

<b>Grade: 5</b> <b>Subject: Science</b>	<b>Unit 4: MicroWorlds</b>
<b>Big Idea/Rationale:</b>	<ul style="list-style-type: none"> <li>• In this unit, students investigate both living and nonliving specimens with a variety of magnifiers, including the microscope.</li> </ul>
<b>Enduring Understanding (Mastery Objective):</b>	<ul style="list-style-type: none"> <li>• In order to magnify, a lens must be transparent and curved. Magnification is directly related to how much a lens is curved.</li> <li>• Higher magnification reveals more detail in a smaller area of a specimen being observed.</li> <li>• Some living organisms are too small to see without magnification</li> <li>• All living things are made of at least one cell</li> <li>• When magnified, all cells have observable structures</li> <li>• Like all organisms, microorganisms grow and reproduce</li> <li>• Microorganisms have structures that help them survive in specific environmental conditions.</li> </ul>
<b>Essential Questions (Instructional Objectives):</b>	<ul style="list-style-type: none"> <li>• How do lenses and microscopes work?</li> <li>• How does perspective impact my thinking about the world?</li> <li>• What are the building blocks of all living things?</li> <li>• How can we investigate the world of microorganisms?</li> </ul>
<b>Content (Subject Matter &amp; Lesson Objectives):</b>	<ul style="list-style-type: none"> <li>• Develop observational skills, increase ability to use magnifiers effectively, brainstorm and discuss ideas about magnifiers and magnification, observe and discover details and record observations (Lesson 1)</li> <li>• Make detailed observations, learn to communicate discoveries with clarity, completeness and accuracy, and record observations in words and sketches (Lesson 2)</li> <li>• Investigate the properties of lenses, experiment with different shapes to discover the properties common to objects that act as magnifiers. Note that the more curved an object is the more it magnifies (Lesson 3)</li> <li>• Use lenses to explore several common objects, learn to focus and examine how much of an object is seen at one time (Lesson 4)</li> <li>• Acquire information about the functions of the different parts of a microscope. Learn to adjust light, focus the microscope and develop the concept of a field of view (Lesson 5)</li> <li>• Continue to use the microscope effectively to make detailed observations of flat objects and develop an understanding of the field of view (Lesson 6)</li> <li>• Get better acquainted with the concept of the field of view and precise measurements (Lesson 7)</li> <li>• Learn to prepare wet mount and well slides and focus over the surface that has depth (Lesson 8)</li> <li>• Students prepare slides, focus, make observations, identify unknown</li> </ul>

	<p>specimens and record results (Lesson 9)</p> <ul style="list-style-type: none"> <li>• Select the appropriate slide, prepare slides of different types, perfect light adjustment and focusing techniques, make observations verbalize observations and record accurately (Lesson 10)</li> <li>• Prepare a wet mount slide, examine and describe the internal structure of an onion skin, draw complete, accurate and clear diagrams (Lesson 11)</li> <li>• Prepare slides of living and moving organisms – Volvox, make observations, record and discuss results. Draw neat labeled diagrams (Lesson 12)</li> <li>• Continue to prepare slides of living and moving organisms—Bepharisma. Make observations, record and discuss results. Draw neat, labeled diagrams (Lesson 13)</li> <li>• Prepare slides of very fast moving living organisms—Vinegar Eel. Experiment with methods to reduce its speed, make observations, record and discuss results, draw neat, labeled diagrams (Lesson 14)</li> </ul>
<p><b>Skills/Benchmarks: (Standards)</b></p>	<p><b>5.1.A: Science Practices, Understanding Scientific Explanations</b></p> <ul style="list-style-type: none"> <li>• 5.1.8.A.1: Demonstrate understanding and use interrelationships among central scientific concepts to revise explanations and to consider alternative explanations</li> <li>• 5.1.8.A.2: Use mathematical, physical and computational tools to build conceptual-based models and to pose theories</li> <li>• 5.1.8.A.3: Use scientific principles and models to frame and synthesize scientific arguments and pose theories</li> </ul> <p><b>5.1.B: Science Practices, Generate Scientific Evidence Through Active Investigations</b></p> <ul style="list-style-type: none"> <li>• 5.1.8.B.1: Design investigations and use scientific instrumentation to collect, analyze and evaluate evidence as part of building and revising models and explanations</li> <li>• 5.1.8.B.2: Gather, evaluate and represent evidence using scientific tools, technologies and computational strategies</li> <li>• 5.1.8.B.3: Use qualitative and quantitative evidence to develop evidence-based arguments</li> </ul> <p><b>5.1.C: Science Practices, Reflect on Scientific Knowledge</b></p> <ul style="list-style-type: none"> <li>• 5.1.8.C.1: Monitor one’s own thinking as understanding of scientific concepts is refined</li> <li>• 5.1.8.C.2: Revise predictions or explanations on the basis of discovering new evidence, learning new information or using models</li> <li>• 5.1.8.C.3: Generate new and productive questions to evaluate and refine core explanations</li> </ul> <p><b>5.1.D: Science Practices, Participate Productively in Science</b></p> <ul style="list-style-type: none"> <li>• 5.1.8.D.1: Engage in multiple forms of discussion in order to process, makes sense of and learn from others’ ideas, observations and experiences.</li> <li>• 5.1.8.D.2: Engage in productive scientific discussion practices during conversations with peers, both face to face and virtually in the context of</li> </ul>

	<p>scientific investigations and model building</p> <ul style="list-style-type: none"> <li>• 5.1.8.D.3: Demonstrate how to safely use tools, instruments and supplies</li> <li>• 5.1.8.D.4: Handle and treatment organisms humanely, responsibly and ethically</li> </ul> <p><b>5.3.A: Life Science, Organization and Development</b></p> <ul style="list-style-type: none"> <li>• 5.3.4.A.1: Develop and use evidence-based criteria to determine if an unfamiliar object is living or non-living</li> <li>• 5.3.4.A.2: Compare and contrast structures that have similar functions in various organisms, and explain how those functions may be carried out by structures that have different physical appearances</li> <li>• 5.3.4.A.3: Describe the interactions of systems involved in carrying out everyday life activities</li> </ul> <p><b>5.3.C: Life Science, Interdependencies</b></p> <ul style="list-style-type: none"> <li>• 5.3.4.C.2: Explain the consequences of rapid ecosystem changes and compare them to consequences of gradual changes</li> </ul> <p><b>5.3.D: Life Science, Heredity and Reproduction</b></p> <ul style="list-style-type: none"> <li>• 5.3.4.D.1: Compare the physical characteristics of the different stages of the life cycle of an individual organism and compare the characteristics of life stages among species</li> </ul> <p><b>5.3.E: Life Science, Evolution and Diversity</b></p> <ul style="list-style-type: none"> <li>• 5.3.4.E.1: Model an adaptation to a species that would increase its chances of survival, should the environment become wetter, dryer, warmer or colder over time</li> </ul>
<b>Materials:</b>	<ul style="list-style-type: none"> <li>• STC MicroWorlds Experiment Kit and Living Materials, Student Activity Books (Full list of supplies can be found on page XII of the Teacher’s Guide.</li> </ul>
<b>Notes:</b>	