Performance Expectations at a Glance

In this unit, students will discover and practice the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts needed to perform the following Performance Expectations.

Performance Expectations	Module: **Cells and Life**	Module: **Body Systems**
MS-LS1-1	●	
MS-LS1-2	●	
MS-LS1-3		●
MS-LS1-8		●
MS-ETS1-1	●	●
MS-ETS1-2	●	●
MS-ETS1-3	●	

Correlations by Module to the NGSS

MODULE: Cells and Life		
MS-LS1	**From Molecules to Organisms: Structures and Processes**	
MS-LS1-1.	**Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.** [Clarification Statement: Emphasis is on developing evidence that living things are made of cells, distinguishing between living and non-living things, and understanding that living things may be made of one cell or many and varied cells.]	*11–12, 20–22,* 49–52
SEP Science and Engineering Practices		
Planning and Carrying Out Investigations* Planning and carrying out investigations in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions. • Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. (MS-LS1-1) *Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		*11–12, 13–14,* 53

Labs and investigations are in italics.

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DCI Disciplinary Core Ideas	
LS1.A: Structure and Function • All living things are made up of cells. A cell 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)	*11–12,* 12, *16,* 17, 19, 23–27, 49–52, 53
CCC Crosscutting Concepts	
Scale, Proportion, and Quantity • Phenomena that can be observed at one scale may not be observable at another scale. (MS-LS1-1)	*11–12,* 12–13, 15, 17, 19, 23, 28, *36–37*
Connections to Engineering, Technology, and Applications of Science **Interdependence of Science, Engineering, and Technology** • Engineering advances have led to important discoveries in virtually every field of science, and scientific discoveries have led to the development of entire industries and engineered systems. (MS-LS1-1)	12–13, 15–16, *16,* 17–18, 23, 28
CCSS ELA/Literacy Connections	
ELA WHST.6–8.7	18, *20–22,* 25, 45, Literacy Skill Handbook (online)
CCSS Math Connections	
Math 6.EE.C.9	Math Skill Handbook (online)

MS-LS1	From Molecules to Organisms: Structures and Processes	
MS-LS1-2.	**Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.** [Clarification Statement: Emphasis is on the cell functioning as a whole system and the primary role of identified parts of the cell, specifically the nucleus, chloroplasts, mitochondria, cell membrane, and cell wall.] *[Assessment Boundary: Assessment of organelle structure/function relationships is limited to the cell wall and cell membrane. Assessment of the function of the other organelles is limited to their relationship to the whole cell. Assessment does not include the biochemical function of cells or cell parts.]*	*34, 36–37,* 39, 41, 49–52, Lab *How is a balloon like a cell membrane?* (online), PhET Interactive Simulation *Membrane Channels* (online)
SEP Science and Engineering Practices		
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop and use a model to describe phenomena. (MS-LS1-2)		*34, 36–37,* 39, 41, 49–52, Lab *How is a balloon like a cell membrane?* (online), PhET Interactive Simulation *Membrane Channels* (online)

Labs and investigations are in italics.

Next Generation Science Standards

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DCI Disciplinary Core Ideas	
LS1.A: Structure and Function • 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)	23, 31, 34, *34,* 35–36, *36–37,* 37–39, *40,* 40–41, *42–43,* 45–48, 49–52, 53, Lab *How is a balloon like a cell membrane?* (online), PhET Interactive Simulation *Membrane Channels* (online)
CCC Crosscutting Concepts	
Structure and Function • Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural and designed structures/systems can be analyzed to determine how they function. (MS-LS1-2)	22–23, 31, *34,* 35, 39, *40,* 40–41, *42–43,* 44–45, 47–48, 49–52, 53, Lab *How is a balloon like a cell membrane?* (online), PhET Interactive Simulation *Membrane Channels* (online)
CCSS ELA/Literacy Connections	
ELA SL.8.5	*20–22,* 45, 49–52, Literacy Skill Handbook (online)
CCSS Math Connections	
Math 6.EE.C.9	Math Skill Handbook (online)

MS-ETS1	**Engineering Design**	
MS-ETS1-1.	**Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.**	*13–14*
SEP Science and Engineering Practices		
Asking Questions and Defining Problems* Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarifying arguments and models. • Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1) *Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		*13–14*

Labs and investigations are in italics.

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DCI Disciplinary Core Ideas	
ETS1.A: Defining and Delimiting Engineering Problems • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)	Science and Engineering Practices Handbook (online)
CCC Crosscutting Concepts	
Connections to Science, Technology, Society and the Environment **Influence of Science, Engineering, and Technology on Society and the Natural World** • All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1)	Science and Engineering Practices Handbook (online)
• The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)	Science and Engineering Practices Handbook (online)
CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 15, 32–33, Literacy Skill Handbook (online)
ELA WHST.6–8.8	*20–22,* 25, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	Math Skill Handbook (online)

MS-ETS1	**Engineering Design**	
MS-ETS1-2.	**Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.**	*13–14*
SEP Science and Engineering Practices		
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. • Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-ETS1-2) *Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		*13–14*

Labs and investigations are in italics.

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DCI **Disciplinary Core Ideas**	
ETS1.B: Developing Possible Solutions • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2)	Science and Engineering Practices Handbook (online)
CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 15, 32–33, Literacy Skill Handbook (online)
ELA RST.6–8.9	Literacy Skill Handbook (online)
ELA WHST.6–8.7	18, *20–22,* 25, 45, Literacy Skill Handbook (online)
ELA WHST.6–8.9	15, *20–22,* 25, 45, Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	Math Skill Handbook (online)

MS-ETS1	Engineering Design	
MS-ETS1-3.	**Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.**	*13–14*
SEP **Science and Engineering Practices**		
Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. • Analyze and interpret data to determine similarities and differences in findings. (MS-ETS1-3)		*11–14, 36–37, 42–43*
DCI **Disciplinary Core Ideas**		
ETS1.B: Developing Possible Solutions • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-3)		Science and Engineering Practices Handbook (online)
• Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. (MS-ETS1-3)		*13–14,* Science and Engineering Practices Handbook (online)
ETS1.C: Optimizing the Design Solution • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. (MS-ETS1-3)		Science and Engineering Practices Handbook (online)

Labs and investigations are in italics.

MS-ETS1	Engineering Design	
MS-ETS1-2.	**Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.**	*154–157*
SEP Science and Engineering Practices		
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. • Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. (MS-ETS1-2)		*154–157*
DCI Disciplinary Core Ideas		
ETS1.B: Developing Possible Solutions • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. (MS-ETS1-2) possible solutions. (MS-ETS1-1)		Science and Engineering Practices Handbook (online)
CCSS ELA/Literacy Connections		
ELA RST.6–8.1		60–61, 78–79, 100–101, 118–119, 140–141, Literacy Skill Handbook (online)
ELA RST.6–8.9		Literacy Skill Handbook (online)
ELA WHST.6–8.7		64, 86, *90,* 123B, *131,* 133, 151–153, *154–157,* 159, Literacy Skill Handbook (online)
ELA WHST.6–8.9		123B, Literacy Skill Handbook (online)
CCSS Math Connections		
Math MP.2		Math Skill Handbook (online)

ALSO INTEGRATES:	
SEP Asking Questions and Defining Problems	55, 71
SEP Developing and Using Models	*68–69, 82–83, 105, 108–109, 129–130, 154–157,* 158

Labs and investigations are in italics.

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CCSS ELA/Literacy Connections	
ELA RST.6–8.1	8–9, 32–33, Literacy Skill Handbook (online)
ELA RST.6–8.7	24, 26, 39, 41, Literacy Skill Handbook (online)
ELA RST.6–8.9	Literacy Skill Handbook (online)
CCSS Math Connections	
Math MP.2	Math Skill Handbook (online)

ALSO INTEGRATES:	
SEP Asking Questions and Defining Problems	25, 53
SEP Planning and Carrying Out Investigations	27, 49–52
SEP Using Mathematics and Computational Thinking	*36–37*
SEP Constructing Explanations and Designing Solutions	8–9, 28, 32–33, *36–37,* 48, 53
SEP Engaging in Argument from Evidence	28
SEP Obtaining, Evaluating, and Communicating Information	15, 18, *20–22,* 25, 45
DCI LS1.C: Organization for Matter & Flow in Organisms	*20–22,* 40
DCI PS3.D: Energy in Chemical Processes & Everyday Life	*20–22,* 40
CCC Systems and System Models	*34,* 37–39, 49–52, Lab *How is a balloon like a cell membrane?* (online), PhET Interactive Simulation *Membrane Channels* (online)
CCC Energy and Matter	*20–22*
CCSS ELA RST.6–8.3	*11–14, 34, 42–43*
CCSS ELA RST.6–8.10	15, 18, 25, 45
CCSS ELA WHST.6–8.1	28
CCSS ELA WHST.6–8.2	18, 25
CCSS ELA SL.6.1	3, *13–14,* 15
CCSS ELA SL.6.4	*20–22,* 45
CCSS Math 6.RP.A.1	*36–37*

Labs and investigations are in italics.

MODULE: Body Systems

MS-LS1	From Molecules to Organisms: Structures and Processes	
MS-LS1-3.	**Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.** [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.]*	124, 165–170
SEP Science and Engineering Practices		
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). • Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. (MS-LS1-3)		63, 83, *104,* 111, 114, 123B, 124, 136, 165–170
DCI Disciplinary Core Ideas		
LS1.A: Structure and Function • 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)		55, 59, 62, *62,* 63–65, *65,* 66, *67,* 68, *68–69,* 70, 72–74, 80–81, *82–83,* 83, 85–87, *87–89,* 89–90, *90,* 91–92, 94, 106–108, *108–109,* 109–114, 121, 123–125, *125,* 126, *129–130, 131,* 132, 134–136, *142–143,* 143–146, 164, 165–170, 171, Lab *Model Digestion from Start to Finish* (online), Lab *How do gizzards help birds eat?* (online)
CCC Crosscutting Concepts		
Systems and System Models • Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems. (MS-LS1-3)		55, 59–61, *62,* 63–65, *65,* 66, *67,* 68, *68–69,* 70, 72–74, 80–81, *82–83,* 83, 89, 94, 106–108, *108–109,* 109–114, 121, 123–125, *125,* 126, *129–130,* 132, 136, 139, *142–143,* 143–146, *146–147,* 164, 165–170, 171, Lab *Model Digestion from Start to Finish* (online), Lab *How do gizzards help birds eat?* (online)
Connections to Nature of Science **Science is a Human Endeavor** • 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)		93

Labs and investigations are in italics.

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CCSS ELA/Literacy Connections	
ELA RST.6–8.1	60–61, 78–79, 100–101, 118–119, 140–141, Literacy Skill Handbook (online)
ELA RI.6.8	110, Literacy Skill Handbook (online)
ELA WHST.6–8.1	63, 104, 114, 123B, 124, 165–170, Literacy Skill Handbook (online)
CCSS Math Connections	
Math 6.EE.C.9	*151–153, Math Skill Handbook (online)*

MS-LS1	From Molecules to Organisms: Structures and Processes	
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.** *[Assessment Boundary: Assessment does not include mechanisms for the transmission of this information.]*	*146–157,* 158–159, 165–170
SEP Science and Engineering Practices		
Obtaining, Evaluating, and Communicating Information 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. • 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)		64, 86, *90,* 110, 123B, *131,* 133, 144, *151–157,* 159
DCI 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. (MS-LS1-8)		*142–143,* 143, 146, *146–147,* 148, *148–149,* 150, *151–153,* 154, *154–157,* 158–159, 162–164, 165–170
CCC Crosscutting Concepts		
Cause and Effect • Cause and effect relationships may be used to predict phenomena in natural systems. (MS-LS1-8)		113, 145, 150
CCSS ELA/Literacy Connections		
ELA WHST.6–8.8		64, 86, *90,* 110, 123B, *131,* 133, 144, *151–157,* 159, Literacy Skill Handbook (online)

Labs and investigations are in italics.

MS-ETS1	Engineering Design	
MS-ETS1-1.	**Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.**	*154–157*
SEP Science and Engineering Practices		
Asking Questions and Defining Problems * Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarifying arguments and models. • Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions. (MS-ETS1-1) *Other aspects of this SEP are integrated throughout this module and are listed in the *Also Integrates* section.		*154–157*
DCI Disciplinary Core Ideas		
ETS1.A: Defining and Delimiting Engineering Problems • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions. (MS-ETS1-1)		Science and Engineering Practices Handbook (online)
CCC Crosscutting Concepts		
Connections to Science, Technology, Society and the Environment **Influence of Science, Engineering, and Technology on Society and the Natural World** • All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1)		Science and Engineering Practices Handbook (online)
• The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. (MS-ETS1-1)		*154–157*
CCSS ELA/Literacy Connections		
ELA RST.6–8.1		60–61, 78–79, 100–101, 118–119, 140–141, Literacy Skill Handbook (online)
ELA WHST.6–8.8		64, 86, *90,* 110, 123B, *131,* 133, 144, *151–153, 154–157,* 159, Literacy Skill Handbook (online)
CCSS Math Connections		
Math MP.2		Math Skill Handbook (online)

Labs and investigations are in italics.

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SEP Analyzing and Interpreting Data	*82–83, 87–88, 146–153, 160–161*
SEP Using Mathematics and Computational Thinking	*148–153*
SEP Constructing Explanations and Designing Solutions	60–61, 70, 74, 78–79, 96, 100–101, 118–119, *129–130,* 140–141, *154–157*
DCI PS3.D: Energy in Chemical Processes	111
DCI PS4.A: Wave Properties	*151–153,* 154
CCC Scale, Proportion, and Quantity	70
CCC Energy and Matter	*102,* 111, 125
CCC Structure and Function	*62,* 63, *67, 82–83,* 83, *84,* 85, *87–89, 108–109,* 123–124, 126, *129–131,* 132, 135, *142–143, 154–157*
CCSS ELA RST.6–8.3	*68–69, 82–83, 84, 87–88, 105, 108–109, 125, 129–130, 142–143, 146–157, 160–161,* Lab *Model Digestion from Start to Finish* (online), Lab *How do gizzards help birds eat?* (online)
CCSS ELA RST.6–8.7	72, 94, 162, 165–170
CCSS ELA RST.6–8.8	110
CCSS ELA RST.6–8.10	71, 86, 93, 110, 122, 123A–123B, 127–128, 133, 144, 159
CCSS ELA WHST.6–8.2	123B, 128, 133, 144
CCSS ELA WHST.6–8.4	123B
CCSS ELA SL.6.1	122, 127–128
CCSS ELA SL.6.4	64, *131*
CCSS Math 6.EE.B.6	*151–153*
CCSS Math 6.SP.B.4	*148–153*

Labs and investigations are in italics.