

# Haddon Township School District

## Curriculum Overview

**Subject Area: Science**

**Grade Level: 7th Grade**

**Course Name:**

**Course Overview/Description:**

Unit Title	Unit Summary	Student Learning Targets
Structure and Properties of Matter	<p>Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level account to explain states of matter and changes between states. The crosscutting concepts of cause and effect, scale, proportion and quantity, structure and function, interdependence of science, engineering, and technology, as well as the influence of science, engineering and technology on society and the natural world, provide a framework for understanding the disciplinary core ideas.</p> <p>Students demonstrate grade-appropriate proficiency in developing and using models, and obtaining, evaluating, and communicating information.</p> <p>Students are also expected to use the scientific and engineering practices to demonstrate understanding</p>	<ul style="list-style-type: none"><li>• Develop models to describe the atomic composition of simple molecules and extended structures. (MS-PS1-1)</li><li>• Analyze and interpret data on properties before and after the substances interact to determine if a chemical reactions has occurred. (MS-PS1-2)</li></ul>

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	of the core ideas.	
Interactions of Matter	<p>Students build understandings of what occurs at the atomic and molecular scale. Students apply their understanding that pure substances have characteristic properties and are made from a single type of atom or molecule. They also provide a molecular level account to explain states of matter and changes between states. The crosscutting concepts of cause and effect, scale, proportion and quantity, structure and function, interdependence of science, engineering, and technology, as well as the influence of science, engineering and technology on society and the natural world, provide a framework for understanding the disciplinary core ideas. Students demonstrate grade-appropriate proficiency in developing and using models, and obtaining, evaluating, and communicating information. Students are also expected to use the scientific and engineering practices to demonstrate understanding of the core ideas. Note: This unit builds on Unit 1: Structure and Properties of Matter and will focus primarily on the formation of synthetic materials from natural resources and on changes to particles when thermal energy is added or removed (modeling phase changes).</p>	<ul style="list-style-type: none"> <li>● Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. (MS-PS1-3)</li> <li>● Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. (MS-PS1-4)</li> </ul>
Chemical Reactions	<p>How do substances combine or change (react) to make new substances? Students provide molecular-level accounts of states of matters and changes between states, of how chemical reactions involve regrouping of atoms to form new substances, and of how atoms rearrange during chemical reactions. Students also apply their</p>	<ul style="list-style-type: none"> <li>● Develop and use a model to describe how the total number of atoms does not change in a chemical reactions and thus mass is conserved. (MS-PS1-5)</li> <li>● Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.</li> </ul>

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	<p>understanding of optimization design and process in engineering to chemical reaction systems. The crosscutting concept of energy and matter provides a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in developing and using models, analyzing and interpreting data, designing solutions, and obtaining, evaluating, and communicating information. Students are also expected to use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.</p>	<p>(MS-PS1-6)</p> <ul style="list-style-type: none"> <li>● Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)</li> </ul>
<p>Structure and Function</p>	<p>Students demonstrate age appropriate abilities to plan and carry out investigations to develop evidence that living organisms are made of cells. Students gather information to support explanations of the relationship between structure and function in cells. They are able to communicate an understanding of cell theory and understand that all organisms are made of cells. Students understand that special structures are responsible for particular functions in organisms. They then are able to use their understanding of cell theory to develop and use physical and conceptual models of cells. The crosscutting concepts of scale, proportion, and quantity and structure and function provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in planning and carrying out investigations, analyzing and interpreting data, and developing and using models, Students are also expected to use these to use these science and engineering practices to demonstrate understanding</p>	<ul style="list-style-type: none"> <li>● Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1)</li> <li>● Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function. (MS-LS1-2)</li> </ul>

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	of the disciplinary core ideas.	
Body Systems	<p>Students develop a basic understanding of the role of cells in body systems and how those systems work to support the life functions of the organism. Students will construct explanations for the interactions of systems in cells and organisms. Students understand that special structures are responsible for particular functions in organisms, and that for many organisms, the body is a system of multiple-interaction subsystems that form a hierarchy, from cells to the body. Students construct explanations for the interactions of systems in cells and organisms and for how organisms gather and use information from the environment. The crosscutting concepts of systems and system models and cause and effect provide a framework for understanding the disciplinary core ideas. Students are expected to demonstrate proficiency in engaging in argument from evidence and obtaining, evaluating, and communicating information. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.</p>	<ul style="list-style-type: none"> <li>● Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3)</li> <li>● Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8)</li> </ul>
Inheritance and Variation of Traits	<p>Students develop and use models to describe how gene mutations and sexual reproduction contribute to genetic variation. Students understand how genetic factors determine the growth of an individual organism. They also demonstrate understanding of the genetic implications of sexual and asexual reproduction. The crosscutting concepts of cause and effect and structure and function provide a framework for understanding how gene structure</p>	<ul style="list-style-type: none"> <li>● 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. (MS-LS3-1)</li> <li>● Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and</li> </ul>

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	<p>determines differences in the functioning of organisms. Students are expected to demonstrate proficiency in developing and using models. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.</p>	<p>sexual reproduction results in offspring with genetic variation. (MS-LS3-2)</p>
<p>Organization for Matter and Energy Flow in Organisms</p>	<p>Students provide a mechanistic account for how cells provide a structure for the plant process of photosynthesis in the movement of matter and energy needed for the cell. Students use conceptual and physical models to explain the transfer of energy and cycling of matter as they construct explanations for the role of photosynthesis in cycling matter in ecosystems. They construct scientific explanations for the cycling of matter in organisms and the interactions of organisms to obtain matter and energy from an ecosystem to survive and grow. They understand that sustaining life requires substantial energy and matter inputs, and that the structure and functions of organisms contribute to the capture, transformation, transport, release, and elimination of matter and energy. The crosscutting concepts of matter and energy and structure and function provide a framework for understanding of the cycling of matter and energy flow into and out of organisms. Students are also expected to demonstrate proficiency in developing and using models. Students use these science and engineering practices to demonstrate understanding of the disciplinary core ideas.</p>	<ul style="list-style-type: none"> <li>● 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. (MS-LS1-6)</li> <li>● 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. (MS-LS1-7)</li> </ul>

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<p>Evidence of Common Ancestry</p>	<p>In this unit of study, students analyze graphical displays and gather evidence from multiple sources in order to develop an understanding of how fossil records and anatomical similarities of the relationships among organisms and species describe biological evolution. Students search for patterns in the evidence to support their understanding of the fossil record and how those patterns show relationships between modern organisms and their common ancestors. The crosscutting concepts of cause and effect, patterns, and structure and function are called out as organizing concepts for these disciplinary core ideas. Students use the practices of analyzing graphical displays and gathering, reading, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas.</p>	<ul style="list-style-type: none"><li>● Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. (MS-LS4-1)</li><li>● Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. (MS-LS4-2)</li><li>● Analyze displays of pictorial data to compare patterns of similarities in the embryological development across the multiple species to identify relationships not evident in the fully form anatomy. (MS-LS4-3)</li></ul>
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