

Title	Roxbury High School Human Anatomy & Physiology Honors
Type	Consensus
Document	Map
Authors	Denise Glenn, Mary Ellen Burd
Subject	Science
Course	Human Anatomy and Physiology Honors
Grade(s)	11 , 12
Location	Roxbury High School
Curriculum Writing History	
Notes	
Attachments	

Duration: September/Week 1 - September/Week 4

UNIT NAME: The Human Organism

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>Anatomy is the study of the structures of the body and physiology is the study of the processes and functions of the body.</p> <p>The function of the human body systems is to maintain constant internal homeostasis.</p> <p>All systems of the human body are independent in their function as well as interdependent for the body's overall well-being.</p> <p>All organs in the human body follow the principle of complementarity of structure and function</p>	<p>How do anatomy and physiology differ and what are the different ways in which they can be studied.</p> <p>How does each of the human body systems maintain a state of constant homeostasis?</p> <p>How do the systems work independently as well as interdependently?</p> <p>How are structure and function related as they pertain to the organs in the human body?</p> <p>What are the major body cavities and their subdivisions?</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • the relationship between anatomy and physiology and some specialties of each discipline. • the major levels of organization in the human body • the 11 major organ systems and their components. • the meaning and importance of homeostasis in the human body. • the role of negative and positive feedback in homeostatic regulation. • the importance of using correct anatomical terms in describing body sections, regions and relative positions of the human body. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • explain the relationship between anatomy and physiology and describe various specialties of each discipline. • identify the major levels of organization in the human body. • identify the 11 major organ systems of the human body and the major components of each • illustrate with examples of how each system is interdependent in their function • explain the concept of homeostasis and its importance in the human body 		<p>MS.LS1.1.DCI.LS1.A.1-All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1) (06-08)[Regional:Next Generation Science Standards (NGSS)]</p> <p>MS.LS1.2.CCC-Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural and designed structures/systems can be analyzed to determine how they function. (MS-LS1-2) (06-08) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of</p>

		<ul style="list-style-type: none"> the major body cavities and their subdivisions 	<ul style="list-style-type: none"> explain how positive and negative feedback are involved in homeostasis. graph physiological data and determine if the homeostatic mechanism is that of negative or positive feedback 		<p>life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</p>
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					(09-12)[Regional:Next Generation Science Standards (NGSS)]
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Plans:

Duration: October/Week 5 - October/Week 6

UNIT NAME: Cell Structure and Physiology

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>Cells are the structural unit of life, containing organelles, which perform specific functions.</p> <p>The plasma membrane's structure causes the cell to be selectively permeable, allowing only certain substances to pass through.</p> <p>Movement across the plasma membrane consists of passive and active types of transport.</p> <p>Intracellular fluid is different from extracellular fluid because the plasma membrane regulates the movement of materials.</p> <p>The difference between intracellular and extracellular fluid concentrations determine water movement.</p> <p>Differentiation is the process by which cells develop specialized structures and functions, resulting from the selective activation and inactivation</p>	<p>Why are cells called the structural unit of life?</p> <p>How does the cell's structure allow it be selectively permeable?</p> <p>What is the difference between passive and active transport? What are the types of passive and active transport called?</p> <p>How does intracellular fluid differ from extracellular fluid?</p> <p>How is cell transport affected by intracellular and extracellular concentrations?</p> <p>What is meant by "cell differentiation"?</p> <p>What are stem cells and where in the body can</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • that cells are the structural unit of all living things • that cells have structures called organelles which perform specific functions for the cell. • that all cells have a selectively permeable membrane, with its structure dictating what moves in and out of the cell • that material can move across the cell membrane by diffusion, osmosis and active transport. • the difference between intracellular and extracellular fluid 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • explain how cells are called the structural unit of life. • explain the functions of lysosomes, nucleus, mitochondria and ribosomes. • describe the structure of the plasma membrane and how materials move across the membrane. • describe the differences between osmosis, diffusion and active transport the material moved by each process • list the most important ions in intracellular and extracellular fluid that affect movement across the cell 		<p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.2-All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) (Note: This Disciplinary C ore Idea is also addressed by HS-LS3-1.) (09-12) [Regional:Next Generation Science Standards</p>

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<p>of genes.</p> <p>Stem cells are unspecialized cells that have the ability to divide for indefinitely and give rise to specialized cells.</p> <p>Stem cells are classified as either omnipotent, pluripotent and multipotent</p>	<p>they be found?</p> <p>How are omnipotent, pluripotent and multipotent stem cells different?</p>	<ul style="list-style-type: none"> • that cell transport depends on the concentration of specific ions and organic molecules inside and outside of the cell • what cell differentiation is and how it is controlled. • that stem cells that always divide, giving rise to specific specialized cells in specific parts of the human body 	<ul style="list-style-type: none"> • describe cell differentiation and provide examples of this process in specific cells. • explain the difference between omnipotent, multipotent and pluripotent stem cells and provide examples of each type of stem cell. • describe the areas of the body where stem cells are found. 	<p>(NGSS) HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1-Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p>
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Plans:

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Duration: October/Week 7 - November/Week 10					
UNIT NAME: Tissues					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>Cells are organized into structures called tissues.</p> <p>All organs are composed of four tissue types.</p> <p>Each tissue's function is directly related to its structure to maintain homeostasis.</p> <p>Cellular changes occur as humans age and these changes can affect tissue structure and function.</p>	<p>How are cells organized into tissues?</p> <p>What are the four tissue types and how do they differ?</p> <p>How does tissue structure relate to its function in order to maintain homeostasis?</p>	<p>Students will know:</p> <p>the four basic tissue types and their role in the human body.</p> <p>the different types of epithelial cells and their functions.</p> <p>the relationship between the form and function of each type of epithelium.</p> <p>the structure and functions of each type of connective tissue.</p> <p>some disorders that affect the different types of tissues of the body, such as scleroderma, sarcoma and carcinoma</p>	<p>Students will be able to:</p> <p>identify the body's four basic tissue types and describe their role.</p> <p>discuss the types and functions of epithelial cells. describe the relationship between form and function of each type of epithelium.</p> <p>compare the structures and functions of the various types of connective tissue</p> <p>describe the three types of muscle tissue and the distinctive structural features of each.</p> <p>explain the physiological effects of some tissue disorders.</p> <p>analyze photomicrographs of different epithelial tissue samples and diagnose the pathology of each, based on the affected layer of cells. (squamous cell carcinoma vs basal cell carcinoma; Pap smear pathologies)</p>		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.DCI.LS1.A.1- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out</p>

					the essential functions of life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.4.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS -LS1-4) (09-12) [Regional:Next Generation Science Standards (NGSS)]
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Plans:

Duration: November/Week 10 - November/Week 12					
UNIT NAME: Integumentary System					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The skin and its derivatives makes up a complex set of organs that serve various functions.</p> <p>All of the body systems are dependent on the normal functioning of the integumentary system.</p> <p>The integumentary system plays a large role in maintaining homeostasis by protecting the internal structures from the external environment.</p>	<p>What are the functions of the skin and its derivatives?</p> <p>How are the body systems dependent on the normal functioning of the integumentary system?</p> <p>How does the integumentary system maintain homeostasis between the internal and external environment?</p>	<p>Students will know:</p> <ul style="list-style-type: none"> · The functions of the integumentary system, as a whole. · The tissue types which make up the epidermis and dermis · The major layers of the epidermis and dermis. · The functions of each layer of the epidermis and dermis · Epidermal pigmentation and dermal circulation which influence skin color. · The structure, function and location of the sweat and oil glands. · The characteristics of the three major types of skin cancer. · How to determine the extent of a burn 	<p>Students will be able to:</p> <ul style="list-style-type: none"> · Name the tissue types composing the epidermis and dermis. • List the major layers of each and describe the functions of each layer. · Describe the factors that contribute to skin color. · Compare the structure, functions and locations of sweat and oil glands. · Summarize the characteristics of the three major types of skin cancers. • Describe how to determine the extent of a burn and differentiate between first, second, and third degree burns. 		<p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.</p>

		<ul style="list-style-type: none"> • The difference between a first, second, and third degree burn. • Serious burns affect many body systems and can be life threatening. • The causes of changes that occur in the skin from birth to old age. 	<ul style="list-style-type: none"> • Describe the changes that occur to the integumentary system as the human body ages. • Explain how transdermal drug delivery occurs after conducting an experiment on a drug transferring through a simulated skin model. 		<p>(HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3)</p>
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					(09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1-Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)]
Plans:					

Duration: December/Week 13 - January/Week 18

UNIT NAME: Skeletal System

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The skeletal system consists of bones, cartilage, tendons, and ligaments.</p> <p>Bone tissue contains various specialized cells that each contribute to the homeostasis of the skeletal system.</p> <p>Bone cells have specific structures and functions.</p> <p>There are four main types of bones, each with a particular structure and function.</p> <p>Bone development of spongy bone differs from that of compact bone.</p> <p>Bone growth can occur by longitudinal and appositional growth.</p> <p>Changes in bone tissue occur as the human body ages.</p> <p>The physiology of the skeletal system maintains homeostasis by playing an important role in regulating calcium levels, bone</p>	<p>What are the four components of the skeletal system?</p> <p>What are the specific cells of bone tissue and what role does each play in the homeostasis of the skeletal system?</p> <p>How does the structure of the different bone cells contribute to their function?</p> <p>What are the four main types of bones and how do they differ in their structure and function?</p> <p>How does bone development in spongy bone differ from that of compact bone?</p> <p>How does longitudinal bone growth differ from appositional growth?</p> <p>What are some changes that occur in bone tissue as a person ages?</p> <p>How is homeostasis maintained by the various</p>	<p><i>Students will know:</i></p> <ul style="list-style-type: none"> • the four components of the skeletal system • the specific cells that make up the bone tissue and the roles each play in homeostasis of the skeleton • that the structure of the different bone cells contribute to their function • the four main types of bones and their functions • spongy bone in the skeletal system develops differently than that of compact bone 	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • list the four components of the skeletal system • name the bones that make up the axial and appendicular skeleton. • define the different types of bone cells and describe their functions and origins • describe the composition and organization of the bone matrix. • identify the bone markings on the bones of the axial and appendicular skeleton. • describe the four main types of bones and be able to distinguish between the different types • explain the role of bone in calcium homeostasis. • name the two patterns of bone formation and explain how each 		<p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and</p>

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<p>remodeling and repair and providing a protective site for hematopoiesis</p> <p>The anatomy of the skeleton provides the framework for the human body and is composed of the axial and appendicular bones.</p> <p>The bones of the appendicular skeleton have different functions than the bones of the axial skeleton.</p> <p>The bones of the appendicular and axial skeleton have distinct bone markings with specific functions.</p>	<p>roles of the skeletal system?</p> <p>How do the axial and appendicular bones join together to create a framework that supports the weight of the human body?</p> <p>How do the functions differ in the appendicular and axial skeleton?</p> <p>What is meant by a "bone marking" and what are some of their functions?</p> <p>What are some of the different types of bone fractures and the complexities/severity of each?</p>	<ul style="list-style-type: none"> • longitudinal bone growth is accomplished by a different process than that of appositional growth • some disorders and conditions of bone in the aging process <ul style="list-style-type: none"> · how bone remodels and repairs itself in order to maintain homeostasis. • the bones of the axial and appendicular skeletons connect by ligaments and tendons. <ul style="list-style-type: none"> · the bones that make up the axial and appendicular skeleton and how the functions of the appendicular and axial skeletons differ · the bone markings associated with the axial and appendicular skeleton. • the various functions of bone markings 	<p>produces bone.</p> <ul style="list-style-type: none"> · describe the process and requirements of bone growth. · describe the process of bone repair, the cells involved and the types of tissue produced. · identify the bone markings on the bones of the axial and appendicular skeleton. <ul style="list-style-type: none"> • explain the physiological effects of some disorders of bone • collaborate with lab partners to provide explanation and or identification of unknown bones and markings • identify a given bone, bone markings and functions of bone and/ or markings with a bone practical • identify the specific type of bone fracture when given a x-ray film of the fracture 		<p>use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.DCI.LS1.A.1-Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.3.DCI.LS1.A.1-Feedback mechanisms maintain a living system's</p>
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		<ul style="list-style-type: none">the various types of bone fractures and the anatomy of each (comminuted, compression, spinal, epiphyseal, depressed and greenstick)			<p>internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1-Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.SEP.1-Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) (09-12)</p>
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					[Regional:Next Generation Science Standards (NGSS)]
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Plans:

Duration: January/Week 19 - January/Week 20					
UNIT NAME: Articulations					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The structural organization of a joint is determined by the integration of bones, muscles and connective tissue</p> <p>Joints allow varying degree of motion based upon structure for the axial and appendicular skeleton</p>	<p>How does the integration of the bones, muscles and conn. tissue determine structure of a joint?</p> <p>How does joint structure determine range of motion of joints in the axial and appendicular skeleton?</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • The structure of a basic joint. • The classification of joints by structure and function. • The general structure of a fibrous joint and location in the body. • The general structure of a cartilagenous joint and location in the body. • The structural classification of synovial joints. • The basic structure of the knee joint, elbow joint, hip and shoulder joint. • The natural factors that stabilize synovial joints. • Factors that disturb joint homeostasis 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Describe the basic joint structure. • Name the different joints based on general structure and function. • List the fibrous joints and give their locations and functions in the body. • List the cartilagenous joints and give their locations and functions in the body. • Describe the basic structure of a synovial joint. • List the accessory structures which stabilize a synovial joint. • Describe the 6 types of synovial joints based on motion. • Compare and contrast the elbow, shoulder, hip, knee joints in terms of articulating bones, anatomical characteristics, movement allowed and stability. • List some causes such as arthritis which disrupt joint stability. 		<p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.DCI.LS1.A.1-Multicellular organisms</p>

			<ul style="list-style-type: none">• Explain what happens to the joint structure when homeostasis is disturbed.• Identify the name, structural and functional classification of a specific joint when marked on a skeleton.		have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.CCC.1-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy , matter, and information flows—within and between systems at different scales. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]
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Plans:

Title : Roxbury High School Human Anatomy & Physiology Honors
Type : Consensus

Duration: February/Week 21 - February/Week 24

UNIT NAME: Muscular System

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>Movement, blood flow, breathing and digestion cannot occur without muscle tissue.</p> <p>The three muscle types have a unique structure and function.</p> <p>Muscle contraction is a complex series of steps in a cascade.</p> <p>Muscles can be named for their location, fiber direction and arrangement.</p> <p>Muscle fatigue is linked to several factors including how fuel is broken down in the body.</p> <p>The principles of muscle mechanics allows for dynamic characteristics of muscle.</p>	<p>How does muscle tissue provide for movement, blood flow and digestion? What are the three muscle types and explain their structure and function?</p> <p>How does muscle structure relate to muscle contraction?</p> <p>How does fiber direction, location and arrangement aid in the naming of muscles.</p> <p>What factors can promote muscle fatigue?</p> <p>What are some examples of muscle mechanics?</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • The structure and function of the three types of muscle tissue. • Microscopic anatomy of skeletal muscle • The role of actin and myosin in muscle physiology. • The key steps involved in the contraction of skeletal muscle fiber. • How muscles are named. • The similarities of aerobic and anaerobic endurance • What produces muscle fatigue • The difference between an isotonic and isometric contraction. • How to differentiate between tetanus and twitch. • Various diseases associated with muscles of the body 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Compare and contrast the structure and function of the three types of muscle tissue and indicate where they are found in the body. • Analyze the macroscopic and microscopic structure of skeletal muscle and explain the role of actin and myosin containing filaments. • Explain the key steps involved in the contraction of a skeletal muscle fiber. • Identify skeletal muscles of the body using criteria. • Compare and contrast aerobic and anaerobic endurance, including muscle fatigue and explain its implications in muscle performance. • List examples of isometric and isotonic contractions. 		<p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system.</p>

			<ul style="list-style-type: none"> • Define a muscle twitch and describe the events occurring during the three phases. • Explain the difference between tetanus and twitch as they relate to muscle contraction. • List the symptoms associated with various muscle diseases/disorders such as muscular dystrophy. 		<p>(HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.CCC.1-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy , matter, and information flows—within and between systems at different scales. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1- Feedback mechanisms maintain a living system’s internal conditions within</p>
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					<p>certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1-Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.7.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-5),(HS-LS1-7) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p>
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Plans:

Duration: March/Week 25 - March/Week 26

UNIT NAME: Cardiovascular System: Blood

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>To maintain homeostasis, the organs of the cardiovascular system work together to keep blood continuously flowing to all cells of the body.</p> <p>Blood flows in one direction.</p> <p>Blood provides the means by which the cells of the body receive the essential nutrients and oxygen and dispose of cellular waste</p> <p>Blood provides both a regulatory and protective function for the body.</p>	<p>How does the organs of the cardiovascular system maintain homeostasis?</p> <p>Why does blood need to flow in only one direction?</p> <p>How does blood, with the aid of the other organs of the cardiovascular system, provide cells with the essential nutrients and oxygen and rid the cells of waste?</p> <p>How does blood help protect the body as well as regulating blood levels of particular substances in the body?</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • The process of hematopoiesis • The distributive function of the blood • The composition and physical characteristics of whole blood. • The composition of plasma and their functions. • The function and structure of the erythrocytes, leukocytes and thrombocytes. • Example of blood cell disorders • The steps of hemostasis • The regulatory and protective functions of blood. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Explain how and where blood cells are formed. • List the functions of the blood. • Describe the composition and physical characteristics of whole blood. • Name the substances found in plasma and explain their function. • Describe how the structure of blood cells determine their function. • Construct a chart listing the various types of blood cells and their functions. • List the physical effects of blood cell disorders such a leukemia. • List and explain the steps involved in blood clotting (hemostasis). • List the classes, structural characteristics, and functions of leukocytes. 		<p>HS.LS1.1-Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.DCI.LS1.A.2-All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. (HS-LS1-1) (Note: This Disciplinary C ore Idea is also addressed by HS-LS3-1.) (09-12) [Regional:Next Generation Science Standards</p>

					<p>(NGSS) HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1-Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1-Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback</p>
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					mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.7.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HSL1-5),(HS-LS1-7) (09-12)[Regional:Next Generation Science Standards (NGSS)]
Plans:					

Duration: March/Week 27 - April/Week 30					
UNIT NAME: Cardiovascular System: Blood Vessels and Heart					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>To maintain homeostasis, the organs of the cardiovascular system work together to keep blood continuously flowing to all cells of the body.</p> <p>Blood normally flows in one direction through the chambers and valves of the heart.</p> <p>Electrical signals flow through the heart to control its contractions, so to maintain a steady flow of blood.</p> <p>Blood flows through an extensive vascular network to reach all the cells of the body.</p> <p>This vascular network is composed of dynamic structures that rapidly alter the blood flow in response to changing internal and external conditions</p> <p>Various homeostatic imbalances of the heart can occur from aging and disease.</p>	<p>How do the heart and blood vessels work together to keep blood flowing to all the cells of the body.</p> <p>How are the chambers and valves of the heart organized so that blood only moves in one direction?</p> <p>How do the electrical signals maintain steady contractions of the heart?</p> <p>How is the vascular network organized?</p> <p>How does blood pressure affect the flow of blood through arteries, capillaries and veins.</p> <p>What are some of the abnormalities that can result from aging and disease?</p>	<p>Students will know:</p> <ul style="list-style-type: none"> • The pathway of blood flow through the heart. • The major blood vessels and heart valves. • The conducting system of the heart • The different paths of pulmonary and systemic circulation. • The parts of a cardiac cycle. • The relationship between stroke volume and cardiac output of the heart. • The 3 layers forming the walls of the blood vessels and the function of each. • The difference in structure and function of the arteries, capillaries and veins. • What blood pressure is and how it is determined. • The factors that influence blood pressure. • Disorders of the cardiovascular system. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> • Trace the flow of blood through the heart, identifying the major blood vessels, chambers and heart valves. • Analyze the components and functions of the conducting system of the heart. • Explain the arterial and venous pathways of pulmonary and systemic circulation. • Interpret the electrical events associated with an electrocardiogram and its relationship to the cardiac cycle. • Name some abnormalities that can be detected on an ECG tracing. • Explain the events of a cardiac cycle, including atrial and ventricular systole and diastole and relate heart sounds to specific events in this cycle. 		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the</p>

		<ul style="list-style-type: none"> • The path that blood travels as it moves through the major arteries and veins of the body. • The factors involved in capillary and cell dynamics. • Age-related changes include sclerosis and thickening of the valve flaps, declines in cardiac reserve, fibrosis of cardiac muscle, and atherosclerosis. 	<ul style="list-style-type: none"> • Determine stroke volume and how its change directly effects cardiac output. • Name the layers of the blood vessels and relate structure to function. • Know what blood pressure is and name some factors which contribute to hypertension. • Explain the physiological effects of various disorders and diseases of the cardiovascular system, such as coronary artery disease. • Trace the path of blood through the major arteries and veins of the body. • Explain how diffusion and osmosis play a role in capillary activity at the cellular level. • Provide examples of age-related changes in heart function. 		<p>relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1-Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.CCC.1-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy , matter, and information flows—within and between systems at different scales. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1-</p>
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					<p>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1- Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p>
Plans:					

Duration: April/Week 31 - April/Week 32

UNIT NAME: Respiratory System

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The circulatory and respiratory systems obtain and deliver oxygen to body cells and eliminate carbon dioxide from the body.</p> <p>The respiratory system structures are responsible for gas exchange between the blood and the external environment.</p> <p>The respiratory system plays an important role in maintaining the acid-base balance of the blood.</p> <p>Homeostatic imbalances can occur as a result of aging, health habits and disease.</p>	<p>How do the circulatory and respiratory systems work together to deliver oxygen and remove carbon dioxide?</p> <p>How do the respiratory structures function in gas exchange between the blood and the external environment?</p> <p>How does the respiratory system maintain acid-base balance in the blood?</p> <p>What are some abnormalities of the respiratory system that can result from disease, health habits and aging?</p>	<p><i>Students will know:</i></p> <ul style="list-style-type: none"> • the function of each organ in the respiratory system. • the protective mechanisms of the respiratory system. • the structure and function of the lungs and pleural coverings? • the four events in respiration. • the relationship between volume changes and breathing. • the different types of respiratory volumes. • how gas exchange occurs in the lungs and tissues. • how oxygen and carbon dioxide are transported in the blood. • why a person can not voluntarily stop breathing. • some of the physical, chemical and emotional factors that affect respiratory rate. 	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> • name the organs in the respiratory passageway, identify them on a diagram and describe the function of each. • describe the protective mechanisms of the respiratory system. • identify and describe the four events that make up respiration. • explain mechanical breathing in terms of volume changes. • identify and explain each of the types of respiratory volumes. • describe the process of gas exchanges in the lungs and tissues. • explain how oxygen and carbon dioxide are transported in the blood. • explain why it is not possible to stop breathing voluntarily. • identify several physical, chemical or emotional factors that affect respiratory rate. 		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the</p>

		<ul style="list-style-type: none"> the symptoms and causes of the following respiratory diseases: emphysema, chronic bronchitis, and lung cancer. 	<ul style="list-style-type: none"> describe symptoms and causes of emphysema, chronic bronchitis and lung cancer. explain the physiological effects of respiratory diseases such as emphysema, chronic bronchitis and lung cancer. 		<p>relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative</p>
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					feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1-Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.5.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HSL1-5),(HS-LS1-7) (09-12)[Regional:Next Generation Science Standards (NGSS)]
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Plans:

Duration: May/Week 33 - May/Week 34

UNIT NAME: Digestive System

Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The digestive system breaks down ingested food into components that can be absorbed into the blood.</p> <p>The digestive organs are responsible for food ingestion, digestion, absorption, and elimination of undigested remains from the body.</p> <p>The gastrointestinal tract activity declines in aging</p>	<p>How does the digestive system break down ingested food into components that are absorbed into the blood?</p> <p>How do the digestive organs function in food ingestion, digestion, absorption and elimination of undigested remains from the body?</p> <p>What are some of the causes of declining digestive activity in the aging population?</p>	<p><i>Students will know:</i></p> <ul style="list-style-type: none"> the organs of the alimentary canal and the accessory digestive organs. the overall function of the digestive system. the general function of each digestive organ. the basic function of the mouth, pharynx and esophagus. the end products of protein, fat and carbohydrate digestion. the digestive function of bile. the definition of a kilocalorie and a nutrient. the six major nutrient categories. why each type of nutrient is important for the cell. some of the problems of the digestive system in the elderly, such as cancer and diverticulosis. some of the disorders of the digestive system, such as Crohn's Disease. 	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> name the organs of the alimentary canal and the accessory digestive organs, and identify each on a diagram or model. identify the overall function of the digestive system and describe the general functions of each digestive organ. describe the gross and microscopic anatomy and the basic functions of the mouth, pharynx and esophagus. name the end products of protein, fat and carbohydrate digestion. state the digestive function of bile. define nutrient and kilocalorie. list the six major nutrient categories. Identify dietary sources of each and why each is necessary for a cell. 		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the</p>

			<ul style="list-style-type: none"> explain the physiological effects of some of the disorders of the digestive system 		<p>relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.DCI.LS1.A.1- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1- Feedback (negative or</p>
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					positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.5.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HLS1-5),(HS-LS1-7) (09-12)[Regional:Next Generation Science Standards (NGSS)]
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Plans:

Title : Roxbury High School Human Anatomy & Physiology Honors
Type : Consensus

Duration: May/Week 35 - May/Week 36					
UNIT NAME: Urinary System					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The kidneys are the major homeostatic organs of the body.</p> <p>The kidneys filter wastes that will leave the body in the form of urine and return necessary components to the blood, retaining internal homeostasis and proper body functioning.</p> <p>Aside from disposing wastes, the kidneys maintain the electrolyte, acid-base, and fluid balances of the blood.</p> <p>The other organs of the urinary system serve as either temporary storage for urine or transport channels for urine.</p> <p>Several changes can occur in urinary system anatomy and physiology with aging.</p>	<p>Why are kidneys important in maintaining homeostasis?</p> <p>How do kidneys filter wastes from the blood, retain necessary components and excrete wastes in the form of urine?</p> <p>What other organs of the urinary system act in the storage and transport or urine?</p> <p>What are some of the disorders that can occur in the urinary system as one ages?</p>	<p><i>Students will know:</i></p> <ul style="list-style-type: none"> the regions of the kidney the structure of the kidney and how it is related to its function the areas of the nephron that are responsible for filtrations, reabsorption and secretion the composition of normal urine the components of abnormal urine the general structure of the ureters, urinary bladder and urethra. some of the disorders of the urinary system, such as kidney stones. some of changes in the anatomy and physiology of the urinary system as one ages, including changes in bladder capacity, urine concentration, and urinary tract infections. 	<p>Students will be able to:</p> <ul style="list-style-type: none"> identify the regions of the kidney identify the structural and functional unit of the kidney describe the composition of normal urine list abnormal urinary components describe the general structure and function of the ureters, urinary bladder, and urethra. explain the physiological effects of some of the disorders of the urinary system. 		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the</p>

					<p>relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.DCI.LS1.A.1-Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.CCC.1-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy , matter, and information flows—within and between systems at different scales. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.3.DCI.LS1.A.1-</p>
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					<p>Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1- Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.5.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HLS1-5),(HS-LS1-7) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p>
Plans:					

Title : Roxbury High School Human Anatomy & Physiology Honors
Type : Consensus

Duration: May/Week 35 - June/Week 38					
UNIT NAME: Nervous and Endocrine System					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The nervous system maintains body homeostasis through sensation, interpretation, response and activity.</p> <p>Nerve cells send electrical signals for communication.</p> <p>Reflexes help protect our bodies from harm and can be tested.</p> <p>Nerves interpret incoming impulses and act with outgoing impulses.</p> <p>The endocrine system is vital to homeostasis and plays an important role in regulating the activity of body cells.</p> <p>The endocrine system organs secrete hormones which orchestrate cellular changes that lead to growth and development, reproductive capability, and the physiological homeostasis of many body systems.</p>	<p>How does sensation, interpretation, response and activity from the nervous system play a role in maintaining homeostasis?</p> <p>How and why do nerve cells send electrical signals for communication?</p> <p>What are reflexes and how do they help in protecting our bodies from harm?</p> <p>How can reflexes be tested?</p> <p>How do nerves interpret incoming impulses and act with outgoing impulses?</p> <p>How does the endocrine system maintain an important role in regulating the activity of body cells?</p> <p>What are hormones and what endocrine organs secrete them?</p> <p>How do hormones regulate growth and development, reproductive capability and</p>	<p><i>Students will know:</i></p> <ul style="list-style-type: none"> the general functions of the nervous system. the general structure of the neuron. what a reflex arc is. the functions of the central, peripheral, autonomic and somatic systems. the major endocrine organs and where they are located. the general hormones secreted by the endocrine glands. the physiological effects produced by the endocrine gland hormones. some disorders that are caused by hyper/hypo activity of various endocrine glands. the effect aging has on endocrine system function. some of the disorders of the endocrine system such as diabetes and hypo/hyperthyroidism. 	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> explain the general functions of the nervous system. describe the general structure of the neuron and name its important anatomical regions. define a reflex arc and list its elements. explain the types of motor responses produced by various reflexes. explain the function of the various divisions of the nervous system, including central, peripheral, autonomic and somatic systems. list the major endocrine organs and describe their body locations. list the hormones produced by specific endocrine glands. describe the physiological effects produced by the secretion of these hormones. 		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.DCI.LS1.A.1- Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next</p>

	<p>physiological homeostasis of many body systems?</p>	<ul style="list-style-type: none"> • some of the disorders of the nervous system such as Parkinson's disease. 	<ul style="list-style-type: none"> • describe some of the disorders that arise from a hypo/hyper activity of various endocrine glands. • describe the effects of aging on endocrine system functioning. • explain the physiological effects of some of the disorders of the endocrine system. • explain the physiological effects of some of the disorders of the endocrine system. 		<p>level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.2.CCC.1-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy , matter, and information flows—within and between systems at different scales. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.SEP.1-Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.</p>
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					<p>(09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.DCI.LS1.A.1- Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. (HS-LS1-3) (09-12)[Regional:Next Generation Science Standards (NGSS)] HS.LS1.3.CCC.1- Feedback (negative or positive) can stabilize or destabilize a system. (HS-LS1-3) (09-12) [Regional:Next Generation Science Standards (NGSS)] HS.LS1.5.SEP.1-Use a model based on evidence to illustrate the relationships between systems or between components of a system. (HSLS1-5),(HS-LS1-7) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p>
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Plans:

Duration: June/Week 39 - June/Week 40					
UNIT NAME: Reproductive System					
Enduring Understandings	Essential Questions	Knowledge	Skills	Assessment	Standards
<p>The biological function of the reproductive system is to provide the means for producing offspring.</p> <p>There are primary and accessory reproductive organs, which become mature at puberty.</p> <p>Sex hormones play a vital role in the development and function of the reproductive organs.</p> <p>Sex hormones regulate the female ovarian and menstrual cycles.</p> <p>The main role of the male reproductive system is to produce sperm and deliver it to the female reproductive tract.</p> <p>The main role of the female reproductive system is to produce eggs and provide a hospitable environment for a fertilized egg to develop.</p> <p>Both male and female gametes are created by a cell division called meiosis.</p>	<p>How does the reproductive system provide the means for producing offspring?</p> <p>What are the primary and accessory reproductive organs of the male and female?</p> <p>Which sex hormones influence the development and function of the reproductive organs and what is their role in this process?</p> <p>Which sex hormones regulate the female ovarian and menstrual cycles and how does this occur?</p> <p>How does the male reproductive make sperm and how is it delivered to the female reproductive tract?</p> <p>How are eggs produced by the female reproductive system and how does this system create a hospitable environment for a zygote?</p> <p>What are the differences between male and female</p>	<p><i>Students will know:</i></p> <ul style="list-style-type: none"> the reproductive system organs in both females and males. the composition of semen and the gland that produce it. the pathway that sperm travel from the testes to the exterior of the body. the structure of sperm and how it relates to its function. the function of the vesicular follicle and corpus luteum of the ovary. the similarities and differences between spermatogenesis and oogenesis. the influence FSH and LH has on testes and ovarian function. the phases and controls of the menstrual cycle. how implantation occurs. the major functions of the placenta. the three stages of labor. 	<p><i>Students will be able to:</i></p> <ul style="list-style-type: none"> identify the reproductive organs of both the male and female. discuss the composition of semen, and name the glands that produce it. trace the pathway of sperm from the testes to the body exterior. describe the structure of a sperm and relate its structure to its function. describe the functions of the vesicular follicle and corpus luteum of the ovary. compare and contrast spermatogenesis and oogenesis. describe the influence of FSH and LH on both testes and ovarian function. describe the phases and controls of the menstrual cycle. describe implantation. describe how labor is initiated and explain the three stages. 		<p>HS.LS1.1.DCI.LS1.A.1- Systems of specialized cells within organisms help them perform the essential functions of life. (HS-LS1-1) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.1.CCC.1- Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. (HS-LS1-1) (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2-Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.SEP.1-Develop and use a model based on evidence to illustrate the</p>

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<p>During pregnancy, there are anatomical as well as physiological changes to the mother's body.</p> <p>Both men and women experience changes in their reproductive system functioning.</p>	<p>gamete formation in meiosis?</p> <p>What types of anatomical and physiological changes occur in the mother's body?</p> <p>What are some of the reproductive system changes men and women experience as they age?</p>	<ul style="list-style-type: none"> • why the presence or absence of testosterone is important during embryonic development of the reproductive organs. • some of the common reproductive problems that occur in adult and aging males and females. • some of the disorders and diseases of the male and female reproductive system such as pelvic inflammatory disease and prostate cancer. 	<ul style="list-style-type: none"> • describe the importance of the presence or absence of testosterone during embryonic development of the reproductive organs. • identify common reproductive problems that occur in adult and aging males and females. • explain the physiological effects of some of the disorders of the male and female reproductive system. 		<p>relationships between systems or between components of a system. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.DCI.LS1.A.1-Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.2.CCC.1-Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions — including energy , matter, and information flows—within and between systems at different scales. (HS-LS1-2) (09-12) [Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.3-Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (09-12)[Regional:Next Generation Science Standards (NGSS)]</p> <p>HS.LS1.3.DCI.LS1.A.1-</p>
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Plans:					