li>9. Squamous</li> <li>10. Cuboidal</li> <li>11. Columnar</li> <li>12. Simple Stratified</li> <li>13. Pseudostratified</li> <li>14. Cilia</li> <li>15. Transitional</li> <li>16. Cutaneous</li> <li>17. Mucus Membrane</li> <li>18. Serous</li> <li>19. Endothelium</li> <li>20. Mesothelium</li> <li>21. Endocrine</li> <li>22. Exocrine</li> <li>23. Connective Tissue Proper</li> <li>24. Mesenchyme</li> <li>25. Fibroblast</li> <li>26. Chondroblast</li> <li>27. Ground Substance</li> <li>28. Extracellular Matrix</li> </ol>

	<ul style="list-style-type: none"><li>29. Collagen Fibers</li><li>30. Elastic Fibers</li><li>31. Reticular Fibers</li><li>32. Fluid Connective Tissue</li><li>33. Cartilage</li><li>34. Aeroelar</li><li>35. Adipose</li><li>36. Reticular</li><li>37. Stroma</li><li>38. Tendon</li><li>39. Ligament</li><li>40. Aponeurosis</li><li>41. Chondrocyte</li><li>42. Hyaline</li><li>43. Fibrocartilage</li><li>44. Lymph</li><li>45. Striated</li><li>46. Smooth</li><li>47. Voluntary Muscle</li><li>48. Involuntary Muscle</li><li>49. Intercalated Discs</li><li>50. Inflammatory</li></ul>
--	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Resources for Vocabulary Development:** Textbook and Online Resources



## Topic 1: Epithelial Tissue

### **Engaging Experience 1**

**Title:** Review Kahoot

**Suggested Length of Time:** 30 minutes

### **Standards Addressed**

*Priority:*

- 1.11 Identify basic levels of organization of the human body.
  - a. Chemical
  - b. Cellular
  - c. **Tissue**
  - d. Organs
  - e. Systems
  - f. Organism

*Supporting:*

- 1.13 Analyze basic structures and functions of human body systems
  - c. Integumentary (layers, structures and functions of skin)

**Detailed Description/Instructions:** Students will play a review game via the website Kahoot about the different types of epithelial tissues. The online formatting is an interactive way for the students to answer difficult questions about the variety of epithelial tissue classifications, structures, and locations.

**Bloom's Levels:** Remember

**Webb's DOK:** 1

## Topic 2: Connective Tissue



### **Engaging Experience 1**

**Title:** Connective Tissue Concept Mapping

**Suggested Length of Time:** ½ class period

#### **Standards Addressed**

*Priority:*

- 1.11 Identify basic levels of organization of the human body.
  - a. Chemical
  - b. **Cellular**
  - c. **Tissue**
  - d. Organs
  - e. **Systems**
  - f. Organism

**Detailed Description/Instructions:** Students will be asked to collaborate with their group to create a graphic organizer to help them keep track of which types of tissues belong in which categories. Their graphic organizer will include illustrations, locations, and descriptions of the variety of connective tissues.

**Bloom's Levels:** Create

**Webb's DOK:** 2

## Topic 3: Muscle Tissue

### **Engaging Experience 1**

**Title:** Exercise Examples

**Suggested Length of Time:** ½ class period

### **Standards Addressed**

*Priority:*

- 1.11 Identify basic levels of organization of the human body.
  - a. Chemical
  - b. Cellular
  - c. **Tissue**
  - d. Organs
  - e. Systems
  - f. Organism

**Detailed Description/Instructions:** Students will be asked to perform a variety of in-class exercises, such as jumping jacks, and then asked which muscle systems are utilized, whether or not those muscles are voluntary or involuntary, as well as smooth, cardiac, or skeletal.

**Bloom's Levels:** Apply

**Webb's DOK:** 2

## Topic 4: Neural Tissue



### **Engaging Experience 1**

**Title:** Neural Tissue Homeostasis Analysis

**Suggested Length of Time:** 1 class period

#### **Standards Addressed**

*Priority:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

*Supportive:*

- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

**Detailed Description/Instructions:** Students will utilize their knowledge of neural tissue and perform research on neurological disorders in which that tissue has become damaged. They will research how the body tries to counteract that damage through homeostasis, and then what still goes wrong to cause the disease.

**Bloom's Levels:** Evaluate


**Webb's DOK:** 3

## Engaging Scenario

**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

**Histology Microscopy:** Students will spend 1-2 days looking at prepared microscope slides that cover all of the variety of tissues learned in the units. Students will have 5-6 slides of different classifications of epithelial tissue, 6-7 slides of different connective tissues, 3-4 slides for muscle tissues, 2 slides for osseous tissue, and a slide for nervous tissues. They will be required, with their partner, to draw and label the major structural characteristics for each type of tissue. On the 3rd day, a lab practical will be set up where students will go to different microscopes and be asked to identify what type of tissue they are looking at.

## Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Epithelial Tissue	Review Kahoot	Students will play a review game via the website Kahoot about the different types of epithelial tissues. The online formatting is an interactive way for the students to answer difficult questions about the variety of epithelial tissue classifications, structures, and locations.	30 minutes
Connective Tissue	Connective Tissue Concept Mapping 	Students will be asked to collaborate with their group to create a graphic organizer to help them keep track of which types of tissues belong in which categories. Their graphic organizer will include illustrations, locations, and descriptions of the variety of connective tissues.	½ class period
Muscle Tissue	Exercise Examples	Students will be asked to perform a variety of in-class exercises, such as jumping jacks, and then asked which muscle systems are utilized, whether or not those muscles are voluntary or involuntary, as well as smooth, cardiac, or skeletal.	½ class period
Neural Tissue	Neural Tissue Homeostasis Analysis	Students will utilize their knowledge of neural tissue and perform research on neurological disorders in which that tissue has become damaged. They will research how the body tries to counteract that damage through homeostasis, and then what still goes wrong to cause the disease.	1 class period

## Unit 3: Blood

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Blood

**Length of Unit:** 7 days

**Overview of Unit:** Students learn the general composition and functionality of blood and then explore a much more detailed look at the major components of blood: erythrocytes, leukocytes, and thrombocytes. They will learn how these ‘formed elements’ are created, function in the body, and the variety of structural differences between these cells. They will also learn practical, applicable knowledge as different blood disorders are learned and the medical science behind blood typing and transfusions are examined.

### **Priority Standards for unit:**

- 1.13 Analyze basic structures and functions of human body systems
  - d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

### **Supporting Standards for unit:**

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - e. Lymphatic (structures and functions of lymphatic system, movement of lymph fluid)
- 1.13 Analyze basic structures and functions of human body systems
  - f. Respiratory (structures and functions of respiratory system, physiology of respiration)

- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- 9-12-LS1 -2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]
- TT.AB.I.3: Students will recognize that peoples’ multiple identities interact and create unique and complex individuals.
- TT.AB.D.8: Students will respectfully express curiosity about the history and lived experiences of others and will exchange ideas and beliefs in an open-minded way.

<b>Unwrapped Concepts (Students need to know)</b>	<b>Unwrapped Skills (Students need to be able to do)</b>	<b>Bloom’s Taxonomy Levels</b>	<b>Webb’s DOK</b>
Analyze basic structures and functions of human body systems: Cardiovascular ( <b>components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle</b> )	Analyze	Analyze	4
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. What are the composition and components found in the blood and why is it necessary for each of these components to exist in order for blood to be functional?
2. How do those components of blood provide functionality?
3. How are blood disorders caused and what is happening on a cellular level to initiate those disorders?
4. How are new blood cells created and how does the body know when it is appropriate to create more blood cells and/or destroy old ones?
5. What are the different blood types and why is it critical to understand how those blood types function in regards to organ transplants and/or giving or receiving blood donations?



**Enduring Understanding/Big Ideas:**

1. Blood is composed of plasma and formed elements. Those formed elements are red blood cells, white blood cells, and platelets. Each different cell type plays a role in the variety of functions that blood is responsible for. For example, our blood is necessary to move oxygen and carbon dioxide into and out of the body. Developmental natural selection has shaped red blood cells to be a hyper-efficient vesicle for this purpose.
2. Blood has three main functions: 1) Regulatory - blood helps to regulate body temperature, liquid content, and other factors of the body; 2) Protective - our blood has self-defense against losing blood (by forming clots) and against foreign entities (by developing an immune system, and 3) Distributive - blood is one of the only organs in the body that is mobile, and as such, it has the role of distributing nutrients, gases, waste, and hormones throughout the body.
3. Blood disorders are caused because one of the formed elements are not functioning properly as a result of a genetic mutation, a genetic condition, or environmental factors. Anemia is the most common of these and is caused when our red blood cells have been altered to the point where they cannot distribute oxygen properly.
4. New blood cells are created when a hormone called erythropoetin (EPO) is released by the kidney. EPO stimulates the red bone marrow to release blood stem cells, which undergo a specific pathway to differentiate into immature red blood cells.
5. The 4 major blood types are A, B, AB, and O. They are inherited in a Codominant Fashion - A and B are dominant to type O, but codominant with each other. These blood types are caused by different membrane proteins on the red blood cells that helps to identify the cells to the immune systems of the body. Blood type can also be due to the presence of the Rh member protein. People with this antigen are considered positive, and people lacking it are considered negative.

**Unit Vocabulary:**

Academic Cross-Curricular Words	Content/Domain Specific
	<ol style="list-style-type: none"><li>1. Hematocrit</li><li>2. Erythrocytes</li><li>3. Thrombocytes</li><li>4. Leukocytes</li><li>5. Plasma</li><li>6. Hemoglobin</li><li>7. Anucluate</li><li>8. Neutrophil</li><li>9. Basophil</li><li>10. Eosinophil</li><li>11. Megakaryocyte</li></ol>

	<ol style="list-style-type: none"><li>12. Hemostasis</li><li>13. Erythropoiesis</li><li>14. Erythropoietin</li><li>15. Anemia</li><li>16. Hemorrhage</li><li>17. Hemolytic</li><li>18. Pernicious</li><li>19. Sickle Cell</li><li>20. Leukemia</li><li>21. Vascular Spasm</li><li>22. Platelet Plug</li><li>23. Coagulation</li><li>24. Fibrinogen</li><li>25. Fibrin</li><li>26. Thrombin</li><li>27. Embolysm</li><li>28. Thrombus</li><li>29. Hemophelia</li><li>30. Antigen</li><li>31. Antibody</li><li>32. Agglutination</li></ol>
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Resources for Vocabulary Development:** Textbook and Online Resources

## Topic 1: Composition of Blood



### **Engaging Experience 1**

**Title:** Composition of Blood Virtual Lab

**Suggested Length of Time:** 1 class period

#### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems  
d. Cardiovascular (**components of blood**, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)

*Supportive:*

- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

**Detailed Description/Instructions:** Students will access a virtual lab of the components of blood. They will interact with the program so that they ‘draw’ virtual blood, spin it in a centrifuge, analyze the components and look at them at a microscopic level to prepare them for the rest of the unit.

**Bloom’s Levels:** Understand

**Webb’s DOK:** 2

## Topic 2: Function of Blood



### **Engaging Experience 1**

**Title:** Blood Function Analogies

**Suggested Length of Time:** 1 class period

#### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems  
d. Cardiovascular (**components of blood**, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)

*Supportive:*

- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students will look at the three functions of blood (protection, regulation, distribution) and come up with an analogy for each “the white blood cells in the blood protect from infection just like \_\_\_\_\_”, etc. They will then make a poster with all three of the analogies including an illustration.

**Bloom’s Levels:** Create

**Webb’s DOK:** 1

## Topic 3: Blood Disorders

### **Engaging Experience 1**

**Title:** Blood Doping Articles

**Suggested Length of Time:** ½ class period

### **Standards Addressed**

#### *Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - d. Cardiovascular (components of blood, **structures and functions of blood components**, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

#### *Supporting:*

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- TT.AB.I.3: Students will recognize that peoples' multiple identities interact and create unique and complex individuals.
- TT.AB.D.8: Students will respectfully express curiosity about the history and lived experiences of others and will exchange ideas and beliefs in an open-minded way.

**Detailed Description/Instructions:** Students will be presented with two articles about a blood doping scandal in the Tour de France from 2010. This event saw over 50 riders get caught abusing the homeostasis controlling hormone erythropoetin. Students will learn about what physiological advantage these athletes sought, why it was dangerous, and how they got caught and write a paper about what they learned.

**Bloom's Levels:** Analyze

**Webb's DOK:** 2

## Topic 4: Homeostasis of Blood via Hemostasis and Hematopoiesis



### **Engaging Experience 1**

**Title:** Hematopoiesis Dance

**Suggested Length of Time:** 20 minutes

### **Standards Addressed**

*Priority:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

**Detailed Description/Instructions:** After learning the very intricate and detailed process of hemostasis (the creation of new red blood cells), students will be taught a ‘dance’ that choreographs movement that roughly mimics each of the 7 steps of the process. Students will then be asked to look up the names of the cells in each stage of the process and be asked to recreate the dance, but with them saying the names of each cell along the way.

**Bloom’s Levels:** Remember

**Webb’s DOK:** 1

## Topic 5: Blood Typing

### **Engaging Experience 1**

**Title:** Blood Typing Lab

**Suggested Length of Time:** 1 class period

### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - d. Cardiovascular (**components of blood, structures and functions of blood components**, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)

**Detailed Description/Instructions:** Students will be given simulated blood with antigens and simulated antibodies. They will be given a prompt of instruction to walk them through a variety of interactions. Through this, students will gain a better understanding of agglutination and begin to understand why blood typing is so critical for transfusions and matching organ donors.

**Bloom's Levels:** Apply

**Webb's DOK:** 2

## Engaging Scenario




**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

**Who's Your Daddy?** This lab activity places the students in the role of a doctor or nurse at a hospital where a newborn baby has just been delivered. The father thinks it does not look like him, and suspects infidelity. It is tasked to the hospital staff to take blood samples from all 3 individuals and try and work out if the father at the hospital indeed fathered the child.

Students will need to incorporate all of the knowledge they have accumulated from this unit - they must know the components of blood so they know which parts of the collected blood samples to analyze, how blood typing works based upon the structure of an erythrocyte, the genetic inheritance patterns of blood typing, and mathematical expressions for how to relate the probability that the child does or does not belong to the father.



## Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Composition of Blood	Composition of Blood Virtual Lab 	Students will access a virtual lab of the components of blood. They will interact with the program so that they ‘draw’ virtual blood, spin it in a centrifuge, analyze the components and look at them at a microscopic level to prepare them for the rest of the unit.	1 class period
Function of Blood	Blood Function Analogies 	Students will look at the three functions of blood (protection, regulation, distribution) and come up with an analogy for each “the white blood cells in the blood protect from infection just like _____”, etc. They will then make a poster with all three of the analogies including an illustration.	1 class period
Blood Disorders	Blood Doping Articles	Students will be presented with two articles about a blood doping scandal in the Tour de France from 2010. This event saw over 50 riders get caught abusing the homeostasis controlling hormone erythropoetin. Students will learn about what physiological advantage these athletes sought, why it was dangerous, and how they got caught and write a paper about what they learned.	½ class period
Homeostasis of Blood via Hemostasis and Hematopoiesis	Hematopoiesis Dance 	After learning the very intricate and detailed process of hemostasis (the creation of new red blood cells), students will be taught a ‘dance’ that choreographs movement that roughly mimics each of the 7 steps of the process. Students will then be asked to look up the names of the cells in each stage of the process and be asked to recreate the dance, but with them saying the names of each cell along the way.	20 minutes

## Unit 4: Cardiovascular System

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Cardiovascular System

**Length of Unit:** 8 days

**Overview of Unit:** Students begin this unit by learning about the anatomy of the heart and learning the names of all of the major chambers, valves, and vessels. They will then take that knowledge and apply it to learning how those components help blood cycle through the body and how that cycle is controlled by an electrical impulse generated inside of the heart. Finally, they will learn the variety of disorders and diseases that a person with an unhealthy heart might be exposed to.

### **Priority Standards for unit:**

- 1.13 Analyze basic structures and functions of human body systems
  - d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

### **Supporting Standards for unit:**

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- 1.13 Analyze basic structures and functions of human body systems
  - e. Lymphatic (structures and functions of lymphatic system, movement of lymph fluid)
- 1.13 Analyze basic structures and functions of human body systems

- f. Respiratory (structures and functions of respiratory system, physiology of respiration)
- 9-12-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]
  - ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
  - ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

<b>Unwrapped Concepts (Students need to know)</b>	<b>Unwrapped Skills (Students need to be able to do)</b>	<b>Bloom's Taxonomy Levels</b>	<b>Webb's DOK</b>
Analyze basic structures and functions of human body systems Cardiovascular (components of blood, structures and functions of blood components, structures and functions <b>of the cardiovascular system, conduction system of the heart, cardiac cycle)</b>	Analyze	Analyze	4
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. How do atria and ventricles differ in function and what are the major chambers and valves in the heart?
2. Why are their two pathways of blood flow out of the heart and to where do they travel?
3. How does the electric impulse generated at the sinoatrial node travel through the rest of the heart?
4. How does atherosclerosis lead to heart attacks?

**Enduring Understanding/Big Ideas:**

1. Atria are the receiving chambers of the heart and ventricles expel blood from the heart. They are named right or left depending on their location in the heart. The tricuspid valve separates the right atrium from the right ventricle to prevent the backflow of blood. The bicuspid valve separates the left atrium from the left ventricle and also prevents backflow. Semilunar valves are at the bottom of the aorta and pulmonary artery and prevent blood from flowing back into the ventricles.
2. The systemic pathway sends oxygen rich blood to the entire body and back to the heart. The pulmonary pathway is necessary to take oxygen depleted blood to the lungs and back.
3. After the sinoatrial node fires, there is a pause in the impulse at the atrioventricular node to allow the atria to finish contracting. From there the impulse travels through the AV bundle and its branches, terminating in purkinje fibers which innervate and allow the ventricles to contract.
4. Build up of fatty plaques on artery walls can cause the delicate endothelium to rupture. This condition is exacerbated by high blood pressure. When the endothelium ruptures it causes an unwanted clot to form, blocking the blood supply to the heart muscle, resulting in a myocardial infarction.

**Unit Vocabulary:**

<b>Academic Cross-Curricular Words</b>	<b>Content/Domain Specific</b>
	<ol style="list-style-type: none"><li>1. Pericardium</li><li>2. Myocardium</li><li>3. Endocardium</li><li>4. Right Atrium</li><li>5. Bicuspid Valve</li><li>6. Right Ventricle</li><li>7. Pulmonary Semilunar Valve</li><li>8. Pulmonary Vein</li><li>9. Left Atrium</li><li>10. Tricuspid Valve</li><li>11. Left Ventricle</li><li>12. Aortic Semilunar Valve</li><li>13. Superior Vena Cava</li><li>14. Inferior Vena Cava</li><li>15. Chordae Tendinae</li><li>16. Pulmonary</li><li>17. Systemic</li><li>18. Systole</li></ol>

	<p>19. Diastole 20. Arterial Capillary 21. Coronary Artery 22. Infarct 23. Angioplasty 24. Conduction System 25. AV Node 26. SA Node 27. AV Bundle 28. Bundle of His 29. Purkinje Fibers 30. Apex 31. Fibrillation</p>
--	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Resources for Vocabulary Development:** Textbook and Online Resources

## Topic 1: Structure and Function of the Heart

### **Engaging Experience 1**

**Title:** Heart Shaped Box

**Suggested Length of Time:** ½ class period

### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)

*Supporting:*

- 9-12-LS1 -2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]

**Detailed Description/Instructions:** Students will create a paper ‘heart’ with four boxes simulating the 4 chambers of the heart. As we progress through the unit, students will include red arrows for pathway of blood and yellow arrows for tracking the electrical current.

**Bloom’s Levels:** Create

**Webb’s DOK:** 1

## Topic 2: Pathway of Blood



### **Engaging Experience 1**

**Title:** Hand puppets of the Heart

**Suggested Length of Time:** 30 minutes



### **Standards Addressed**

#### *Priority:*

- 1.13 Analyze basic structures and functions of human body systems  
d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, conduction system of the heart, cardiac cycle)

#### *Supporting:*

- 9-12-LS1 -2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. [Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.]
- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students will be shown how they can keep track of the pathway of blood as it flows through the heart using only their hands. After they are shown, students will be asked to partner with somebody and rehearse their hand puppet performance until they are comfortable presenting to the class.

**Bloom's Levels:** Remember

**Webb's DOK:** 1

## Topic 3: Conduction System



### **Engaging Experience 1**

**Title:** Conduction Review Games

**Suggested Length of Time:** 1 class period

#### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems  
d. Cardiovascular (components of blood, structures and functions of blood components, structures and functions of the cardiovascular system, **conduction system of the heart**, cardiac cycle)

*Supportive:*

- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students will break up into groups of 3-5 and be tasked with creating a review game about the conduction system of the heart. Only 1 group will be allowed to use each platform (for example, only 1 group would be allowed to use 'Kahoot'). Students will spend the first half of class researching and creating their game, and then the second half of class playing each other's games.

**Bloom's Levels:** Create

**Webb's DOK:** 3



## Topic 4: Heart Disease



### **Engaging Experience 1**

**Title:** Heart Disease Presentation

**Suggested Length of Time:** 2 class periods

### **Standards Addressed**

*Priority:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

*Supporting:*

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students will be given 1 day to pick one of the numerous heart conditions that exist and research them. The next day they will give a 2-3-minute audio-visual presentation about their disease making sure to place an emphasis on how the disease is caused at a cellular / tissue level, and what can be done to treat/prevent it as well as whether or not the disease is caused by environmental factors or genetic conditions.

**Bloom's Levels:** Create

**Webb's DOK:** 3




## Engaging Scenario

**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

**Blood Pressure / Heart Rate Lab:** Students will be given 1 day to complete this lab exploration into the physiological changes that occur to the cardiovascular system before, during, and after exercise. Students will take their heart rate and blood pressure readings using the appropriate instruments before the lab begins, after completing a 5-minute exercise, and 10 minutes after they have finished their exercise.

Using their knowledge of blood from the last unit, and their knowledge of the parts of the heart, pathway of blood, and heart disease, they will try and analyze patterns in their data and compare that to what a stereotypical data set for a 'healthy' heart would look like. They will finally be tasked with writing up what happens on a physiological level before, during, and after exercise.

## Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Parts of the Heart	Heart Shaped Box	Students will create a paper 'heart' with four boxes simulating the 4 chambers of the heart. As we progress through the unit, students will include red arrows for pathway of blood and yellow arrows for tracking the electrical current.	½ class period
Pathway of Blood	Hand puppets of the Heart 	Students will be shown how they can keep track of the pathway of blood as it flows through the heart using only their hands. After they are shown, students will be asked to partner with somebody and rehearse their hand puppet performance until they are comfortable presenting to the class.	30 minutes
Electrical Currents of the Heart	Conduction Review Games 	Students will break up into groups of 3-5 and be tasked with creating a review game about the conduction system of the heart. Only 1 group will be allowed to use each platform (for example, only 1 group would be allowed to use 'Kahoot'). Students will spend the first half of class researching and creating their game, and then the second half of class playing each other's games.	1 class period
Heart Disease	Heart Disease Presentation 	Students will be given 1 day to pick one of the numerous heart conditions that exist and research them. The next day they will give a 2-3-minute audio-visual presentation about their disease making sure to place an emphasis on how the disease is caused at a cellular / tissue level, and what can be done to treat/prevent it as well as whether or not the disease is caused by environmental factors or genetic conditions.	2 class periods

## Unit 5: Skeletal System

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Skeletal System

**Length of Unit:** 15 days

**Overview of Unit:** Students begin this unit by learning about the structure, classification, and functionality of the different types of bones found in the body. The unit culminates with an in depth study of all of the major bones of the body. Students will learn to identify these different bones based upon the variety of markings and shapes of the bones.

### **Priority Standards for unit:**

- 1.13 Analyze basic structures and functions of human body systems
  - a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

### **Supporting Standards for unit:**

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- TT.AB.I.3: Students will recognize that peoples' multiple identities interact and create unique and complex individuals.
- TT.AB.D.8: Students will respectfully express curiosity about the history and lived experiences of others and will exchange ideas and beliefs in an open-minded way.

<b>Unwrapped Concepts (Students need to know)</b>	<b>Unwrapped Skills (Students need to be able to do)</b>	<b>Bloom's Taxonomy Levels</b>	<b>Webb's DOK</b>
basic structures and functions of human body systems a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)	Analyze	Analyze	3
Analyze basic structures and functions of human body systems b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of skeletal muscles, functions of muscles, tendons, directional movements)	Analyze	Analyze	3
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. How do the axial and appendicular skeletons have similarities and differences? How do these similarities and differences allow them to perform the functions required of the skeletal system?
2. How are bones classified and how are the structures of these bones similar and different?
3. How are the bones in our body named, oriented, and located?
4. Why are there so many different ways that someone can fracture a bone?

**Enduring Understanding/Big Ideas:**

1. The axial skeleton is the trunk of our body, the main purpose for this skeleton system is to protect the underlying organs of the head, abdomen, and thorax. The appendicular skeleton's purpose is to allow our body a range of motion so that movement is possible.
2. Bones are classified either as long, short, irregular, or flat. The structure of these bones is dependent on the function required of them. For example, the bones in the skull are mostly flat bones to provide a nearly solid layer of protection for the brain from the outside environment.

3. Bones in our body are named based upon the location of the bone, and usually originate from a Greek or Latin word origin. There are 206 bones in the body with 83 unique names.
4. Bones can fracture in any number of ways based upon what type of bone is being fractured, the age and health of the person whose bone it is, and the type and strength of the force being placed upon these bones. These different factors can cause a variety of different fractures that medical professionals (and anatomy students) are trained to recognize and diagnose.

**Unit Vocabulary:**

<b>Academic Cross-Curricular Words</b>	<b>Content/Domain Specific</b>
	<ol style="list-style-type: none"> <li>1. Diaphesis</li> <li>2. Epiphyseal Plate</li> <li>3. Epiphysis</li> <li>4. Red Marrow</li> <li>5. Yellow Marrow</li> <li>6. Hematopoiesis</li> <li>7. Long Bone</li> <li>8. Short Bone</li> <li>9. Flat Bone</li> <li>10. Irregular Bone</li> <li>11. Foramen</li> <li>12. Fossa</li> <li>13. Compact</li> <li>14. Spongy</li> <li>15. Trabeculae</li> <li>16. Axial</li> <li>17. Appendicular</li> <li>18. Cranium</li> <li>19. Parietal</li> <li>20. Temporal</li> <li>21. Occipital</li> <li>22. Frontal</li> <li>23. Sphenoid</li> <li>24. Ethmoid</li> <li>25. Zygomatic</li> <li>26. Maxilla</li> <li>27. Mandible</li> <li>28. Vomer</li> </ol>

	<p>29. Conchae  30. Fontinel  31. Suture  32. Lambdoidal Suture  33. Sinus  34. Hyoid  35. Dumb Bone  36. Vertebrae  37. Cervical  38. Thoracic  39. Lumbar  40. Femur  41. Tibia  42. Fibula  43. Scapula  44. Clavicle  45. Digits  46. Sternum  47. Humerus  48. Pubis  49. Ilium  50. Ischium  51. Ulna  52. Radius  53. Pollex  54. Hallux  55. Phallanges  56. Patella  57. Calcaneus  58. Talus  59. Tarsal  60. Metatarsal  61. Carpals  62. Metacarpals  63. Lordosis  64. Scholosis</p>
--	-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Resources for Vocabulary Development:** Textbook and Online Resources

## Topic 1: Appendicular and Axial Skeleton

### **Engaging Experience 1**

**Title:** Compare and contrast graphic organizer

**Suggested Length of Time:** 20 minutes

### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
  - b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of skeletal muscles, functions of muscles, tendons, directional movements)

**Detailed Description/Instructions:** Students will use a Venn Diagram (or similar organizer of choice) to compare and contrast the functions, bone categories and structures of the bones of the axial vs appendicular skeleton

**Bloom's Levels:** Analyze

**Webb's DOK:** 3



## Topic 2: Classification and Structure of Bone

### **Engaging Experience 1**

**Title:** Bone sort race

**Suggested Length of Time:** 30 minutes

#### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)
- 1.13 Analyze basic structures and functions of human body systems
  - b. Muscular (microscopic anatomy of muscle tissue, types of muscle, locations of
- TT.AB.I.3: Students will recognize that peoples' multiple identities interact and create unique and complex individuals.
- TT.AB.D.8: Students will respectfully express curiosity about the history and lived experiences of others and will exchange ideas and beliefs in an open-minded way.

**Detailed Description/Instructions:** Students are divided into lab groups. Each group is given a set of bones and a set of four notecards. They are not allowed to open their bone box until the teacher says "go". At this point students will open their bone set and place all of the bones under the corresponding notecard category. The first group to finish and be completely correct wins.

**Bloom's Levels:** Analyze

**Webb's DOK:** 3

### **Engaging Experience 2**

**Title:** Bone remodeling diagram

**Suggested Length of Time:** 30 minutes

#### **Standards Addressed**

*Priority:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

*Supporting:*

- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)

**Detailed Description/Instructions:** Students will illustrate a balance model demonstrating the negative feedback control mechanism for maintaining blood calcium level. The model must include the hormones used and the control center, receptor and effector in this situation.

**Bloom's Levels:** Create, Analyze

**Webb's DOK:** 2, 3

## Topic 3: Bone Identification

### **Engaging Experience 1**

**Title:** Bone Practical Practice

**Suggested Length of Time:** 1 class period

### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - a. Skeletal (bone anatomy, axial and appendicular skeletal bones, functions of bones, ligaments, types of joints)

**Detailed Description/Instructions:** Students will pair up and practice identifying and classifying bones from the bone set. They will do a practice practical to check for understanding and grade their own mock test. This score gets recorded in the virtual notebook. They will resort the bone set to include only the bones they missed and make a second attempt. They make take the entire practical again and track their learning in their virtual notebooks.

**Bloom's Levels:** Analyze

**Webb's DOK:** 3

## Engaging Scenario



**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

**Life-Sized Skeleton:** Throughout the unit students will illustrate a full-sized human skeleton on butcher paper. The part of the skeleton illustrated will be the portion covered in lecture each day. Students need to draw and outline each bone, as well as label the bone name and any important bone markings mentioned in notes. At the end of the unit, the skeleton should be complete. After test day students will post their skeletons for peer grading (accuracy). There is an extra credit contest gallery walk for extra credit. Two or three classes come vote on their top two favorites. First, Second and Third places are awarded.

## Summary of Engaging Learning Experiences for Topics

<b>Topic</b>	<b>Engaging Experience Title</b>	<b>Description</b>	<b>Suggested Length of Time</b>
Appendicular and Axial Skeleton	Compare and contrast graphic organizer	Students will use a Venn Diagram (or similar organizer of choice) to compare and contrast the functions, bone categories and structures of the bones of the axial vs appendicular skeleton	20 minutes
Classification and Structure of Bone	Bone sort race	Students are divided into lab groups. Each group is given a set of bones and a set of four notecards. They are not allowed to open their bone box until the teacher says “go”. At this point students will open their bone set and place all of the bones under the corresponding notecard category. The first group to finish and be completely correct wins.	30 minutes
Classification and Structure of Bone	Bone remodeling diagram	Students will illustrate a balance model demonstrating the negative feedback control mechanism for maintaining blood calcium level. The model must include the hormones used and the control center, receptor and effector in this situation.	30 minutes
Bone Identification	Bone Practical Practice	Students will pair up and practice identifying and classifying bones from the bone set. They will do a practice practical to check for understanding and grade their own mock test. This score gets recorded in the virtual notebook. They will resort the bone set to include only the bones they missed and make a second attempt. They make take the entire practical again and track their learning in their virtual notebooks.	1 class period

## Unit 6: Digestive System

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Digestive System

**Length of Unit:** 10 days

**Overview of Unit:** The digestive unit has the students track what happens to food as they eat it by exploring the alimentary canal of the digestive system. As they learn about the organs directly involved with the extraction of nutrients from food, they will also learn the anatomy and physiology of the accessory digestive organs, which do not play a major role in food digestion, but play a crucial role at various times of the process.

**Priority Standards for unit:**

- 1.13 Analyze basic structures and functions of human body systems
  - j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

**Supporting Standards for unit:**

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)

Unwrapped Concepts (Students need to know)	Unwrapped Skills (Students need to be able to do)	Bloom's Taxonomy Levels	Webb's DOK
basic structures and functions of human body systems j. Digestive (structures and functions of gastrointestinal tract,	Analyze	Analyze	3

chemical and mechanical digestion, structures and functions of accessory organs)			
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. How do accessory organs differ from organs making up the alimentary canal?
2. How does each organ contribute to the digestion of the 4 major categories of biological macromolecules (carbohydrates, proteins, lipids, and nucleic acids)?
3. How is the digestive system specialized at the microscopic level to aid in breaking down and absorbing food?

**Enduring Understanding/Big Ideas:**

1. Accessory organs (salivary glands, liver, gallbladder, and pancreas) secrete substances that aid in digestion. The organs of the alimentary canal (mouth, esophagus, stomach, small intestine, large intestine) form a continuous pathway for food to travel through the body.
2. Carbohydrates begin digestion in the mouth when the salivary glands secrete the enzyme amylase. In the stomach, enzymes and HCl begin the digestion of protein. The pancreas secretes all categories of enzymes necessary to break down the four macromolecules. Bile from the liver is required to emulsify fat.
3. Gastric pits in the stomach contain cells that secrete HCl, pepsinogen, mucus, and hormones that control digestion. Villi in the small intestine are lined with columnar cells that contain microvilli at their surface to maximize surface area for absorption.

**Unit Vocabulary:**

Academic Cross-Curricular Words	Content/Domain Specific
	<ol style="list-style-type: none"> <li>1. Alimentary</li> <li>2. Mouth</li> <li>3. Pharynx</li> <li>4. Esophagus</li> <li>5. Stomach</li> </ol>

6. Duodenum
7. Jejunum
8. Ileum
9. Colon
10. Cecum
11. Appendix
12. Rectum
13. Anus
14. Sphincter
15. Gall Bladder
16. Salivary Glands
17. Liver
18. Pancreas
19. Ingestion
20. Propulsion
21. Peristalsis
22. Mechanical Digestion
23. Chemical Digestion
24. Mucosa
25. Submucosa
26. Muscularis Externa
27. Serosa
28. Mesentery
29. Peritoneum
30. Bolus
31. Chyme
32. Frenulum
33. Ankyloglossia
34. Amylase
35. Segmentation
36. Gastroesophageal Sphincter
37. Pepsin
38. Intrinsic Factor
39. Pylorus
40. Omentum
41. Rugae
42. Ulcer
43. Villi
44. Microvilli
45. Lacteal



	46. Bile 47. Emulsify 48. Hepatopancreatic Sphincter 49. Cirrohsis 50. Jaundice 51. Lipase 52. Nuclease
--	---------------------------------------------------------------------------------------------------------------------------

**Resources for Vocabulary Development:** Textbook and Online Resources

## Topic 1: Accessory Structures vs. the Alimentary Canal

### **Engaging Experience 1**

**Title:** Trash Bag Illustration

**Suggested Length of Time:** ½ class period

### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)

**Detailed Description/Instructions:** Students wear a trash bag and illustrate the location of the alimentary canal and show where accessory structures contribute enzymes for digestion.

**Bloom's Levels:** Analyze

**Webb's DOK:** 3

## Topic 2: Digestion of Macromolecules

### **Engaging Experience 1**

**Title:** Food Day Essay

**Suggested Length of Time:** ½ class period

**Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)

**Detailed Description/Instructions:** Students bring in and consume a variety of foods. They then trace the pathway of the food, describing what macromolecule from a specific food is digested in each part of the system and how this occurs.

**Bloom's Levels:** Analyze

**Webb's DOK:** 3

### **Engaging Experience 2**

**Title:** Hormone Research

**Suggested Length of Time:** ½ class period

**Standards Addressed**

*Priority:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

**Detailed Description/Instructions:** Students use the internet to research the hormones controlling appetite and link these hormones to homeostatic control of the body's need for nutrition.

**Bloom's Levels:** Apply

**Webb's DOK:** 2

## Topic 3: Microscopic Anatomy

### **Engaging Experience 1**

**Title:** Textbook Illustration

**Suggested Length of Time:** 20 minutes

### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  - j. Digestive (structures and functions of gastrointestinal tract, chemical and mechanical digestion, structures and functions of accessory organs)

**Detailed Description/Instructions:** Students are asked to create their own illustration of a villus with columnar cells that have microvilli. This is done after watching a clip from Crashcourse on the surface area of the digestive system.

**Bloom's Levels:** Analyze

**Webb's DOK:** 3

## Engaging Scenario



**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

One Page Poster Project. Students will be assigned a particular organ of the digestive system. The front of the poster will contain a picture, major functions, how the organ contributes to both chemical and mechanical digestion, and any substances produced by this organ. The back of the poster covers a disease of choice associated with the organ. During presentations, the rest of the class may take notes. There will be an open-note quiz using the presentation notes. The teacher will write two questions from each presentation to put on the quiz.

## Summary of Engaging Learning Experiences for Topics

<b>Topic</b>	<b>Engaging Experience Title</b>	<b>Description</b>	<b>Suggested Length of Time</b>
Accessory Structures vs. Alimentary	Trash Bag Illustration	Students wear a trash bag and illustrate the location of the alimentary canal and show where accessory structures contribute enzymes for digestion.	½ class period
Digestion of Macromolecules	Food Day Essay	Students bring in and consume a variety of foods. They then trace the pathway of the food, describing what macromolecule from a specific food is digested in each part of the system and how this occurs.	½ class period
Digestion of Macromolecules	Hormone Research	Students use the internet to research the hormones controlling appetite and link these hormones to homeostatic control of the body's need for nutrition.	½ class period
Microscopic Anatomy	Textbook Illustration	Students are asked to create their own illustration of a villus with columnar cells that have microvilli. This is done after watching a clip from Crashcourse on the surface area of the digestive system.	20 minutes

## Unit 7: Reproductive System

**Subject:** Human Anatomy and Physiology

**Grade:** 10,11,12

**Name of Unit:** Reproductive System

**Length of Unit:** 10 days

**Overview of Unit:** In this unit, students will learn how and at what stage of fetal development that sex of a baby begins to form and take shape, along with the physiological changes that accompany it. Students will further learn how the differences in the purpose of male and female reproductive systems shape the anatomy of those corresponding organs. Finally, students will learn the incredible amount of changes that occurs to a woman's body as she is pregnant, and why those changes occur in order to assure the healthy development and delivery of a baby.

### Priority Standards for unit:

- 1.13 Analyze basic structures and functions of human body systems
  1. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)
- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]

### Supporting Standards for unit:

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

<b>Unwrapped Concepts (Students need to know)</b>	<b>Unwrapped Skills (Students need to be able to do)</b>	<b>Bloom's Taxonomy Levels</b>	<b>Webb's DOK</b>
basic structures and functions of human body systems Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)	Analyze	Analyze	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Plan	Create	2
an investigation to provide evidence that feedback mechanisms maintain homeostasis	conduct	Apply	2

**Essential Questions:**

1. How does a fetus differentiate into either a male or a female by the time it is born?
2. How is the female reproductive anatomy different than the male reproductive anatomy?
3. How does a pregnancy impact the overall anatomy and physiology of the female body?

**Enduring Understanding/Big Ideas:**

1. When a fetus is 8 weeks old, the chromosomes activate a different pathway depending on whether there are two copies of the X chromosome, or only one.
2. Female reproductive anatomy differs from the males in regards to functionality. The purpose of the male reproductive anatomy is to be able to deliver sperm - female anatomy must be able to not only receive the sperm, but also to be able to house, nurture, and ultimately deliver a baby during the 9 months of pregnancy. These extremely functional differences results in distinct anatomical features that allow for this to occur.
3. A female's body changes in a multitude of ways during a pregnancy, including (but certainly not limited to): organs compressed in the abdomen, hormonal changes, increased appetite, etc.



**Unit Vocabulary:**

<b>Academic Cross-Curricular Words</b>	<b>Content/Domain Specific</b>
	<ol style="list-style-type: none"><li>1. Sperm</li><li>2. Ovum</li><li>3. Ovulation</li><li>4. Menstruation</li><li>5. Penis</li><li>6. Vagina</li><li>7. Ovaries</li><li>8. Testes</li><li>9. Prostate</li><li>10. Vas Deferens</li><li>11. Fallopian Tubes</li><li>12. Uterus</li><li>13. Epididymis</li><li>14. Vulva</li><li>15. Labia Minora</li><li>16. Labia Majora</li><li>17. Seminal Gland</li><li>18. Bulbourethral Gland</li><li>19. Clitoris</li><li>20. Endometrium</li><li>21. Cervix</li><li>22. Fimbria</li></ol>

**Resources for Vocabulary Development:** Textbook and Online Resources

## Topic 1: Sexual Development of a Fetus



### **Engaging Experience 1:**

**Title:** Hormone Sequence EdPuzzle

**Suggested Length of Time:** 1 class period

### **Standards Addressed**

#### *Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  1. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)

#### *Supporting:*

- 1.21 Describe common diseases and disorders of each body system (such as: cancer, diabetes, dementia, stroke, heart disease, tuberculosis, hepatitis, COPD, kidney disease, arthritis, ulcers).
  - a. Etiology
  - b. Pathology
  - c. Diagnosis
  - d. Treatment
  - e. Prevention
- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

**Detailed Description/Instructions:** Student will watch the Ted Talk video showing MRI imaging taken throughout fetal development in an EdPuzzle Format. EdPuzzle will pause at each significant event in development. Students will be required to enter the hormone/gene controlling this particular event before the video will continue.

[https://www.ted.com/talks/alexander\\_tsiaras\\_conception\\_to\\_birth\\_visualized](https://www.ted.com/talks/alexander_tsiaras_conception_to_birth_visualized)

**Bloom's Levels:** Analyze, Create

**Webb's DOK:** 2, 3

## Topic 2: Male and Female Reproductive Anatomy



### **Engaging Experience 1**

**Title:** MapQuest Mating

**Suggested Length of Time:** 1 class period

#### **Standards Addressed**

*Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  1. Reproductive (**structures and functions of male and female reproductive systems, formation of gametes**, hormone production and effects, menstrual cycle, and conception)

*Supportive:*

- 1.13 Analyze basic structures and functions of human body systems
  - i. Endocrine (endocrine versus exocrine, structures and functions of endocrine system, hormones, regulation of hormones)
- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students will create a step by step map with instructions on the path that the sperm takes from the creation of the sperm to fertilization of the egg. Students will share their maps with classmates.

**Bloom's Levels:** Analyze, Create

**Webb's DOK:** 3,2

## Topic 3: Changes During Pregnancy



### **Engaging Experience 1**

**Title:** Interview with a Mom



**Suggested Length of Time:** 1 class period

### **Standards Addressed**

#### *Priority:*

- 1.13 Analyze basic structures and functions of human body systems
  1. Reproductive (structures and functions of male and female reproductive systems, formation of gametes, hormone production and effects, menstrual cycle, and conception)

#### *Supportive:*

- 9-12-LS1 - 3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. [Clarification Statement: Examples of investigations could include heart rate response to exercise, stomata response to moisture and temperature, and root development in response to water levels.]
- ISTE - KNOWLEDGE COLLECTOR.3: Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
- ISTE - CREATIVE COMMUNICATOR.6: Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

**Detailed Description/Instructions:** Students will be tasked with finding someone who is either pregnant or has been pregnant and ask them questions about changes that they noticed. They will summarize their interview in a paper and present to the class.

**Bloom's Levels:** Analyze

**Webb's DOK:** 1

## Engaging Scenario






**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

**Aging and the Reproductive System:** A medical professional will come into the class and discuss the wide variety of preventative screenings available to them as they progress through their livings. Topics include things such as prostate and cervical cancer, menopause, hormone replacement therapy, and others.

Students will be assigned to research these, and any other disorders relating to the reproductive system to determine frequency of the disease and treatment options and additional screening measures. Each student will be asked to come up with at least 1 question to ask the medical professional to be examined in class. Finally, each student will be asked to submit a summary of what they expected to hear and did, as well as something they did not know.

## Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Sexual Development of a Fetus	Hormone Sequence EdPuzzle 	<p>Student will watch the Ted Talk video showing MRI imaging taken throughout fetal development in an EdPuzzle Format. EdPuzzle will pause at each significant event in development. Students will be required to enter the hormone/gene controlling this particular event before the video will continue.</p> <p><a href="https://www.ted.com/talks/alexander_tsiaras_conception_to_birth_visualized">https://www.ted.com/talks/alexander_tsiaras_conception_to_birth_visualized</a></p>	1 class period
Male and Female Reproductive Anatomy	MapQuest Mating 	<p>Students will create a step by step map with instructions on the path that the sperm takes from the creation of the sperm to fertilization of the egg. Students will share their maps with classmates.</p>	1 class period
Changes During Pregnancy	Interview with a Mom 	<p>Students will be tasked with finding someone who is either pregnant or has been pregnant and ask them questions about changes that they noticed. They will summarize their interview in a paper and present to the class.</p>	1 class period

## Course Engaging Scenario

**Engaging Scenario** (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Students will spend approximately a month at the end of the course dissecting a cat. The course has been designed so that by the time students dissect the cat, they know enough about anatomy and physiology to have an understanding of the variety of different structures, organs, and connective tissues they find inside of the cat.

Just like the course was broken up into different body systems, the cat itself will be dissected by body systems. We will begin by exploring the skeletal and muscular systems of the cat by analyzing the origin and insertion points of the muscles. Students will then open up the abdominal cavity and explore the digestive system and organs. The students will end the dissection by opening the thoracic cavity and looking at the heart and cardiovascular system as well as briefly looking at the respiratory system.

# Unit of Study Terminology

**Appendices:** All Appendices and supporting material can be found in this course's shell course in the District's Learning Management System.

**Assessment Leveling Guide:** A tool to use when writing assessments in order to maintain the appropriate level of rigor that matches the standard.

**Big Ideas/Enduring Understandings:** Foundational understandings teachers want students to be able to discover and state in their own words by the end of the unit of study. These are answers to the essential questions.

**Engaging Experience:** Each topic is broken into a list of engaging experiences for students. These experiences are aligned to priority and supporting standards, thus stating what students should be able to do. An example of an engaging experience is provided in the description, but a teacher has the autonomy to substitute one of their own that aligns to the level of rigor stated in the standards.

**Engaging Scenario:** This is a culminating activity in which students are given a role, situation, challenge, audience, and a product or performance is specified. Each unit contains an example of an engaging scenario, but a teacher has the ability to substitute with the same intent in mind.

**Essential Questions:** Engaging, open-ended questions that teachers can use to engage students in the learning.

**Priority Standards:** What every student should know and be able to do. These were chosen because of their necessity for success in the next course, the state assessment, and life.

**Supporting Standards:** Additional standards that support the learning within the unit.

**Topic:** These are the main teaching points for the unit. Units can have anywhere from one topic to many, depending on the depth of the unit.

**Unit of Study:** Series of learning experiences/related assessments based on designated priority standards and related supporting standards.

**Unit Vocabulary:** Words students will encounter within the unit that are essential to understanding. Academic Cross-Curricular words (also called Tier 2 words) are those that can be found in multiple content areas, not just this one. Content/Domain Specific vocabulary words are those found specifically within the content.

## **Symbols:**



This symbol depicts an experience that can be used to assess a student's 21st Century Skills using the rubric provided by the district.



This symbol depicts an experience that integrates professional skills, the development of professional communication, and/or the use of professional mentorships in authentic classroom learning activities.