

Content Area	Course: Anatomy & Grade Level: 11-12		
Anatomy & Physiology Full Year	Physiology R14 The Seven Cs of Learning Collaboration Character Citizenship Creativity Curiosity		
Unit Titles	Length of Unit		
Human Body: An Orientation	2 Weeks		
Biochemistry, Cells, and Medical Imaging	3 Weeks		
Tissues	2 Weeks		
Body membranes and Integumentary System	• 2.5 Weeks		
Skeletal System	• 4 Weeks		
Muscular System	• 3 Weeks		
Nervous System	4 Weeks		
Special Senses	• 4 Weeks		
• Blood	• 2.5 Weeks		
Cardiovascular System	• 4 Weeks		
The Respiratory, Digestive, and Lymphatic Systems	3 Weeks		



Strands	Course Level Expectations	
Structure and	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis	
Function	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide	
	specific functions within multicellular organisms.	
	Evaluate the structure of each tissues, organs, bones and membranes and explain how it relates to its	
	function.	
	Construct a model showing how the various transport processes account for the directional movements	
	of specific substances across the plasma membrane	
	Compare and contrast the sympathetic nervous system and the parasympathetic nervous system in	
	terms of situations when that system is used, neurotransmitters involved, target organs involved and	
	the responses of those target organs in the body.	
	 Summarize the overall function of the digestive system and differentiate between organs of the 	
	alimentary canal and accessory digestive organs	
	 Model the relationship between the distribution of lymph nodes and vessels to the point of entry of 	
	foreign bodies	
	Analyze the structure of an antibody in terms of genetic recombination.	
Growth and	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and	
Development of	maintaining complex organisms	
Organisms	Construct a scientific explanation explaining how the cardiovascular and respiratory system maintain	
	roper oxygen levels in the body	
Organization for	 Use a model to illustrate that cell respiration is a chemical process whereby bonds are broken and 	
Matter and	formed to create energy	
Energy Flow in	 Construct a scientific explanation detailing the process of gas exchanges in the lungs and tissues by 	
Organisms	applying the gas laws.	
Inheritance of	Determine blood types of offspring given parent blood types or a child and one parent using Punnett	
Traits	Squares.	
	 Conduct blood typing procedures to determine the blood types of four unknown simulated blood 	
	samples.	

This page left intentionally blank.

Unit Title	Human Body: An Orientation	Length of Unit	2 weeks

Inquiry Questions (Engaging & Debatable)	 How is the human body organized? How does homeostasis maintain the human body?
Standards*	HS-LS1-2, HS-LS1-3
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):
Concepts	Structure and Function
	Cross Cutting Concepts (CCC)
	Systems & System Models
	Structure and Function
	Stability and Change
Key Vocabulary	Cell, tissue, organ, homeostasis, receptor effector

*Standards based on Next Generation Science Standards (NGSS) For more information visit: https://www.nextgenscience.org/

Unit Title	Human Body: An Orientation	Length of Unit	2 weeks

Critical Content:	Key Skills:		
My students will Know	My students will be able to (Do)		
 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. 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. 	 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. 		

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Biochemistry, Cells, and Medical Imaging	Length of Unit	3 weeks

Inquiry Questions (Engaging & Debatable)	 How do cells maintain balance within the human body? How has technology allowed scientists to learn more about the human body? 			
Standards	HS-LS1-1, HS-LS1-4, HS-LS1-7			
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):			
Concepts	Structure and Function			
	Growth and Development of Organisms			
	Cross Cutting Concepts (CCC)			
	Organization for Matter and Energy Flow in Organisms			
	Structure and Function			
	 Systems and System Models 			
Key Vocabulary	Cell organelles: Nucleus, Cytoplasm, Chromosome, Ribosome, Endoplasmic Reticulum,, Lysosome, Vacuole, Mitochondrion, chloroplast, cytoskeleton, Centriole, Diffusion, Endocytosis, Phagocytosis, Pinocytosis, Exocytosis, Osmosis			

Unit Title	Biochemistry, Cells, and Medical Imaging	Lengt	h of Unit	weeks
Critical Content: My students will • How to differ • The pH scale • The structure the cell. • Systems of sp	Know entiate between ionic, polar covalent, nonpolar covalent bonds. and the role of buffers in the body. of the cell membrane and explain how it maintains homeostasis within ecialized cells within organisms help them perform the essential function	s of	Key Skills: My students • Research technique class usir • Construc evidence	will be able to (Do) about medical imaging es and present them to the ng technology t an explanation based on for how the structure of
 Systems of specialized cells within organisms help them perform the essential functions of life. In multicellular organisms individual cells grow and then divide via a process called mitosis, thereby allowing the organism to grow. Cellular division and differentiation produce and maintain a complex organism, composed of systems of tissues and organs that work together to meet the needs of the whole organism. As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment. 		 DNA deter proteins essential systems of Use a model cellular deta differenti maintain Use a model vespiration whereby formed to 	ermines the structure of which carry out the functions of life through of specialized cells. del to illustrate the role of ivision (mitosis) and fation in producing and ing complex organisms del to illustrate that cell on is a chemical process bonds are broken and o create energy	

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Tissues	Length of Unit	2 weeks
Inquiry Questions	 How does the specificity of a tissue affect the overall org 	an function in the l	human body?
(Engaging &	 How do cells work together to make a tissue? 		
Debatable)			
Standards	HS-LS1-2		
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):		
Concepts	Structure and Function		
	Cross Cutting Concepts (CCC)		
	• Systems and System Models		
Key Vocabulary	Enithelium Connective Tissue Extracellular Matrix Cartilage A	reolar Adinose R	eticular Muscle Skeletal
ixey vocabulary	Tissue, Cardiac Tissue, Norvous Tissues, Eibrosis		
	1155uc, Gardiae 1155uc, Nervous 1155ucs. 11010515		

Unit Title	Tissues	Length of Unit	2 weeks

Critical Content:	Key Skills:		
My students will Know	My students will be able to (Do)		
 Specialized groups of differentiated cells form tissues The structure, function, and location of epithelial, connective, muscle, and nervous tissue. 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. 	 Evaluate the structure of each tissue type and explain how it relates to its function. Construct a model showing how the various transport processes account for the directional movements of specific substances across the plasma membrane Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. 		

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Body Membranes and Integumentary System	Length of Unit	2.5 weeks

Inquiry Questions (Engaging & Debatable)	• How does the structure of the skin help to regulate other parts of the human body?
Standards	HS-LS1-2, HS-LS1-3
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):
Concepts	Structure and Function
	Cross Cutting Concepts (CCC)
	 Systems and System Models
	Structure and Function
	Stability and Change
Key Vocabulary	Membranes, Integumentary System, Melanin, Papillary Layer, Reticular Layer,, Sebaceous Gland, Sebum, Sudoriferous Gland, Eccrine Gland, Apocrine Gland

Unit Title	Body Membranes and Integumentary System		Length of Unit	2.5 weeks
Critical Content: My students will The general types (cutan give the loca The structur The function sebaceous gl How imbalan themselves t The purpose The character basal cell can malignant m How skin he The skin pro Body membr	Know functions of the four body membrane eous, mucous, serous and synovial) and tion in the body. e of the skin affects its functions. s of the skin appendages (nails, hair, ands and sudoriferous glands) nces or diseases in the body can manifest through the skin. of the "Rule of Nines". eristics of different types of skin cancer: rcinoma, squamous cell carcinoma, and elanoma. eals itself. vides nonspecific defenses against infection. ranes line, cover, protect and lubricate body	 Key Skills: My students will Compare and membrane ty Develop a sci body membri Design and constructions with Develop and organization functions with Develop a me aids in maint Construct a so functions as Construct a so 	be able to (Do) d contrast the structu ypes. ientific model illustration anes conduct an experiment all Human Hair the S use a model to illustration of interacting system thin multicellular org odel to provide evide taining homeostasis scientific explanation an organ	re of the major ting the functions of t to answer the ame?" rate the hierarchical ns that provide specific anisms nce for how the skin outlining how the skin n evidence for how the
 Body memory surfaces. Skin condition The integum and glands. 	ons can relate to the health of an individual. entary system includes skin, hair, nails, muscle	structure and function of the skin contributes to human body's overall health.		contributes to the

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Skeletal System	Length of Unit	4 weeks
Inquiry Questions (Engaging & Debatable)	 How does the skeletal system interact with other body systems? How does the skeletal system used in movement and support within the human body? 		
Standards	HS-LS1-2, HS-LS1-3		
Unit Strands & Concepts	 DISCIPLINARY CORE IDEAS (DCI): Structure and Function Growth and Development of Organisms Cross Cutting Concepts (CCC) Systems and System Models Structure and Function Stability and Change 		
Key Vocabulary	Axial Skeleton, Appendicular Skeleton, Osteocytes, Ossification,	Arthritis, Joint	

Unit Title	Skeletal System	Length of Unit	4 weeks

Critical Content:	Key Skills:		
My students will Know	My students will be able to (Do)		
 How bone gets made, repaired and remodeled. The difference between the axial and appendicular skeleton. The different types of joints The relative function of the major regions of the skeleton Components of the male vs. female skeleton Common disorders that affect the skeletal system The importance of spinal curvatures and intervertebral discs in normal and abnormal physiology 	 Compare and contrast the pelvic girdles of males and females. Compare and contrast the structure of the four bone classes Construct an explanation based on evidence for how the structure and function of the skeletal system contributes to the human body's overall health. Compare and contrast the histology of compact and spongy bone Analyze the chemical composition of bone and the relative advantages conferred by its organic and inorganic components Model the skeletal system 		

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Muscular System	Length of Unit	3 weeks
Inquiry Questions (Engaging & Debatable)	 How does the structure of muscle tissue relate to its function in different muscles of the body? How does the muscular system interact with other body systems? 		
Standards	HS-LS1-2, HS-LS1-3, HS-LS1-7		
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):		
Concepts	• Structure and Function		
	Organization for Matter and Energy Flow in Organisms		
	Cross Cutting Concepts (CCC)		
	 Systems and System Models 		
	Structure and Function		
Key Vocabulary	Muscle Fibers, Smooth Muscle, Skeletal Muscle, Cardiac Muscle, Potential, Sarcomere	Tendon, Neuromu	scular Junction, Action

Unit Title	Muscular System	Length of Unit	3 weeks

Critical Content:	Key Skills:		
My students will Know	My students will be able to (Do)		
 The functions of the muscular system. The roles of actin, myosin, calcium ions and ATP in muscle contraction. What causes different degrees of contraction. Sliding Filament Theory of Muscle Contraction Three types of muscle tissue (smooth, skeletal and cardiac) create the body movements and transport of materials in the body Muscle performance depends on adequate amounts of oxygen to the muscle tissue. Muscular contraction is controlled by the nervous system through electrical and chemical signaling. 	 Compare and contrast the three types of muscle tissue in terms of structure and function Classify muscles based on how they are named Construct an explanation based on evidence of how muscles get fatigued Construct an explanation based on evidence for how the structure and function of the muscular system contributes to the human body's overall health. Model the microscopic makeup of a skeletal muscle 		

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Nervous System	Length of Unit	4 weeks
Inquiry Questions (Engaging & Debatable)	 How does the nervous system communicate with the rest of the body? What is the role of the nervous system in maintaining homeostasis? 		
Standards	HS-LS1-2, HS-LS1-3		
Unit Strands & Concepts	 DISCIPLINARY CORE IDEAS (DCI): Structure and Function Cross Cutting Concepts (CCC) Systems and System Models Stability and Change 		
Key Vocabulary	Nervous System, Sensory, Neuroglia, Spinal cord, Nerve Impulse	e, Neuron	

Unit Title	Nervous System	Length of Unit	4 weeks

Critical Content:	Key Skills:	
My students will Know	My students will be able to (Do)	
 The different cells found in the nervous system. The five types of receptors and their functions. How the senses receive stimuli and process the information. Summarize the functions of the major cerebral hemispheres, diencephalon, brainstem, and cerebellum How nerve impulses travel from one neuron to the next The functions of the twelve pairs of cranial nerves, spinal nerves and spinal nerve plexuses The nervous system mediates communication between different parts of the body and the body's interactions with the environment Feedback loops in the nervous and endocrine systems regulate conditions in the body. Sensory neurons, interneurons, and motor neurons all have a role in sensation, thought and response. 	 Compare and contrast the central nervous system and peripheral nervous systems in terms of organs and functions. Model and describe a reflex arc. Construct an explanation based on evidence describing the parts of the brain and their functions. Compare and contrast the sympathetic nervous system and the parasympathetic nervous system in terms of situations when that system is used, neurotransmitters involved, target organs involved and the responses of those target organs in the body. Construct an explanation based on evidence for how the structure and function of the nervous system contributes to the human body's overall health. 	

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Special Senses	Length of Unit	4 weeks
Inquiry Questions (Engaging & Debatable)	 How does the sensory system communicate with the res What is the role of the sensory system in maintaining ho 	t of the body? meostasis?	
Standards	HS-LS1-2, HS-LS1-3		
Unit Strands & Concepts	 DISCIPLINARY CORE IDEAS (DCI): Structure and Function Cross Cutting Concepts (CCC) Systems and System Models Stability and Change 		
Key Vocabulary	Neuron, Sensory Receptor, Olfactory Receptor, Gustatory Recep Equilibrium	otor, Static Equilibr	ium, Dynamic

Unit Title	Special Senses	Length of Unit	4 weeks

Critical Content:	Key Skills:		
My students will Know	My students will be able to (Do)		
 Sense organs such as the eye, ear, mouth and nose contain receptors for stimuli that gets integrated into the nervous system. Different types of receptors are found in the different sense organs: photoreceptors i the eye for vision, mechanoreceptors in the ear for hearing and balance and chemoreceptors in the nose and mouth for taste and smell. The functions of each eye structure The difference between emmetropia, myopia and hyperopia. The causes, effects, and treatments for glaucoma and cataracts. The structures and function of the ear 	 Model the pathway of light through the eye to the retina Use different types of eye tests and processes to assess vision: Snellen eye chart, astigmatism, accommodation, pupillary reflex, optical illusions, convergence, and photopupillary reflex Design and conduct an experiment to determine if there is a relationship between taste and smell. Conduct a series of experiments to assess how we hear. Identify and label the structures of the eye and the muscles surrounding the eye. Classify general sensory receptors by structure, stimulus detected, and body location Identify the location, structure, and function of the olfactory and gustatory receptors 		

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Blood	Length of Unit	2.5 weeks
Inquiry Questions (Engaging & Debatable)	 What happens if a person gets the wrong type of blood? How does blood clot? 		
Standards	HS-LS1-1, HS-LS1-2, HS-LS1-3, HS-LS3-1		
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):		
Concepts	Structure and Function		
	Inheritance of Traits		
	Cross Cutting Concepts (CCC)		
	Systems and System Models		
	Stability and Change		
	Structure and Function		
	Cause and Effect		
Key Vocabulary	Formed Elements, Hemoglobin, Hemostasis, Leukocytes, Erythi	rocytes, Platelets, A	Antigen

Unit Title	Blood	Length of Unit	2.5 weeks

Critical Content:	Key Skills:
My students will Know	My students will be able to (Do)
 The components of blood as well as their function. The basis for the ABO blood groups in humans and how to determine blood type. The basis of adverse reactions in blood transfusions and organ transplants. Approximately half of an individual's DNA sequence comes from each parent. Possible combinations of alleles in a zygote can be predicted from the genetic makeup of the parents. The complementary activity of major body systems provides cells with oxygen and nutrients and removes toxic waste products such as carbon dioxide 	 Compare and contrast red blood cells and white blood cells in terms of where made and functions. Model the events of hemostasis Determine blood types of offspring given parent blood types or a child and one parent using Punnett Squares. Conduct blood typing procedures to determine the blood types of four unknown simulated blood samples.

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide

Unit Title	Cardiovascular System	Length of Unit	4 weeks
Inquiry Questions	• How does the heart's structure facilitate the numping of	blood?	I
(Engaging & Debatable)	 How does our body maintain the proper oxygen levels in What is the pathway of blood flow throughout the body? 	our body?	
Standards	HS-LS1-2, HS-LS1-3		
Unit Strands & Concepts	 DISCIPLINARY CORE IDEAS (DCI): Structure and Function Cross Cutting Concepts (CCC) Systems and System Models Stability and Change 		
Key Vocabulary	Atria, Ventricles, Arteries, Aorta, Blood Vessels, Pacemaker, fibr Atherosclerosis, Angioplasty, Hypertension	illation, Veins, Cap	illaries, Hypotension,

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation guide

Unit Title	The Respiratory, Digestive, and Lymphatic Systems	Length of Unit	3 weeks

Inquiry Questions	 How do internal cells exchange vital gases with the environment?
(Engaging &	 How can the human digestive system be viewed as a "disassembly line"?
Debatable)	How does our body defend itself against foreign invaders
Standards	HS-LS1-2, HS-LS1-3, HS-LS1-6, HS-LS1-7
Unit Strands &	DISCIPLINARY CORE IDEAS (DCI):
Concepts	Structure and Function
	Organization for Matter and Energy Flow in Organisms
	Cross Cutting Concepts (CCC)
	Systems and System Models
	Stability and Change
	• Energy and Matter
Key Vocabulary	Cellular Respiration, External Respiration, Internal Respiration, Eupnea, Alveoli, Diaphragm, Alimentary
	Canal, Peristalsis, Chymotrypsin, Carboxypeptidase, Edema, Pathogens, Phagocytes, Antibodies

 The protective mechanisms of the respiratory system. How gas exchange happens between the alveoli and the 	
 bloodstream. How breathing is controlled by the nervous system. The difference between tidal volume, vital capacity, inspiratory reserve volume, expiratory reserve volume and residual volume. The respiratory system supplies oxygen to the body while removing carbon dioxide. The cardiovascular system works in conjunction with the respiratory system to transport the oxygen to the cells and the carbon dioxide away from the cells. The digestive system is responsible for taking the food humans eat and processing it so that it is available for cellular metabolism. Proteins, carbohydrates, lipids and nucleic acids are all broken down in different locations throughout the digestive system. The endocrine function of the pancreas in maintaining 	Jse a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. Describe structure and function of each respiratory organ. Trace how the respiratory muscles can cause volume changes that lead to airflow into and out of the lungs. Construct a scientific explanation detailing the process of gas exchanges in the lungs and tissues by applying the ga aws. Compare and contrast how oxygen and carbon dioxide are ransported in the blood. Summarize the overall function of the digestive system and differentiate between organs of the alimentary canal and accessory digestive organs. Model mechanical/physical digestion and chemical

canal.

The Respiratory, Digestive, and Lymphatic Systems

- The lymphatic system returns leaked plasma from the tissues back into the blood vessels after cleansing it of pathogens and cell debris in an effort to maintain fluid balance homeostasis.
- Construct a scientific explanation that links the function of the lymphatic system to the cardiovascular and immune systems

Length of Unit

3 weeks

Unit Title

 The lymphatic system and the immune system work together to defend the body. The immune system is composed of nonspecific and specific defenses. The function of the major lymphatic vessels The body's three lines of defense against pathogens 	 Model the relationship between the distribution of lymph nodes and vessels to the point of entry of foreign bodies. Compare and contrast the development and function of T-lymphocytes and B-lymphocytes. Analyze the structure of an antibody in terms of genetic recombination.
---	---

Assessments:	Unit Test, Lab activities, Performance Tasks
Teacher Resources:	Region 14 Implementation Guide