



Anatomy & Physiology Pacing Guide

Anatomy & Physiology should investigate the chemistry and role of cells in life processes, genetics, evolution and the diversity of life. Students should learn about the world through the study of behavioral relationships, ecology, and the global impact of ecological issues. Biology should continue to educate the student in the nature of science. Students should be expected to spend time viewing and classifying life forms. Field studies should be an integral part of the course as well as the process of collecting and analyzing data. Instruction and assessment should include both appropriate technology and the safe use of laboratory equipment. Students should be engaged in hands-on laboratory experiences at least 20% of the instructional time.

First Nine Weeks

1. Enduring Understanding: Science is a systematic inquiry process where conclusions are derived from questions through appropriate and accurate investigative techniques.

1a. Essential Question: What steps do scientists use to investigate problems?

NS.16.AP.1	Explain why science is limited to natural explanations of how the world works
NS.16.AP.2	Compare and contrast hypotheses, theories, and laws
NS.16.AP.3	Distinguish between a scientific theory and the term “theory” used in general conversation
NS.16.AP.4	Summarize the guidelines of science:
	· explanations are based on observations, evidence, and testing
	· hypotheses must be testable
	· understandings and/or conclusions may change with additional empirical data
	· scientific knowledge must have peer review and verification before acceptance

1b. Essential Question: What guidelines must be followed to design and conduct a scientific investigation?

NS.17.AP.1	Develop and explain the appropriate procedure, controls, and variables (dependent and independent) in scientific experimentation
NS.17.AP.2	Research and apply appropriate safety precautions (refer to ADE Guidelines) when designing and/or conducting scientific investigations
NS.17.AP.3	Identify sources of bias that could affect experimental outcome
NS.17.AP.4	Gather and analyze data using appropriate summary statistics
NS.17.AP.5	Formulate valid conclusions without bias
NS.17.AP.6	Communicate experimental results using appropriate reports, figures, and tables
NS.18.AP.1	Understand that scientific theories may be modified or expanded based on additional empirical data, verification, and peer review

1c. Essential Question: How can technology be appropriately used in solving and communicating life science problems?

NS.18.AP.5	Research current events and topics in anatomy & physiology
NS.19.AP.1	Collect and analyze scientific data using appropriate mathematical calculations, figures, and tables
NS.19.AP.2	Use appropriate equipment and <i>technology</i> as tools for solving problems (e.g., microscopes, centrifuges, flexible arm cameras, computer software and hardware)
NS.19.AP.3	Utilize <i>technology</i> to communicate research findings

1d. Essential Question: What are the connections between pure science and science applied to the real world?

NS.20.AP.1	Compare and contrast biological concepts in <i>pure science</i> and <i>applied science</i>
NS.20.AP.2	Discuss why scientists should work within ethical parameters
NS.20.AP.3	Explain how the cyclical relationship between science and <i>technology</i> results in reciprocal advancements in science and <i>technology</i>
NS.21.AP.1	Research and evaluate science careers using the following criteria:
	· educational requirements
	· salary
	· availability of jobs
	· working conditions

2. Enduring Understanding: Anatomy and Physiology is a systematic inquiry of the organizational structure of the body from molecular to organismic level.	
2a. Essential Question: What is the relationship between anatomy and physiology including the major characteristics of life?	
OHB.1.AP.8	Identify the major characteristics of life:
	· <i>metabolism</i>
	· <i>responsiveness</i>
	· <i>movement</i>
	· <i>growth</i>
	· <i>reproduction</i>
· <i>differentiation</i>	
OHB.1.AP.1	Infer the relationship between anatomy and physiology
2b. Essential Question: How is the homeostasis of the body controlled?	
OHB.1.AP.6	Investigate homeostatic control mechanisms and their importance to health and diseases
OHB.1.AP.7	Predict the effect of positive and negative feedback mechanisms on homeostasis
2c. Essential Question: What are the levels of organization of the body?	
OHB.1.AP.2	Sequence the levels of organization of the human body
OHB.1.AP.3	Identify the major body systems
NS.18.AP.2	Relate the development of the cell theory to current trends in cellular biology
2d. Essential Question: How can anatomical positional terms and body sections be applied?	
OHB.1.AP.4	Describe relative positions, body planes, body regions and body quadrants
OHB.1.AP.5	Identify the major body cavities and the subdivisions of each cavity
3. Enduring Understanding: The role of chemistry in body processes.	
3a. Essential Question: What are the differences between matter and energy?	
CC.2.AP.1	Distinguish between matter and energy
CC.2.AP.2	Explain the basic assumptions and conclusions of the atomic theory
3b. Essential Question: How is the physiology of matter related to the human body?	
CC.2.AP.3	Distinguish between compounds and mixtures
CC.2.AP.4	Explain the role of ionic, covalent, and hydrogen bonds in the human body
CC.2.AP.5	Write simple formulas and chemical word equations for the four basic types of reactions:
	· <i>synthesis</i>
	· <i>decomposition</i>
	· <i>single replacement</i>
· <i>double replacement</i>	
CC.2.AP.6	Analyze the role of water in the human body
CC.2.AP.7	Explain the relationship among acids, bases, and salts
CC.2.AP.8	Relate the concept of pH to homeostasis
3c. Essential Question: How do the structure and function of organic molecules effect the human body?	
CC.2.AP.9	Compare the structure and function of carbohydrates, lipids, proteins, and nucleic acids
CC.2.AP.10	Describe the characteristics and importance of enzymes

4. Enduring Understanding: Cells are the basic, structural, and functional units of life.	
4a. Essential Question: What are the parts of the cell and their function?	
APC.3.AP.1	Explain the structure and function of the plasma membrane
APC.3.AP.3	Describe the structure and function of organelles and cell parts
APC.3.AP.4	Identify chemical substances produced by cells
4b. Essential Question: How are substances transmitted across the membrane?	
APC.3.AP.2	Compare and contrast the different ways in which substances cross the plasma membrane:
	· <i>diffusion and osmosis</i>
	· <i>facilitated diffusion</i>
	· <i>active transport</i>
	· <i>filtration</i>
	· <i>endocytosis</i>
· <i>exocytosis</i>	
4c. Essential Question: What is the relationship between DNA and proteins?	
APC.3.AP.5	Differentiate among replication, transcription, and translation
4d. Essential Question: What happens if the cell cycle goes awry?	
APC.3.AP.6	Differentiate between mitosis and meiosis
APC.3.AP.7	Explain the consequences of abnormal cell division
NS.18.AP.4	Relate the chromosome theory of heredity to recent findings in genetic research (e.g., Human Genome Project-HGP, chromosome therapy)

Second Nine Weeks

5. Enduring Understanding: Histology is the classification of the tissues in the human body.

5a. Essential Question: How are the tissues of the body classified?

T.4.AP.1	Describe the structure, location, and function of each tissue category:
	· epithelial
	· connective
	· nervous
	· muscle

6. Enduring Understanding: Knowledge of the integumentary system and its individual components leads to the understanding of associated disorders.

6a. Essential Question: What are the components of the physiological functions of the integument system?

BS.5.AP.1	Identify the components of the integument system
BS.5.AP.2	Discuss the physiological mechanisms of the skin
BS.5.AP.3	Identify the macroscopic and microscopic structure of the integument system

6b. Essential Question: What are some of the associated disorders of the integument system?

BS.5.AP.4	Describe disorders associated with the integument system
------------------	--

7. Enduring Understanding: The skeletal system is a component of the system of support and movement for the body

7a. Essential Question: What are the components and physiological mechanisms of the skeletal system?

BS.6.AP.1	Identify the components the skeletal system
BS.6.AP.2	Discuss the physiological mechanisms of the skeletal system
BS.6.AP.3	Identify the macroscopic and microscopic structure of bone

7b. Essential Question: What are associated disorders of the skeletal system?

BS.6.AP.4	Describe disorders associated with the skeletal system
------------------	--

Third Nine Weeks

8. Enduring Understanding: The muscular system is a component of the system of support and movement for the body.

8a. Essential Question: What are the components and physiological mechanisms of the muscular system?

BS.7.AP.1 Identify the components the muscular system

BS.7.AP.2 Discuss the physiological mechanisms of the muscular system

BS.7.AP.3 Identify the macroscopic, microscopic, and molecular structure of muscle

8b. Essential Question: What are associated disorders of the muscular system?

BS.7.AP.4 Describe disorders associated with the muscular system

9. Enduring Understanding: The human body has a control system.

9a. Essential Question: What are the components and physiological mechanisms of the nervous system?

BS.8.AP.1 Identify the components the nervous system

BS.8.AP.2 Discuss the physiological mechanisms of the nervous system

BS.8.AP.3 Identify the macroscopic, microscopic, and molecular structure of the nervous system

9b. Essential Question: What are the disorders associated with the nervous system?

BS.8.AP.4 Describe disorders associated with the nervous system

9c. Essential Question: What are the components and physiological mechanisms of the endocrine system?

BS.9.AP.1 Identify the components of the endocrine system

BS.9.AP.2 Discuss the physiological mechanisms of the endocrine system

BS.9.AP.3 Identify the macroscopic, microscopic, and molecular structure of the endocrine system

9d. Essential Question: What are the disorders associated with the endocrine system?

BS.9.AP.4 Describe disorders associated with the endocrine system

10. Enduring Understanding: The human body has a system of transport.

10a. Essential Question: What are the components and physiological mechanisms of the cardiovascular system?

BS.10.AP.1 Identify the components of the cardiovascular system

BS.10.AP.2 Discuss the physiological mechanisms of the cardiovascular system

BS.10.AP.3 Identify the macroscopic, microscopic, and molecular structure of the cardiovascular system

10b. Essential Question: What are the disorders associated with the cardiovascular system?

BS.10.AP.4 Describe disorders associated with the cardiovascular system

10c. Essential Question: What are the components and physiological mechanisms of the immune system?

BS.11.AP.1 Identify the components of the immune and lymphatic systems

BS.11.AP.2 Discuss the physiological mechanisms of the immune and lymphatic systems

BS.11.AP.3 Identify the macroscopic, microscopic, and molecular structure of the immune and lymphatic systems

10d. Essential Question: What are the associated disorders with the immune system?

BS.11.AP.4 Describe disorders associated with the immune and lymphatic systems

BS.11.AP.3 Describe the relationship between the germ theory of disease and our current knowledge of immunology and control of infectious diseases

Fourth Nine Weeks

11. Enduring Understanding: The human body has a system of absorption and excretion

11a. Essential Question: What are the components and physiological mechanisms of the respiratory system?

BS.12.AP.1	Identify the components of the respiratory system
BS.12.AP.2	Discuss the physiological mechanisms of the respiratory system
BS.12.AP.3	Identify the macroscopic, microscopic, and molecular structure of the respiratory system

11b. Essential Question: What are the disorders associated with the respiratory system?

BS.12.AP.4	Describe disorders associated with the respiratory system
-------------------	---

11c. Essential Question: What are the components and physiological mechanisms of the digestive system?

BS.13.AP.1	Identify the components the digestive system
BS.13.AP.2	Discuss the physiological mechanisms of the digestive system
BS.13.AP.3	Identify the macroscopic, microscopic, and molecular structure of the digestive system

11d. Essential Question: What are the disorders associated with the digestive system?

BS.13.AP.4	Describe disorders associated with the digestive system
-------------------	---

11e. Essential Question: What are the components and physiological mechanisms of the urinary system?

BS.14.AP.1	Identify the components the urinary system
BS.14.AP.2	Discuss the physiological mechanisms of the urinary system
BS.14.AP.3	Identify the macroscopic, microscopic, and molecular structure of the urinary system

11f. Essential Question: What are the disorders associated with the urinary system?

BS.14.AP.4	Describe disorders associated with the urinary system
-------------------	---

12. Enduring Understanding: The human body has a system of continuity

12a. Essential Question: What are the components and physiological mechanisms of the reproductive system?

BS.15.AP.1	Describe the components and the organization of the reproductive system
BS.15.AP.2	Discuss the physiological mechanisms of the reproductive system
BS.15.AP.3	Identify the macroscopic, microscopic, and molecular structure of the reproductive system

12b. Essential Question: What are associated disorders with the urinary system?

BS.15.AP.4	Describe disorders associated with the reproductive system
-------------------	--