

**McKinley Presidential Library & Museum  
Discover World Tour Ohio Science Standards  
Fifth Grade**



**MCKINLEY PRESIDENTIAL**  
Library & Museum

<b>Strand:</b>	<b><i>Cycles and Patterns in the Solar System</i></b>	<b><i>This topic focuses on the characteristics, cycles and patterns in the solar system and within the universe.</i></b>
<b>Earth</b>	<p>The solar system includes the sun and all celestial bodies that orbit the sun. Each planet in the solar system has unique characteristics.</p> <p>The sun is one of many stars that exist in the universe.</p> <p>Most of the cycles and patterns of motion between the Earth and sun are predictable</p>	<ul style="list-style-type: none"> <li>• The distance from the sun, size, composition and movement of each planet are unique. Planets revolve around the sun in elliptical orbits. Some of the planets have moons and/or debris that orbit them. Comets, asteroids and meteoroids orbit the sun.</li> <li>• The sun appears to be the largest star in the sky because it is the closest star to Earth. Some stars are larger than the sun and some stars are smaller than the sun.</li> <li>• Earth's revolution around the sun takes approximately 365 days. Earth completes one rotation on its axis in a 24-hour period, producing day and night. This rotation makes the sun, stars and moon appear to change position in the sky. Earth's axis is tilted at an angle of 23.5°. This tilt, along with Earth's revolution around the sun, affects the amount of direct sunlight that the Earth receives in a single day and throughout the year. The average daily temperature is related to the amount of direct sunlight received. Changes in average temperature throughout the year are identified as seasons.</li> </ul>
<b>Strand:</b>	<b><i>Interactions within Ecosystems</i></b>	<b><i>This topic focuses on foundational knowledge of the structures and functions of ecosystems.</i></b>
<b>Life</b>	<p>Organisms perform a variety of roles in an ecosystem.</p> <p>All of the processes that take place within organisms require energy</p>	<ul style="list-style-type: none"> <li>• Populations of organisms can be categorized by how they acquire energy. Food webs can be used to identify the relationships among producers, consumers and decomposers in an ecosystem.</li> <li>• For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred and transformed by producers into energy that organisms use through the process of photosynthesis. That energy then passes from organism to organism as illustrated in food webs. In most ecosystems, energy derived from the sun is transferred and transformed into energy that organisms use by the process of photosynthesis in plants and other photosynthetic organisms.</li> </ul>
<b>Strand:</b>	<b><i>Light, Sound and Motion</i></b>	<b><i>This topic focuses on the forces that affect motion. This includes the relationship between the change in speed of an object, the amount of force applied and the mass* of the object. Light and sound are explored as forms of energy that move in predictable ways, depending on the matter through which they move.</i></b>

*Fifth Grade-Interconnections Within Systems: Cycles on Earth, such as those occurring in ecosystems, in the solar system, and in the movement of light and sound result in describable patterns. Speed is a measurement of movement. Change in speed is related to force and mass\*. The transfer of energy drives changes in systems, including ecosystems and physical systems.*

<b>Physical</b>	<p>The amount of change in movement of an object is based on the mass of the object and the amount of force exerted.</p> <p>Light and sound are forms of energy that behave in predictable ways.</p>	<ul style="list-style-type: none"> <li>• Movement can be measured by speed. The speed of an object is calculated by determining the distance (d) traveled in a period of time (t). Earth pulls down on all objects with a gravitational force. Weight is a measure of the gravitational force between an object and the Earth. Any change in speed or direction of an object requires a force and is affected by the mass* of the object and the amount of force applied.</li> <li>• Light travels and maintains its direction until it interacts with an object or moves from one medium to another and then it can be reflected, refracted or absorbed. Sound is produced by vibrating objects and requires a medium through which to travel. The rate of vibration is related to the pitch of the sound.</li> </ul>
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- ***Design and conduct a scientific investigation***
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- ***Analyze and interpret data***
- ***Develop descriptions, models, explanations and predictions***
- ***Think critically and logically to connect evidence and explanations***
- ***Recognize and analyze alternative explanations and predictions***
- ***Communicate scientific procedures and explanations.***

(Ohio Dept. of Education, adopted 2011)

**McKinley Presidential Library & Museum**  
**Discover World Tour Ohio Science Standards**  
**Sixth Grade**



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<b>Strand:</b>	<b>Rocks, Minerals and Soil</b>	<b><i>This topic focuses on the study of rocks, minerals and soil, which make up the lithosphere. Classifying and identifying different types of rocks, minerals and soil can decode the past environment in which they formed</i></b>
<b>Earth</b>	<p>Minerals have specific, quantifiable properties.</p> <p>Igneous, metamorphic and sedimentary rocks have unique characteristics that can be used for identification and/or classification</p> <p>Igneous, metamorphic and sedimentary rocks form in different ways.</p> <p>Soil is unconsolidated material that contains nutrient matter and weathered rock.</p> <p>Rocks, minerals and soils have common and practical uses.</p>	<ul style="list-style-type: none"> <li>• Minerals are naturally occurring, inorganic solids that have a defined chemical composition. Minerals have properties that can be observed and measured. Minerals form in specific environments.</li> <li>• Most rocks are composed of one or more minerals, but there are a few types of sedimentary rocks that contain organic material, such as coal. The composition of the rock, types of mineral present, mineral arrangement, and/or mineral shape and size can be used to identify the rock and to interpret its history of formation, breakdown (weathering) and transport (erosion).</li> <li>• Magma or lava cools and crystallizes to form igneous rocks. Heat and pressure applied to existing rock forms metamorphic rocks. Sedimentary rock forms as existing rock weathers chemically and/or physically and the weathered material is compressed and then lithifies. Each rock type can provide information about the environment in which it was formed.</li> <li>• Soil formation occurs at different rates and is based on environmental conditions, types of existing bedrock and rates of weathering. Soil forms in layers known as horizons. Soil horizons can be distinguished from one another based on properties that can be measured.</li> <li>• Nearly all manufactured material requires some kind of geologic resource. Most geologic resources are considered nonrenewable. Rocks, minerals and soil are examples of geologic resources that are nonrenewable.</li> </ul>
<b>Strand:</b>	<b>Cellular to Multicellular</b>	<b><i>This topic focuses on the study of the basics of Modern Cell Theory. All organisms are composed of cells, which are the fundamental unit of life. Cells carry on the many processes that sustain life. All cells come from pre-existing cells</i></b>

*Sixth Grade-Order and Organization: All matter is made of small particles called atoms. The properties of matter are based on the order and organization of atoms and molecules. Cells, minerals, rocks and soil are all examples of matter.*

<b>Life</b>	<p>Cells are the fundamental unit of life.</p> <p>All cells come from pre-existing cells.</p> <p>Cells carry on specific functions that sustain life.</p> <p>Living systems at all levels of organization demonstrate the complementary nature of structure and function.</p>	<ul style="list-style-type: none"> <li>• All living things are composed of cells. Different body tissues and organs are made of different kinds of cells. The ways cells function are similar in all living organisms.</li> <li>• Cells repeatedly divide resulting in more cells and growth and repair in multicellular organisms.</li> <li>• Many basic functions of organisms occur in cells. Cells take in nutrients and energy to perform work, like making various molecules required by that cell or an organism. Every cell is covered by a membrane that controls what can enter and leave the cell. Within the cell are specialized parts for the transport of materials, energy capture and release, protein building, waste disposal, information feedback and movement.</li> <li>• The level of organization within organisms includes cells, tissues, organs, organ systems and whole organisms. Whether the organism is single-celled or multicellular, all of its parts function as a whole to perform the tasks necessary for the survival of the organism. Organisms have diverse body plans, symmetry and internal structures that contribute to their being able to survive in their environments.</li> </ul>
<b>Strand:</b>	<b><i>Matter and Motion</i></b>	<b><i>This topic focuses on the study of foundational concepts of the particulate nature of matter, linear motion, and kinetic and potential energy</i></b>
<b>Physical</b>	<p>All matter is made up of small particles called atoms.</p> <p>Changes of state are explained by a model of matter composed of atoms and/or molecules that are in motion.</p> <p>There are two categories of energy: kinetic and potential.</p> <p>An object's motion can be described by its speed and the direction in which it is moving</p>	<ul style="list-style-type: none"> <li>• Each atom takes up space, has mass and is in constant motion. Mass is the amount of matter in an object. Elements are a class of substances composed of a single kind of atom. Molecules are the combination of two or more atoms that are joined together chemically. Compounds are composed of two or more different elements. Each element and compound has properties, which are independent of the amount of the sample</li> <li>• When substances undergo changes of state, neither atoms nor molecules themselves are changed in structure. Thermal energy is a measure of the motion of the atoms and molecules in a substance. Mass is conserved when substances undergo changes of state</li> <li>• Objects and substances in motion have kinetic energy. Objects and substances can have energy as a result of their position (potential energy).</li> <li>• An object's position and speed can be measured and graphed as a function of time.</li> </ul>

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