

SCIENCE GRADE LEVEL 7	<b>YEAR AT A GLANCE</b> <b>Student Learning Outcomes by Unit</b> <b>2016-2017</b>
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UNIT: Diversity of Life Dates:	Overarching/general themes: Characteristics of life; cell as basic unit of life and cell parts and functions; plant structures and development; animal investigation						
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Networks E & F - 3/21 to 6/13							
5 sessions, 1 week	<b>Investigation 1</b> What Is Life?	<ul style="list-style-type: none"> <li>Develop an operational definition of life that will be used and revised throughout the unit</li> <li>Investigate unknown materials to determine whether they are alive by observing for the common characteristics of life</li> </ul>					
3-4 sessions, 1 week	<b>Investigation 2</b> Introduction to the Microscope	<ul style="list-style-type: none"> <li>Use a microscope as a tool to carefully observe and record observations in notebooks.</li> <li>Draw scale representations of images seen in a microscope to estimate size accurately. (TE 2.2)</li> <li>Explain how focal plane affects the image seen through a microscope.</li> </ul>					
5-6 sessions, 1+ week	<b>Investigation 3</b> Microscopic Life	<ul style="list-style-type: none"> <li>Observe a single-celled microorganism (paramecia) with a microscope and investigate structure-function relationships to generate evidence to support the idea that they are organisms.</li> <li>Use the appropriate tools of science to search for microorganisms in pond water. Observe and record structure and functions observed. Compare and contrast single-celled organisms with more complex organisms. (LS-3)</li> <li>Explain that the cell is the basic unit of life and that cells have the same needs and perform the same functions as more complex organisms. (LS-4)</li> </ul>					
2 sessions, 1-2 days	<b>Investigation 4</b> The Ribbon of Life	<ul style="list-style-type: none"> <li>Compare structure and function of cells from different organisms. (LS-3)</li> <li>Relate the structure and function of cells, tissues, organs, systems, and organisms. (LS-5)</li> <li>Explain that humans, and all other complex life-forms, are made of cells, and that cells have defining structures, such as membranes, cell walls, nuclei, chloroplasts, ribosomes, mitochondria, and cytoplasm. (LS-2)</li> <li><b>Close Reading: based on FOSS Student Resource book passage <i>The Insect Empire</i></b></li> </ul>					
5 sessions, 1 week	<b>Investigation 5</b> Seeds of Life	<ul style="list-style-type: none"> <li>Dissect seeds to discover their structures. Describe seed structures in words and diagrams. Identify the embryo as dormant and living.</li> <li>Investigate the effect of light on germinated seeds. Document observations and write a narrative with relevant descriptive details and a well-structured event sequence.</li> <li>Compare the development of two groups of complex plants— monocots and dicots. (LS-1)</li> <li><b>CWA: Is it living?</b></li> </ul>					
6 sessions, 1+ week	<b>Investigation 6</b> Transpiration	<ul style="list-style-type: none"> <li>Design an experiment to determine what happens to water in a celery stalk. (TE-2.2)</li> <li>Collect and analyze data to develop evidence for an explanation for how water enters a plant's roots and flows through the plant during transpiration.</li> <li>Describe the process of transpiration, including plant parts and functions. Explain the relationship of transpiration to the water cycle.</li> </ul>					
2-3 sessions, 2-3 days	<b>Investigation 7</b> Plant Reproduction	<ul style="list-style-type: none"> <li>Describe the structure-function relationships of plant flowers/parts. Use illustrations to clarify and provide detail.</li> <li>Develop a general model of how seeds disperse. (TE-2.2)</li> </ul>					

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Networks B, D & G - 12/7 to 3/14		
Networks E & F - 3/21 to 6/13		
		<ul style="list-style-type: none"> <li>• Explain how seed-dispersal mechanisms contribute to a plant's survival.</li> </ul>
7 sessions, 1.5 weeks	<b>Investigation 8</b> Land Snails or Mud Snails	<ul style="list-style-type: none"> <li>• Explain why scientists strive to avoid anthropomorphisms when discussing non-human organisms.</li> <li>• Design and conduct an experiment safely and appropriately, using a living organism. (TE-2.2)</li> <li>• Collect data and draw conclusions. Share findings through a class presentation or written paper.</li> <li>• Describe the difference between scientific observations and inferences, providing examples.</li> </ul>
4-5 sessions, 1 week	<b>Investigation 9</b> Cockroaches	<ul style="list-style-type: none"> <li>• Design and conduct an experiment safely and appropriately, using a living organism. (TE-2.2)</li> <li>• Collect data and draw conclusions. Share findings through a class presentation or written paper.</li> <li>• Explain adaptation in terms of an organism's survival. Relate structure to function in an insect.</li> </ul>
5 sessions, 1 week	<b>Investigation 10</b> Kingdoms of Life	<ul style="list-style-type: none"> <li>• Design an investigation of microbial growth using lab procedures to inoculate agar plates with bacteria and fungi from natural sources. Make observations and draw conclusions. Present findings orally and/or in writing.</li> <li>• Compare and contrast various groupings of living things by characteristics. Explain that classification systems are human constructs that help us show relationships in groups of organisms.</li> <li>• Distinguish between prokaryotes and eukaryotes.</li> </ul>

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<b>UNIT: Earth History</b>		<b>Overarching/general themes:</b>
<b>Dates:</b>		<b>Rock types - sedimentary, igneous, and metamorphic; how types are formed; fossils and fossil record; Earth's history</b>
<b>Networks A &amp; C - 3/21 to 6/13</b>	<b>Textual References</b> <b>Earth History</b> <b>Teacher's Guide (FOSS)</b>	<b>To Demonstrate Proficiency by the End of the Unit Students Will:</b>
<b>Networks B, D, &amp; G-9/8 to 11/30</b>		
<b>Networks E &amp; F - 12/7 to 3/14</b>		
2 sessions, 1-2 days	<b>Investigation 1</b> Pushing the Envelope	<ul style="list-style-type: none"> <li>• Make observations and generate evidence to support an idea.</li> <li>• Share study results with others for critical review. Provide and receive critical review with a respectful attitude.</li> <li>• Compare and contrast observation and inference, providing definitions and examples. Make inferences based on evidence.</li> </ul>
4-5 sessions, 1 week	<b>Investigation 2</b> Into the Grand Canyon	<ul style="list-style-type: none"> <li>• Use photographic and video images of rocks and landforms to gather data about the Grand Canyon. Use the data to make sense and ask questions. (ES-2)</li> <li>• Observe, describe, and compare rocks using appropriate tools.</li> <li>• Generate questions to guide further study.</li> </ul>
4-5 sessions, 1 week	<b>Investigation 3</b> Grand Canyon Rocks	<ul style="list-style-type: none"> <li>• Use acid to test for the presence of calcium carbonate in a rock sample. (TE-2.2)</li> <li>• Identify and name three sedimentary rocks: limestone, sandstone, shale.</li> <li>• Observe and compare photographs and rock samples representing two locations along the Colorado River in the Grand Canyon. Use evidence to correlate the rocks from two locations along the Colorado River. Investigate how differential erosion has changed the landscape of the Colorado Plateau. Use all of this information to explain how we come to understand the history of the earth through rock layers. (ES-6)</li> </ul>
6-9 sessions, 2 weeks	<b>Investigation 4</b> My Sediments Exactly	<ul style="list-style-type: none"> <li>• Identify the sediments in sandstone and shale. Model the formation of layers of sandstone and shale in an ancient environment.</li> <li>• Relate the process of weathering, erosion, and deposition to the formation of sediments, sedimentary rock, and landforms. (ES-6)</li> </ul>
4-5 sessions, 1 week	<b>Investigation 5</b> Limestone	<ul style="list-style-type: none"> <li>• Identify sediments in limestone and describe how limestone is formed. Model the formation of limestone layers in an ancient environment. (ES-6)</li> <li>• Investigate how carbon dioxide contributes to the precipitation of calcium carbonate in water. Write a description based on observations.</li> <li>• Make inferences about prehistoric environments based on evidence provided from rocks and minerals.</li> </ul>

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Networks E & F - 12/7 to 3/14					
5-6 sessions, 1+ week	<b>Investigation 6</b> It's About Time	<ul style="list-style-type: none"> <li>• Construct a time line of geological events and prehistoric life. Write a narrative that explains the history of life and geologic events on the earth. (ES-7)</li> <li>• Determine the relative age of rocks, based on association with other rocks. (ES-7)</li> <li>• <b>CWA: Were these land masses ever connected?</b></li> </ul>			
2-3 sessions, 2-3 days	<b>Investigation 7</b> Fossils and Time	<ul style="list-style-type: none"> <li>• Use index fossils to correlate rock layers in three locations on the Colorado Plateau. (ES-7)</li> <li>• Compare various events and fossils to derive a faunal succession over geological time.(ES-7)</li> <li>• Make inferences from fossil evidence that contribute to an understanding of fossil succession.</li> <li>• Make claims and provide evidence and reasoning to support them.</li> </ul>			
4-8 sessions, 1-2 weeks	<b>Investigation 8</b> One Rock to Another	<ul style="list-style-type: none"> <li>• Observe and compare the properties of sedimentary, igneous, and metamorphic rocks. Relate the formation processes of the three types of rocks to develop the rock cycle. Write an explanation of the rock cycle. (ES-2, ES-5)</li> <li>• Relate the size of crystals in igneous rocks to environmental variables.</li> <li>• <b>Close Reading: FOSS Student Resource Book, <i>Destroying and Reconstructing Earth</i></b></li> </ul>			

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<b>UNIT: Force and Motion</b>	<b>Overarching/general themes:</b>				
<b>Dates:</b>	<b>Force and motion; speed, acceleration and velocity; gravity; friction; inertia and momentum</b>				
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<b>Force and Motion</b>	<b>Teacher's Guide (FOSS)</b>				
5 sessions, 1 week	<b>Investigation 1</b> Here to There	<ul style="list-style-type: none"> <li>• Calculate distance (d) using the distance equation. Measure distance in standard metric units.</li> <li>• Observe and describe an object's motion in terms of change of position. Explain how to use a reference point to determine the distance moved by an object. (PS-11)</li> <li>• Use tools to gather data and mathematics to organize data. (PS-12)</li> </ul>			
5-6 sessions, 1+ week	<b>Investigation 2</b> Speed	<ul style="list-style-type: none"> <li>• Describe speed as the rate of change of position of an object: <math>v = d/\Delta t</math>. And that the slope of the line on a speed graph represents speed; steeper slopes represent higher speeds. (PS-11)</li> <li>• Manipulate variables in an equation to solve for different unknowns.</li> <li>• Conduct experiments to acquire distance and time data and to determine speed. (PS-11)</li> <li>• Use tools to gather data and mathematics to organize data. Use mathematics to solve problems involving unknown quantities. (TE-2.2)</li> <li>• Explain speed in terms of distance and time and that average speed is the total distance traveled by an object divided by the total time needed to go that distance. (PS-11, PS-12)</li> </ul>			
8-9 sessions, 2 weeks	<b>Investigation 3</b> Comparing Speeds	<ul style="list-style-type: none"> <li>• Conduct experiments to acquire time and distance data and to determine speed. Use distance-versus-time graph to determine an object's speed. Explain that the slope of a line on a distance-versus-time graph represents speed and that steeper slopes represent higher speeds. (PS-12)</li> <li>• Use tools to gather and organize data and solve problems involving unknown quantities. (TE-2.2)</li> <li>• Explain speed in terms of distance and time.</li> </ul>			
7 sessions, 1.5 weeks	<b>Investigation 4</b> Representing Motion	<ul style="list-style-type: none"> <li>• Use tools to gather and organize data.</li> <li>• Transform narrative accounts of motion events into graphic representations. Explain what a horizontal line on a speed graph represents. (PS-11)</li> <li>• Generate motion scenarios from graphic representations of motion events. (PS-12)</li> <li>• Explain the difference between displacement and distance. (PS-11)</li> </ul>			
9 sessions, 2 weeks	<b>Investigation 5</b> Acceleration	<ul style="list-style-type: none"> <li>• Define acceleration as change of velocity (<math>\Delta v</math>)– per unit time, measured in units of change of position (<math>\Delta x</math>) per unit of time per unit of time. Explain that objects rolling down slopes accelerate; acceleration is greater on steeper slopes and the mass of a rolling car has little effect on its acceleration. (PS-11)</li> <li>• Use tools (mechanical and electronic Dotcars) to collect time and distance data and mathematics to organize and analyze the data. (PS-12)</li> <li>• Use equations to calculate acceleration, displacement, and velocity of rolling objects. (PS-11)</li> </ul>			

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		<ul style="list-style-type: none"> <li>Identify and interpret graphs of accelerating motion and constant velocity. (PS-12)</li> <li><b>CWA: <i>Who ended up closest to home?</i></b></li> </ul>				
7-8 sessions, 1.5 weeks	<b>Investigation 6</b> Force	<ul style="list-style-type: none"> <li>Define force as a push or pull and a net force as the sum of all the forces acting on a mass. Explain that a net force applied to a mass produces acceleration and that friction is a force that acts to resist movement. (PS-11)</li> <li>Use tools (pushers, spring scales, and multimedia simulations) to apply force and investigate friction and motion.</li> <li>Analyze illustrations of forces in motion. Describe forces as represented in the illustration. (PS-12)</li> <li>Describe change of motion as a result of net force.</li> </ul>				
7 sessions, 1.5 weeks	<b>Investigation 7</b> Gravity	<ul style="list-style-type: none"> <li>Determine the relationship between mass and the force of gravity, using spring scales. Infer that gravity is a force pulling masses toward each other; the strength of the force depends on the objects' masses. (PS-1)</li> <li>Gather time and displacement data electronically to investigate and then describe the acceleration of gravity. The acceleration produced by the force of gravity is about 10 m/s<sup>2</sup> toward Earth. (PS-1)</li> <li>Explain gravity as a universal force and discuss Galileo's discovery of acceleration due to gravity. (PS-1)</li> <li><b>Close Reading: FOSS Student Resource book passage <i>How To Get and Hold Onto a Moon</i></b></li> </ul>				
8 sessions, 1.5 weeks	<b>Investigation 8</b> Momentum	<ul style="list-style-type: none"> <li>Define and explain inertia and momentum; e.g., inertia tends to keep masses in uniform motion, it resists change of motion; inertia is proportional to mass, large masses have a lot of inertia; momentum is inertia in motion, it is the product of an object's velocity and mass. (PS-11)</li> <li>Conduct simple investigations to demonstrate inertia of both stationary and moving masses. (PS-11)</li> <li>Use a force scale to determine the force needed to stop cars traveling at different speeds and electronic Dotcar data to calculate velocity and momentum. Explain how inertia and momentum affect passenger safety in car crashes. Explain and apply the interplay of force and time (impulse) and momentum in crashes. (TE-2.2)</li> </ul>				