

Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Introduction to A & P

Time Allotment: 8 days

Unit Sequence: 1

Major Concepts to be learned:

- Levels of Organization
 - What is Anatomy and Physiology, and how do the two fields work together to explain the human body?
 - How is the human body organized from the simplest level to the most complex level?
 - Why is understanding the levels of organization important in studying the human body?
 - How are structure and function related in the human body?
- Anatomical Divisions
 - How do anatomical divisions help us describe and study the body accurately?
 - Why is anatomical language important for communicating about body position, location, and movement?
 - How do directional terms and anatomical terminology help healthcare professionals describe injuries and conditions?
 - How can case studies and medical scenarios help us apply anatomical knowledge to real-world situations?
- Homeostasis
 - What is homeostasis, and why is maintaining balance essential for survival?
 - How does the body respond when homeostasis is disrupted?
 - How do body systems work together to maintain internal stability?
 - Why is homeostasis important for overall health and survival?
- Medical/Disease Terminology
 - How does disease affect the structure and function of the body?
 - Why is disease terminology important in the medical field?
 - How can understanding anatomy and physiology help explain sports injuries and recovery?
 - How can medical terminology improve communication in healthcare settings?

Expected Skills to be demonstrated:

- Levels of Organization
 - I can explain the difference between anatomy and physiology.
 - I can identify the levels of organization in the human body.
 - I can describe how cells, tissues, organs, and organ systems work together.
 - I can explain how structure relates to function in the body
- Anatomical Divisions of the Body
 - I can use anatomical terminology correctly.
 - I can identify body planes, regions, and cavities.
 - I can describe the location of body parts using directional terms.
 - I can apply anatomical language to real-life medical scenarios and case studies.
- Homeostatic Regulation
 - I can define homeostasis and explain why it is important.
 - I can describe how the body maintains internal balance.
 - I can identify examples of positive and negative feedback systems.
 - I can explain how body systems work together to maintain homeostasis.
- Medical/Disease Terminology
 - I can identify and use common medical and disease terminology.
 - I can explain how diseases disrupt normal body function.
 - I can analyze injuries or disorders using anatomical terminology.
 - I can apply medical vocabulary to case studies and healthcare scenarios.

PA STEELS/NGSS Standards:

SEP/DCI/CCC:

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations and Designing Solutions○ Engaging in Argument from Evidence○ Obtaining, Evaluating, and Communicating Information○ Analyzing and Interpreting Data• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy Flow in Organisms○ Information Processing○ Stability and Change in Body Systems○ Interdependent Relationships of Body Systems• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Stability and Change○ Cause and Effect○ Patterns
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Instructional Strategies:

Assessments:

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Banana Surgery• Ginger Bread Directional Icing• Simon Says Practice• Planes and Anatomical Regions Coloring• Medical Terminology Quiz• Directional Terminology Quiz• Disease Terminology Quiz• Unit 1 Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Chemistry of Life

Time Allotment: 7 days

Unit Sequence: 2

Major Concepts to be learned:

- Intro to Chemistry
 - Why is chemistry important to understanding the human body?
 - How do atoms combine to form the substances needed for life?
 - How does the structure of matter influence its function in living organisms?
 - What types of chemical reactions occur within the body?
- Inorganic Compounds
 - Why is water essential for life and homeostasis?
 - How do acids, bases, and pH affect body function?
 - What roles do electrolytes and salts play in maintaining normal body processes?
 - How does the body regulate the balance of inorganic compounds?
- Organic Compounds
 - How do carbohydrates, lipids, proteins, and nucleic acids support life?
 - How does the structure of a biomolecule determine its function?
 - Why are biomolecules necessary for growth, repair, and energy production?
 - How do different biomolecules work together to maintain homeostasis?
- Enzymes
 - How do enzymes regulate chemical reactions in the body?
 - Why are enzymes essential for life processes?
 - How do environmental factors affect enzyme activity?
 - What happens when enzymes do not function properly?

Expected Skills to be demonstrated:

- Intro to Chemistry
 - I can describe the basic structure of an atom.
 - I can explain the difference between elements, compounds, and molecules.
 - I can identify common chemical bonds found in living organisms.
 - I can explain how chemical reactions occur in the body.
 - I can relate chemistry concepts to human anatomy and physiology.
- Inorganic Compounds
 - I can explain the importance of water in the human body.
 - I can describe the roles of acids, bases, and pH in maintaining homeostasis.
 - I can identify common electrolytes and their functions.
 - I can explain how inorganic compounds support normal body processes.
- Organic Compounds (Biomolecules)
 - I can identify the four major classes of biomolecules.
 - I can compare the structures and functions of carbohydrates, lipids, proteins, and nucleic acids.
 - I can explain how biomolecules contribute to growth, repair, and energy production.
 - I can recognize examples of biomolecules in everyday life and the human body.
- Enzymes
 - I can explain how enzymes speed up chemical reactions.
 - I can describe the relationship between enzymes and substrates.
 - I can predict how temperature and pH affect enzyme activity.
 - I can explain the importance of enzymes in maintaining life processes.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy Flow in Organisms○ Structure and Properties of Matter○ Chemical Reactions• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Energy and Matter
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Chemistry Vocab Quiz• Enzyme Graphing• Biomolecules Quiz• Unit 2 Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Introduction to Cytology

Time Allotment: 7 days

Unit Sequence: 3

Major Concepts to be learned:

- Intro to Cytology
 - Why are cells considered the basic unit of life?
 - How does cell theory explain the organization of living organisms?
 - How have advances in technology improved our understanding of cells?
- Cells and Their Parts
 - How do the structures of a cell contribute to its function?
 - How do organelles work together to maintain cellular life?
 - How does specialization of cell structures support the needs of an organism?
- Cell Membrane and Cell Transport
 - How does the cell membrane maintain homeostasis?
 - How do substances move into and out of cells?
 - Why is selective permeability essential for cell survival?
 - How does the movement of materials affect cellular function?
- DNA, RNA, and Protein Synthesis
 - How is genetic information stored and transmitted within cells?
 - How does DNA direct the production of proteins?
 - Why are proteins essential for cellular function?
 - How does gene expression influence the characteristics and activities of cells?
- Mitosis (and Cancer)
 - Why do cells divide?
 - How does mitosis support growth, repair, and maintenance of the body?
 - What can happen when the cell cycle is not properly regulated?
 - How does cancer result from disruptions in normal cell division?
- Meiosis (and Disorders of Nondisjunction)
 - How does meiosis contribute to genetic diversity?
 - Why is meiosis necessary for sexual reproduction?
 - How can errors during meiosis affect human development?
 - What are the biological consequences of nondisjunction?

Expected Skills to be demonstrated:

- Intro to Cytology
 - I can explain the principles of cell theory.
 - I can describe the characteristics of cells.
 - I can explain why cells are considered the basic unit of life.
 - I can use a microscope to observe cellular structures.
- Cells and Their Parts
 - I can identify the major organelles of a cell.
 - I can describe the function of each cell organelle.
 - I can explain how organelles work together to maintain cellular function.
 - I can compare the structures of different types of cells.
- Cell Membrane and Cell Transport
 - I can describe the structure and function of the cell membrane.
 - I can explain how the cell membrane helps maintain homeostasis.
 - I can compare passive and active transport.
 - I can predict the movement of substances across a cell membrane.
 - I can analyze the effects of hypertonic, hypotonic, and isotonic environments on cells.
- DNA, RNA, and Protein Synthesis
 - I can describe the structure and function of DNA and RNA.
 - I can explain how genetic information is used to make proteins.
 - I can summarize the processes of transcription and translation.
 - I can explain how proteins contribute to cell function.
 - I can describe how gene expression affects cellular activities.
- Mitosis (and Cancer)
 - I can identify and describe the stages of mitosis.
 - I can explain the purpose of mitosis in growth and repair.
 - I can compare normal cell division and cancerous cell division.
 - I can explain how disruptions in the cell cycle can lead to cancer.
 - I can analyze evidence related to cancer development and treatment.
- Meiosis (and Disorders of Nondisjunction)
 - I can identify and describe the stages of meiosis.
 - I can compare and contrast mitosis and meiosis.
 - I can explain how meiosis contributes to genetic variation.
 - I can describe how nondisjunction occurs.
 - I can explain how chromosomal abnormalities can affect human development.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy Flow in Organisms○ Growth and Development○ Inheritance/Variation of Traits• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Cell Structure and Differentiation Quiz• Cell Coloring• Central Dogma CER• Cell Cycle Quiz• Unit 3 Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Histology

Time Allotment: 10 days

Unit Sequence: 4

Major Concepts to be learned:

- Intro to Tissues
 - How do specialized cells work together to form tissues?
 - Why are tissues considered an important level of organization in the human body?
 - How does the structure of a tissue relate to its function?
 - How do tissues contribute to the formation of organs and organ systems?
- Epithelial Tissues
 - How does epithelial tissue protect and support the body?
 - How does the structure of epithelial tissue determine its function?
 - Why are different types of epithelial tissue found in different parts of the body?
 - How do epithelial tissues contribute to homeostasis?
- Connective Tissues
 - How do connective tissues support, protect, and connect body structures?
 - How does the composition of connective tissue relate to its function?
 - Why are connective tissues the most diverse tissue type in the body?
 - How do connective tissues contribute to movement, transport, and protection?
- Muscle and Nervous Tissues
 - How do muscle tissues produce movement within the body?
 - How do nervous tissues communicate and coordinate body functions?
 - How are the structures of muscle and nervous tissues adapted to their specialized functions?
 - How do muscle and nervous tissues work together to maintain homeostasis?
- Body Membranes
 - What roles do body membranes play in protecting and organizing the body?
 - How do the structures of body membranes support their functions?
 - How do body membranes reduce friction and protect organs?
 - Why are body membranes essential for maintaining healthy body systems?

Expected Skills to be demonstrated:

- Intro to Tissues
 - I can define a tissue and explain its role in the organization of the human body.
 - I can describe the four major tissue types.
 - I can explain how tissues work together to form organs.
 - I can relate tissue structure to tissue function.
- Epithelial Tissues
 - I can identify the major types of epithelial tissue.
 - I can describe the functions of epithelial tissues.
 - I can classify epithelial tissues based on cell shape and arrangement.
 - I can identify epithelial tissues from histology images and slides.
 - I can explain how epithelial tissues contribute to protection, absorption, and secretion.
- Connective Tissues
 - I can identify the major types of connective tissue.
 - I can describe the functions of connective tissues.
 - I can compare the structures of various connective tissues.
 - I can identify connective tissues from histology images and slides.
 - I can explain how connective tissues support, protect, and connect body structures.
- Muscle and Nervous Tissues
 - I can distinguish between the three types of muscle tissue.
 - I can describe the functions of skeletal, cardiac, and smooth muscle tissue.
 - I can identify muscle tissues from histology images and slides.
 - I can describe the structure and function of nervous tissue.
 - I can identify neurons and supporting cells in histological samples.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy Flow in Organisms○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Patterns
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Tissue Types Graphical Organizer• Tissue Coloring• Tissue Matching• Microscopy Lab• Edible Muscle cells• Chicken Wing Dissection• Histology Photo Practical• Unit 4 Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Integumentary System

Time Allotment: 10 days

Unit Sequence: 5

Major Concepts to be learned:

- Intro to the Integumentary System
 - How does the integumentary system help maintain homeostasis?
 - How does the structure of the skin support its protective functions?
 - Why is the skin considered the body's first line of defense?
 - How do the various components of the integumentary system work together to protect the body?
- Injuries of the Integumentary System
 - How does the body respond to injuries of the skin?
 - How does the severity of an injury affect healing and treatment?
 - Why is proper wound care important for recovery?
 - How do burns and other skin injuries affect homeostasis?
- Diseases and Disorders of the Integumentary System
 - How do diseases and disorders affect the normal function of the integumentary system?
 - What factors contribute to the development of skin diseases and disorders?
 - How can skin disorders impact overall health and well-being?
 - How can individuals reduce their risk of developing common skin disorders?

Expected Skills to be demonstrated:

- Intro to the Integumentary System
 - I can identify the major structures of the integumentary system.
 - I can label the layers of the skin and their components.
 - I can describe the functions of the integumentary system.
 - I can explain how the integumentary system contributes to homeostasis.
 - I can relate the structure of the skin to its function.
- Injuries to the Integument
 - I can classify different types of skin injuries and burns.
 - I can describe the stages of wound healing.
 - I can explain how the body responds to skin injuries.
 - I can assess the severity of burns and predict their effects on the body.
 - I can explain why proper wound care is important.
 - I can analyze how skin injuries affect the body's ability to maintain homeostasis.
- Diseases and Disorders
 - I can identify common diseases and disorders of the integumentary system.
 - I can describe the causes, symptoms, and treatments of common skin disorders.
 - I can explain how diseases and disorders affect normal skin function.
 - I can evaluate risk factors associated with skin diseases.
 - I can analyze the impact of lifestyle choices on skin health.
 - I can use evidence to explain methods for preventing skin diseases and disorders.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ InformationProcessing○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Patterns
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Skin Coloring• Wound Lab• Sunscreen Lab• Burn Case Study• Unit 5 Exam
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Skeletal System

Time Allotment: 25 days

Unit Sequence: 6

Major Concepts to be learned:

- Intro to the Skeletal System
 - How does the skeletal system contribute to homeostasis?
 - What functions does the skeletal system perform?
 - How do bones serve as living organs?
 - How does the skeletal system interact with other body systems?
- Bone Markings
 - Why do bones have markings, projections, and openings?
 - How do bone markings relate to muscle attachment and movement?
 - How can bone markings help identify specific bones?
 - How does bone structure support bone function?
- Bones of the Axial Skeleton
 - How does the axial skeleton protect vital organs?
 - How does the structure of the axial skeleton support the body?
 - Why are the bones of the skull, vertebral column, and thoracic cage uniquely adapted for their functions?
 - How does the axial skeleton contribute to stability and protection?
- Bones of the Appendicular Skeleton
 - How does the appendicular skeleton facilitate movement?
 - How do the upper and lower limbs differ in structure and function?
 - How do the pectoral and pelvic girdles connect the limbs to the body?
 - How does skeletal structure influence mobility?
- Articulations (Joints)
 - How do joints allow movement while maintaining stability?
 - How does the structure of a joint determine its range of motion?
 - Why are some joints more mobile than others?
 - How do joints contribute to overall body function?
- Fractures
 - How do different types of fractures affect bone function?
 - How does the body repair damaged bone tissue?
 - What factors influence fracture healing?
 - How can fractures impact overall health and mobility?
- Diseases and Disorders of the Skeletal System
 - How do skeletal disorders affect the body's ability to function?
 - What factors contribute to diseases of the skeletal system?
 - How can skeletal diseases be prevented, diagnosed, and treated?

Expected Skills to be demonstrated:

- Intro to the Skeletal System
 - I can identify the major functions of the skeletal system.
 - I can describe the composition and structure of bone tissue.
 - I can explain how the skeletal system contributes to homeostasis.
 - I can distinguish between the axial and appendicular skeleton.
- Bone Markings
 - I can identify common bone markings.
 - I can describe the functions of bone markings.
 - I can relate bone markings to muscle attachment and joint formation.
 - I can use anatomical terminology to describe bone structures.
- Bones of the Axial Skeleton
 - I can identify the major bones of the axial skeleton.
 - I can locate and label structures of the skull, vertebral column, and thoracic cage.
 - I can explain the functions of the axial skeleton.
 - I can describe how the axial skeleton protects vital organs.
- Bones of the Appendicular Skeleton
 - I can identify the major bones of the appendicular skeleton.
 - I can locate and label the bones of the upper and lower limbs.
 - I can distinguish between the pectoral and pelvic girdles.
 - I can explain how the appendicular skeleton facilitates movement.
- Articulations (Joints)
 - I can classify joints based on structure and function.
 - I can identify major joints of the body.
 - I can explain how joint structure affects movement.
 - I can compare the range of motion of different joint types.
- Fractures
 - I can identify common types of fractures.
 - I can describe the stages of bone repair.
 - I can explain factors that affect fracture healing.
 - I can analyze how fractures impact movement and body function.
- Diseases and Disorders of the Skeletal System
 - I can identify common skeletal diseases and disorders.
 - I can explain the causes and effects of skeletal disorders.
 - I can evaluate risk factors associated with skeletal diseases.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Information Processing○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Skeletal Coloring• Bone Marking Vocab Quiz• Skeletal Labeling• Skeletal Sorting Practice• X-Ray Investigation• Skeletal Practical• Unit 6 Exam
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Muscular System

Time Allotment: 20 days

Unit Sequence: 7

Major Concepts to be learned:

- Introduction to Muscles
 - How does the muscular system contribute to homeostasis?
 - What are the functions of the muscular system?
 - How do the three types of muscle tissue differ in structure and function?
 - How do muscles interact with other body systems to maintain life?
- Gross Anatomy of Muscles
 - How does the structure of a skeletal muscle support its function?
 - How are muscles organized from the microscopic to the gross anatomical level?
 - Why are attachments important for muscle function?
 - How does muscle anatomy influence movement?
- Skeletal Muscle Actions
 - How do muscles produce movement?
 - Why do muscles work in groups rather than individually?
 - How do muscle origin and insertion affect movement?
 - How do agonists, antagonists, synergists, and fixators work together during movement?
- Tension and Skeletal Muscle Contractions
 - How does a muscle generate force?
 - What occurs within a muscle fiber during contraction?
 - How do different types of contractions produce movement?
 - What factors affect the strength and duration of muscle contractions?
- Diseases and Disorders of the Muscular System
 - How do muscular disorders affect movement and overall health?
 - What factors contribute to diseases of the muscular system?
 - How can muscular disorders be diagnosed, treated, and managed?
 - How can lifestyle choices influence muscular health?

Expected Skills to be demonstrated:

- Introduction to Muscles
 - I can identify the three types of muscle tissue.
 - I can compare the structures and functions of skeletal, cardiac, and smooth muscle.
 - I can describe the major functions of the muscular system.
 - I can explain how muscles contribute to homeostasis.
- Gross Anatomy of Muscles
 - I can identify the major structures of a skeletal muscle.
 - I can describe the organization of muscle tissue from fibers to whole muscles.
 - I can explain the roles of tendons and connective tissues.
 - I can relate muscle structure to muscle function.
- Skeletal Muscle Actions
 - I can identify muscle origin and insertion points.
 - I can explain how muscles create movement.
 - I can distinguish between agonists, antagonists, synergists, and fixators.
 - I can analyze movements and identify the muscles involved.
- Tension and Skeletal Muscle Contractions
 - I can describe the sliding filament theory.
 - I can explain the events involved in muscle contraction.
 - I can compare isotonic and isometric contractions.
 - I can explain factors that influence muscle force production.
 - I can relate ATP and energy use to muscle contractions.
- Diseases and Disorders of the Muscular System
 - I can identify common muscular diseases and disorders.
 - I can explain the causes and symptoms of muscular disorders.
 - I can analyze how muscular diseases affect body function.
 - I can evaluate strategies for maintaining muscular health.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Information Processing○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Energy and Matter
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Muscle Coloring• Muscle types Quiz• Microscopic Muscle Labeling• Muscle Action Quiz• Muscle Fatigue Lab• Sliding Filament Diagraming• Clay muscle Modeling• Muscle Practical• Unit 7 Exam
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Nervous System & Special Senses

Time Allotment: 20 days

Unit Sequence: 8

Major Concepts to be learned:

- Introduction to the Nervous System
 - How does the nervous system coordinate and regulate body functions?
 - What are the major divisions of the nervous system, and how do they work together?
 - Why is rapid communication essential for maintaining homeostasis?
- Impulse Transmission
 - How do neurons transmit information throughout the body?
 - What role do electrical and chemical signals play in nerve communication?
 - How does the structure of a neuron support its function?
- Functional Anatomy of the Central Nervous System
 - How do the brain and spinal cord process and respond to information?
 - What are the major regions of the brain, and what functions do they control?
 - How does the central nervous system integrate sensory input and motor output?
- Functional Anatomy of the Peripheral Nervous System
 - How does the peripheral nervous system connect the body to the central nervous system?
 - What are the differences between the somatic and autonomic nervous systems?
 - How do peripheral nerves contribute to sensation and movement?
- Diseases and Disorders of the Nervous System
 - How can diseases and disorders disrupt normal nervous system function?
 - What are the causes and effects of common neurological disorders?
 - How can advances in medicine improve the diagnosis and treatment of nervous system disorders?
- The Eye
 - How does the eye detect and process visual information?
 - How do the structures of the eye work together to produce vision?
 - What factors can affect visual acuity and eye health?
- The Ear
 - How does the ear detect sound and maintain balance?
 - How are sound waves converted into nerve impulses?
 - What structures of the ear are responsible for hearing and equilibrium?
- Smell and Taste
 - How do the senses of smell and taste contribute to perception?
 - How are chemical stimuli detected and interpreted by the nervous system?
 - How do smell and taste work together to influence flavor perception?

Expected Skills to be demonstrated:

- Introduction to the Nervous System
 - I can identify the major divisions of the nervous system.
 - I can explain the functions of the central and peripheral nervous systems.
 - I can describe how the nervous system helps maintain homeostasis.
- Impulse Transmission
 - I can identify the structures of a neuron and describe their functions.
 - I can explain how nerve impulses travel through neurons.
 - I can describe how neurons communicate at synapses.
- Functional Anatomy of the Central Nervous System
 - I can identify the major structures of the brain and spinal cord.
 - I can explain the functions of different regions of the brain.
 - I can describe how the central nervous system processes information.
- Functional Anatomy of the Peripheral Nervous System
 - I can identify the major components of the peripheral nervous system.
 - I can distinguish between the somatic and autonomic nervous systems.
 - I can explain how peripheral nerves carry sensory and motor information.
- Diseases and Disorders of the Nervous System
 - I can describe common diseases and disorders of the nervous system.
 - I can explain how neurological disorders affect body function.
 - I can evaluate factors that contribute to nervous system health.
- The Eye
 - I can identify the major structures of the eye.
 - I can explain how the eye converts light into nerve signals.
 - I can describe how vision is processed by the nervous system.
- The Ear
 - I can identify the major structures of the ear.
 - I can explain how hearing occurs.
 - I can describe how the ear helps maintain balance.
- Smell and Taste
 - I can explain how the senses of smell and taste detect stimuli.
 - I can describe how sensory receptors send information to the brain.
 - I can explain how smell and taste work together to create flavor perception.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Information Processing○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Labeling Neurons /Brain Structures• Function and structure matching Game• Vocab Quizzes• Impulse Transmission Flow Charts• Sheep Brain Dissection• TBI Case Study• Brain Dissection Practical• Unit 8 Exam
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Blood & the Cardiovascular System

Time Allotment: 20 days

Unit Sequence: 9

Major Concepts to be learned:

- **Blood**
 - What are the components of blood, and how do they contribute to maintaining homeostasis?
 - How do blood cells and plasma work together to support body functions?
 - Why is blood considered a connective tissue?
- **Blood Disorders**
 - How do disorders of the blood affect the body's ability to function?
 - What causes common blood disorders, and how are they treated?
 - How can changes in blood composition impact overall health?
- **Overview of Blood Vessels**
 - How do blood vessels transport materials throughout the body?
 - What are the structural and functional differences between arteries, veins, and capillaries?
 - How does blood vessel structure support circulation?
- **Anatomy of the Heart**
 - How is the heart structured to efficiently pump blood throughout the body?
 - What are the major chambers, valves, and vessels of the heart?
 - How does blood flow through the heart?
- **Regulation/Physiology of the Heart**
 - How is the heartbeat initiated and regulated?
 - How does the electrical conduction system coordinate heart contractions?
 - How do changes in heart rate help maintain homeostasis?
- **Diseases and Disorders of the Cardiovascular System**
 - How do cardiovascular diseases affect the function of the heart and blood vessels?
 - What factors increase the risk of cardiovascular disease?
 - How can lifestyle choices promote cardiovascular health?

Expected Skills to be demonstrated:

- Blood
 - I can identify the major components of blood.
 - I can explain the functions of plasma, red blood cells, white blood cells, and platelets.
 - I can describe how blood contributes to homeostasis.
- Blood Disorders
 - I can describe common blood disorders and their effects on the body.
 - I can explain how abnormalities in blood cells impact health.
 - I can analyze case studies involving blood disorders.
- Overview of Blood Vessels
 - I can compare the structures and functions of arteries, veins, and capillaries.
 - I can trace the pathway of blood through the circulatory system.
 - I can explain how blood vessels support circulation.
- Anatomy of the Heart
 - I can identify and label the structures of the heart.
 - I can trace the flow of blood through the heart.
 - I can explain the function of the chambers, valves, and major vessels.
- Regulation/Physiology of the Heart
 - I can explain how the heart's electrical conduction system functions.
 - I can identify normal and abnormal heart rhythms.
 - I can describe how heart rate is regulated.
- Diseases and Disorders of the Cardiovascular System
 - I can describe common cardiovascular diseases and disorders.
 - I can explain risk factors associated with cardiovascular disease.
 - I can evaluate strategies for maintaining cardiovascular health.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Information Processing○ Organization for Matter and Energy flow in Organisms○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Blood/ Vessel/Heart Coloring• ECG Lab• Auscultation• Sphygmomanometry• Blood Typing Lab• Heart Dissection Practical• Blood Flow Practical• Blood Unit Test• Cardio Unit Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Respiratory System

Time Allotment: 15 days

Unit Sequence: 10

Major Concepts to be learned:

- Anatomy of the Respiratory System
 - How do the structures of the respiratory system work together to support breathing?
 - What are the functions of the upper and lower respiratory tracts?
 - How does the anatomy of the respiratory system maximize gas exchange?
- Physiology of the Respiratory System
 - How does air move into and out of the lungs?
 - How does gas exchange occur between the lungs and the bloodstream?
 - How does the respiratory system help maintain homeostasis?
- Aging, Disease, and Disorders
 - How do aging and disease affect respiratory system function?
 - What are the causes and effects of common respiratory disorders?
 - How can lifestyle choices influence respiratory health?

Expected Skills to be demonstrated:

- Anatomy of the Respiratory System
 - I can identify and label the structures of the upper respiratory tract.
 - I can identify and label the structures of the lower respiratory tract.
 - I can explain the functions of major respiratory system structures.
- Physiology of the Respiratory System
 - I can describe the pathway of air through the respiratory system.
 - I can explain how inhalation and exhalation occur.
 - I can explain how gas exchange occurs at the alveoli.
 - I can describe how oxygen and carbon dioxide are transported in the blood.
- Aging, Disease, and Disorders
 - I can describe common diseases and disorders of the respiratory system.
 - I can explain how aging affects respiratory function.
 - I can evaluate factors that contribute to respiratory health and disease.
 - disorders and their effects on the body.
 - I can explain how abnormalities in blood cells impact health.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Information Processing○ Organization for Matter and Energy flow in Organisms○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Respiratory Volume Lab• Respiratory Coloring Pages• Lung Auscultation• Unit 10 Test• Respiratory Health Poster
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Digestive & Urinary System

Time Allotment: 8 days

Unit Sequence: 11

Major Concepts to be learned:

- Nutrition
 - How does nutrition support the body's structure, function, and homeostasis?
 - What roles do macronutrients and micronutrients play in human health?
 - Digestive System Anatomy and Physiology
- How do the organs of the digestive system work together to break down and absorb nutrients?
 - What are the mechanical and chemical processes involved in digestion?
 - How do accessory organs contribute to digestion?
- Urinary System Anatomy and Physiology
 - How do the kidneys filter blood and maintain homeostasis?
 - How is urine formed and eliminated from the body?
 - How does the urinary system regulate fluid and electrolyte balance?
- Diseases and Disorders
 - How do diseases affect the digestive and urinary systems?
 - What lifestyle factors contribute to digestive and urinary health?
 - How do these systems work together to remove waste and maintain homeostasis?

Expected Skills to be demonstrated:

- Nutrition
 - I can differentiate between macronutrients and micronutrients.
 - I can explain the role of nutrients in maintaining health.
 - I can analyze nutritional information to make informed dietary choices.
- Digestive System
 - I can identify and label the structures of the digestive system.
 - I can explain the functions of digestive organs and accessory organs.
 - I can describe the mechanical and chemical processes of digestion.
 - I can explain how nutrients are absorbed and utilized by the body.
- Urinary System
 - I can identify and label the structures of the urinary system.
 - I can explain the role of the kidneys in maintaining homeostasis.
 - I can describe the structure and function of a nephron.
 - I can explain the process of urine formation.
 - I can identify hormones involved in fluid balance.
- Diseases and Disorders
 - I can describe common disorders of the digestive and urinary systems.
 - I can analyze case studies involving digestive and urinary diseases.
 - I can evaluate factors that promote digestive and urinary health.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy flow in Organisms○ Growth and Development• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Urinary Coloring Pages• Digestive Coloring Pages• Nutrition Label Lab• Blue Food Day• Unit 11 Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Reproductive System

Time Allotment: 8 days

Unit Sequence: 12

Major Concepts to be learned:

1. Male Reproductive Anatomy and Physiology
 - a. How do the structures of the male reproductive system support reproduction?
 - b. What are the functions of the organs of the male reproductive system?
 - c. How do hormones regulate male reproductive function?
2. Female Reproductive Anatomy and Physiology
 - a. How do the structures of the female reproductive system support reproduction?
 - b. What are the functions of the organs of the female reproductive system?
 - c. How do hormones regulate the menstrual cycle and reproductive processes?
3. Reproductive Health
 - a. How do the male and female reproductive systems work together in human reproduction?
 - b. How do hormones influence reproductive development and function?
 - c. What factors can affect reproductive health?
4. Fertilization and Pregnancy
 - a. How does fertilization occur?
 - b. What changes occur during pregnancy to support fetal development?
 - c. How does the placenta support the developing fetus?
 - d. What are the major stages of prenatal development?

Expected Skills to be demonstrated:

- Male Reproductive Anatomy and Physiology
 - I can identify and label the structures of the male reproductive system.
 - I can explain the functions of the organs of the male reproductive system.
 - I can describe the process of sperm production.
 - I can explain the role of hormones in male reproduction.
- Female Reproductive Anatomy and Physiology
 - I can identify and label the structures of the female reproductive system.
 - I can explain the functions of the organs of the female reproductive system.
 - I can describe the stages of the menstrual cycle.
 - I can explain the role of hormones in female reproduction.
- Reproductive Health
 - I can compare the structures and functions of the male and female reproductive systems.
 - I can explain how reproductive systems contribute to human reproduction.
 - I can evaluate factors that influence reproductive health.
- Fertilization and Pregnancy
 - I can describe the process of fertilization.
 - I can explain the stages of prenatal development.
 - I can identify the functions of the placenta, umbilical cord, and amniotic sac.
 - I can describe major physical and physiological changes that occur during pregnancy.
 - I can explain how the mother's body supports fetal growth and development.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy flow in Organisms○ Growth and Development○ Reproduction and Inheritance of Traits• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Male Anatomy Coloring Pages• Female Anatomy Coloring Pages• Contraceptive Graphical Organizer• Unit 12 Test
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Grade level: 11-12

Course Title: Anatomy & Physiology

Topic/Concept: Final Fetal Pig Dissection

Time Allotment: 5 days

Unit Sequence: 13

Major Concepts to be learned:

- How does the structure of an organ relate to its function within the body?
- How do multiple organ systems work together to maintain homeostasis?
- How is fetal pig anatomy similar to and different from human anatomy?
- How does the organization of body systems contribute to the survival of an organism?
- How do the integumentary, muscular, and skeletal systems work together to provide support, protection, and movement?
- How do the cardiovascular and respiratory systems work together to transport oxygen, nutrients, and wastes throughout the body?
- How do the digestive and urinary systems process nutrients and remove wastes from the body?
- How does the nervous system coordinate and regulate the activities of other body systems?
- What evidence of structure-function relationships can be observed during a fetal pig dissection?
- How can the study of a fetal pig improve our understanding of human anatomy and physiology?

Expected Skills to be demonstrated:

- I can identify and label major external anatomical structures of a fetal pig.
- I can identify and label major organs and structures within each body system.
- I can use proper anatomical terminology to describe structures and locations.
- I can explain the functions of organs and structures observed during the dissection.
- I can compare fetal pig anatomy to human anatomy.
- I can distinguish between different body cavities and identify the organs located within them.
- I can explain how the integumentary, muscular, skeletal, nervous, cardiovascular, respiratory, digestive, urinary, and reproductive systems contribute to homeostasis.
- I can analyze how multiple body systems work together to perform essential life functions.
- I can demonstrate careful observation and accurate data collection during laboratory investigations.
- I can relate anatomical structures to their physiological functions.
- I can communicate scientific observations using appropriate vocabulary and evidence.
- I can identify similarities and differences among organ systems based on structure and function.
- I can apply knowledge from previous anatomy and physiology units to identify structures and predict their functions.
- I can demonstrate mastery of anatomical structures and functions on a practical examination.

PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy flow in Organisms○ Growth and Development○ Reproduction and Inheritance of Traits• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	
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PA STEELS/NGSS Standards:**SEP/DCI/CCC:**

3.1.9-12.A 3.1.9-12.B 3.1.9-12.C HS-LS1-1 HS-LS1-2 HS-LS1-3 HS-LS1-6	<ul style="list-style-type: none">• SEP<ul style="list-style-type: none">○ Developing and Using Models○ Constructing Explanations○ Analysing and Interpreting Data○ Obtaining, Evaluating, and Communicating Information• DCI<ul style="list-style-type: none">○ Structure and Function○ Organization for Matter and Energy flow in Organisms○ Growth and Development○ Reproduction and Inheritance of Traits• CCC<ul style="list-style-type: none">○ Structure and Function○ Systems and System Models○ Cause and Effect○ Stability and Change
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Instructional Strategies:**Assessments:**

<ul style="list-style-type: none">• Direct Instruction / Guided Notes• Interactive Lecture and Discussion• Anatomical Coloring Activities• Hands-On Laboratory Investigations• Model-Based Learning• Demonstrations	<ul style="list-style-type: none">• Male Anatomy Coloring Pages• Female Anatomy Coloring Pages• Contraceptive Graphical Organizer• Unit 12 Test
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