Alabama Science

Human Anatomy and Physiology

From Molecules to Organisms: Structures and Processes

Tissues

Structure and Function

1 Obtain, evaluate, and communicate information to explain how differences in cellular structure (mitochondria, cytoskeletal structure, endoplasmic reticulum, cell membrane) lead to differences in the function and organization of the four tissue types (epithelial, connective, muscular, and nervous). HAP.1

2 Obtain, evaluate, and communicate information to describe how the structures of the integumentary system and its accessory organs contribute to its function. HAP.2

Integumentary System

Stability and Change

Skeletal System

Structure and Function

3 Develop and use a model to illustrate how the structures of the skeletal system contribute to its function. HAP.3

a Obtain, evaluate, and communicate information describing the growth and development of the skeletal system. HAP.3.A

Skeletal System

Stability and Change

Skeletal System

Structure and Function

4 Develop and build a three-dimensional model to illustrate the structures of the muscular system, including muscle locations, origins, and insertions, and explain their roles in movement and support. HAP.4

Muscular System

Systems and System Models

Muscular System

Structure and Function

Nervous System

Systems and System Models

5 Obtain, evaluate, and communicate information explaining the relationship between the structures and functions of the central nervous system and the peripheral nervous system. HAP.5

- a Systems and System Models HAP.5.A

Nervous System

Stability and Change

Nervous System

Structure and Function

Endocrine System

Stability and Change

6 Construct an explanation of how the interdependence of the nervous and endocrine systems maintains homeostasis. HAP.6

- a Obtain, evaluate, and communicate information explaining how hormones secreted by endocrine glands help the body maintain homeostasis through negative and positive feedback loops HAP.6.A
- b Obtain, evaluate, and communicate information describing the role of endocrine axes involving the thyroid and gonads in controlling growth, development, metabolism, and reproduction. HAP.6.B

Immune System

Structure and Function

7 Obtain, evaluate, and communicate information describing the structure of lymph nodes and primary cells of the immune system (neutrophils, lymphocytes, monocytes, macrophages, eosinophils, and basophils) and explaining their role in inflammation and the body's defense. HAP.7

Immune System

Cause and Effect

Immune System

Systems and System Models

Cardiovascular System

Structure and Function

8 Obtain, evaluate, and communicate information explaining how the structures of the cardiovascular system are related to its functions. HAP.8

Cardiovascular System

Systems and System Models

Cardiovascular System

Cause and Effect

Cardiovascular System

Stability and Change

Respiratory System

Structure and Function

9 Obtain, evaluate, and communicate information to explain the relationship between the structures and functions of the respiratory system. HAP.9

Respiratory System

Systems and System Models

Respiratory System

Stability and Change

Digestive System

Structure and Function

10 Obtain, evaluate, and communicate information explaining the relationship between the structures and functions of the digestive system, including absorption and chemical and mechanical digestion. HAP.10

- a Construct an explanation of the roles of accessory organs (salivary glands, pancreas, and liver) in digestion. HAP.10.A

Digestive System

Stability and Change

Excretory System

	Systems and System Models 11 Use a model to illustrate the microanatomy of excretory structures and describe their functions. HAP.11
	Excretory System
	Stability and Change
	Reproductive System
	Systems and System Models 12 Use models to compare and contrast the internal and external structures of the female and male reproductive systems and their production of gametes. HAP.12
	Reproductive System
	Cause and Effect
Construct an explanation of the relationships between the integumentary system and other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.2.A	**a Construct an explanation of the relationships between the integumentary system and other organ systems, including the body's mechanisms for maintaining homeostasis.** HAP.2.A
Construct an explanation of the relationships between the skeletal system and other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.3.B	**b Construct an explanation of the relationships between the skeletal system and other organ systems, including the body's mechanisms for maintaining homeostasis.** HAP.3.B
Model the cellular physiology of skeletal muscle, including how the cell functions in muscle contraction and relaxation. HAP.4.A	**a Model the cellular physiology of skeletal muscle, including how the cell functions in muscle contraction and relaxation.** HAP.4.A
Obtain, evaluate, and communicate information to explain	**b Obtain, evaluate, and communicate information to explain muscle fatigue and tone in terms of muscle cell physiology.** HAP.4.B

muscle fatigue and tone in terms of muscle cell physiology. HAP.4.B	
Construct an explanation of the role of reflex arcs, the central nervous system, and special senses in the response to stimuli to maintain homeostasis and guide behavior. HAP.5.B	b Construct an explanation of the role of reflex arcs, the central nervous system, and special senses in the response to stimuli to maintain homeostasis and guide behavior. HAP.5.B
Construct an explanation of the role of neurotransmitters in the functions and behavior of the nervous system. HAP.5.C	c Construct an explanation of the role of neurotransmitters in the functions and behavior of the nervous system. HAP.5.C
Obtain, evaluate, and summarize scientific findings regarding the biological origin of emotions and memories in distinct regions of the brain. HAP.5.D	d Obtain, evaluate, and summarize scientific findings regarding the biological origin of emotions and memories in distinct regions of the brain. HAP.5.D
Obtain, evaluate, and communicate information explaining how vaccines work to stimulate immunity in the human body. HAP.7.A	a Obtain, evaluate, and communicate information explaining how vaccines work to stimulate immunity in the human body. HAP.7.A
Construct an explanation of how the lymphatic system interacts with the immune and circulatory systems. HAP.7.B	b Construct an explanation of how the lymphatic system interacts with the immune and circulatory systems. HAP.7.B
Create a model to show how a pressure gradient moves blood through the circulatory system. HAP.8.A	a Create a model to show how a pressure gradient moves blood through the circulatory system. HAP.8.A

Carry out an investigation exploring the link between blood pressure and heart rate and include the role of baroreceptors and chemoreceptors in the explanation of results. HAP.8.B	b Carry out an investigation exploring the link between blood pressure and heart rate and include the role of baroreceptors and chemoreceptors in the explanation of results. HAP.8.B
Construct an explanation of the cardiovascular system's relationships with other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.8.C	c Construct an explanation of the cardiovascular system's relationships with other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.8.C
Construct an explanation of how the circulatory system works with respiration to transport respiratory gases. HAP.9.A	a Construct an explanation of how the circulatory system works with respiration to transport respiratory gases. HAP.9.A
Use a model to illustrate how pressure gradients move air into and out of the lungs. HAP.9.B	b Use a model to illustrate how pressure gradients move air into and out of the lungs. HAP.9.B
Construct an explanation of the respiratory system's relationships with other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.9.C	c Construct an explanation of the respiratory system's relationships with other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.9.C
Construct an explanation of the relationships between the digestive system and other organ systems, including the body's	b Construct an explanation of the relationships between the digestive system and other organ systems, including the body's mechanisms for maintaining homeostasis. HAP.10.B

mechanisms for maintaining homeostasis. HAP.10.B	
Construct an explanation of how the excretory system maintains homeostasis, including blood pressure and pH. HAP.11.A	**a** Construct an explanation of how the excretory system maintains homeostasis, including blood pressure and pH. HAP.11.A
Construct an explanation of how the endocrine system influences the growth, development, and functions of the reproductive systems in males and females, including the mechanisms of hormonal birth control. HAP.12.A	**a** Construct an explanation of how the endocrine system influences the growth, development, and functions of the reproductive systems in males and females, including the mechanisms of hormonal birth control. HAP.12.A