

Anatomy and Physiology

Unit 3- Body Systems: Blood, Cardiovascular, Lymphatic and Body Defenses, Respiratory

Big Ideas:

- Blood serves as a vehicle for distributing body heat and for transporting nutrients, respiratory gases, and other substances throughout the body.
- The heart pumps blood. Blood vessels provide the conduits within which blood circulates to all body tissues.
- The lymphatic system returns leaked plasma to the blood vessels after cleansing it of bacteria and other foreign matter. It also provides sites for surveillance by immune system cells.
- The innate defenses hinder pathogen entry, prevent the spread of disease-causing microorganisms, and strengthen the immune response.
- The adaptive defenses protect against disease by destroying “foreign” cells and by inactivating toxins and other foreign chemicals with antibodies.
- The respiratory system supplies oxygen to the blood while removing carbon dioxide.

Essential Questions:

1. How does the heart work within the cardiovascular system and the body as a whole?
2. How is gas exchange facilitated by way of the respiratory system?
3. How does the digestive system take in food, break food down into nutrient molecules, absorb the molecules into the bloodstream, and rid the body of indigestible remains?

NGSS Priority Standards:

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-LS1-6 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-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

Alaska State Standards Connections:

ELA/Literacy -

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-LS1-7)

Mathematics -

HSN-Q.A.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. HS-PS1-7

HSN-Q.A.2 Define appropriate quantities for the purpose of descriptive modeling. (HS-PS1-7)

HSN-Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. (HS-PS1-7)

Recommended Activities and Labs:

- Full body tracing labeled with body regions, body landmarks, and directional terminology
- Body buffer lab

- Transport lab (diffusion and osmosis) with dialysis tubing Histology atlas
- Skin cancer activity
- Long bone (NASA) lab