Kenilworth Public Schools

Curriculum Guide

Content Area: Anatomy & Physiology
Grade: 11-12
BOE Approved: 5/13/2019

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Anatomy & Physiology – Grade 11 & 12 Scope and Sequence

Unit 1- Levels of Organization	Unit 2- Support and Movement	Unit 3- Integration and Coordination	Unit 4- Transport
Weeks 1-4	Weeks 5-10	Weeks 11-14	Weeks 15-20
Unit Description: Anatomy and physiology are the studies of the components of the body and how they work together. They human body is a complex system consisting of many levels of organization. This organization begins with the chemistry that makes life possible, and continues through cells, tissues, organs, and organ systems. Understanding the structure of these levels of organization is key to understanding their function.	*Unit Description:* The integumentary, skeletal, and muscular systems are responsible for the support and movement of the body. The integumentary system protects the body from bacteria and other external threats and composes the largest organ system in the body. The skeletal system provides protection, support, and an anchor for the body's movement. The muscular system allows body parts to move. The structure of these systems aids in the functions.	*Unit Description:* The organ systems of the human body are responsible for a multitude of functions. The integumentary, skeletal, and muscular systems do not function in isolation. The nervous system, the senses, and the endocrine system are all involved in the receiving and sending information between different systems of the body.	*Unit Description:* The movement of nutrients, heat energy, and waste products in and out of the body is crucial for the body's overall productivity. Blood, cardiovascular system, and the lymphatic system work to transport materials between various parts of the body, and help maintain the body's homeostasis.

Unit Targets:	*Unit Targets:*	*Unit Targets:*	*Unit Targets:*
• Identify some of the early discoveries that led to our understanding of the human body. • Explain how anatomy and physiology are related. • List the levels of organization in the human body and characteristics of each. • Properly use the terms that describe the relative positions, body systems, and body regions. • List the four major tissue types, and indicate a function of each type. • Distinguish among the four major types of membranes. • Distinguish among the three types of muscle tissue. • Describe the general characteristics and functions of nervous tissue.	• List the layers of the skin and describe the tissues in each layer. • Describe the structure of a long bone, including the macroscopic and microscopic structure. • Distinguish between intramembranous and endochondral bones, and explain how such bones develop and grow. • Describe the major function of bones. • Distinguish between the axial and appendicular skeletons, and name the major parts of each. • Locate and identify the function of the skull bones. • Classify and describe the different joint characteristics. • Distinguish between the different types of muscles.	• Explain the general functions of the nervous system. • Name the major parts of the brain and their functions. • List the major parts of the peripheral and autonomic nervous system. • Name five kinds of receptors, and explain their functions. • Describe the function of senses, and the mechanisms for each one. • Name functions of hormones in the body. • Name and describe the different glands in the body. • Describe how the body responses to stress.	• Describe the general characteristics of blood, and discuss its major functions. • Discuss the functions of the organs of the cardiovascular systems. • Identify the structure and function of the different parts of the heart • Trace the pathway of blood through the heart. • Compare the structures and functions of the major types of blood vessels, including arteries and veins. • Explain how blood pressure is produced and controlled. • List and describe seven innate body defense mechanisms.

Anatomy & Physiology – Grade 11 and 12 Unit of Study

Unit Title: Levels of Organization

Unit Summary: Anatomy and physiology are the studies of the components of the body and how they work together. They human body is a complex system consisting of many levels of organization. This organization begins with the chemistry that makes life possible, and continues through cells, tissues, organs, and organ systems. Understanding the structure of these levels of organization is key to understanding their function.

21st Century Career and Life Themes: Global Awareness, Learning and Innovation Skills, Health Literacy

Learning Targets

NGSS Standards: HS-LS1-1/ HS-LS1-2/ HS-LS1-3

Technology Standards:

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

8.2.12.C.3 Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).

ELA Companion Standards:

RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.

RST.9-10.2. Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.8. Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

Content Statements:

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.
2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
3	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Big Idea: The human body is composed of systems that depend on the structure and function of their components. The human body is also made up of many levels of organization, which work together to comprise a complex organism.

Unit Essential Questions:

- How did the understanding of the human body develop?
- How are anatomy and physiology related?
- What are the levels of organization in the human body?
- What are the 4 different types of membranes?
- What are the three types of muscle tissue?
- Why is nervous tissue important?
- What are the anatomical terms used to describe the positions, body systems, and body regions?

Unit Enduring Understandings:

- The human body is a complex system of interacting parts with individual structures and functions.
- The relationships between anatomy and physiology explains the complex abilities of the human body.
- Homeostasis is essential for a healthy, functioning organism.
- Each body system plays a specific role in the overall healthy and functioning of the organism.

Unit Learning Targets

Students will…

- Identify some of the early discoveries that led to our understanding of the human body.
- Explain how anatomy and physiology are related.
- List the levels of organization in the human body and characteristics of each.
- Properly use the terms that describe the relative positions, body systems, and body regions.
- List the four major tissue types, and indicate a function of each type.
- Distinguish among the four major types of membranes.
- Distinguish among the three types of muscle tissue.
- Describe the general characteristics and functions of nervous tissue.

Evidence of Learning

Summative Assessment: Unit Test/Project, Labs

Formative Assessments:

- Quizzes
- Chapter Tests
- Homework
- Mini-labs
- Worksheets

Lesson Plans

Activities	*Timeframe*

• Anatomical terminology activity • Review of basic biology & chemistry • Coloring & labeling worksheets • Foldable for muscle tissue • Foldable for membranes	Weeks 1-4
Teacher Resources	*Teacher Note*
• Textbook • PowerPoint presentations • Laboratory materials	

Unit Summary: The integumentary, skeletal, and muscular systems are responsible for the support and movement of the body. The integumentary system protects the body from bacteria and other external threats and composes the largest organ system in the body. The skeletal system provides protection, support, and an anchor for the body's movement. The muscular system allows body parts to move. The structure of these systems aids in the functions.

21st Century Career and Life Themes: Global Awareness, Learning and Innovation Skills, Health Literacy

Learning Targets

NGSS Standards: HS-LS1-2/ HS-LS1-3

Technology Standards:

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

8.2.12.C.3 Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).

ELA Companion Standards:

RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.

RST.9-10.2. Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.

RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.8. Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

Content Statements:

1	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
2	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Big Idea: The integumentary, skeletal, and muscular systems are responsible for the support and movement of the body.

Unit Essential Questions:	Unit Enduring Understandings:
• What constitutes an organ? • What is the difference between the types of	• There are major difference between the different types of bones, muscles, and tissues in

bones and how do they develop and grow? • What are the layers of the skin and characteristics of each layer? • What is the difference between the axial and appendicular skeleton? • What are the different types of joints and how do each of them function? • What are the different types of muscles and how do they function?	the body, which allows for specific structures and functions. • The skeletal, muscular, and integumentary systems function together in a living human. • The integumentary system protects the body from bacteria and other external threats, and composes the largest organ system in the body. • The structure of bones allows them to protect, support and anchor the body for movement. • The structure of muscles allows them to move body parts.

Unit Learning Targets
Students will…

- List the layers of the skin and describe the tissues in each layer.
- Describe the structure of a long bone, including the macroscopic and microscopic structure.
- Distinguish between intramembranous and endochondral bones, and explain how such bones develop and grow.
- Describe the major function of bones.
- Distinguish between the axial and appendicular skeletons, and name the major parts of each.
- Locate and identify the function of the skull bones.
- Classify and describe the different joint characteristics.
- Distinguish between the different types of muscles.

Evidence of Learning

Summative Assessment: Unit Test/Project, Labs

Formative Assessments:

- Quizzes
- Chapter Tests
- Homework
- Mini-labs
- Worksheets

Lesson Plans

Activities	*Timeframe*
• Chicken bone dissection • Coloring and labeling worksheets • Analyzing models • Worksheets	Weeks 5-10

Teacher Resources	*Teacher Note*
• Textbook • PowerPoint presentations • Laboratory materials	

Unit Title: Integration and Coordination

Unit Summary: The organ systems of the human body are responsible for a multitude of functions. The integumentary, skeletal, and muscular systems do not function in isolation. The nervous system, the senses, and the endocrine system are all involved in the receiving and sending information between different systems of the body.

Primary Interdisciplinary Connections:

Health - 2.1.12.PGD.2

21st Century Career and Life Themes: Global Awareness, Learning and Innovation Skills, Health Literacy

Learning Targets

NGSS Standards: HS-LS1-2/ HS-LS1-3

Technology Standards:

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

8.2.12.C.3 Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).

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RST.9-10.8. Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

Content Statements:

1	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
2	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Big Idea: The integumentary, skeletal, and muscular systems are responsible for the support and movement of the body.

Unit Essential Questions:	**Unit Enduring Understandings:**
• What is the function of the nervous	• The nervous system conveys information and maintains homeostasis through the conduction

system? • What are the major parts of the brain and how do they function? • What is the difference between the peripheral and autonomic nervous system? • Why are receptors important? • Why are hormones essential to humans? • What are the different glands in the body and how do they function? • How does the body respond to stress?	of electrical signals and the release of chemicals called neurotransmitters. • Our senses provide information about our environment and allow us to distinguish among a variety of stimuli. • The endocrine system has the ability to release chemicals called hormones in order to maintain homeostasis.

Unit Learning Targets
Students will…

- Explain the general functions of the nervous system.
- Name the major parts of the brain and their functions.
- List the major parts of the peripheral and autonomic nervous system.
- Name five kinds of receptors, and explain their functions.
- Describe the function of senses, and the mechanisms for each one.
- Name functions of hormones in the body.
- Name and describe the different glands in the body.
- Describe how the body responses to stress.

Evidence of Learning

Summative Assessment: Unit Test/Project, Labs

Formative Assessments:

- Quizzes
- Chapter Tests
- Homework
- Mini-labs
- Worksheets

Lesson Plans

Activities	*Timeframe*
• Case study analyzation • Senses lab • Hormone activity • Coloring and labeling worksheets	Weeks 11-14

Teacher Resources	*Teacher Note*
• Textbook • PowerPoint presentations • Laboratory materials	

Unit Title: Transport

Unit Summary: The movement of nutrients, heat energy, and waste products in and out of the body is crucial for the body's overall productivity. Blood, cardiovascular system, and the lymphatic system work to transport materials between various parts of the body, and help maintain the body's homeostasis.

Primary Interdisciplinary Connections:

Health - 2.3.12.HCDM.4

21st Century Career and Life Themes: Global Awareness, Learning and Innovation Skills, Health Literacy

Learning Targets

NGSS Standards: HS-LS1-2/ HS-LS1-3

Technology Standards:

8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

8.2.12.C.3 Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).

ELA Companion Standards:

RST.9-10.1. Accurately cite strong and thorough evidence from the text to support analysis of science and technical texts, attending to precise details for explanations or descriptions.

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RST.9-10.8. Determine if the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.

Content Statements:

1	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
2	Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

Big Idea: There are systems within the body that are responsible for the movement of substances internally within the body.

Unit Essential Questions:	Unit Enduring Understandings:
• What is blood responsible for in the body? • How does the cardiovascular system function?	• Blood distributes heat energy and transports nutrients and waste products throughout the body.

• How does the heart circulate blood throughout the body? • What is the difference between arteries and veins? How do they function in the cardiovascular system? • How is blood pressure produced and controlled? • What are the body's defense mechanisms and how do they function?	• The cardiovascular system, consisting of the heart, blood vessels, and blood, transports nutrients and oxygen to the body's cells and transports wastes to the organs of excretion. • The lymphatic system and immunity are responsible for defending the body against disease-causing agents such as bacteria and viruses.

Unit Learning Targets
Students will…

- Describe the general characteristics of blood, and discuss its major functions.
- Discuss the functions of the organs of the cardiovascular systems.
- Identify the structure and function of the different parts of the heart
- Trace the pathway of blood through the heart.
- Compare the structures and functions of the major types of blood vessels, including arteries and veins.
- Explain how blood pressure is produced and controlled.
- Describe the general functions of the lymphatic system.
- List and describe seven innate body defense mechanisms.

Evidence of Learning

Summative Assessment: Unit Test/Project, Labs

Formative Assessments:

- Quizzes
- Chapter Tests
- Homework
- Mini-labs
- Worksheets

Lesson Plans

Activities	*Timeframe*
• Blood activities • Coloring and labeling worksheets • Cardiovascular lab • Blood pressure lab	Weeks 15-20

Teacher Resources	*Teacher Note*
• Textbook • PowerPoint presentations • Laboratory materials	