

Anatomy and Physiology

Unit 2: Body Systems: Muscular, Nervous, Special Senses, and Endocrine

Big Ideas:

- The muscular system provides for movement of the body and its parts, maintains posture, generates heat, and stabilizes joints.
- The nervous system maintains body homeostasis with electrical signals; provides for sensation, higher mental functioning, and emotional response; and activates muscles and glands
- The special senses respond to different types of energetic stimuli involved in vision, hearing, balance, smell, and taste
- The endocrine system maintains homeostasis by releasing chemicals called hormones, and it controls prolonged or continuous processes such as growth and development, reproduction, and metabolism.

Essential Questions:

1. How does the nervous system act as the master system in controlling and communicating within the body?
2. What are the distinguishing functional characteristics of muscles and how does the muscle permit movement?
3. How do the systems of the human body react to the internal and external environment to stimulate changes in behavior or response?
4. Why can't humans survive without oxygen? Specifically, why can't we depend on fermentation instead of cellular respiration?
5. How do multicellular body cells specialize to perform specific functions that help maintain homeostasis and benefit the body as a whole?

NGSS Priority Standards

HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determine the structure of proteins which carry out the essential functions of life through systems of specialized cells.

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

HS-LS1-3 Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.

HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

HS-LS1-7 Use 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.

HS-LS3-1 Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

HS-PS1-2 Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

Alaska Math and ELA

RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. (HS-LS1-1),(HS-LS1-6)

WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-LS1-1),(HS-LS1-6)

WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. (HS-LS1-6)

WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (HS-LS1-3)

WHST.11-12.8 Gather relevant information from multiple authoritative print and digital sources, using advanced searches effectively; assess the strengths and limitations of each source in terms of the specific task, purpose, and audience; integrate information into the text selectively to maintain the flow of ideas, avoiding plagiarism and overreliance on any one source and following a standard format for citation. (HS-LS1-3)

WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-LS1-1),(HS-LS1-6)

SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest. (HS-LS1-2),(HS-LS1-4),(HS-LS1-5),(HS-LS1-7)

Mathematics -

MP.4 Model with mathematics. (HS-LS1-4)

HSF-IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. (HS-LS1-4)

HSF-BF.A.1 Write a function that describes a relationship between two quantities (HS-LS1-1)

Recommended Activities and Labs:

- EKG Vernier muscle potential of masseter chewing various foods
- Exercise muscle contraction describing muscle action (flexion, extension etc)
- Cat dissection muscle
- EKG Vernier patellar reflex arcs
- Brain dissection
- Eye exam lab
- Eye dissection Blind walk