

2021 - 2022, HS, Human Anatomy & Physiology, Quarter 1

Big Ideas/Key Concepts:

- Anatomy and physiology describe and investigate the relationship between form and function of interconnected structures to form an integrated whole.
- Organ systems (integumentary and skeletal) work together to support, protect, and move body structures and to maintain homeostasis.
- Bioengineers develop technologies to diagnose and treat disorders.

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Standards	Student Friendly "I Can" Statements
<p><u>Organization of the Human Body</u></p> <p>HAP.LS1.1 Investigate the organization of the human body in relation to its ability to accomplish life functions and construct an explanation for the relationship between anatomy and physiology.</p> <p>HAP.LS1.2 Differentiate the major organ systems of the human body by their anatomy and physiology and engage in argument about defined boundaries due to their functional connectivity.</p>	<p><u>Organization of the Human Body</u></p> <p>I can model the relationship between the organization of the human body and its ability to accomplish basic life functions.</p> <p>I can explain the relationship between the terms "anatomy" and "physiology".</p> <p>I can model the major organ systems of the body based on location and the organs contained within the system.</p> <p>I can use the model to explain why different organ systems are located where they are and how they functionally relate to each other.</p>

<p>HAP.LS1.3 Describe the organizational levels of the human body and observe patterns in cell types and tissue types across organ systems.</p> <p>HAP.LS1.4 Use a human model to differentiate the major body cavities and organs located within them. Describe the model using proper anatomical and directional terminology for body regions, planes, and cavities.</p> <p>HAP.LS1.5 Explain homeostasis and describe how it is accomplished through feedback mechanisms that utilize receptors and effectors.</p>	<p>I can explain the levels of structural organization within the body, from cell to organism.</p> <p>I can explain why specific cell and tissue types are found within specific organ systems.</p> <p>I can model the location of major body cavities as well as organs located within each cavity.</p> <p>I can describe the major body cavities, including organs contained within each.</p> <p>I can properly use anatomical and directional terms to describe body movement and location of body cavities and organs.</p> <p>I can model homeostasis and explain how the body works to maintain a stable environment.</p> <p>I can explain how receptors and effectors in positive and negative feedback mechanisms help maintain homeostasis.</p>
<p><u>Integumentary System</u></p> <p>HAP.LS1.6 Describe the anatomical structures of the integumentary system and explain their role in the physiological processes of protection, temperature homeostasis, and sensation.</p> <p>HAP.LS1.7 Diagram a cross-sectional image of skin layers identifying the microscopic components and describe the life cycle of cells that maintain these layers.</p>	<p><u>Integumentary System</u></p> <p>I can explain how major structures of the integumentary system work to protect the body, aid in sensation, and maintain homeostasis.</p> <p>I can use a model to identify and describe the major structures of the integumentary system on a cross-sectional model of the skin.</p> <p>I can explain the life cycle of cells that make up the layers of the skin.</p>

<p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p> <p><u>Skeletal System</u></p> <p>HAP.LS1.8 Identify major bones within the axial and appendicular divisions, describing their physiological roles in creating a body scaffold, internal organ protection, and anchor points for skeletal muscles participating in movement.</p> <p>HAP.LS1.9 Diagram microscopic bone structures, identifying regions that participate in hematopoiesis and storage of minerals and fat.</p> <p>HAP.LS1.10 Explain the processes of bone formation, growth, and repair.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p>I can research disorders of the integumentary system to explain causes/signs/symptoms and treatments for them.</p> <p><u>Skeletal System</u></p> <p>I can identify the major bones in the body, and describe whether each is part of the axial or appendicular divisions. Based on shape and location, I can explain the role each bone plays in giving the body shape, protecting organs, or as an attachment point for muscles.</p> <p>I can model the gross and microscopic structures of a typical long bone.</p> <p>I can relate specific areas of a long bone to function, including hematopoiesis and fat/mineral storage.</p> <p>I can model long bone formation, growth and repair.</p> <p>I can research disorders of the skeletal system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>
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2021 - 2022, HS, Human Anatomy & Physiology, Quarter 2

Big Ideas/Key Concepts:

- Anatomy and physiology describe and investigate the relationship between form and function of interconnected structures to form an integrated whole.
- Organ systems (skeletal, muscular, and nervous) work together to support, protect, and move body structures and to maintain homeostasis.
- Organ systems (nervous and endocrine) work together to maintain homeostasis and communicate with other body systems.
- Bioengineers develop technologies to diagnose and treat disorders.

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Standards	Student Friendly "I Can" Statements
<p><u>Muscular System</u></p> <p>HAP.LS1.11 Differentiate visceral, cardiac, and skeletal muscle tissues based on anatomical criteria and their physiological role in the movement of body parts and/or substances.</p> <p>HAP.LS1.12 Model the gross and microscopic anatomy of skeletal muscle and a muscle fiber and use the model to identify and explain the roles of subcellular structures that participate in the events of muscle fiber contraction and heat generation.</p>	<p><u>Muscular System</u></p> <p>I can differentiate between visceral (smooth), cardiac, and skeletal muscle based on their structure.</p> <p>I can use a microscope to investigate the structure of visceral (smooth), cardiac, and skeletal muscles relative to their physiological roles.</p> <p>I can describe the gross and microscopic structures of a skeletal muscle.</p> <p>I can use the sliding filament theory to model how gross and microscopic structures of skeletal muscles function to cause muscle</p>

<p>HAP.LS1.13 Model the anatomical connections between the skeletal system and muscular system and explain how they generate movement through antagonistic muscle groups.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p> <p><u>Nervous System</u></p> <p>HAP.LS1.33 Anatomically distinguish between the central nervous system and the peripheral nervous system. Explain how their structures and locations are related to their physiological roles.</p> <p>HAP.LS1.34 Model the cellular and subcellular structures of neurons and explain the molecular neurophysiology of membrane potentials and the conduction of information through synaptic transmission.</p> <p>HAP.LS1.36 Compare and contrast the structures and functions of the somatic nervous system and the autonomic nervous system.</p> <p>HAP.LS1.37 Model the major parts of the brain and spinal cord, relating each part to its source of sensory information and/or its</p>	<p>contraction and heat generation.</p> <p>I can design and construct a working model to demonstrate how skeletal and muscular systems interact to generate movement through antagonistic muscle groups.</p> <p>I can research disorders of the muscular system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p> <p><u>Nervous System</u></p> <p>I can describe the structures of the central and the peripheral nervous systems.</p> <p>I can relate the structure and organization of the central and peripheral nervous systems to their functions.</p> <p>I can model how cellular and subcellular structures of multipolar neurons relate to their physiological functions.</p> <p>I can explain membrane potentials and the conduction of information through synaptic transmission.</p> <p>I can sequence the events in a reflex arc.</p> <p>I can model the relationship of structure to function of somatic (voluntary) and autonomic nervous systems.</p> <p>I can model the major parts of the brain and spinal cord, and relate each part to its source of sensory information and/or its primary target of regulation.</p>
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<p>primary target of regulation.</p> <p>HAP.LS1.35 Identify and describe the types of sensory receptors found in the human body.</p> <p>HAP.LS1.38 Explain the structures, functions, and limitations of the human sensory systems (senses): hearing, balance/proprioception, sight, touch, smell, and taste.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p>I can explain the organization and function protective layers of the brain and spinal cord.</p> <p>I can identify and describe the function of the 12 cranial nerves.</p> <p>I can identify the types of sensory receptors found in the human body and explain their function.</p> <p>I can explain the functions and limitations of the human sensory system.</p> <p>I can describe and explain the functions of the major structural and functional components of the human eye.</p> <p>I can describe and explain the functions of the major structural and functional components of the human ear.</p> <p>I can research disorders of the nervous system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>
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2021 - 2022, HS, Human Anatomy & Physiology, Quarter 3

Big Ideas/Key Concepts:

- Anatomy and physiology describe and investigate the relationship between form and function of interconnected structures to form an integrated whole.
- Organ systems (integumentary, muscular, cardiovascular, nervous and endocrine) work together to maintain homeostasis and communicate with other body systems.
- Organ systems (cardiovascular and lymphatic) transport materials through vessels to all parts of the body.
- Bioengineers develop technologies to diagnose and treat disorders.

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Standards	Student Friendly "I Can" Statements
<p><u>Endocrine System</u></p> <p>HAP.LS1.30 Using a model, name and locate the major endocrine glands and identify additional organ tissues in the human body that produce hormones. Describe the hormones produced and their physiological effects on other body targets.</p> <p>HAP.LS1.31 Describe the relationship between receptors and ligands and differentiate between steroid and nonsteroidal hormones as ligands.</p>	<p><u>Endocrine System</u></p> <p>I can model the location of major endocrine glands and organs that have endocrine functions.</p> <p>I can identify the major hormones produced and describe the physiological effects on their body targets.</p> <p>I can model how hormones interact with target cells.</p> <p>I can explain the structural and functional differences between steroid and nonsteroidal hormones.</p> <p>I can model negative feedback and explain its role in maintaining</p>

<p>HAP.LS1.32 Explain using examples, the mechanism of negative feedback in hormonal production and control.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p> <p><u>Circulatory System</u></p> <p>HAP.LS1.17 Examine the structure (molecular and cellular) of blood constituents and describe their function.</p> <p>HAP.LS1.22 Analyze ABO and Rh blood groups as a basis for blood transfusion and infant incompatibility reactions.</p> <p>HAP.LS1.14 Describe in terms of structure and function, the systemic and pulmonary paths of the cardiovascular system.</p> <p>HAP.LS1.15 Prepare and/or use a model of a human heart to explain</p>	<p>homeostasis.</p> <p>I can explain the relationship between positive feedback and specific hormones.</p> <p>I can research disorders of the endocrine system to identify causes/signs/symptoms and treatments for them.</p> <p><u>Circulatory System</u></p> <p>I can model the molecular and cellular components of blood, and explain each component's function.</p> <p>I can explain the difference between ABO and Rh blood groups, including patterns of inheritance.</p> <p>I can explain the results of mixing different blood types in terms of blood transfusions and infant compatibility reactions.</p> <p>I can conduct an investigation that illustrates the reactions caused by mixing different blood types.</p> <p>I can develop a model that illustrates the flow of blood through systemic and pulmonary paths of the cardiovascular system.</p> <p>I can model the flow of blood through the human heart.</p> <p>I can relate the structures of the heart to their specific functions in moving blood.</p> <p>I can develop a model to explain systole and diastole.</p>
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<p>systole and diastole and the heart’s internal and external control mechanisms involved in producing the heartbeat.</p> <p>HAP.LS1.16 Explain blood pressure in terms of systole and diastole. Describe the factors affecting blood pressure and blood pressure’s role in homeostasis.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p>I can use a model of the heart that illustrates the role external and internal structures play in producing a heartbeat.</p> <p>I can relate systole and diastole to blood pressure.</p> <p>I can design, conduct, and communicate the results of an investigation of factors impacting blood pressure and heart rate.</p> <p>I can relate the role blood pressure plays in maintaining homeostasis.</p> <p>I can research disorders of the cardiovascular system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>
<p><u>Respiratory System</u></p> <p>HAP.LS1.18 Explain how the anatomy of the respiratory system functions to provide oxygen and carbon dioxide transport mechanisms between the lungs and the circulatory system, considering capillary structures, red blood cell structures, diffusion, and affinity.</p> <p>HAP.LS1.19 Explain the relationship between the integumentary, muscular, and circulatory systems in temperature homeostasis.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p><u>Respiratory System</u></p> <p>I can identify the parts of the respiratory system and explain how they relate to the circulatory system.</p> <p>I can explain how respiratory gases diffuse between the alveoli and capillaries in the lungs.</p> <p>I can design and build a functional model of the lungs that includes parts representing all major macroscopic structures of the respiratory system.</p> <p>I can explain how integumentary, muscular, and circulatory systems work together to help maintain temperature homeostasis in the body.</p> <p>I can research disorders of the respiratory system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>

<p><u>Urinary System</u></p> <p>HAP.LS1.28 Model the sequential organization of the male and female urinary tracts in order to describe the physiological role of blood filtration and waste excretion from the body.</p> <p>HAP.LS1.29 Identify the parts of a nephron and describe how they assist in homeostatic mechanisms through urine formation.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p><u>Urinary System</u></p> <p>I can identify the organs of the male and female urinary system, modeling the role they play in blood filtration and waste excretion.</p> <p>I can describe the anatomy of the kidney while explaining its role in blood filtration.</p> <p>I can identify the structures of a nephron and explain the role these structures play in the process of urine formation.</p> <p>I can conduct an investigation analyzing the components of (artificial) urine.</p> <p>I can explain the role urine formation plays in maintaining homeostasis.</p> <p>I can research disorders of the urinary system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>
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2021 - 2022, HS, Human Anatomy & Physiology, Quarter 4

<p>Big Ideas/Key Concepts:</p> <ul style="list-style-type: none"> ● Anatomy and physiology describe and investigate the relationship between form and function of interconnected structures to form an integrated whole. ● Organ systems (cardiovascular and lymphatic) transport materials through vessels to all parts of the body. ● Organ systems (urinary and digestive) work together to extract needed components from materials, and remove waste from the body. ● The reproductive system provides the structure and function for procreation. ● Bioengineers develop technologies to diagnose and treat disorders. 	
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Standards	Student Friendly “I Can” Statements
<p><u>Lymphatic System</u></p> <p>HAP.LS1.20 Describe the relationship between the structure and function of the lymphatic system.</p> <p>HAP.LS1.21 Differentiate between innate and adaptive immunity, identifying immune cells that play a role in each.</p>	<p><u>Lymphatic System</u></p> <p>I can model the relationship between structure and function of the lymphatic system.</p> <p>I can model the relationship between antigens and antibodies, explaining the role they play in adaptive immunity.</p> <p>I can explain the differences between innate and adaptive immunity.</p> <p>I can describe different types of immune cells and explain the role they play in human immunity.</p>

<p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p> <p><u>Digestive System</u></p> <p>HAP.LS.1.23 Diagram the progression of lipid transport from the digestive system, through the lymphatic system, and into the cardiovascular circulation.</p> <p>HAP.LS1.24 Model the sequential organization of the alimentary canal and its accessory organs in order to describe the physiological role of each.</p> <p>HAP.LS1.25 Analyze gastrointestinal wall histology and explain the anatomical architecture that supports efficient absorption and transport of molecules into cardiovascular or lymphatic circulation.</p> <p>HAP.LS1.26 Investigate the actions of major digestive enzymes and hormones and identify their sources.</p> <p>HAP.LS1.27 Describe the role of the hepatic portal system in coupling the digestive and cardiovascular systems.</p> <p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p>I can research disorders of the immune system to identify causes/signs/symptoms and treatments for them.</p> <p><u>Digestive System</u></p> <p>I can model progression of lipid transport from the digestive system, through the lymphatic system, into cardiovascular circulation.</p> <p>I can model the sequential organization of the alimentary canal, explaining the roles each plays in mechanical and chemical digestion.</p> <p>I can explain the physiological role that accessory organs play in chemical digestion.</p> <p>I can analyze how the structure of the small intestine supports efficient absorption and transport of molecules into cardiovascular or lymphatic circulation.</p> <p>I can research and communicate actions of major digestive enzymes and hormones, and identify their sources.</p> <p>I can model the hepatic portal system in coupling the digestive and cardiovascular systems.</p> <p>I can research disorders of the digestive system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>
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<u>Reproductive System</u>	<u>Reproductive System</u>
<p>HAP.LS1.39 Identify and describe the organs of the human male and female reproductive systems that provide the physiological functions of gametogenesis, fertilization, and embryogenesis.</p>	<p>I can identify the organs of the male and female reproductive systems and describe their functions relative to gametogenesis, fertilization, and embryogenesis.</p>
<p>HAP.LS1.40 Examine the microscopic structures of the human egg and sperm and explain how their structures relate to their functions.</p>	<p>I can compare and contrast oogenesis and spermatogenesis.</p> <p>I can explain how the structure of the human egg and sperm relates to their roles in fertilization.</p>
<p>HAP.LS1.41 Based on the secretion of hormones, identify the endocrine tissues of the reproductive system and describe their roles in regulation of secondary sex characteristics, the female menstrual cycle, pregnancy, fetal development, and parturition.</p>	<p>I can differentiate between primary and secondary sex characteristics, explaining the role the endocrine system plays in their development.</p> <p>I can explain the role hormones play in regulating events of the menstrual cycle.</p>
<p>HAP.LS1.42 Trace the major events of human development from fertilization to birth, with a focus on the development of organs and functional organ systems.</p>	<p>I can explain the role hormones play during major events of pregnancy, fetal development, and labor/delivery.</p> <p>I can model the major events of fetal development from fertilization to birth.</p>
<p>HAP.ETS2.1 Research system disorders to communicate information on the known facts about the disorders and identify technology that has been developed to diagnose and/or treat the disorders.</p>	<p>I can research disorders of the reproductive system to identify causes/signs/symptoms and technologies used to diagnose/treat them.</p>