

Henry County Schools
Middle School Life Science Scope and Sequence

Standards of Learning and Elements	Performance Indicators	Big Ideas/Lessons	Number of Weeks
<p>S7CS1. Students will explore of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.</p> <ul style="list-style-type: none"> a. Understand the importance of—and keep—honest, clear, and accurate records in science. b. Understand that hypotheses can be valuable, even if they turn out not to be completely accurate <p>S7CS2. Students will use standard safety practices for all classroom laboratory and field investigations.</p> <ul style="list-style-type: none"> a. Follow correct procedures for use of scientific apparatus. b. Demonstrate appropriate techniques in all laboratory situations. c. Follow correct protocol for identifying and reporting safety problems and violations. <p>S7CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities.</p> <ul style="list-style-type: none"> c. Learn and use on a regular basis standard safety practices for scientific investigations. <p>S7CS9. Students will investigate the features of the process of scientific inquiry. Students will apply the following to inquiry learning practices:</p> <ul style="list-style-type: none"> a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing competing theories. b. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence. c. Scientific experiments investigate the effect of one variable on another. All other variables are kept constant. d. Scientists often collaborate to design research. To prevent this bias, scientists conduct independent studies of the same questions. e. Accurate record keeping, data sharing, and replication of results are essential for maintaining an investigator’s credibility with other scientists and society. 		<p>Classroom Expectations, Procedures and Nature of Science</p>	<p>2 Weeks Aug 3 - Aug 14</p>

Graduation Standard..MS7 : I can apply scientific and engineering practices to understand and analyze the structural similarities of organisms and how they can be compared scientifically.

Standards of Learning and Elements	Performance Indicators	Big Ideas/Lessons	Number of Weeks
S7L1. Students will investigate the diversity of living organisms and how they can be compared scientifically. <ul style="list-style-type: none"> a. Demonstrate the process for the development of a dichotomous key. b. Classify organisms based on physical characteristics using a dichotomous key of the six kingdom system (archaebacteria, eubacteria, protists, fungi, plants, and animals). 	<p>A. Develop a dichotomous key that can be used to identify a collected group of organisms and determine their scientific name. (S7L1.a.)</p> <p>B. Identify the physical characteristics of an organism and determine the placement of that organism into the six kingdom classification system. (S7L1.b)</p>	Classification and the diversity of organisms	<p>3 Weeks</p> <p>Aug 17- Sept 4</p>

Graduation Standard..MS4 : I can apply scientific and engineering practices to understand and analyze molecular, structural, and chemical biology, as they relate to biological systems and each level of organization from cells to organ systems

Standards of Learning and Elements	Performance Indicators	Big Ideas/Lessons	Number of Weeks
S7L2. Students will describe the structure and function of cells, tissues, organs, and organ systems. <ul style="list-style-type: none"> a. Explain that cells take in nutrients in order to grow and divide and to make needed materials. b. Relate cell structures (cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria) to basic cell functions. c. Explain that cells are organized into tissues, tissues into organs, organs into systems, and systems into organisms. d. Explain that tissues, organs, and organ systems serve the needs cells have for oxygen, food, and waste removal. 	<p>A. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers of cells that may be organized into tissue, organs, and organ systems. (S7L2.c)</p> <p>B. Develop and use a model to describe a specific function of an assigned cell as a whole, and the ways individual structures of the cell contribute to its function. (S7L2.b)</p> <p>C. Develop a model to explain that cells take in nutrients in order to grow and divide and to make needed materials. (S7L2.a)</p>	Structure, Function, and Information Processing	<p>10 weeks</p> <p>Sept. 8- Nov. 20</p>

<p>e. Explain the purpose of the major organ systems in the human body (i.e., digestion, respiration, reproduction, circulation, excretion, movement, control, and coordination, and for protection from disease).</p> <p>S7L3. Students will recognize how biological traits are passed on to successive generations.</p> <p>a. Explain the role of genes and chromosomes in the process of inheriting a specific trait.</p> <p>b. Compare and contrast that organisms reproduce asexually and sexually (bacteria, protists, fungi, plants & animals).</p> <p>c. Recognize that selective breeding can produce plants or animals with desired traits.</p>	<p>D. 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. (S7L2d)</p> <p>E. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (S7L2.e)</p> <p>F. Develop a model that illustrates the inheritance of specific traits from genes located on chromosomes in both sexual and asexual reproduction. (S7L3.a-b)</p> <p>G. Apply the concepts of selective breeding to create an organism (plant or animal) with desired traits and explain the benefits of the traits. (S7L3.c)</p>		
<p><i>Graduation Standard..MS6 : I can apply scientific and engineering practices to understand and analyze the relationship between genetics, adaptation, and biodiversity.</i></p>			
Standards of Learning and Elements	Performance Indicators	Big Ideas/Lessons	Number of Weeks
<p>S7L3. Students will recognize how biological traits are passed on to successive generations.</p> <p>a. Explain the role of genes and chromosomes in the process of inheriting a specific trait.</p> <p>b. Compare and contrast that organisms reproduce asexually and sexually (bacteria, protists, fungi, plants & animals).</p>	<p>A. Using a created population, demonstrate the role of genes and chromosomes in the process of inheriting a specific trait and how the trait may enhance the survival of an organism and, consequently, remain in the population through natural selection. (S7L3.a and S7L5.b)</p> <p>B. Gather and synthesize information about the technologies that have impacted</p>	<p>Growth, Development, and Reproduction of Organisms, Natural Selection, and Adaptations</p>	<p>7 Weeks Nov 30- Jan 29</p>

<p>c. Recognize that selective breeding can produce plants or animals with desired traits.</p> <p>S7L5. Students will examine the evolution of living organisms through inherited characteristics that promote survival of organisms and the survival of successive generations of their offspring.</p> <p>a. Explain that physical characteristics of organisms have changed over successive generations (e.g. Darwin’s finches and peppered moths of Manchester).</p> <p>b. Describe ways in which species on earth have evolved due to natural selection.</p> <p>c. Trace evidence that the fossil record found in sedimentary rock provides evidence for the long history of changing life forms.</p>	<p>the way humans influence the inheritance of desired traits in organisms. (S7L3.c)</p> <p>C. Using a selected organism, conduct research and create a model to demonstrate how the organism has changed over time and predict what it can look like in the future (include the environmental conditions to influence the future prediction). (S7L5.a)</p> <p>D. Generate an argument to explain how reproduction (sexual and asexual) contributes to the process of natural selection. (S7L3.b and S7L5.b.)</p> <p>E. Analyze data to demonstrate and explain how natural selection may lead to increase and decreases of specific traits in populations over time. (S7L5.b)</p> <p>F. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. (S7L5.c)</p>		
<p><i>Graduation Standard..MS5 : I can apply scientific and engineering practices to understand and analyze the characteristics, functions, and behavioral interactions within an ecosystem.</i></p>			
Standards of Learning and Elements	Performance Indicators	Big Ideas/Lessons	Number of Weeks
<p>S7L4. Students will examine the dependence of organisms on one another and their environments.</p> <p>a. Demonstrate in a food web that matter is transferred from one organism</p>	<p>A. Develop a model to describe the cycling of matter and flow of energy among biotic and abiotic components of a chosen or assigned ecosystem. (S7L4.a,b)</p>	<p>Matter and Energy in Organisms and Ecosystems</p>	<p>Feb. 1- Mar 31 8 weeks</p>

<p>to another and can recycle between organisms and their environments.</p> <p>b. Explain in a food web that sunlight is the source of energy and that this energy moves from organism to organism.</p> <p>c. Recognize that changes in environmental conditions can affect the survival of both individuals and entire species.</p> <p>d. Categorize relationships between organisms that are competitive or mutually beneficial.</p> <p>e. Describe the characteristics of Earth's major terrestrial biomes (i.e. tropical rain forest, savannah, temperate, desert, taiga, tundra, and mountain) and aquatic communities (i.e. freshwater, estuaries, and marine).</p>	<p>B. Construct an argument supported by empirical evidence that changes to an ecosystem affect populations. (S7L4.c)</p> <p>C. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (S7L4c)</p> <p>D. Create a model to provide evidence for the effects of limiting factors on organisms and populations of organisms in an ecosystem. (S7L4d)</p> <p>E. Create a tool to provide information of the characteristics of the Earth's major terrestrial biomes and aquatic communities. (S7L4.e)</p>		
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*Flex time is already built in to each unit.