

Unit 5: Body Systems

CONTENT AREA: General Physical Science	GRADES: 7	UNIT: 5 of 8
Pacing: Approx. 1 Month (January)		
<p style="text-align: center;"><u>Science and Engineering Practices</u></p> <p>Obtaining, Evaluating, and Communicating Information Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. (MS-LS1-8)</p> <p>Engaging in Argument from Evidence Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3)</p>	<p style="text-align: center;"><u>Disciplinary Core Ideas</u></p> <p><u>LS1.A: Structure and Function</u></p> <ul style="list-style-type: none"> <u>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. (MS-LS1-3)</u> <p><u>LS1.D: Information Processing</u></p> <ul style="list-style-type: none"> <u>Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. (MS-LS1-8)</u> 	<p style="text-align: center;"><u>Crosscutting Concepts</u></p> <p>Systems and System Models</p> <ul style="list-style-type: none"> Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3) <p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8) <p style="text-align: center;">-----</p> <p style="text-align: center;">Connections to Nature of Science</p> <p>Science is a Human Endeavor</p> <ul style="list-style-type: none"> Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)
Performance Expectations: MS-LS1-8, MS-LS1-3		
Evidence Statement(s): MS-LS1-8, MS-LS1-3		
Essential Question: What are humans made of?		
21st Century Skills: 9.2.8.B.3, 9.2.8.B.4		
Career Ready Practices: CRP4, CRP6, CRP7		
Technology: HS-ETS1-1 HS-ETS1-3		
Technical Terms (Suggested)	Core Instructional Materials	Assessment Statement

<p>Cells Living Non-Living Organisms Unicellular Multicellular Nucleus Chloroplasts Mitochondria Cell Membrane Cell Wall Structures Functions Passive Transport Active Transport Tissues Circulatory Excretory Digestive System Respiratory System Muscular System Nervous System Brain Nerve cells Cause and Effect Relationships Stimuli</p> <p>** All terms should be taught in context rather than in isolation. These terms should be addressed after conceptual understanding.**</p>	<p><u>MS-LS1-8</u> - Chromebook, internet access, smartboard, notebook, pen, pencil, whiteboard.</p> <p><u>MS-LS1-3</u>- Computer, Internet access, smartboard, notebook, pen, pencil, whiteboard.</p>	<p>Students who understand the concepts are able to:</p> <ul style="list-style-type: none"> • Use an oral and written argument supported by evidence to support or refute an explanation or a model of how the body is a system of interacting subsystems composed of groups of cells.
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Modifications

<u>English Language Learners</u>	<u>Special Education</u>	<u>At Risk</u>	<u>Gifted & Talented</u>
<p>Scaffolding Word walls Sentence/paragraph frames Bilingual dictionaries/translation Think alouds Read alouds Highlight key vocabulary Annotation guides Think-pair-share Visual aides Modeling Cognates</p>	<p>Word walls Visual aides Graphic organizers Multimedia Leveled readers Assistive technology Notes/summaries Extended time Answer masking Answer eliminator Highlighter Color contrast</p>	<p>Teacher tutoring Peer tutoring Study guides Graphic organizers Extended time Parent communication Modified assignments Counseling</p>	<p>Curriculum compacting Challenge assignments Enrichment activities Tiered activities Independent research/inquiry Collaborative teamwork Higher level questioning Critical/Analytical thinking tasks Self-directed activities</p>

5E Model

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.](#)

Engage: Anticipatory Set	<p>Students will complete a “Pin the organ on the body” game. Hand students an organ of the body. Ask students to identify organ. Then, ask students to put organ in its place on the human body. This can be done via SmartBoard, a physical model, or paper cut-outs. Ask students: What are these organs? Where do they go in the body?</p> <p>http://sciencenetlinks.com/interactives/systems.html.</p> <p>Students will help Arnold find his organs. They will be able to identify the name of organs in different body systems and place them in the body.</p>
Exploration: Student Inquiry	<p>http://utahscience.oremjr.alpine.k12.ut.us/sciber00/7th/cells/sciber/levelorg.htm <u>Start by putting levels of organization on the board (Levels 1-5). Pictures can accompany the words. Put students into groups.</u></p> <p>Research: <u>Put students into groups and assign each group a body system to research. Systems can include: Digestive System, Respiratory System, Skeletal System, Nervous System, Cardiovascular System, Circulatory System, Reproductive System and Muscular system. Students will indicate the role the body system, which organs are within the body system, and how the system interacts with other body systems.</u></p> <p><u>Students can use the following website to gather information:</u> http://www.getbodysmart.com/ap/systems/tutorial.html</p> <p>Presentation: <u>Students will conduct a presentation on their body system. Students will create a PowerPoint that presents key information about their system including a list of organs in the system and the functions of these organs. Students should use an oral and written argument that is supported by evidence to explain their system. After all presentations, teacher should lead a class discussion focusing on how all body systems work in conjunction with one another.</u></p>
Explanation: Concepts & Practices	<u>In these lessons</u>

	<p>Teachers Should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities.</p> <p>Students Should: Verbalize conceptual understandings and demonstrate scientific and engineering practices.</p> <p>Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas):</p> <p>LS1.A: Structure and Function</p> <p>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.</p>
Elaboration: Extension Activity	Have students research a disease which affects the body system they presented on. Students can research various aspects of the disease including the causes and its impact on the system.
Evaluation: Assessment	<p>Assessment Task A: Research Presentation</p> <p>Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.</p> <p>Evaluation Criteria- Presentation should include:</p> <p><u>Key terms</u></p> <p><u>Information on major organs within the system</u></p> <p><u>Arguments that are supported by evidence</u></p> <p><u>Information on how body systems interact with one another</u></p>

5E Model	
<p>Performance Expectation:</p> <p>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.</p>	
Engage: Anticipatory Set	<p>Begin class with leading students through an online interactive Stroop Test:</p> <p>https://faculty.washington.edu/chudler/java/ready.html</p> <p>The test will show words written in various colors. Students will have to read words of colors and also try to read the color of the words. Any type of Stroop test can be conducted.</p> <p>http://brainu.org/do-stroop</p> <p>http://www.brainfacts.org/Sensing-Thinking-Behaving/Senses-and-Perception/Articles/2013/A-Mind-About-Touch</p>
Exploration: Student Inquiry	<p>Reaction Time Lab</p> <p><u>In this experiment students will test each other's reaction times. Lab activities will assess visual, auditory and tactile stimuli.</u></p>

	http://wiki.backyardbrains.com/Reaction_Time
Explanation: Concepts & Practices	<p>In these lessons Teachers Should: Introduce formal labels, definitions, and explanations for concepts, practices, skills or abilities. Students Should: Verbalize conceptual understandings and demonstrate scientific and engineering practices. Topics to Be Discussed in Teacher Directed Lessons (Disciplinary Core Ideas): LS1.D: Information Processing Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.</p>
Elaboration: Extension Activity	<p>Sensory Flowchart Students will be able to connect how nerve receptors and senses can send messages to the brain. Students will be able to summarize the connection, create a flow chart that connects the concepts.</p>
Evaluation: Assessment	<p>Assessment A: Lab Reflection Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. Students will synthesize the information learned in the lab to respond to the following questions and tasks. Why do you think touch and audio stimuli have a faster reaction time on average? Do your results match the averages mentioned above? Would you expect a difference in the average reaction times between a male and female? What about a more athletic person compared to a more sedentary person? Do you think it's OK to average two people like we did? What might be the problem? Why did we not test the "tactile" reaction time in the choice task? How could you redesign the experimental setup to test tactile reaction times in the choice task? As you know, you have a dominant vs. a non-dominant hand. With only four trials, it is too hard to see a difference. Perhaps you should repeat the experiment 10-20 times to see if there is any difference between dominant and non-dominant hands. The average conduction velocity speed is approximately 20-80 m/s. It takes approximately 1 ms for a neurotransmitter to cross the synapses. Calculate the lower limit for your patella reflex vs. the patellar reflex of a giraffe.</p>

What are humans made of?

Students develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms. Students understand that special structures are responsible for particular functions in organisms, and that for many organisms, the body is a system of multiple-interaction subsystems that form a hierarchy, from cells to the body. Students construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. The cross cuttings concepts of *systems and system models* and *cause and effect* provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in *engaging in argument from evidence* and *obtaining, evaluating, and communicating information*. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.

#	STUDENT LEARNING OBJECTIVES	CORRESPONDING PEs and DCIs
1	Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. <i>[Clarification Statement: Emphasis is on the conceptual understanding that cells form tissues and tissues form organs specialized for particular body functions. Examples could include the interaction of subsystems within a system and the normal functioning of those systems.] [Assessment Boundary: Assessment does not include the mechanism of one body system independent of others. Assessment is limited to the circulatory, excretory, digestive, respiratory, muscular, and nervous systems.]</i>	(MS-LS1-3)
2	Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. <i>[Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]</i>	(MS-LS1-8)

The Student Learning Objectives above were developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

<p>Evidence Statements: MS-LS1-3 Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).</p>	<p>LS1.A: Structure and Function <u>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.</u></p> <p>LS1.D: Information Processing <u>Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in</u></p>	<p style="text-align: center;">Crosscutting Concepts</p> <p>LS1.3 Systems and System Models <u>Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.</u></p> <p>Connections to Nature of Science Science is a Human Endeavor</p>
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<p>Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon.</p> <p>Evidence Statements: MS-LS1-8</p> <p>Obtaining, Evaluating, and Communicating Information</p> <p>Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods.</p> <p>Obtaining, evaluating, and communicating information in 6-8 builds on K-5 experiences and progresses to evaluating the merit and validity of ideas and methods.</p>	<p>the brain, resulting in immediate behaviors or memories.</p>	<p>Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.</p> <p>LS1.8 Cause and Effect</p> <p>Cause and effect relationships may be used to predict phenomena in natural systems.</p>
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<p><i>Connections to other DCIs in this grade-band:</i></p>
<p><i>Articulation of DCIs across grade-bands:</i></p> <p>HS.LS1.A ; 4.LS1.D</p>
<p><i>Common Core State Standards Connections:</i></p> <p><i>ELA/Literacy -</i></p> <p>RST.6-8.1, RI.6.8, WHST.6-8.1, WHST.6-8.8</p> <p><i>Mathematics -</i></p> <p>6.EE.C.9</p>