

Unit 2 Maintenance of the Human Body

The systems contained in this unit maintain the health of the human body. The systems are all different in structure, function and location. They are related in the fact that they all do different jobs but working well together to keep the organism healthy.

Overarching Essential Questions	Overarching Enduring Understandings	
<ul style="list-style-type: none"> ● How are blood and the cardiovascular system related to the maintenance of a healthy body and how are the two topics interrelated? ● How does the lymphatic system work in conjunction with the cardiovascular system to keep the body healthy? <ul style="list-style-type: none"> ● How is the respiratory system related to the blood and cardiovascular system? ● How does the digestive system maintain the health of the body and how is it interrelated to the other systems in this unit? ● How does the urinary system work in conjunction with the other systems in the unit to maintain a healthy body? 	<ul style="list-style-type: none"> ● Blood serves as a vehicle for distributing body heat and for transporting nutrients, respiratory gases and other substances throughout the body. The cardiovascular system is how the blood is transported. ● The lymphatic system returns leaked plasma to the blood vessels after cleansing it of foreign matter ● The respiratory system supplies oxygen to the blood while removing carbon dioxide. ● The digestive system breaks down ingested food into particles small enough to be absorbed by the blood and transported by the cardiovascular system. ● The urinary system rids the body of nitrogenous wastes while regulating water, electrolytes and the acid base balance of the blood. 	
Student Learning Objectives		
<i>What students should be able to do after instruction.</i>	<i>Evidence Statements</i>	
Describe the composition of whole blood comparing and contrasting its components and the functions of the different components. Examine blood typing and the chemicals associated with typing someone's blood. Describe the blood clotting process and identify the situations that inhibit or enhance clotting and proper healing after injury.	HS-LS1-2 HS-LS1-3	
Describe the structures of the lymphatic system the source of lymph and summarize its formation and transport.	HS-LS1-2 HS-LS1-3	
Compare and contrast the organs of the respiratory passageway from the nasal cavity to the alveoli. Discuss the structure and function of the lungs and the pleural coverings.	HS-LS1-2 HS-LS1-3	
Point out the structures of the digestive system and describe the mechanism of digestion following the path of the digestive system?	HS-LS1-2	

	HS-LS1-7
Discuss the structures of the urinary system summarize the process of urine formation that includes filtration, reabsorption and secretion.	HS-LS1-2

The Student Learning Objectives above were developed using the following elements from the NRC document <i>A Framework for K-12 Science Education</i> :		
Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<ul style="list-style-type: none"> ● Examine blood under the microscope visually identifying the different types of blood cells. ● Determine the blood type of different individuals. ● Sheep heart dissection ● Trace blood through the heart and pulmonary and cardiac circulatory systems. ● Compare the structural differences between arteries and veins. ● Compare apical and radial pulse. ● Using a sphygmomanometer to determine blood pressure. ● Diagram the respiratory system ● Examine trachea and alveoli under the microscope. ● Compare respiratory volumes. ● Diagram the digestive system. ● Examine liver and pancreas cells under the microscope. ● Observe the movements and sounds of digestion. ● Identify the structures of the urinary system. ● Dissection of sheep kidney ● Microscopic study of a nephron. 	<ul style="list-style-type: none"> ● LS1.A: Structure and Function All living things are made up of cells, which is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). (MS-LS1-1) ● Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2) ● In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions 	<ul style="list-style-type: none"> ● Cause and Effect - Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) ● Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability. (MS-LS1-4),(MSLS1-5) ● Scale, Proportion, and Quantity Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)

Embedded English Language Arts/Literacy and Mathematics

English Language Arts/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.9-12.5 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)

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)

Three-Dimensional Teaching and Learning

This unit deals with the multiple systems that work together to keep the body healthy.

The DCI's and CC's SEP's allow us to intensify our investigation of these systems by studying them using different tools

Prior Learning

- Correct microscope usage
- Basic cytology
- Cellular respiration
- Homeostasis

● Part A:	
Concepts	Formative Assessment
<ul style="list-style-type: none"> ● Demonstrate the complexity and interrelatedness of the components of blood and the cardiovascular system and how the lymphatic system works with these two to keep the body healthy. ● 	<p><i>Students who understand the concepts are able to:</i></p> <p><i>Compare and contrast the components of blood and the different jobs these components do.</i></p> <p><i>Take a heart practical</i></p> <p><i>Diagram the structures of the heart and summarize systemic and pulmonary circulation.</i></p> <p><i>Illustrate the lymphatic system summarizing the process of making urine through this system.</i></p> <p><i>Review these systems with the end of the year cat dissection</i></p>

Part B:	
Concepts	Formative Assessment
<ul style="list-style-type: none"> ● Compare and contrast the structures of the respiratory system with the cardiovascular system to build understanding of how these systems are interrelated. 	<p><i>Students who understand the concepts are able to:</i></p> <p><i>Take a practical using models of the respiratory system.</i></p> <p><i>Diagram the respiratory system summarizing the movement of the gasses into and out of the blood and to the rest of the body relating the structures of the respiratory system with the functions of these structures.</i></p> <p><i>Differentiate between the artery and vein to build understanding that their structure is related to their function.</i></p> <p><i>Review these systems with the end of the year cat dissection</i></p>

Part C:	
Concepts	Formative Assessment
<ul style="list-style-type: none"> ● Compare and contrast the digestive and urinary systems summarizing that both of these systems operate differently but do the same basic job ridding the body of waste materials. 	<p><i>Students who understand the concepts are able to:</i></p> <ul style="list-style-type: none"> ● <i>Illustrate the digestive system summarizing the breakdown of food as it moves through this system.</i>

	<ul style="list-style-type: none"> • Diagram the urinary system investigating the creation of urine by the system. • Dissect a sheep kidney. • <i>Review these systems with the end of the year cat dissection.</i>
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Modifications: *Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.(See NGSS Appendix D)*

- *Reinforcement packet*
- *One on one conferencing*
- *504s and IEPs will be consulted and followed.*
- *Case managers will be brought in to maximize learning.*
- Videos for reinforcement to maximize learning for ELL students
- Concept Maps and quizzes evaluate topics as the unit progresses
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Leveraging English Language Arts/Literacy and Mathematics

English Language Arts/Literacy-
 Precis of articles will be done by students.
 Text and additional writings will be assigned to students.
 Read and comprehend complex laboratory instructions.
 Write formal lab reports

Samples of Open Education Resources for this unit:

- Bozeman videos
- Quia testing
- Google Classroom
- Online flashcards of structures.

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Appendix

Differentiation	
Enrichment	<ul style="list-style-type: none">● Utilize collaborative media tools● Provide differentiated feedback● Opportunities for reflection● Encourage student voice and input● Model close reading● Distinguish long term and short term goals
Intervention & Modification	<ul style="list-style-type: none">● Utilize “skeleton notes” where some required information is already filled in for the student● Provide access to a variety of tools for responses● Provide opportunities to build familiarity and to practice with multiple media tools● Leveled text and activities that adapt as students build skills● Provide multiple means of action and expression● Consider learning styles and interests● Provide differentiated mentors● Graphic organizers

ELLs	<ul style="list-style-type: none">● Pre-teach new vocabulary and meaning of symbols● Embed glossaries or definitions● Provide translations● Connect new vocabulary to background knowledge● Provide flash cards● Incorporate as many learning senses as possible● Portray structure, relationships, and associations through concept webs● Graphic organizers
21st Century Skills	
<ul style="list-style-type: none">● Creativity● Innovation● Critical Thinking● Problem Solving● Communication● Collaboration	
Integrating Technology	
<ul style="list-style-type: none">● Chromebooks● Internet research● Online programs● Virtual collaboration and projects● Presentations using presentation hardware and software	