

8th Grade Science Curriculum Map

Month	Objectives/Learning Goals	Applicable State and National Learning Standards	Assessments
August	<p>Topic 1: Living Things in the Biosphere In this topic, students will explore living things, including how and why organisms are classified. Students will also learn about viruses, bacteria, protists, fungi, plants, and animals and how organisms from these various groups impact humans.</p> <p>Lesson 1: Living Things Students will investigate evidence that living things are made of cells and where they come from. Students will also study what living things need to stay alive, grow, and reproduce.</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
September	<p>Topic 1: Living Things in the Biosphere continued: Lesson 2: Classification Systems Students will explore how living things are classified, and how the theory of evolution supports the classification of organisms. Lesson 3: Viruses, Bacteria, Protists, and Fungi Students will investigate the characteristics of viruses, bacteria, protists, and fungi, and how these organisms interact with nature and humans. Lesson 4: Plants and Animals Students will investigate the characteristics of plants and animals and how these organisms interact with nature and humans.</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
October	<p>Topic 2 The Cell System The students will take an in depth look at the organization and development of living things, in particular their cells, are the main ideas that frame this topic. While studying cells, students use models to recognize cell structures and conduct investigations to understand cell structures and functions. Lesson 1: Structure and Function</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic</p>

	<p>of Cell Students investigate Cell theory and explain how cells determine the structure of living things. Lesson 2: Cell Structures Using models, students compare and contrast cell structures and their functions. They also compare and contrast plant and animal cells.</p>		<p>will have a comprehensive assessment covering all of the lessons in the topic.</p>
November	<p>Topic 2 The Cell System Continued : Lesson 3: Obtaining and Removing Materials Students explore the primary role of the cell membrane and how it helps the cell to maintain homeostasis. Lesson 4: Cell Division (Mitosis) Students explore how cells undergo reproduction. Using models, they recognize how structures in the cell support this process.</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
December	<p>Topic 2 The Cell System Continued : Lesson 5: Photosynthesis <i>Students investigate how plants and other organisms use photosynthesis to make food.</i> Lesson 6: Cellular Respiration Students explore how organisms use cellular respiration to break down food and produce energy and carbon dioxide.</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
January	<p>Mandatory School wide Science Fair Projects based on IJAS standards will be worked on during class time.Topic 3 : Human</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow</p>

	<p>Body Systems How human body organs and their systems interact is the main idea that frames this topic. Students will demonstrate the interactions among several systems and learn how the nervous system sends and receives messages throughout the body. This topic supports student understanding of the importance of making healthy lifestyle decisions with regard to their physical and nutritional health. Lesson 1: Body Organization Students identify patterns as they observe how cells form interacting subsystems in the body. Through models, they identify and investigate the organs that are specialized for particular body functions.</p>		<p>students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
February	<p>Topic 3 Human Body Systems (Continued) Lesson 2: Systems Interacting Students identify and investigate how organ systems interact with each other to carry out all necessary functions for an organism's growth and survival. Through this investigation, they relate how the organ systems interact to maintain homeostasis. Lesson 3: Supplying Energy Students investigate and explain how the digestive system provides necessary energy to the body's cells in the form of nutrients. Students use this information to analyze the nutritional value of foods and develop healthy meals.</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
March	<p>. Topic 3 Human Body Systems (Continued) Lesson 4: Manging Materials Students investigate and determine the relationship between the circulatory and respiratory systems, which provide the body with oxygen and remove carbon dioxide. Lesson 5: Controlling Processes Students identify the nervous system as the central system that controls all other</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic</p>

	<p>systems and bodily functions. Students also use models to determine how the endocrine system works with the nervous system to regulate growth and development and maintain homeostasis.</p>		<p>will have a comprehensive assessment covering all of the lessons in the topic.</p>
<p>April/May</p>	<p>Topic 4: Genes and Heredity This topic deals with patterns of reproduction and inheritance. Students will identify how off spring receive traits from their parents. Lesson 1: Patterns of Inheritance Students investigate Gregor Mendel's advances in the fields of genetics and inheritance. Through Gregor Mendel's experiments, students discover how inherited alleles are related to an organism's traits and how probability is related to inheritance. Lesson 2: Chromosomes and Inheritance Students explore the relationship between genes, chromosomes, and inheritance. Students utilize models, such as a pedigree, to track inheritance. Lesson 3: Genetic Coding and Protein Synthesis Students delve into DNA replication to explore how cells make proteins and the process of protein synthesis. Lesson 4: Trait Variations Students learn how changes in DNA and RNA lead to trait variations in individuals and species.</p>		<p>Worksheets and digital interactivities that allow students to learn about the lesson. Hands on labs, virtual labs that allow students to analyze different scenarios that are presented in the lessons. Each lesson will culminate in a quiz, and the topic will have a comprehensive assessment covering all of the lessons in the topic.</p>
		<p>PS-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. PS-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</p>	

		<p>the function. PS-MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. PS-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. PS-MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. PS-MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. MS-LS1-A-1 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) MS-LS1-A-2 Within cells, special structures are responsible for particular functions, and the cell</p>	
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		<p>membrane forms the boundary that controls what enters and leaves the cell. (MS-LS1-2) MS-LS1-A-3 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) MS-LS1-B-2 Animals engage in characteristic behaviors that increase the odds of reproduction. (MS-LS1-4) MS-LS1-B-3 Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. (MS-LS1-4) MS-LS1-D-1 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) MS-SEP-3.b Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of the investigation. MGS-SEP-7.c Construct use, and</p>	
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		<p>present 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. 6-8-CCC-6.a 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. STSE-MS-1.a 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.</p> <p>PS-MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. PS-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</p>	
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		<p>matter moves through an organism. PS-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. MS-LS1-A-2 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) MS-LS1-C-1 Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. (MS-LS1-6) MS-LS1-C-2 Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. (MS-LS1-7) MS-ETS1-A-1 The more</p>	
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		<p>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) MS-SEP-2.f Develop a model to describe unobservable mechanisms. MS-SEP-2.g Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs. MS-SEP-3.b Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of the investigation. MS-SEP-4.g Analyze and interpret data to determine similarities and differences in findings. MS-SEP-6.c Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. MGS-SEP-7.c</p>	
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		<p>Construct use, and present 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. 6-8-CCC-2.b Cause and effect relationships may be used to predict phenomena in natural systems. 6-8-CCC-4.b Models can be used to represent systems and their interactions. 6-8-CCC-5.a Matter is conserved because atoms are conserved in physical and chemical processes. MGS-NoS-2.a Science knowledge is based upon logical and conceptual connections between evidence and explanations. MGS-NoS-2.b Science disciplines share common rules of obtaining and evaluating empirical evidence. MGS-NoS-7.c Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism and openness to new ideas. STSE-MS-2.b The uses of technologies and any limitation on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in</p>	
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		<p>such factors as climate, natural resources, and economic conditions.</p> <p>PS-MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. PS-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. MS-LS1-A-3 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) MS-LS1-D-1 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) 6-8-CCC-4.a Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.</p>	
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		<p>PS-MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. PS-MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. PS-MS-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. PS-MS-LS4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. MS-LS1-A-2 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) MS-LS1-B-1 Organisms reproduce, either sexually or asexually, and transfer their</p>	
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		<p>genetic information to their offspring. (secondary to MS-LS3-2) MS-LS3-A-1 Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits. (MS-LS3-1) MS-LS3-A-2 Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2) MS-LS3-B-1 In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2) MS-LS3-B-2 In addition to variations that arise from sexual reproduction, genetic information</p>	
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		<p>can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1) MS-LS4-B-2 Natural selection leads to the predominance of certain traits in a population, and the suppression of others. (MS-LS4-4) MS-LS4-C-1 Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. (MS-LS4-6) MS-SEP-6.c Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in</p>	
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		<p>the future. MGS-SEP-7.c Construct use, and present 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. 6-8-CCC-6.a 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.</p>	
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