



# Township of Ocean Schools

Assistant Superintendent  
Office of Teaching and Learning

## **SPARTAN MISSION:**

*Meeting the needs of all students with a proud tradition of academic excellence.*

---

## **Curriculum Documents**

**School:** Ocean Township High School

**Course:** Anatomy and Physiology

**Department:** Science

**Supervisor:** Patrick Sullivan

Board Approval	Supervisor	Notes
August 2011	Patrick Sullivan	Update Standards
December 2017	Patrick Sullivan	Update Standards

*Home of the Spartans!*  
*#spartanlegacy*



Week	Marking Period 1	Week	Marking Period 3
1	The Human Body: An Orientation	1	The Human Body: An Orientation
2	Basic Chemistry	2	Basic Chemistry
3	Cells & Tissues	3	Cells & Tissues
4	Skin and Body Membranes	4	Skin and Body Membranes
5	The Skeletal System	5	The Skeletal System
6	The Skeletal System Continued	6	The Skeletal System Continued
7	The Muscular System	7	The Muscular System
8	The Muscular System Continued	8	The Muscular System Continued
9	The Nervous System	9	The Nervous System
10	Special Senses	10	Special Senses
Week	Marking Period 2	Week	Marking Period 4
11	The Endocrine System	11	The Endocrine System
12	Blood	12	Blood
13	The Circulatory System	13	The Circulatory System
14	The Circulatory System Continued	14	The Circulatory System Continued
15	The Respiratory System	15	The Respiratory System
16	The Digestive System and Body Metabolism	16	The Digestive System and Body Metabolism
17	The Digestive System Continued	17	The Digestive System Continued
18	The Urinary System	18	The Urinary System
19	The Reproductive System	19	The Reproductive System
20	Review & Final Exam	20	Review & Final Exam

**Time Frame****One Week****Topic**

The Human Body: An Orientation

**Essential Questions**

- How does anatomy relate to physiology?
- What are the six levels of structural organization?
- What is required to maintain life?
- How important is homeostasis to survival and health?
- What is the necessity of learning the language of anatomy?

**Enduring Understandings**

- Anatomy is the study of structure and physiology is the study of how a structure functions.
- Atoms form the cell, cells group into tissues, tissues are arranged into organs, organs form organ systems, and together all of the organ systems form the organism.
- To sustain life, an organism must respond to stimuli, digest nutrients, excrete wastes, carry on metabolism, reproduce itself, and grow.
- Homeostasis is necessary for survival and good health; its loss results in illness or disease.
- All anatomical terminology is relative and relates to the body in the anatomical position.

**Alignment to NJSL-S**

HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4

- Define anatomy and physiology.
- Explain how anatomy and physiology are related.
- Name the levels of structural organization that make up the human body and explain how they are related.
- Name the organ systems of the body and briefly state the major functions of each system.
- Classify by organ system all organs discussed.
- Identify the organs discussed on a diagram.
- List the functions that humans must perform to maintain life.
- List the survival needs of the human body.
- Define homeostasis and explain the importance.
- Define negative feedback and describe its role in maintaining homeostasis and normal body function.
- Describe the anatomical position verbally or demonstrate it.
- Use the proper anatomical terminology to describe body directions, surfaces, and body planes.
- Locate the major body cavities and list the chief organs in each cavity.

**Learning Activities**

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

**Assessments**

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

**21<sup>st</sup> Century Skills**

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

**Interdisciplinary Connections**

- Writing
- Math
- History
- Art

**Technology Integration**

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
Basic Chemistry		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• Why is a study of basic chemistry essential to understanding human physiology?</li> <li>• What four elements make up the bulk of all living matter?</li> <li>• What are hydrogen bonds and how are they important in the body?</li> <li>• Why is water so important to body homeostasis?</li> <li>• What are the inorganic and organic compounds essential for life?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• Matter is anything that occupies space and has mass.</li> <li>• Energy forms important in body functioning include chemical, electrical, mechanical, and radiant.</li> <li>• Four elements (carbon, hydrogen, oxygen, and nitrogen) comprise 96% of living matter.</li> <li>• Chemical reactions involve the formation or breaking of chemical bonds.</li> <li>• Water is the single most abundant compound in the body.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Differentiate clearly between matter and energy.</li> <li>• List the major energy forms and provide one example of the use of each energy form.</li> <li>• Define chemical element and list the four elements that form the bulk of body matter.</li> <li>• Explain the relationship between elements and atoms.</li> <li>• List the subatomic particles and describe their relative masses, charges, and positions in the atom.</li> <li>• Define radioisotope and explain briefly how radioisotopes are used in the diagnosis and treatment of disease.</li> <li>• Define molecule and explain its relationship to compounds.</li> <li>• Differentiate between ionic, polar covalent, and nonpolar covalent bonds, and describe the importance of hydrogen bonds.</li> <li>• Distinguish between organic and inorganic compounds.</li> <li>• Differentiate between a salt, an acid, and a base.</li> <li>• Explain the importance of water to body homeostasis.</li> <li>• Compare and contrast carbohydrates, lipids, proteins, and nucleic acids.</li> <li>• Define enzyme and explain the role of enzymes.</li> <li>• Compare and contrast the structure and general functions of DNA and RNA.</li> </ul>		
<b>Learning Activities</b>		
<ul style="list-style-type: none"> <li>• Direct teacher instruction</li> <li>• Demonstrations</li> <li>• Laboratory experiments</li> <li>• Mini-activities (e.g. simulations)</li> <li>• Worksheets (e.g. anatomy coloring book)</li> <li>• Computer-assisted instruction</li> </ul>		

- Cooperative learning - problem solving
- Videos
- Library research

**Assessments**

- Homework
  - Quizzes
  - Tests
  - Projects
  - Inquiry Based Activities
- Class discussion/ group work

**21<sup>st</sup> Century Skills**

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

**Interdisciplinary Connections**

- Writing
- Math
- History
- Art

**Technology Integration**

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
Cells and Tissues		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What functional abilities do all cells exhibit?</li> <li>• Why is mitosis important?</li> <li>• Which of the four major tissue types is most widely distributed in the body?</li> <li>• What is the difference between active and passive transport processes?</li> <li>• How are benign neoplasms different from cancerous neoplasms?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• An understanding of cell structure is basic to understanding how cells support life at the cellular and organism levels.</li> <li>• The nucleus directs cell activity and is necessary for reproduction.</li> <li>• The plasma membrane limits and encloses the cytoplasm and acts as a selective barrier to the movement of substances into and out of the cell.</li> <li>• The characteristics of a tissue remain the same regardless of where it occurs in the body.</li> <li>• Knowledge of these characteristics is basic to understanding how a specific tissue contributes to the function of an organ.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Name the four elements that make up the bulk of living matter and list several trace elements.</li> <li>• Define cell, organelle, and inclusion.</li> <li>• Identify on a cell model or diagram the three major cell regions.</li> <li>• Describe the structures of the nucleus and explain the function of chromatin and nucleoli.</li> <li>• Identify on a cell model or describe the organelles and discuss the major function of each.</li> <li>• Describe the structure of the plasma membrane and explain the various transport processes.</li> <li>• Name the four major tissue types and the chief subcategories of each.</li> <li>• Give the chief locations of the various tissue types in the body.</li> <li>• Describe the process of tissue repair.</li> <li>• Define neoplasm and distinguish between benign and malignant neoplasms.</li> </ul>		
<b>Learning Activities</b>		
<ul style="list-style-type: none"> <li>• Direct teacher instruction</li> <li>• Demonstrations</li> <li>• Laboratory experiments</li> <li>• Mini-activities (e.g. simulations)</li> <li>• Worksheets (e.g. anatomy coloring book)</li> <li>• Computer-assisted instruction</li> </ul>		

Department Science Course Anatomy and Physiology

- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs



<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
Skin and Body Membranes		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What are the structures that comprise the skin?</li> <li>• From what types of damage does skin protect the body?</li> <li>• How does the skin help to regulate body temperature?</li> <li>• What are that factors that determine skin color and what is the function of melanin?</li> <li>• What three changes occur in the skin as one ages?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• Knowledge of membranes and the integumentary system is essential to understanding how the body controls interactions between internal and external environments.</li> <li>• Skin functions include protection from chemicals, bacteria, and drying.</li> <li>• The skin regulates body temperature and contains sensory receptors.</li> <li>• Skin contains sweat glands and sebaceous glands.</li> <li>• The skin is thick, resilient, and well-hydrated in youth but loses its elasticity and thins as aging occurs.</li> </ul>		
<b>Alignment to NJSLS-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• List the general functions of each membrane type—cutaneous, mucous, serous, and synovial and give their location in the body.</li> <li>• List several important functions of the integumentary system and explain how these functions are accomplished.</li> <li>• Identify the major structures of the skin.</li> <li>• Describe the distribution and function of the sebaceous glands, sweat glands, and hair.</li> <li>• Name the factors that determine skin color and describe the function of melanin.</li> <li>• Differentiate between first, second, and third degree burns.</li> <li>• Summarize the characteristics of basal cell carcinoma, squamous cell carcinoma, and malignant melanoma.</li> <li>• List several examples of integumentary system aging.</li> </ul>		
<b>Learning Activities</b>		

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

**Assessments**

- Homework
  - Quizzes
  - Tests
  - Projects
  - Inquiry Based Activities
- Class discussion/ group work

**21<sup>st</sup> Century Skills**

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

**Interdisciplinary Connections**

- Writing
  - Math
  - History
- Art

**Technology Integration**

- Wireless Computer Lab
  - Elmo Projector
  - Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>Two Weeks</b>	
<b>Topic</b>		
The Skeletal System		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What are three functions of the skeletal system?</li> <li>• What are the four major classifications of bones?</li> <li>• What are the most common types of fractures?</li> <li>• What is the function of joints and what three categories are they separated into?</li> <li>• In addition to arthritis, what other conditions or diseases affect the skeletal system?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• The skeleton is arranged to facilitate support and movement of the body as well as protection of vital organs.</li> <li>• Bones store essential nutrients and the organic matrix and bone salts contribute to making bone both hard and flexible.</li> <li>• Common types of fractures are simple, compound, compression, comminuted, and greenstick.</li> <li>• Movement is a characteristic of living things, and the type of joint dictates the possible motions.</li> <li>• Some of the most common diseases or conditions are rheumatoid arthritis, osteoarthritis, and osteoporosis.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Identify the subdivisions of the skeleton as axial or appendicular.</li> <li>• List at least three functions of the skeletal system.</li> <li>• Name the four main kinds of bones.</li> <li>• Identify the major anatomical areas of a long bone.</li> <li>• Explain the role of bone salts and the organic matrix in making bone hard and flexible.</li> <li>• Describe the process of bone formation in the fetus and summarize the events of bone remodeling throughout life.</li> <li>• Name and describe the various types of fractures.</li> <li>• On a skull or diagram, identify and name the bones of the skull.</li> <li>• Name the parts of a typical vertebra and explain in general how the cervical, thoracic, and lumbar</li> </ul>		

vertebrae differ from one another.

- Discuss the importance of the intervertebral disks and spinal curvatures.
- Identify on a diagram the bones of the shoulder and pelvic girdles and their attached limbs.
- Name the three major categories of joints and compare the amount of movement allowed by each.
- Identify some of the causes of bone and joint problems throughout life.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Skills	X	Information Literacy	X	Media Literacy	Collaboration
X	Creativity	X	Critical Thinking	X	Communication	

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>Two Weeks</b>	
<b>Topic</b>		
The Muscular System		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What is the major function of the muscular system?</li> <li>• What are the similarities and differences in the three types of muscle tissue?</li> <li>• What events are involved in muscle cell contraction?</li> <li>• What is the importance of a nerve supply and exercise to a healthy muscular system?</li> <li>• What is the effect of aging on skeletal muscles?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• Knowledge of muscle characteristics and functions is essential to understanding movement and posture, as well as providing a foundation for the study of other organ systems.</li> <li>• The three types of muscle tissue are skeletal, smooth, and cardiac muscle.</li> <li>• Muscle contractions are isotonic or isometric.</li> <li>• Muscles are named according to size, shape, number and location origins, bones associated with, and action of the muscle.</li> <li>• To remain healthy, muscles must be regularly exercised.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Describe the similarities and differences in the three types of muscle tissue and note where they are found in the body.</li> <li>• Describe the structure of skeletal muscle from gross to microscopic levels.</li> <li>• Describe the events of muscle contraction.</li> <li>• Explain the effects of aerobic and resistance exercise on skeletal muscles and other body organs.</li> <li>• Demonstrate or identify the different types of body movements and list some criteria used in naming muscles.</li> <li>• Explain the importance of a nerve supply and exercise in keeping muscles healthy.</li> <li>• Identify the changes that occur in aging muscles.</li> </ul>		

**Learning Activities**

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

**Assessments**

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

**21<sup>st</sup> Century Skills**

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

**Interdisciplinary Connections**

- Writing
- Math
- History
- Art

**Technology Integration**

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
The Nervous System		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What are the structural and functional classifications of the nervous system?</li> <li>• What is a reflex arc?</li> <li>• Why is the medulla the most vital part of the brain?</li> <li>• How does the arrangement of gray matter and white matter differ in the cerebral hemispheres and the spinal cord?</li> <li>• What is the difference in function of the sympathetic and parasympathetic divisions?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• The nervous system coordinates and integrates the functions of other body systems so that they function normally and homeostasis is maintained.</li> <li>• All nervous system structures are classified as part of the CNS (central nervous system) or the PNS (peripheral nervous system).</li> <li>• A reflex arc is a rapid, predictable response to a stimulus.</li> <li>• The cerebral hemispheres form the largest part of the brain.</li> <li>• Alzheimer’s disease is a degenerative brain disease in which abnormal protein deposits appear.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Explain the structural and functional classifications of the nervous system.</li> <li>• State the function of neurons and neuroglia.</li> <li>• Describe the general structure and list the two major functions of a neuron.</li> <li>• Identify the composition of gray matter and white matter.</li> <li>• List the types of sensory receptors and describe the function of each.</li> <li>• Identify and indicate the functions of the major regions of the central nervous system.</li> </ul>		

Department Science Course Anatomy and Physiology

- List two important functions and describe the structure of the spinal cord.
- Describe the general structure of a nerve.
- Identify the cranial nerves by number and by name, and list the major functions of each.
- Identify the site of origin and explain the function of the sympathetic and parasympathetic divisions of the autonomic nervous system.
- List several factors that may have harmful effects on brain development.
- Define senility and note some possible causes.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs



<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
Special Senses		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What are the structures and functions of the eye?</li> <li>• What is the blind spot and why is it called this?</li> <li>• How do the functions of the rods and cones differ?</li> <li>• What are the structures of the outer, middle, and inner ears?</li> <li>• What are the four primary taste sensations?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• The senses allow the body to assess and adjust to the environment in order to support life.</li> <li>• The major internal and external structures of the eye include the pupil, iris, sclera, cornea, retina, and lens.</li> <li>• The major structures of the ear include the stirrup, anvil, hammer, tympanic membrane, cochlea, and auricle.</li> <li>• Problems of aging associated with vision include presbyopia, glaucoma, cataracts, and macular degeneration.</li> <li>• Taste and smell are most acute at birth and decrease in sensitivity after the age of 40 as the receptors decrease.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Identify the accessory structures of the eye and list the functions of each.</li> <li>• Explain the difference in rod and cone function.</li> <li>• Describe image formation on the retina.</li> <li>• Trace the visual pathway to the optic cortex.</li> <li>• Discuss the importance of the papillary and convergence reflexes.</li> <li>• Identify the structures of the external, middle, and internal ear, and list the functions of each.</li> </ul>		

Department Science Course Anatomy and Physiology

- Describe how the equilibrium organs help maintain balance.
- Define sensorineural and conductive deafness and list possible causes of each.
- Explain how one is able to localize the source of a sound.
- Describe the location, structure, and function of the olfactory and taste receptors.
- Name the four basic taste sensations and list factors that modify the sense of taste.
- Discuss that occur in the special sense organs with age.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
The Endocrine System		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What are the major endocrine organs of the body?</li> <li>• In what way(s) are endocrine glands stimulated to release their hormones?</li> <li>• What controls the release of hormones by the anterior pituitary?</li> <li>• Which two hormones are involved in the regulation of the fluid and electrolyte balance of the body?</li> <li>• What are some problems individuals have as a result of a decrease in hormone production?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• The endocrine system controls and regulates metabolic processes to maintain a relatively constant internal environment and yet meet the changing needs of the body.</li> <li>• The major endocrine organs of the body include the pituitary, thyroid, parathyroid, adrenal, pineal, and thymus glands, the pancreas, and the gonads.</li> <li>• Endocrine organs are activated to release their hormones into the blood by hormonal, humoral, or neural stimuli.</li> <li>• In general, the endocrine system becomes less efficient as we age which could lead to diabetes and depression of the immune system.</li> <li>• In addition to the major endocrine organs, pockets of hormone-producing cells are found in the walls of the small intestine, stomach, kidneys, and heart.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		

- Define hormone and describe how they bring about their effects in the body.
- Describe the difference between endocrine and exocrine glands.
- Using a diagram, identify the major endocrine glands and tissues.
- List hormones produced by the endocrine glands and discuss their general functions.
- Explain the functional relationship between the hypothalamus and the pituitary gland.
- Indicate the endocrine role of the kidneys, stomach, intestine, heart, and the placenta.
- Describe the effect of aging on the endocrine system and body homeostasis.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
Blood		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What is the blood volume of an average-sized adult?</li> <li>• What are the living blood cells that make up about 45% of whole blood?</li> <li>• What is the liquid portion of blood called and what is it mostly comprised of?</li> <li>• What is anemia and what are the possible causes?</li> <li>• What conditions are seen with an increase in the number of white blood cells?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• The structure of blood helps meet the oxygenation needs of the cells, allows recognition and rejection of foreign protein, and controls the coagulation of blood.</li> <li>• The three major components of blood are erythrocytes (RBCs), leukocytes (WBCs) and platelets.</li> <li>• When bacteria, viruses, or other foreign substances invade the body, WBCs increase in number to fight them in various ways.</li> <li>• The blood group most commonly typed for is ABO.</li> <li>• Platelets are necessary for the clotting process that occurs in plasma when blood vessels are ruptured.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4
<b>Key Concepts and Skills</b>		
<ul style="list-style-type: none"> <li>• Describe the composition and volume of whole blood.</li> <li>• Describe the composition of plasma and discuss its importance in the body.</li> <li>• List the cell types comprising the formed elements and describe the major functions of each type.</li> <li>• Describe the blood-clotting process and identify factors that may inhibit or enhance it.</li> </ul>		

- Identify the ABO and Rh blood groups.
- Indicate blood disorders that increase in frequency in the aged.

**Learning Activities**

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

**Assessments**

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

**21<sup>st</sup> Century Skills**

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

**Interdisciplinary Connections**

- Writing
- Math
- History
- Art

**Technology Integration**

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>Two Weeks</b>	
<b>Topic</b>		
The Circulatory System		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What are the major structures of the circulatory system?</li> <li>• How does the heart’s ability to contract differ from that of other muscles of the body?</li> <li>• What vital role does blood pressure play?</li> <li>• What are varicose veins and what factors promote their formation?</li> <li>• What is the most important function of the lymphatic vessels and the lymph nodes?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• In conjunction with blood and the respiratory system, the cardiovascular system transports oxygen and nutrients to the cells, and transports wastes away from the cells.</li> <li>• The majority of the heart is composed of cardiac muscle. It has four hollow chambers (two atria and two ventricles).</li> <li>• Arteries carry blood away from the heart and veins transport it back.</li> <li>• Blood pressure is the pressure that blood exerts on the walls of the blood vessels.</li> <li>• Arteriosclerosis is an expected consequence of aging. Cardiovascular disease is an important cause of death in individuals over age 65.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4

### Key Concepts and Skills

- Describe the location of the heart in the body and identify its major anatomical areas.
- Trace the pathway of blood through the heart.
- Define systole, diastole, stroke volume, and cardiac cycle.
- Explain the operation of the heart valves and define heart sounds and murmur.
- Explain what information can be gained from an electrocardiogram.
- Compare and contrast the structure and function of arteries, veins, and capillaries.
- List factors affecting and or determining blood pressure.
- Define hypertension and atherosclerosis and describe health consequences of these conditions.
- Explain how the lymphatic system is functionally related to cardiovascular and immune systems.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs



<b>Time Frame</b>	<b>One Week</b>	
<b>Topic</b>		
The Respiratory System		
<b>Essential Questions</b>		
<ul style="list-style-type: none"> <li>• What is the main function of respiration?</li> <li>• What are the major organs of the respiratory system?</li> <li>• What is the difference between external and internal respiration?</li> <li>• What two chemical factors modify respiratory rate and depth?</li> <li>• What are the major respiratory disorders?</li> </ul>		
<b>Enduring Understandings</b>		
<ul style="list-style-type: none"> <li>• Knowledge of how air is taken into the lungs and oxygen and carbon dioxide exchanged, as well as how this is controlled, is vital to understanding how cells produce energy to sustain life.</li> <li>• The organs of the respiratory system include the nose, pharynx, larynx, trachea, bronchi, and the lungs.</li> <li>• Breathing, or pulmonary ventilation, is a mechanical process that depends on volume changes occurring in the thoracic cavity.</li> <li>• The major respiratory disorders are emphysema, bronchitis, and lung cancer.</li> <li>• Changes in blood levels of carbon dioxide are the most important stimuli affecting respiratory rhythm.</li> </ul>		
<b>Alignment to NJSL-S</b>		
HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4

### Key Concepts and Skills

- Name the organs forming the respiratory passageway from the nasal cavity to the alveoli of the lungs and describe the function of each.
- Describe the structure and function of the lungs and the pleural coverings.
- Explain how the respiratory muscles cause volume changes that lead to air flow into and out of the lungs.
- Name brain areas involved in the control of respiration and name several physical factors that influence respiratory rate.
- Describe the symptoms and probable causes of COPD and lung cancer.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>Two Weeks</b>
<b>Topic</b>	
The Digestive System and Body Metabolism	
<b>Essential Questions</b>	
<ul style="list-style-type: none"> <li>• What is the main function of digestion?</li> <li>• What are the major organs of the digestive system?</li> <li>• What are the three pairs of salivary glands called and what are two functions of saliva?</li> <li>• Why is it necessary for the stomach contents to be so acidic?</li> <li>• What are the most common conditions or disorders that are related to the digestive system?</li> </ul>	
<b>Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>• Knowledge of the digestive systems illustrates how fuel is made available for metabolism, which enables the cells to function, grow, and reproduce.</li> <li>• The digestive system consists of a hollow tube extending from the mouth to anus (alimentary canal) and several accessory digestive organs.</li> <li>• The major organs of alimentary canal include the mouth (lips, cheeks, teeth, tongue, palate), pharynx, esophagus, stomach, small intestine, and the large intestine.</li> <li>• Some of the accessory organs of the digestive system include the pancreas, liver, gall bladder, and the salivary glands.</li> <li>• Metabolism includes all chemical breakdown and building reactions needed to maintain life.</li> </ul>	
<b>Alignment to NJSL-S</b>	
HS-PS1-5	HS-LS1-3
HS-LS3-3	

Department Science

Course Anatomy and Physiology

HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4

### Key Concepts and Skills

- Name the organs of the alimentary canal and accessory digestive organs and identify their location.
- Identify the overall function of the digestive system as digestion and absorption of foodstuffs, and describe the general activities of each of the digestive system organs.
- Describe the composition and function(s) of saliva.
- Describe how foodstuffs in the digestive tract are mixed and moved along the tract.
- List the major enzymes or enzyme groups produced by the digestive organs or accessory glands and name the foodstuffs on which they act.
- List the six major nutrient categories. Note important dietary sources and the main cellular uses of each.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>
<b>Topic</b>	
The Urinary System	
<b>Essential Questions</b>	
<ul style="list-style-type: none"> <li>• What are the organs of the urinary system and their general function?</li> <li>• In addition to eliminating the body of wastes, what are three other ways the kidney adjusts blood chemistry?</li> <li>• What three substances not normally found in urine are normally found in the blood?</li> <li>• What type of problem most commonly affects the urinary system organs?</li> <li>• What changes occur with the kidneys and bladder function because of old age?</li> </ul>	
<b>Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>• The urinary system helps maintain homeostasis by excreting nitrogenous waste products and selectively excreting or retaining water and electrolytes.</li> <li>• The kidneys are the major organs that comprise the urinary system.</li> <li>• The ureters connect each kidney to the urinary bladder which functions to store urine.</li> <li>• The urethra is a tube that leads urine from the bladder to the outside of the body.</li> <li>• Renal failure is a problem in which the kidneys are unable to concentrate urine and dialysis must be done to maintain chemical homeostasis of blood.</li> </ul>	
<b>Alignment to NJSL-S</b>	

Department Science

Course Anatomy and Physiology

HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4

### Key Concepts and Skills

- Describe the location of the kidneys in the body.
- Recognize that the nephron is the structural and functional unit of the kidney and describe its anatomy.
- Explain the process of urine formation, identifying the areas of the nephron that are responsible for filtration, reabsorption, and secretion and describe the composition of urine.
- Identify the general structure and function of the ureters, bladder, and urethra.
- Name three common urinary tract problems and explain the effects of aging on the urinary system.

### Learning Activities

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

### Assessments

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

### 21<sup>st</sup> Century Skills

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

### Interdisciplinary Connections

- Writing
- Math
- History
- Art

### Technology Integration

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector
- Computer Based Programs

<b>Time Frame</b>	<b>One Week</b>
<b>Topic</b>	
The Reproductive System	
<b>Essential Questions</b>	
<ul style="list-style-type: none"> <li>• What are the organs of the male reproductive system and their general function?</li> <li>• What are the organs of the female reproductive system and their general function?</li> <li>• What is spermatogenesis and when does it occur?</li> <li>• What are the events of the menstrual cycle and why is it so important?</li> <li>• What are the stages of reproduction from fertilization to childbirth?</li> </ul>	
<b>Enduring Understandings</b>	
<ul style="list-style-type: none"> <li>• Reproductive systems are essential to the survival of the species, but not to survival of the individual.</li> <li>• Understanding the processes of sexual function provides an enlightened understanding of humans as sexual beings.</li> <li>• Spermatogenesis begins at puberty in the seminiferous tubules that involves meiosis.</li> <li>• The menstrual cycle concerns changes in the endometrium in response to hormones and if fertilization does not occur, the phases are repeated every 28 days.</li> </ul>	

- The reproductive system is inactive during childhood. Reproductive organs mature and become functional for childbearing at puberty.

**Alignment to NJSL-S**

HS-PS1-5	HS-LS1-3	HS-LS3-3
HS-PS1-6	HS-LS1-4	HS-LS4-2
HS-LS1-1	HS-LS3-1	HS-LS4-3
HS-LS1-2	HS-LS3-2	HS-LS4-4

**Key Concepts and Skills**

- Identify the organs of the male reproductive system and discuss the general functions of each.
- Identify the organs of the female reproductive system and discuss the general functions of each.
- Discuss the composition of semen and name the glands that produce it.
- Explain the location of the following regions of the female uterus: cervix, fundus, body.
- Define meiosis, oogenesis, and spermatogenesis.
- Describe the influence of FSH and LH on ovarian function and testis functioning.
- Describe the phases and controls of the menstrual cycle.
- Identify the stages of reproduction from fertilization to birth.
- List common reproductive system problems seen in adult and aging males and females.

**Learning Activities**

- Direct teacher instruction
- Demonstrations
- Laboratory experiments
- Mini-activities (e.g. simulations)
- Worksheets (e.g. anatomy coloring book)
- Computer-assisted instruction
- Cooperative learning - problem solving
- Videos
- Library research

**Assessments**

- Homework
- Quizzes
- Tests
- Projects
- Inquiry Based Activities
- Class discussion/ group work

**21<sup>st</sup> Century Skills**

X	Creativity	X	Critical Thinking	X	Communication	X	Collaboration
X	Skills	X	Information Literacy	X	Media Literacy		

**Interdisciplinary Connections**

- Writing
- Math
- History
- Art

**Technology Integration**

- Wireless Computer Lab
- Elmo Projector
- Overhead Projector



- Computer Based Programs