Unit 4: Systems that Transport and Protect

Content Area: **Science**
Course(s):
Time Period: **Marking Period 1**
Length: **3-4 weeks**
Status: **Published**

Summary

This unit consists of an examination of the generalized systems that provide transportation and protection for the human body. For the human body to function properly, materials must be transported to and from the interstitial fluid for the needs of the cell to be met. This transportation function is achieved by the movement of blood through the cardiovascular system. The function of protection is closely associated with transportation due to elements in the blood working in conjunction with the lymphatic system to protect/defend the body from different forms of disease. These two systems of tubes work in tandem to allow the body to receive nutrients and fight off pathogens.

Revised: July 2024

Essential Questions/Enduring Understandings

Essential Questions

- How do the systems of tubes propel or transport materials through the body?
- How do the living cells found within the blood and lymph aid in maintaining homeostasis?
- What are the living components of blood and how are they created/related to other body systems?
- How does the lymphatic system change throughout our lifespan?
- What is the role of each organ in the cardiovascular system?

Enduring Understandings

- Cardiovascular and lymphatic systems are intertwined because they depend on the same transport system of tubes to deliver essential cells throughout the body.
- The living components in both the cardiovascular and lymphatic system are present in blood and serve to interact with other body systems and help ensure the balance of homeostasis.

Objectives

- Students will be skilled at relating the muscle contraction of hollow organs and tubes to transport.

- Students will know the three living cells found in blood.
- Students will know the differences between blood types and the pathway blood takes through the

heart.
- Students will know how cells can transport between the blood and lymph vessels.
- Students will know how the thymus changes as we age and the direct relationship to our immune system.
- Students will know the link between the lymphatic system and bone marrow.

Learning Plan

- Preview the essential questions and connect them to the learning throughout the unit.
- Introduce key concepts via direct instruction and discussion.
- Discuss the various elements found in blood and identify the different essential roles they play.
- Distinguish between different types of blood
    - ABO and Rh factor
- Follow the pathway of blood flow through the heart.
- Define cardiac output and explain how the sounds of the heart relate to its function.
- Identification of major blood vessels and the roles they play in the cardiovascular system.
- Describe the pathway of lymph by identifying the structures it passes through.
- Identify the various organs of the lymphatic system.
- Describe the types of acquired immunity.

Assessment

Formative

- Do Now questions
- Small group discussion participation
- Large group discussion participation
- Individual student questions and responses
- Independent tasks
- Microscopic observations of different formed elements found in blood
- Drawing, labeling, and identifying key features of the cardiovascular and lymphatic systems
- Compare and contrast the cardiovascular and lymphatic systems using a Venn diagram

Summative

- Quizzes
    - Draw and label the parts of the heart
    - Identify the different types of blood vessels
    - Identify the organs of each system
    - Communicate how lymph flows in one direction to protect the body from pathogens
- Unit test

Benchmark

- Final exam

Alternative

- Open note exam
- Create a movie/play that shows how fluids, cells, and other materials are transported throughout the body.

Materials

- Hole's Essentials of Human Anatomy and Physiology, High School 2nd Edition by Charles J. Welsh
- Google slides
- Lab materials & models
    - Skeleton model
    - Skull model
    - Brain model
    - Model of the upper body
    - Model of the digestive system
    - Anatomical poster of body systems
- core book list

Standards

L	Language
L.SS.11–12.1	Demonstrate command of the system and structure of the English language when writing or speaking.
	Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
9.2.12.CAP.4	Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.
9.2.12.CAP.5	Assess and modify a personal plan to support current interests and post-secondary plans.
9.2.12.CAP.6	Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7	Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8	Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
L.VL.11–12.3.D	Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, its etymology, or its standard usage.

LS1.A	Structure and Function Systems of specialized cells within organisms help them perform the essential functions of life. All cells contain genetic information in the form of DNA molecules. Genes are regions in the DNA that contain the instructions that code for the formation of proteins, which carry out most of the work of cells. Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem. Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to neural stimuli. An example of an interacting system could be an artery depending on the proper function of elastic tissue and smooth muscle to regulate and deliver the proper amount of blood within the circulatory system. Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level. Examples of investigations could include heart rate response to exercise, stomate response to moisture and temperature, and root development in response to water levels. Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. Feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system.
LS1.C	Organization for Matter and Energy Flow in Organisms The sugar molecules thus formed contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used for example to form new cells.

Integrated Accommodations and Modifications

https://docs.google.com/spreadsheets/d/11cEQxerWEHQEjIbnMkdf8AsemQLmsrMS6VdGmBFYliU/edit?usp=sharing