

NGSS UNIT OVERVIEW

BODY SYSTEMS

Performance Expectation MS-LS1-3: Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

Performance Expectation MS-LS1-8: Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Performance Expectation MS-LS1-7: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

Activity Description	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core State Standards
<p>1. View and Reflect: The Pellagra Story Students obtain and evaluate information from a short video segment and a text passage on the investigation of pellagra, a nutritional deficiency common in the early 1900s. They reflect on how scientists gather evidence about cause-and-effect relationships in the human body and are introduced to the concept of clinical trials. The issues associated with investigating and experimenting on humans provides a context for the exploration of the human body system as a system of interacting subsystems.</p>	MS-LS1.A	Obtaining, Evaluating, and Communicating Information Engaging in Argument from Evidence	Cause and Effect Connections to Nature of Science: Science Is a Human Endeavor Connections to Nature of Science: Scientific Knowledge Is Based on Empirical Evidence	ELA/Literacy: RST.6-8.7 RST.6-8.9
<p>2. Modeling: Parts of a Whole Students draw the organs of the human body based on their prior knowledge. They then use diagrams to create a three-dimensional clay model of some of the organs and structures in the human torso. The concepts of structure and function are introduced as students begin to think about how the organs can be grouped into body systems based on their function within the human body.</p>	MS-LS1.A	Developing and Using Models Asking Questions and Defining Problems	Structure and Function Systems and System Models	ELA/Literacy RST.6-8.7
<p>3. Investigation: What's Happening Inside? Students group organs and structures into body systems based on their functions. They compare their initial ideas to information about human body systems and learn about the function of various systems. The idea that the human body is a system of interacting subsystems is formally introduced.</p>	MS-LS1.A	Constructing Explanations and Designing Solutions	Structure and Function Systems and System Models	ELA/Literacy: SL.8.1

BODY SYSTEMS (continued)

Activity Description	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core State Standards
<p>4. Reading: Digestion: An Absorbing Tale Students integrate information from text and visual displays about the structure and function of the digestive system. They further develop the concept of interacting systems and how subsystems can be part of a larger complex system.</p>	MS-LS1.A	Engaging in Argument from Evidence	Structure and Function Systems and System Models	ELA/Literacy: RST.6-8.4
<p>5. Modeling: Food Breakdown Students read two text passages about the composition and breakdown of food. After the first passage, they begin to develop a model to explain how organisms obtain matter and energy. After the next passage, they modify and elaborate their models to account for the new information provided.</p>	MS-LS1.A MS-LS1.C	Developing and Using Models Constructing Explanations and Designing Solutions	Energy and Matter	ELA/Literacy: RST.6-8.2 RST.6-8.9
<p>6. Laboratory: Observing Organisms In this laboratory, students begin to explore how sense receptors respond to stimuli in the blackworm (<i>Lumbriculus variegatus</i>). Students are introduced to the concept of immediate behavior being a response to stimuli. Students use what they have learned to predict blackworm behavior in response to specific application of stimuli.</p>	MS-LS1.D	Planning and Carrying Out Investigations Analyzing and Interpreting Data	Cause and Effect	
<p>7. Laboratory: Can You Feel the Difference? In this laboratory, students investigate how the human nervous system and sensory receptors respond to stimuli that induce immediate behaviors. They are introduced to the idea that there are similar systems in different organisms.</p>	MS-LS1.D	Planning and Carrying Out Investigations Analyzing and Interpreting Data	Cause and Effect	
<p>8. Reading: Finding the Nerve In this reading, students deepen their understanding of the structure and function of the human nervous system. They learn about how information is transmitted and processed to result in behaviors or memories. They also learn more about how the nervous system works with other body systems to perform particular body functions. Students are formally assessed on Performance Expectation MS-LS1-8.</p>	MS-LS1.D	Obtaining, Evaluating, and Communicating Information	Systems and System Models	ELA/Literacy: RST.6-8.4

BODY SYSTEMS (continued)

Activity Description	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core State Standards
<p>9. Laboratory: Heartily Fit Students use mathematics and computational thinking as they conduct an investigation and analyze and interpret data on their own heart and respiratory rates before and after exercise. The investigation stimulates a discussion of the interactions between human body systems—specifically the circulatory and respiratory systems—in order to meet the body’s need for more oxygen during exercise.</p>	MS-LS1.A	<p>Analyzing and Interpreting Data</p> <p>Using Mathematics and Computational Thinking</p>	Systems and System Models	<p>Mathematics: 6.SP.B.4</p> <p>ELA/Literacy: RST.6-8.3</p>
<p>10. Laboratory: Gas Exchange Students conduct an investigation to identify the presence of carbon dioxide in exhaled breath in order to build toward an understanding of the function of the respiratory system in excreting carbon dioxide produced as a result of cellular respiration. This activity is building towards an understanding of human body systems and subsystems from the level of the cell to the complete system, and to the interacting roles of these systems in providing nutrients and oxygen and removing carbon dioxide wastes from the cells throughout the body.</p>	MS-LS1.A MS-PS3.D	<p>Planning and Carrying Out Investigations</p> <p>Analyzing and Interpreting Data</p>	Systems and System Models	ELA/Literacy: RST.6-8.3
<p>11. Reading: Interacting Systems In this activity, students obtain more information about the circulatory and respiratory systems, which they investigated in the previous two activities. They read about the structure and function of each of these systems and how they interact at the system, organ, tissue, and cellular levels of organization. They construct an explanation for how each level of organization contributes to circulatory function. This helps them to prepare for the argument they will develop in the next activity.</p>	MS-LS1.A	Constructing Explanations and Designing Solutions	<p>Systems and System Models</p> <p>Structure and Function</p>	ELA/Literacy: RST.6-8.2
<p>12. Modeling: The Circulation Game Students use what they have learned from the activities and readings in this unit to develop a whole-class model of the interactions of the circulatory, respiratory, and digestive systems. This activity provides an opportunity to assess MS-LS1-3.</p>	MS-LS1.A	<p>Developing and Using Models</p> <p>Engaging in Argument from Evidence</p> <p>Constructing Explanations and Designing Solutions</p>	<p>Systems and System Models</p> <p>Structure and Function</p>	<p>ELA/Literacy: WHST.6-8.1 WHST.6-8.2</p>

BODY SYSTEMS (continued)

Activity Description	Disciplinary Core Ideas	Science and Engineering Practices	Crosscutting Concepts	Common Core State Standards
<p>13. Investigation: Testing Medicines: A Clinical Trial</p> <p>In this investigation, students analyze and interpret data about a simulated clinical trial of a headache medicine. They use the evidence from their analysis to engage in an argument about the potential use of this medicine. They begin to think about how body system interactions may need to be considered when developing new medicines for human use.</p>	MS-LS1.A	<p>Engaging in Argument from Evidence</p> <p>Analyzing and Interpreting Data</p>	<p>Cause and Effect</p> <p>Systems and System Models</p> <p>Connections to Nature of Science: Science Is a Human Endeavor</p>	<p>ELA/Literacy: RST.6-8.3 WHST.6-8.1</p>
<p>14. Talking It Over: Evaluating Clinical Trials</p> <p>In this activity, students analyze and interpret data from a fictional headache medicine clinical trial to develop an argument for which of three medicines should be further developed and tested. Students consider how body system interactions play a role in the side effects of the medications and what that might mean for future possible use of the medicines.</p>	MS-LS1.A	<p>Engaging in Argument from Evidence</p> <p>Analyzing and Interpreting Data</p>	<p>Cause and Effect</p> <p>Systems and System Models</p> <p>Connections to Nature of Science: Science Is a Human Endeavor</p>	<p>ELA/Literacy: WHST.6-8.1 WHST.6-8.9</p>