

# Seymour Public Schools Curriculum

## Anatomy and Physiology

Most of us are naturally curious about our bodies; we want to know what makes us tick. This curiosity is even seen in infants, who can keep themselves happy for a long time staring at their own hands or pulling their mother's nose. Older children wonder where food goes when they swallow it, and some believe that they will grow a watermelon in their belly if they swallow the seeds. They scream loudly when approached by medical personnel (fearing shots that sting), but they like to play doctor. Adults become upset when their hearts pound, when they have uncontrollable hot flashes, or when they cannot keep their weight down.

Anatomy and physiology, explore many of these topics as they describe how our bodies are put together and how they work.

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Grade: 12	<b>Subject: Anatomy and Physiology</b> <b>The Human Body: An Orientation</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> </ul>
<b>Enduring Understanding</b>	Through the study of anatomy and physiology the students will explore topics which describe how their bodies are put together and how they work.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• Why is an understanding of <i>anatomy</i> and <i>physiology</i> important?</li> <li>• How is the study anatomy and physiology related?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Body systems have a homeostatic role in maintaining the proper body functions.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>An Overview of Anatomy and Physiology</b></p> <ul style="list-style-type: none"> <li>• Define <i>anatomy</i> and <i>physiology</i>.</li> <li>• Explain how anatomy and physiology are related.</li> </ul> <p><b>Levels of Structural Organization</b></p> <ul style="list-style-type: none"> <li>• Name the levels of structural organization that make up the human body and explain how they are related.</li> <li>• Name the organ systems of the body and briefly state the major functions of each system.</li> <li>• Classify by organ system all organs discussed.</li> <li>• Identify the organs shown on a diagram or a dissectible torso.</li> </ul> <p><b>Maintaining Life</b></p> <ul style="list-style-type: none"> <li>• List functions that humans must perform to maintain life.</li> <li>• List the survival needs of the human body.</li> </ul> <p><b>Homeostasis</b></p> <ul style="list-style-type: none"> <li>• Define <i>homeostasis</i> and explain its importance.</li> <li>• Define <i>negative feedback</i> and describe its role in maintaining homeostasis and normal body function.</li> </ul> <p><b>The Language of Anatomy</b></p> <ul style="list-style-type: none"> <li>• Describe the anatomical position verbally or demonstrate it.</li> <li>• Use proper anatomical terminology to describe body directions, surfaces, and body planes.</li> <li>• Locate the major body cavities and list the chief organs in each cavity.</li> </ul>

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<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments Who Am I? Project Cloning Article Reading for Information

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Grade: 12	<b>Subject: Anatomy and Physiology Basic Chemistry</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ The bonding characteristics of carbon allow the formation of many different organic molecules of varied sizes, shapes and chemical properties, and provide the biochemical basis of life.</li> </ul>
<b>Enduring Understanding</b>	The basics of chemistry and biochemistry (the chemistry of living material), provides an understanding of body functions.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How do chemical processes maintain body functions and homeostasis?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ Large molecules (polymers), such as proteins, nucleic acids and starch, are formed by repetitive combinations of organic monomers.</li> <li>▪ The bonding characteristics of carbon result in the formation of a large variety of structures, ranging from simple hydrocarbons to complex biological molecules and synthetic polymers.</li> <li>▪ Amino acids are the building blocks of proteins.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Concepts of Matter and Energy</b></p> <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 how each energy form is used in the body.</li> </ul> <p><b>Composition of Matter</b></p> <ul style="list-style-type: none"> <li>• Define <i>chemical element</i> and list the four elements that form the bulk of body matter.</li> <li>• Explain how elements and atoms are related.</li> <li>• List the subatomic particles and describe their relative masses, charges, and positions in the atom.</li> <li>• Define <i>radioisotope</i> and describe briefly how radioisotopes are used in the diagnosis and treatment of disease.</li> </ul> <p><b>Molecules and Compounds</b></p> <ul style="list-style-type: none"> <li>• Recognize that chemical reactions involve the interaction of electrons to make and break chemical bonds.</li> <li>• Define <i>molecule</i> and explain how molecules are related to compounds.</li> </ul> <p><b>Chemical Bonds and Chemical Reactions</b></p> <ul style="list-style-type: none"> <li>• Differentiate between ionic, polar covalent and nonpolar covalent bonds, and describe the importance of hydrogen bonds.</li> <li>• Contrast synthesis, decomposition, and exchange reactions.</li> </ul> <p><b>Biochemistry: The Chemical Composition of Living Matter</b></p> <ul style="list-style-type: none"> <li>• Distinguish between organic and inorganic compounds.</li> <li>• Differentiate clearly between a salt, an acid, and a base.</li> <li>• List several salts (or their ions) vitally important to body functioning.</li> </ul>

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<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Enzyme Lab Testing for Organic Macromolecules	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments

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Grade: 12	<b>Subject: Anatomy and Physiology Cells and Tissues</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (<i>homeostatic</i>) despite changes in the outside environment.</li> </ul>
<b>Enduring Understanding</b>	The human body has trillions of microscopic building blocks called cells, the organization and structure of the cells supports life.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How are animal cells organized and categorized?</li> <li>• What are the major tissues found in the human body and how do they function?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Cells</b></p> <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 <i>cell</i>, <i>organelle</i>, and <i>inclusion</i>.</li> <li>• Identify on a cell model or diagram the three major cell regions (nucleus, cytoplasm, and plasma membrane).</li> <li>• List the structures of the nucleus and explain the function of chromatin and nucleoli.</li> <li>• Identify the organelles on a cell model or describe them, and discuss the major function of each.</li> <li>• Define <i>selective permeability</i>, <i>diffusion</i> (including <i>simple</i> and <i>facilitated diffusion</i> and <i>osmosis</i>), <i>active transport</i>, <i>passive transport</i>, <i>solute pumping</i>, <i>exocytosis</i>, <i>endocytosis</i>, <i>phagocytosis</i>, <i>bulk-phase endocytosis</i>, <i>hypertonic</i>, <i>hypotonic</i>, and <i>isotonic</i>.</li> <li>• Describe the structure of the plasma membrane, and explain how the various transport processes account for the directional movements of specific substances across the plasma membrane.</li> <li>• Describe briefly the process of DNA replication and of mitosis. Explain the importance of mitotic cell division.</li> <li>• In relation to protein synthesis, describe the roles of DNA and of the three varieties of RNA.</li> <li>• Name some cell types and relate their overall shape and internal structure to their special functions.</li> </ul> <p><b>Body Tissues</b></p> <ul style="list-style-type: none"> <li>• Name the four major tissue types and their chief subcategories. Explain how the four major tissue types differ structurally and functionally.</li> <li>• Give the chief locations of the various tissue types in the body.</li> <li>• Describe the process of tissue repair (wound healing).</li> </ul> <p><b>Developmental Aspects of Cells and Tissues</b></p> <ul style="list-style-type: none"> <li>• Define <i>neoplasm</i>, and distinguish between benign and malignant neoplasms.</li> <li>• Explain the significance of the fact that some tissue types (muscle and nerve) are largely amitotic after the growth stages are over.</li> </ul>

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<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments Breast Cancer Paper and Poster Histology Drawings

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology Skin and Body Membranes</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ Organisms have a variety of mechanisms to combat disease.</li> </ul>
<b>Enduring Understanding</b>	The cutaneous membrane, generally called the skin or integumentary system, is an important organ which protects us and sustains life.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How do body membranes, which cover surfaces, line body cavities, and form protective sheets around organs, differ from one another?</li> <li>• How do body membranes, which cover surfaces, line body cavities, and form protective sheets around organs, help support life?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ The skin provides nonspecific defenses against infection.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Classification of Body Membranes</b></p> <ul style="list-style-type: none"> <li>• List the general functions of each membrane type-cutaneous, mucous, serous, and synovial-and give its location in the body.</li> <li>• Compare the structure (tissue makeup) of the major membrane types.</li> </ul> <p><b>Integumentary System (Skin)</b></p> <ul style="list-style-type: none"> <li>• List several important functions of the integumentary system and explain how these functions are accomplished.</li> <li>• When provided with a model or diagram of the skin, recognize and name the following skin structures: epidermis, dermis (papillary and reticular layers), hair and hair follicle, sebaceous gland, and sweat gland.</li> <li>• Name the layers of the epidermis and describe the characteristics of each.</li> <li>• Describe the distribution and function of the epidermal derivatives-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>• Explain the importance of the "rule of nines."</li> <li>• Summarize the characteristics of basal cell carcinoma, squamous cell carcinoma, and malignant melanoma.</li> </ul> <p><b>Developmental Aspects of Skin and Body Membranes</b></p> <ul style="list-style-type: none"> <li>• List several examples of integumentary system aging.</li> </ul>



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<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments

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Grade: 12	<b>Subject: Anatomy and Physiology</b> <b>The Skeletal System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	Our internal framework is so beautifully designed and engineered that it puts any modern skyscraper to shame. Strong, yet light, it is perfectly adapted for its functions of body protection and motion.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does our skeletal system enable us to move?</li> <li>• How does our skeletal system protect our vital organs?</li> <li>• How does our skeletal system provide support for all other life functions?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Body systems have a homeostatic role in maintaining the proper body functions.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Bones: An Overview</b></p> <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 both hard and flexible.</li> <li>• Describe briefly 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> </ul> <p><b>Axial Skeleton</b></p> <ul style="list-style-type: none"> <li>• On a skull or diagram, identify and name the bones of the skull.</li> <li>• Describe how the skull of a newborn infant (or fetus) differs from that of an adult, and explain the function of fontanelles.</li> <li>• Name the parts of a typical vertebra and explain in general how the cervical, thoracic, and lumbar vertebrae differ from one another.</li> <li>• Discuss the importance of the intervertebral discs and spinal curvatures.</li> <li>• Explain how the abnormal spinal curvatures (scoliosis, lordosis, and kyphosis) differ from one another.</li> </ul> <p><b>Appendicular Skeleton</b></p> <ul style="list-style-type: none"> <li>• Identify on a skeleton or diagram the bones of the shoulder and pelvic girdles and their attached limbs.</li> <li>• Describe important differences between a male and female pelvis.</li> </ul> <p><b>Joints</b></p> <ul style="list-style-type: none"> <li>• Name the three major categories of joints and compare the amount of movement allowed by each.</li> </ul> <p><b>Developmental Aspects of the Skeleton</b></p> <ul style="list-style-type: none"> <li>• Identify some of the causes of bone and joint problems throughout life.</li> </ul>

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<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Reading X-rays & MRIs Movie on surgical replacement of the hip	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments Construct human skeleton from disarticulated bones

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Muscular System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	The primary function of muscle is <i>contraction</i> , or <i>shortening</i> -a unique characteristic that sets it apart from any other body tissue. As a result of this ability, muscles are responsible for essentially all body movement and can be viewed as the "machines" of the body.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What are the different types of muscles in the body and how do they work?</li> <li>• How do muscles help us move?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The role of the mitochondria is to make stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.</li> <li>▪ The nervous system mediates communication between different parts of the body and the body's interactions with the environment.</li> <li>▪ Actin, myosin, Ca<sup>2+</sup> and ATP have a role in the cellular and molecular basis of muscle contraction.</li> <li>▪ Hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.</li> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Body systems have a homeostatic role in maintaining the proper body functions.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Skeletal Muscle Activity</b></p> <ul style="list-style-type: none"> <li>• Describe how an action potential is initiated in a muscle cell.</li> <li>• Describe the events of muscle cell contraction.</li> <li>• Define <i>graded response</i>, <i>tetanus</i>, <i>isotonic</i> and <i>isometric contractions</i>, and <i>muscle tone</i> as these terms apply to a skeletal muscle.</li> <li>• Describe three ways in which ATP is regenerated during muscle activity.</li> <li>• Define <i>oxygen debt</i> and <i>muscle fatigue</i> and list possible causes of muscle fatigue.</li> <li>• Describe the effects of aerobic and resistance exercise on skeletal muscles and other body organs.</li> </ul> <p><b>Muscle Movements, Types, and Names</b></p> <ul style="list-style-type: none"> <li>• Define <i>origin</i>, <i>insertion</i>, <i>prime mover</i>, <i>antagonist</i>, <i>synergist</i>, and <i>fixator</i> as they relate to muscles.</li> <li>• Demonstrate or identify the different types of body movements.</li> <li>• List some criteria used in naming muscles.</li> </ul> <p><b>Gross Anatomy of Skeletal Muscles</b></p> <ul style="list-style-type: none"> <li>• Name and locate the major muscles of the human body (on a torso model, muscle chart, or diagram) and state the action of each.</li> </ul> <p><b>Developmental Aspects of the Muscular System</b></p>

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	<ul style="list-style-type: none"> <li>• Explain the importance of a nerve supply and exercise in keeping muscles healthy.</li> <li>• Describe the changes that occur in aging muscles.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction  Overhead Projections  Small Group Collaborative Work  Laboratory Work  Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook  Laboratory Manual  Laboratory Materials  Computers for On-Line Activity Access</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes  Student Self Tests  Summative Tests  Laboratory Activities  On-Line Self Assessments</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Nervous System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	The nervous system is the master controlling and communicating system of the body. Every thought, action, and emotion reflects its activity. Its signaling device, or means of communicating with body cells, is electrical impulses, which are rapid and specific and cause almost immediate responses.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What are the different types of nerve tissue in the body and how do they work?</li> <li>• How do muscles help us move?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The nervous system mediates communication between different parts of the body and the body's interactions with the environment.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ The neurons transmit electrochemical impulses.</li> <li>▪ Sensory neurons, interneurons and motor neurons all have a role in sensation, thought and response.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Body systems have a homeostatic role in maintaining the proper body functions.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Organization of the Nervous System</b></p> <ul style="list-style-type: none"> <li>• List the general functions of the nervous system.</li> <li>• Explain the structural and functional classifications of the nervous system.</li> <li>• Define <i>central nervous system</i> and <i>peripheral nervous system</i> and list the major parts of each.</li> </ul> <p><b>Nervous Tissue: Structure and Function</b></p> <ul style="list-style-type: none"> <li>• State the function of neurons and neuroglia.</li> <li>• Describe the general structure of a neuron and name its important anatomical regions.</li> <li>• Describe the composition of gray matter and white matter.</li> <li>• List the two major functional properties of neurons.</li> <li>• Classify neurons according to structure and function.</li> <li>• List the types of general sensory receptors and describe their functions.</li> <li>• Describe the events that lead to the generation of a nerve impulse and its conduction from one neuron to another.</li> <li>• Define <i>reflex arc</i> and list its elements.</li> </ul> <p><b>Central Nervous System</b></p> <ul style="list-style-type: none"> <li>• Identify and indicate the functions of the major regions of the cerebral hemispheres, diencephalon, brain stem, and</li> </ul>

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<p>cerebellum on a human brain model or diagram.</p> <ul style="list-style-type: none"> <li>• Name the three meningeal layers and state their functions.</li> <li>• Discuss the formation and function of cerebrospinal fluid and the blood-brain barrier.</li> <li>• Compare the signs of a CVA with those of Alzheimer's disease; of a contusion with those of a concussion.</li> <li>• Define <i>EEG</i> and explain how it evaluates neural functioning.</li> <li>• List two important functions of the spinal cord.</li> <li>• Describe spinal cord structure.</li> </ul> <p><b>Peripheral Nervous System</b></p> <ul style="list-style-type: none"> <li>• Describe the general structure of a nerve.</li> <li>• Identify the cranial nerves by number and by name, and list the major functions of each.</li> <li>• Describe the origin and fiber composition of (a) ventral and dorsal roots, (b) the spinal nerve proper, and (c) ventral and dorsal rami.</li> <li>• Discuss the distribution of the dorsal and ventral rami of spinal nerves.</li> <li>• Name the four major nerve plexuses, give the major nerves of each, and describe their distribution.</li> <li>• Identify the site of origin and explain the function of the sympathetic and parasympathetic divisions of the autonomic nervous system.</li> <li>• Contrast the effect of the parasympathetic and sympathetic divisions on the following organs: heart, lungs, digestive system, blood vessels.</li> </ul> <p><b>Developmental Aspects of the Nervous System</b></p> <ul style="list-style-type: none"> <li>• List several factors that may have harmful effects on brain development.</li> <li>• Briefly describe the cause, signs, and consequences of the following congenital disorders: spina bifida, anencephaly, cerebral palsy.</li> <li>• Explain the decline in brain size and weight that occurs with age.</li> <li>• Define <i>senility</i> and list some possible causes.</li> </ul>		
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Dissection of individual muscle groups</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology Special Senses</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	In addition to touch there are five "special" senses-smell, taste, sight, and hearing and <i>equilibrium</i> which is housed in the ear, these special senses keep us in touch with what is going on in the external world.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What is the functional anatomy of the special sense organs?</li> <li>• How do the special sense organs work?</li> <li>• What impact does the blending of the special senses have on life processes?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The nervous system mediates communication between different parts of the body and the body's interactions with the environment.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Sensory neurons, interneurons and motor neurons all have a role in sensation, thought and response.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>The Eye and Vision</b></p> <ul style="list-style-type: none"> <li>• When provided with a model or diagram, identify the accessory eye structures and list the functions of each.</li> <li>• Name the eye tunics and indicate the major function of each.</li> <li>• Explain how rod and cone function differ.</li> <li>• Describe image formation on the retina.</li> <li>• Trace the pathway of light through the eye to the retina.</li> <li>• Discuss the importance of an ophthalmoscopic examination.</li> <li>• Define the following terms: <i>accommodation, astigmatism, blind spot, cataract, emmetropia, glaucoma, hyperopia, myopia, and refraction.</i></li> <li>• Trace the visual pathway to the optic cortex.</li> <li>• Discuss the importance of the pupillary and convergence reflexes.</li> </ul> <p><b>The Ear: Hearing and Balance</b></p> <ul style="list-style-type: none"> <li>• Identify the structures of the external, middle, and internal ear, and list the functions of each.</li> <li>• Explain the function of the organ of Corti in hearing.</li> <li>• Define <i>sensorineural</i> and <i>conductive deafness</i> and list possible causes of each.</li> <li>• Explain how one is able to localize the source of a sound.</li> <li>• Describe how the equilibrium organs help maintain balance.</li> </ul> <p><b>Chemical Senses: Taste and Smell</b></p>



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	<ul style="list-style-type: none"> <li>Describe the location, structure, and function of the olfactory and taste receptors.</li> <li>Name the four basic taste sensations and list factors that modify the sense of taste.</li> </ul> <p><b>Developmental Aspects of the Special Senses</b></p> <ul style="list-style-type: none"> <li>Describe changes that occur with age in the special sense organs.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction          Overhead Projections          Small Group Collaborative Work          Laboratory Work          Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook          Laboratory Manual          Laboratory Materials          Computers for On-Line Activity Access</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes          Student Self Tests          Summative Tests          Laboratory Activities          On-Line Self Assessments</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Endocrine System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	Although hormones have widespread and varied effects, the major processes controlled by hormones are reproduction; growth and development; mobilizing body defenses against stressors; maintaining electrolyte, water, and nutrient balance of the blood; and regulating cellular metabolism and energy balance. As you can see, the endocrine system regulates processes that go on for relatively long periods and, in some cases, continuously.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How do hormones regulate body functions?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>The Endocrine System and Hormone Function: An Overview</b></p> <ul style="list-style-type: none"> <li>• Define <i>hormone</i> and <i>target organ</i>.</li> <li>• Describe how hormones bring about their effects in the body.</li> <li>• Explain how various endocrine glands are stimulated to release their hormonal products.</li> <li>• Define <i>negative feedback</i> and describe its role in regulating blood levels of the various hormones.</li> </ul> <p><b>The Major Endocrine Organs</b></p> <ul style="list-style-type: none"> <li>• Describe the difference between endocrine and exocrine glands.</li> <li>• On an appropriate diagram, identify the major endocrine glands and tissues.</li> <li>• List hormones produced by the endocrine glands and discuss their general functions.</li> <li>• Discuss ways in which hormones promote body homeostasis by giving examples of hormonal actions.</li> <li>• Describe the functional relationship between the hypothalamus and the pituitary gland.</li> <li>• Describe major pathological consequences of hypersecretion and hyposecretion of the hormones.</li> </ul> <p><b>Other Hormone-Producing Tissues and Organs</b></p> <ul style="list-style-type: none"> <li>• Indicate the endocrine role of the kidneys, the stomach and intestine, the heart, and the placenta.</li> </ul> <p><b>Developmental Aspects of the Endocrine System</b></p> <ul style="list-style-type: none"> <li>• Describe the effect of aging on the endocrine system and body homeostasis.</li> </ul>

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<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments Paper on an endocrine disorder

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Grade: 12	<b>Subject: Anatomy and Physiology Blood</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> <li>▪ Organisms have a variety of mechanisms to combat disease.</li> </ul>
<b>Enduring Understanding</b>	Blood is the "river of life" that surges within us. It transports everything that must be carried from one place to another within the body-nutrients, wastes (headed for elimination from the body), and body heat-through blood vessels.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• What are the components of our blood?</li> <li>• How does the circulatory system maintain homeostasis?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ The kidneys have a homeostatic role in the removal of nitrogenous wastes from the blood.</li> <li>▪ The liver has a homeostatic role in detoxification and keeping the blood glucose balance.</li> <li>▪ Antibodies have a role in the body's response to infection.</li> <li>▪ An individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign.</li> <li>▪ Phagocytes, B-lymphocytes and T-lymphocytes have a role in the immune system.</li> <li>▪ Hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Composition and Functions of Blood</b></p> <ul style="list-style-type: none"> <li>• Indicate 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 making up the formed elements and describe the major functions of each type.</li> <li>• Define <i>anemia</i>, <i>polycythemia</i>, <i>leucopenia</i>, and <i>leukocytosis</i>, and list possible causes for each condition.</li> <li>• Explain the role of the hemocytoblast.</li> </ul> <p><b>Hemostasis</b></p> <ul style="list-style-type: none"> <li>• Describe the blood-clotting process.</li> <li>• Name some factors that may inhibit or enhance the blood-clotting process.</li> </ul> <p><b>Blood Groups and Transfusions</b></p> <ul style="list-style-type: none"> <li>• Describe the ABO and Rh blood groups.</li> <li>• Explain the basis for a transfusion reaction.</li> </ul>

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	<b>Developmental Aspects of Blood</b> <ul style="list-style-type: none"> <li>• Explain the basis of physiologic jaundice seen in some newborn babies.</li> <li>• Indicate blood disorders that increase in frequency in the aged.</li> </ul>	
<b>Strategies/Modes (examples)</b>  Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	<b>Materials/Resources (examples)</b>  Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Blood Typing Activity	<b>Assessments (examples)</b>  Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments

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Grade: 12	<b>Subject: Anatomy and Physiology The Cardiovascular System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	The major function of the cardiovascular system is transportation. Using blood as the transport vehicle, the system carries oxygen, nutrients, cell wastes, hormones, and many other substances vital for body homeostasis to and from the cells.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• Describe the structures of the cardiovascular system?</li> <li>• How does the cardiovascular system work?</li> <li>• What must we do to maintain cardiovascular health?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Cardiovascular System: The Heart</b></p> <ul style="list-style-type: none"> <li>• Describe the location of the heart in the body and identify its major anatomical areas on an appropriate model or diagram.</li> <li>• Trace the pathway of blood through the heart.</li> <li>• Compare the pulmonary and systemic circuits.</li> <li>• Explain the operation of the heart valves.</li> <li>• Name the functional blood supply of the heart.</li> <li>• Name the elements of the intrinsic conduction system of the heart and describe the pathway of impulses through this system.</li> <li>• Define <i>systole</i>, <i>diastole</i>, <i>stroke volume</i>, and <i>cardiac cycle</i>.</li> <li>• Define <i>heart sounds</i> and <i>murmur</i>.</li> <li>• Explain what information can be gained from an electrocardiogram.</li> <li>• Describe the effect of the following on heart rate: stimulation by the vagus nerve, exercise, epinephrine, and various ions.</li> </ul> <p><b>Cardiovascular System: Blood Vessels</b></p> <ul style="list-style-type: none"> <li>• Compare and contrast the structure and function of arteries, veins, and capillaries.</li> <li>• Identify the body's major arteries and veins and name the body region supplied by each.</li> <li>• Discuss the unique features of special circulations of the body: arterial circulation of the brain, hepatic portal circulation, and fetal circulation.</li> <li>• Define <i>blood pressure</i> and <i>pulse</i> and name several pulse points.</li> <li>• List factors affecting and/or determining blood pressure.</li> </ul>

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	<ul style="list-style-type: none"> <li>• Define <i>hypertension</i> and <i>atherosclerosis</i> and describe possible health consequences of these conditions.</li> <li>• Describe the exchanges that occur across capillary walls.</li> </ul> <p><b>Developmental Aspects of the Cardiovascular System</b></p> <ul style="list-style-type: none"> <li>• Describe briefly the development of the cardiovascular system.</li> <li>• Name the fetal vascular modifications, or "fetal shunts," and describe their function before birth.</li> <li>• Explain how regular exercise and a diet low in fats and cholesterol may help maintain cardiovascular health.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Blood pressure EKG Readings</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments Brochure on a cardiovascular disease OR how to maintain a healthy heart</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Lymphatic System and Body Defenses</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	Without the lymphatic system our cardiovascular system would stop working and our immune system would be hopelessly impaired.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• Describe the structures of the lymphatic system?</li> <li>• How does the lymphatic support the cardiovascular system?</li> <li>• How does the lymphatic support the immune system?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Lymphatic System</b></p> <ul style="list-style-type: none"> <li>• Name the two major types of structures composing the lymphatic system and explain how the lymphatic system is functionally related to the cardiovascular and immune systems.</li> <li>• Describe the composition of lymph and explain its formation and transport.</li> <li>• Describe the function(s) of lymph nodes, tonsils, the thymus, Peyer's patches, and the spleen.</li> </ul> <p><b>Body Defenses</b></p> <ul style="list-style-type: none"> <li>• Describe the protective functions of skin and mucous membranes.</li> <li>• Explain the importance of phagocytes and natural killer cells.</li> <li>• Describe the inflammatory process.</li> <li>• Name several antimicrobial substances produced by the body that act in nonspecific body defense.</li> <li>• Explain how fever helps protect the body against invading bacteria.</li> <li>• Define <i>antigen</i> and <i>haptan</i>, and name substances that act as complete antigens.</li> <li>• Name the two arms of the immune response and relate each to a specific lymphocyte type (B or T cell).</li> <li>• Compare and contrast the development of B and T cells.</li> <li>• State the roles of B cells, T cells, and plasma cells.</li> <li>• Explain the importance of macrophages in immunity.</li> <li>• List the five antibody classes and describe their specific roles in immunity.</li> <li>• Describe several ways in which antibodies act against antigens.</li> <li>• Distinguish between active and passive immunity.</li> </ul>



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	<ul style="list-style-type: none"> <li>• Describe immunodeficiencies, allergies, and autoimmune diseases.</li> </ul> <p><b>Developmental Aspects of the Lymphatic System and Body Defenses</b></p> <ul style="list-style-type: none"> <li>• Describe the origin of the lymphatic vessels.</li> <li>• Describe the effects of aging on immunity.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments</p>

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Grade: 12	<b>Subject: Anatomy and Physiology The Respiratory System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	<p>The <i>cardiovascular</i> and <i>respiratory systems</i> share responsibility for supplying the body with oxygen and disposing of carbon dioxide. The respiratory system organs oversee the gas exchanges that occur between the blood and the external environment. The transportation of respiratory gases between the lungs and the tissue cells is accomplished by the cardiovascular system organs, using blood as the transporting fluid. If either system fails, body cells begin to die from oxygen starvation and accumulation of carbon dioxide.</p>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does the respiratory system function?</li> <li>• What is the function of the respiratory system?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Functional Anatomy of the Respiratory System</b></p> <ul style="list-style-type: none"> <li>• Name the organs forming the respiratory passageway from the nasal cavity to the alveoli of the lungs (or identify them on a diagram or model) and describe the function of each.</li> <li>• Describe several protective mechanisms of the respiratory system.</li> <li>• Describe the structure and function of the lungs and the pleural coverings.</li> </ul> <p><b>Respiratory Physiology</b></p> <ul style="list-style-type: none"> <li>• Define <i>cellular respiration</i>, <i>external respiration</i>, <i>internal respiration</i>, <i>pulmonary ventilation</i>, <i>expiration</i>, and <i>inspiration</i>.</li> <li>• Explain how the respiratory muscles cause volume changes that lead to air flow into and out of the lungs (breathing).</li> <li>• Define the following respiratory volumes: <i>tidal volume</i>, <i>vital capacity</i>, <i>expiratory reserve volume</i>, <i>inspiratory reserve volume</i>, and <i>residual air</i>.</li> <li>• Name several nonrespiratory air movements and explain how they modify or differ from normal respiratory air movements.</li> <li>• Describe the process of gas exchanges in the lungs and tissues.</li> <li>• Describe how oxygen and carbon dioxide are transported in the blood.</li> <li>• Name the brain areas involved in control of respiration.</li> <li>• Name several physical factors that influence respiratory rate.</li> <li>• Explain the relative importance of oxygen and carbon dioxide in modifying the rate and depth of breathing.</li> <li>• Explain why it is not possible to stop breathing voluntarily.</li> </ul>

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	<ul style="list-style-type: none"> <li>Define <i>apnea, dyspnea, hyperventilation, hypoventilation</i>, and chronic <b>obstructive pulmonary disease (COPD)</b> .</li> </ul> <p><b>Respiratory Disorders</b></p> <ul style="list-style-type: none"> <li>Describe the symptoms and probable causes of COPD and lung cancer.</li> </ul> <p><b>Developmental Aspects of the Respiratory System</b></p> <ul style="list-style-type: none"> <li>Describe normal changes that occur in respiratory system functioning from infancy to old age.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Digestive System and Body Metabolism</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	The digestive system takes in food ( <i>ingests</i> it), breaks it down physically and chemically into nutrient molecules ( <i>digests</i> it), and <i>absorbs</i> the nutrients into the bloodstream. Then it rids the body of the indigestible remains ( <i>defecates</i> ).
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does the digestive system function?</li> <li>• How does nutrition and metabolism effect life processes?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> <li>▪ Digestion includes the secretion of stomach acid, digestive enzymes (amylases, proteases, nucleases, lipases) and bile salts into the digestion system.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Anatomy of the Digestive System</b></p> <ul style="list-style-type: none"> <li>▪ Name the organs of the alimentary canal and accessory digestive organs and identify each on an appropriate diagram or model.</li> <li>▪ Identify the overall function of the digestive system as digestion and absorption of foodstuffs, and describe the general activities of each digestive system organ.</li> <li>▪ Describe the composition and function(s) of saliva.</li> <li>▪ Name the deciduous and permanent teeth and describe the basic anatomy of a tooth.</li> <li>▪ Explain how villi aid digestive processes in the small intestine.</li> </ul> <p><b>Functions of the Digestive System</b></p> <ul style="list-style-type: none"> <li>▪ Describe the mechanisms of swallowing, vomiting, and defecation.</li> <li>▪ Describe how foodstuffs in the digestive tract are mixed and moved along the tract.</li> <li>▪ Describe the function of local hormones in the digestive process.</li> <li>▪ List the major enzymes or enzyme groups produced by the digestive organs or accessory glands and name the foodstuffs on which they act.</li> <li>▪ Name the end products of protein, fat, and carbohydrate digestion.</li> <li>▪ State the function of bile in the digestive process.</li> </ul> <p><b>Nutrition</b></p> <ul style="list-style-type: none"> <li>▪ Define <i>nutrient</i> and <i>calorie</i>.</li> </ul>

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	<ul style="list-style-type: none"> <li>▪ List the six major nutrient categories. Note important dietary sources and the principal cellular uses of each.</li> </ul> <p><b>Metabolism</b></p> <ul style="list-style-type: none"> <li>▪ Define <i>enzyme</i>, <i>metabolism</i>, <i>anabolism</i>, and <i>catabolism</i>.</li> <li>▪ Describe the metabolic roles of the liver.</li> <li>▪ Recognize the sources of carbohydrates, fats, and proteins and their uses in cell metabolism.</li> <li>▪ Explain the importance of energy balance in the body and indicate consequences of energy imbalance.</li> <li>▪ List several factors that influence metabolic rate, and indicate the effect of each.</li> <li>▪ Describe how body temperature is regulated.</li> </ul> <p><b>Developmental Aspects of the Digestive System and Metabolism</b></p> <ul style="list-style-type: none"> <li>• Name important congenital disorders of the digestive system and significant inborn errors of metabolism.</li> <li>• Describe the effect of aging on the digestive system.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments Digestive System Brochure</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Urinary System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	Every day, the kidneys filter gallons of fluid from the bloodstream. They then process this filtrate, allowing wastes and excess ions to leave the body in urine while returning needed substances to the blood in just the right proportions.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How does the urinary system function?</li> <li>• How does the urinary system help maintain homeostasis?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> <li>▪ The kidneys have a homeostatic role in the removal of nitrogenous wastes from the blood.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Kidneys</b></p> <ul style="list-style-type: none"> <li>• Describe the location of the kidneys in the body.</li> <li>• Identify the following regions of a kidney (longitudinal section): hilus, cortex, medulla, medullary pyramids, calyces, pelvis, and renal columns.</li> <li>• Recognize that the nephron is the structural and functional unit of the kidney and describe its anatomy.</li> <li>• Describe the process of urine formation, identifying the areas of the nephron that are responsible for filtration, reabsorption, and secretion.</li> <li>• Describe the function of the kidneys in excretion of nitrogen-containing wastes.</li> <li>• Define <i>polyuria</i>, <i>anuria</i>, <i>oliguria</i>, and <i>diuresis</i>.</li> <li>• Describe the composition of normal urine.</li> <li>• List abnormal urinary components.</li> </ul> <p><b>Ureters, Urinary Bladder, and Urethra</b></p> <ul style="list-style-type: none"> <li>• Describe the general structure and function of the ureters, bladder, and urethra.</li> <li>• Compare the course and length of the male urethra to that of the female.</li> <li>• Define <i>micturition</i>.</li> <li>• Describe the difference in control of the external and internal urethral sphincters.</li> <li>• Name three common urinary tract problems.</li> </ul> <p><b>Fluid, Electrolyte, and Acid-Base Balance</b></p>

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	<ul style="list-style-type: none"> <li>Name and localize the three main fluid compartments of the body.</li> <li>Explain the role of antidiuretic hormone (ADH) in the regulation of water balance by the kidney.</li> <li>Explain the role of aldosterone in sodium and potassium balance of the blood.</li> <li>Compare and contrast the relative speed of buffers, the respiratory system, and the kidneys in maintaining the acid-base balance of the blood.</li> </ul> <p><b>Developmental Aspects of the Urinary System</b></p> <ul style="list-style-type: none"> <li>Describe three common congenital problems of the urinary system.</li> <li>Describe the effect of aging on urinary system functioning.</li> </ul>	
<p><b>Strategies/Modes (examples)</b></p> <p>Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment</p>	<p><b>Materials/Resources (examples)</b></p> <p>Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Urinalysis Lab</p>	<p><b>Assessments (examples)</b></p> <p>Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments</p>

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<b>Grade: 12</b>	<b>Subject: Anatomy and Physiology The Reproductive System</b>
<b>CSDE Standard</b>	<ul style="list-style-type: none"> <li>▪ As a result of the coordinated structures and functions of organ systems, the internal environment of the human body remains relatively stable (homeostatic) despite changes in the outside environment.</li> <li>▪ The fundamental life processes of plants and animals depend on a variety of chemical reactions that occur in specialized areas of the organism's cells.</li> </ul>
<b>Enduring Understanding</b>	Most organ systems of the body function almost continuously to maintain the well-being of the individual. The reproductive system, however, appears to "slumber" until puberty. The primary sex organs, or gonads, are the <i>testes</i> in males and the <i>ovaries</i> in females. The gonads produce sex cells, or gametes, and secrete sex hormones. The remaining reproductive system structures are accessory reproductive organs. Although male and female reproductive systems are quite different, their joint purpose is to produce offspring.
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>• How do the reproductive systems in males and females work to produce offspring?</li> </ul>
<b>Content Standard:</b>	<ul style="list-style-type: none"> <li>▪ The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide.</li> <li>▪ Feedback loops in the nervous and endocrine systems regulate conditions in the body.</li> <li>▪ Cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.</li> <li>▪ Enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions and the pH of the surroundings.</li> <li>▪ Hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.</li> </ul>
<b>Performance Expectations (Student outcomes)</b>	<p><b>Anatomy of the Male Reproductive System</b></p> <ul style="list-style-type: none"> <li>▪ Discuss the common purpose of the reproductive system organs.</li> <li>▪ When provided with a model or diagram, identify the organs of the male reproductive system and discuss the general function of each.</li> <li>▪ Name the endocrine and exocrine products of the testes.</li> <li>▪ Discuss the composition of semen and name the glands that produce it.</li> <li>▪ Trace the pathway followed by a sperm from the testis to the body exterior.</li> <li>▪ Define <i>erection</i>, <i>ejaculation</i>, and <i>circumcision</i>.</li> </ul> <p><b>Male Reproductive Functions</b></p> <ul style="list-style-type: none"> <li>▪ Define <i>meiosis</i> and <i>spermatogenesis</i>.</li> <li>▪ Describe the structure of a sperm and relate its structure to its function.</li> <li>▪ Describe the effect of FSH and LH on testis functioning.</li> </ul> <p><b>Anatomy of the Female Reproductive System</b></p> <ul style="list-style-type: none"> <li>▪ When provided with an appropriate model or diagram, identify the organs of the female reproductive system and discuss the general function of each.</li> </ul>



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	<ul style="list-style-type: none"> <li>▪ Describe the functions of the vesicular follicle and corpus luteum of the ovary.</li> <li>▪ Define <i>endometrium</i>, <i>myometrium</i>, and <i>ovulation</i>.</li> <li>▪ Indicate the location of the following regions of the female uterus: cervix, fundus, body.</li> </ul> <p><b>Female Reproductive Functions and Cycles</b></p> <ul style="list-style-type: none"> <li>▪ Define <i>oogenesis</i>.</li> <li>▪ Describe the influence of FSH and LH on ovarian function.</li> <li>▪ Describe the phases and controls of the menstrual cycle.</li> </ul> <p><b>Mammary Glands</b></p> <ul style="list-style-type: none"> <li>▪ Describe the structure and function of the mammary glands.</li> </ul> <p><b>Survey of Pregnancy and Embryonic Development</b></p> <ul style="list-style-type: none"> <li>▪ Define <i>fertilization</i> and <i>zygote</i>.</li> <li>▪ Describe implantation.</li> <li>▪ Distinguish between an embryo and a fetus.</li> <li>▪ List the major functions of the placenta.</li> <li>▪ Indicate several ways that pregnancy alters or modifies the functioning of the mother's body.</li> <li>▪ Describe how labor is initiated and briefly discuss the three stages of labor.</li> <li>▪ List several agents that can interfere with normal fetal development.</li> </ul> <p><b>Developmental Aspects of the Reproductive System</b></p> <ul style="list-style-type: none"> <li>• Describe the importance of the presence/absence of testosterone during embryonic development of the reproductive system organs.</li> <li>• Define <i>menarche</i> and <i>menopause</i>.</li> <li>• List common reproductive system problems seen in adult and aging males and females.</li> </ul>	
<b>Strategies/Modes (examples)</b>	<b>Materials/Resources (examples)</b>	<b>Assessments (examples)</b>
Whole Group Instruction Overhead Projections Small Group Collaborative Work Laboratory Work Student Self-Assessment	Textbook Laboratory Manual Laboratory Materials Computers for On-Line Activity Access Child Birth film	Quizzes Student Self Tests Summative Tests Laboratory Activities On-Line Self Assessments