

**East Newark Public School**  
**Science Curriculum**  
**Grade 8**



# 8th Grade Science Curriculum

EAST NEWARK PUBLIC SCHOOL

## Course Description

The East Newark Public School eighth grade science program is designed to introduce and develop a foundation in science through five major units of study. Students will gain an understanding of many important areas of the Life, Earth and Physical Sciences, and will utilize and understand scientific processes.

## Course Resources

1. Next Generation Science Standards:
  - Physical Science: <http://www.nextgenscience.org/file/3886/download?token=DgiPGjif>
  - Life Science: <http://www.nextgenscience.org/file/3751/download?token=l9tt2Yaw>
  - Earth & Space Science: <http://www.nextgenscience.org/file/3221/download?token=SbGEGsSFG>
2. Engineering Design <http://www.nextgenscience.org/file/3196/download?token=N-IGFy6h>
3. Integrated iScience Course 3, McGraw Hill, Copyright 2012, ConnectEd online textbook resources
4. New Jersey Center for Teaching & Learning (NJCTL) <https://njctl.org/courses/science/>

## Pacing Guide

Unit	Unit Title	Topics Covered	Standards	Resources
1	Heredity and Human Body Systems	<ul style="list-style-type: none"> <li>• Interactions of Human Body Systems</li> <li>• Heredity and How Traits Change</li> </ul>	MS-LS1-2 MS-LS1-3 MS-LS1-4 MS-LS1-5	iScience (Owl)
2	Motion and Energy	<ul style="list-style-type: none"> <li>• Describing Motion</li> <li>• The Laws of Motion</li> <li>• Energy, Work, and Simple Machines</li> <li>• Sound and Light</li> </ul>	MS-PS2-1 MS-PS2-2 MS-PS2-4 MS-PS2-5 MS-PS3-1 MS-PS3-4	iScience (Owl)
3	Interactions of Matter	<ul style="list-style-type: none"> <li>• Thermal Energy</li> <li>• States of Matter</li> <li>• Understanding the Atom</li> <li>• Elements and Chemical Bonds</li> <li>• Chemical Reactions and Equations</li> <li>• Mixtures, Solubility, and Acid/Base Solutions</li> </ul>	MS-PS1-1 MS-PS1-2 MS-PS1-4 MS-PS1-5	iScience (Owl)
4	Understanding the Universe	<ul style="list-style-type: none"> <li>• The Solar System</li> <li>• Stars and Galaxies</li> </ul>	MS-ESS1-4 MS-ESS2-1 MS-ESS2-2 MS-ESS2-3	iScience (Owl)
5	Earth and Geologic Changes	<ul style="list-style-type: none"> <li>• Minerals and Rocks</li> <li>• Plate Tectonics</li> <li>• Earthquakes and Volcanoes</li> <li>• Clues to Earth's Past</li> <li>• Geologic Time</li> </ul>	MS-ESS1-4 MS-ESS2-1 MS-ESS2-2 MS-ESS2-3	iScience (Owl)

## Unit 1: Heredity and Human Body Systems

<b>Timeframe</b>	September-November
<b>Overview</b>	Students demonstrate age appropriate abilities to plan and carry out investigations to develop evidence that inheritance and human body systems are based on traits. During this unit students will build on the previous years knowledge of the human body's systems and how they function.
<b>Resources</b>	<ul style="list-style-type: none"> <li>● iScience Online &amp; Digital Texts</li> <li>● iScience Materials</li> <li>● Chapter 21 - Lesson 1-2</li> <li>● Chapter 22 - Lesson 1-3</li> </ul>
<b>Essential Questions</b>	<ol style="list-style-type: none"> <li>1. How do human body systems interact and support life?</li> <li>2. How do species adapt to a new environment over time?</li> </ol>
<b>Essential Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Students will identify the functions and the properties of inorganic and organic materials within the human body system.</li> <li>2. Students will explore the how the many systems of the human body function together.</li> <li>3. Students will learn and be able to explain why scientists study genetics and how traits are inherited.</li> </ol>
<b>Technology Infusion</b>	<ul style="list-style-type: none"> <li>● 8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools. Select and use applications effectively and productively.</li> <li>● 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications.</li> <li>● 8.1.8.A.3 Use and/or develop a simulation that solves or supports a real world problem or theory.</li> <li>● 8.1.8.A.4 Graph and calculate data within a spreadsheet and summarize the results</li> </ul>
<b>Standards</b>	<ul style="list-style-type: none"> <li>● <b>MS-LS1-2:</b> Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.</li> <li>● <b>MS-LS1-3:</b> Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.</li> <li>● <b>MS-LS1-4:</b> Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.</li> <li>● <b>MS-LS1-5:</b> Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</li> </ul>
<b>Integrated Accommodations and Modifications</b>	<ul style="list-style-type: none"> <li>● <b>Special Education Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>English Language Learners</b> <ul style="list-style-type: none"> <li>○ Invite students to explore different points of view on a topic of study and compare.</li> <li>○ Device used for translation purposes</li> </ul> </li> <li>● <b>504 Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>Gifted &amp; Talented Students</b></li> </ul>

	<ul style="list-style-type: none"> <li>o Encourage students to explore concepts in depth and encourage independent studies or investigations.</li> <li>o Modeling or independent student led research</li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>• Simulation tasks and peer review</li> <li>• Formal Assessments by way of tests and quizzes</li> <li>• Multimedia presentation</li> <li>• Writing prompts</li> <li>• Vocabulary quizzes</li> <li>• Formative assessments in the form of quizzes, class participation, discussion, topic blogging, and/or journaling</li> </ul>
<b>Integration of 21st Century Learning Skills</b>	<ul style="list-style-type: none"> <li>• 9.2.8.B.1 Research careers within the 16 Career Clusters and determine attributes of career success.</li> <li>• 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> <li>• 9.2.8.B.6 Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.</li> <li>• 9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.</li> <li>• CRP1. Act as a responsible and contributing citizen and employee.</li> <li>• CRP2. Apply appropriate academic and technical skills.</li> <li>• CRP4. Communicate clearly and effectively and with reason.</li> <li>• CRP5. Consider the environmental, social and economic impacts of decisions.</li> <li>• CRP6. Demonstrate creativity and innovation.</li> <li>• CRP7: Employ valid and reliable research strategies.</li> <li>• CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>• CRP9. Model integrity, ethical leadership and effective management.</li> <li>• CRP10. Plan education and career paths aligned to personal goals.</li> <li>• CRP11: Use technology to enhance productivity.</li> </ul>
<b>Career Education</b>	<p>The 12 Career Ready Practices: These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness. This unit addresses standard 9.2 (Career Awareness, Exploration, and Preparation) as it outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p>
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>• The science curriculum includes unifying themes such as systems, changes, and models. These themes combine with connected skills such as using measurement and representations. These themes and skills, along with the shared processes of observing and predicting, provide teachers with a myriad of opportunities for making meaningful cross-curricular connections.</li> <li>• For example, investigations of local issues can engage students in thinking about science and social science concepts and help develop their understanding of probability and data analysis, which are part of the mathematics standards. Learning, understanding, and using scientific vocabulary allows students to connect their ideas to content specific words and phrases. Students must understand appropriate levels of scientific terminology to be able to achieve the lesson objectives. In addition, teachers may use journals, writing prompts, lab reports, and outlines to provide students with opportunities to write in the science classroom.</li> </ul>

## Unit 2: Motion and Energy

<b>Timeframe</b>	September-November
<b>Overview</b>	Students build on previous knowledge to further understand the laws of motion, gravity, and how objects interact and transfer energy.
<b>Resources</b>	<ul style="list-style-type: none"> <li>● iScience Online &amp; Digital Texts</li> <li>● iScience Materials</li> <li>● Chapter 1 - Lesson 1-3</li> <li>● Chapter 2 - Lesson 1-4</li> <li>● Chapter 3 - Lesson 1-3</li> <li>● Chapter 4 - Lesson 1-3</li> </ul>
<b>Essential Questions</b>	<ol style="list-style-type: none"> <li>1. What are some ways to describe motion?</li> <li>2. How do forces change the motion of objects?</li> <li>3. How does energy cause change?</li> <li>4. How do sound and light waves travel and interact with matter?</li> </ol>
<b>Essential Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Describe the difference between distance and displacement.</li> <li>2. Accurately describe an object's position using a reference point.</li> <li>3. Define speed and use a distance-time graph to calculate average speed.</li> <li>4. Explain ways that velocity changes.</li> <li>5. Describe three ways that an object can accelerate.</li> <li>6. List contact and noncontact forces.</li> <li>7. Describe how friction affects the motion of objects sliding past each other.</li> <li>8. Explain Newton's laws of motion.</li> <li>9. Describe the effect of inertia on the motion of an object.</li> <li>10. Define energy, describe the different forms of energy and explain how energy is used.</li> <li>11. Understand the law of conservation of energy and explain how energy can be transformed.</li> <li>12. Understand the relationship between energy and work.</li> <li>13. Describe examples of simple machines and explain how they make work easier.</li> <li>14. Describe how sound waves are produced, and why the speed of sound waves varies depending on the material.</li> <li>15. Differentiate between light waves and sound waves.</li> <li>16. Explain what happens to light waves when they interact with matter.</li> <li>17. Differentiate between regular and diffuse reflection.</li> <li>18. Describe the images formed by mirrors and lenses.</li> <li>19. Explain how the human eye enables a person to see.</li> </ol>
<b>Technology Infusion</b>	<ul style="list-style-type: none"> <li>● 8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools. Select and use applications effectively and productively.</li> <li>● 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications.</li> <li>● 8.1.8.A.3 Use and/or develop a simulation that solves or supports a real world problem or theory.</li> <li>● 8.1.8.A.4 Graph and calculate data within a spreadsheet and summarize the results</li> </ul>
<b>Standards</b>	<ul style="list-style-type: none"> <li>● <b>MS-PS2-1:</b> Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.</li> <li>● <b>MS-PS2-2:</b> Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.</li> <li>● <b>MS-PS2-4:</b> Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.</li> <li>● <b>MS-PS2-5:</b> Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the</li> </ul>

	<p>objects are not in contact.</p> <ul style="list-style-type: none"> <li>● <b>MS-PS3-1:</b> Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.</li> <li>● <b>MS-PS3-4:</b> Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.</li> </ul>
<p><b>Integrated Accommodations and Modifications</b></p>	<ul style="list-style-type: none"> <li>● <b>Special Education Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>English Language Learners</b> <ul style="list-style-type: none"> <li>○ Invite students to explore different points of view on a topic of study and compare.</li> <li>○ Device used for translation purposes</li> </ul> </li> <li>● <b>504 Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>Gifted &amp; Talented Students</b> <ul style="list-style-type: none"> <li>○ Encourage students to explore concepts in depth and encourage independent studies or investigations.</li> <li>○ Modeling or independent student led research</li> </ul> </li> </ul>
<p><b>Assessments</b></p>	<ul style="list-style-type: none"> <li>● Simulation tasks and peer review</li> <li>● Formal Assessments by way of tests and quizzes</li> <li>● Multimedia presentation</li> <li>● Writing prompts</li> <li>● Vocabulary quizzes</li> <li>● Formative assessments in the form of quizzes, class participation, discussion, topic blogging, and/or journaling</li> </ul>
<p><b>Integration of 21st Century Learning Skills</b></p>	<ul style="list-style-type: none"> <li>● 9.2.8.B.1 Research careers within the 16 Career Clusters and determine attributes of career success.</li> <li>● 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> <li>● 9.2.8.B.6 Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.</li> <li>● 9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.</li> <li>● CRP1. Act as a responsible and contributing citizen and employee.</li> <li>● CRP2. Apply appropriate academic and technical skills.</li> <li>● CRP4. Communicate clearly and effectively and with reason.</li> <li>● CRP5. Consider the environmental, social and economic impacts of decisions.</li> <li>● CRP6. Demonstrate creativity and innovation.</li> <li>● CRP7: Employ valid and reliable research strategies.</li> <li>● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>● CRP9. Model integrity, ethical leadership and effective management.</li> <li>● CRP10. Plan education and career paths aligned to personal goals.</li> <li>● CRP11: Use technology to enhance productivity.</li> </ul>

<b>Career Education</b>	The 12 Career Ready Practices: These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness. This unit addresses standard 9.2 (Career Awareness, Exploration, and Preparation) as it outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"><li>• The science curriculum includes unifying themes such as systems, changes, and models. These themes combine with connected skills such as using measurement and representations. These themes and skills, along with the shared processes of observing and predicting, provide teachers with a myriad of opportunities for making meaningful cross-curricular connections.</li><li>• For example, investigations of local issues can engage students in thinking about science and social science concepts and help develop their understanding of probability and data analysis, which are part of the mathematics standards. Learning, understanding, and using scientific vocabulary allows students to connect their ideas to content specific words and phrases. Students must understand appropriate levels of scientific terminology to be able to achieve the lesson objectives. In addition, teachers may use journals, writing prompts, lab reports, and outlines to provide students with opportunities to write in the science classroom.</li></ul>



### Unit 3: Interactions of Matter

<b>Timeframe</b>	September-November
<b>Overview</b>	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 use molecule motion 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, and 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.
<b>Resources</b>	<ul style="list-style-type: none"> <li>● iScience Online &amp; Digital Texts</li> <li>● iScience Materials</li> <li>● Chapter 5 - Lesson 1-2</li> <li>● Chapter 6 - Lesson 1-3</li> <li>● Chapter 7 - Lesson 1-2</li> <li>● Chapter 8 - Lesson 1-3</li> <li>● Chapter 9 - Lesson 1-3</li> <li>● Chapter 10 - Lesson 1-3</li> </ul>
<b>Essential Questions</b>	<ol style="list-style-type: none"> <li>1. How can thermal energy be used?</li> <li>2. What physical changes and energy changes occur as matter goes from one state to another?</li> <li>3. What are atoms, and what are they made of?</li> <li>4. How do elements join together to form chemical compounds?</li> <li>5. What happens to atoms and energy during a chemical reaction?</li> <li>6. What are solutions, and how are they described?</li> </ol>
<b>Essential Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Explain how temperature and kinetic energy are related and explain how heat and thermal energy differ.</li> <li>2. Describe how thermal energy can be transferred and explain what happens to a material when it is heated.</li> <li>3. Describe the motion of particles and explain how the forces between those particles are different in solids, liquids, and gases.</li> <li>4. Differentiate between temperature and thermal energy and describe how temperature is related to particle motion.</li> <li>5. Explain the behavior of gases using Boyle's Law and Charles's Law.</li> <li>6. Define atom, describe the size of an atom, and describe how the atomic model has changed over time.</li> <li>7. Explain how an atom changes when its number of protons, electrons, or neutrons change.</li> <li>8. Understand what happens during nuclear decay.</li> <li>9. Explain why atoms gain, lose, or share electrons and understand how an electron's energy is related to its distance from the nucleus.</li> <li>10. Analyze how elements differ from the compounds they create.</li> <li>11. Differentiate between covalent, ionic, and metallic bonds.</li> <li>12. Explain what happens to atoms and the total mass during a chemical reaction and list some signs that a chemical reaction might have occurred.</li> <li>13. Describe different types of chemical reactions and explain how you can recognize the type of chemical reaction by the number or type of reactants and products.</li> <li>14. Differentiate between endothermic and exothermic reactions.</li> <li>15. List factors that can affect the rate of a chemical reaction.</li> <li>16. Describe how substances and mixtures differ and compare and contrast solutions, heterogeneous mixtures, and compounds.</li> </ol>

	<p>17. Explain why some substances dissolve in water and others do not.</p> <p>18. Understand the difference between solute and solvent.</p> <p>19. Describe how to measure the pH of a substance and describe what happens when acids and bases dissolve in water.</p>
<b>Technology Infusion</b>	<ul style="list-style-type: none"> <li>● 8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools. Select and use applications effectively and productively.</li> <li>● 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications.</li> <li>● 8.1.8.A.3 Use and/or develop a simulation that solves or supports a real world problem or theory.</li> <li>● 8.1.8.A.4 Graph and calculate data within a spreadsheet and summarize the results</li> </ul>
<b>Standards</b>	<ul style="list-style-type: none"> <li>● <b>MS-PS1-1:</b> Develop models to describe the atomic composition of simple molecules and extended structures.</li> <li>● <b>MS-PS1-2:</b> Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.</li> <li>● <b>MS-PS1-4:</b> 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.</li> <li>● <b>MS-PS1-5:</b> Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</li> </ul>
<b>Integrated Accommodations and Modifications</b>	<ul style="list-style-type: none"> <li>● <b>Special Education Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>English Language Learners</b> <ul style="list-style-type: none"> <li>○ Invite students to explore different points of view on a topic of study and compare.</li> <li>○ Device used for translation purposes</li> </ul> </li> <li>● <b>504 Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>Gifted &amp; Talented Students</b> <ul style="list-style-type: none"> <li>○ Encourage students to explore concepts in depth and encourage independent studies or investigations.</li> <li>○ Modeling or independent student led research</li> </ul> </li> </ul>
<b>Assessments</b>	<ul style="list-style-type: none"> <li>● Simulation tasks and peer review</li> <li>● Formal Assessments by way of tests and quizzes</li> <li>● Multimedia presentation</li> <li>● Writing prompts</li> <li>● Vocabulary quizzes</li> <li>● Formative assessments in the form of quizzes, class participation, discussion, topic blogging, and/or journaling</li> </ul>
<b>Integration of 21st Century Learning Skills</b>	<ul style="list-style-type: none"> <li>● 9.2.8.B.1 Research careers within the 16 Career Clusters and determine attributes of career success.</li> <li>● 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> <li>● 9.2.8.B.6 Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.</li> </ul>

	<ul style="list-style-type: none"> <li>● 9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.</li> <li>● CRP1. Act as a responsible and contributing citizen and employee.</li> <li>● CRP2. Apply appropriate academic and technical skills.</li> <li>● CRP4. Communicate clearly and effectively and with reason.</li> <li>● CRP5. Consider the environmental, social and economic impacts of decisions.</li> <li>● CRP6. Demonstrate creativity and innovation.</li> <li>● CRP7: Employ valid and reliable research strategies.</li> <li>● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>● CRP9. Model integrity, ethical leadership and effective management.</li> <li>● CRP10. Plan education and career paths aligned to personal goals.</li> <li>● CRP11: Use technology to enhance productivity.</li> </ul>
<p><b>Career Education</b></p>	<p>The 12 Career Ready Practices: These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness. This unit addresses standard 9.2 (Career Awareness, Exploration, and Preparation) as it outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p>
<p><b>Interdisciplinary Connections</b></p>	<ul style="list-style-type: none"> <li>● The science curriculum includes unifying themes such as systems, changes, and models. These themes combine with connected skills such as using measurement and representations. These themes and skills, along with the shared processes of observing and predicting, provide teachers with a myriad of opportunities for making meaningful cross-curricular connections.</li> <li>● For example, investigations of local issues can engage students in thinking about science and social science concepts and help develop their understanding of probability and data analysis, which are part of the mathematics standards. Learning, understanding, and using scientific vocabulary allows students to connect their ideas to content specific words and phrases. Students must understand appropriate levels of scientific terminology to be able to achieve the lesson objectives. In addition, teachers may use journals, writing prompts, lab reports, and outlines to provide students with opportunities to write in the science classroom.</li> </ul>

## Unit 4: Understanding the Universe

<b>Timeframe</b>	February-April
<b>Overview</b>	Students will build on their astrological knowledge and examine various laws and functions of physical science and relate them to the principles that will help them gain new perspective about our universe.
<b>Resources</b>	<ul style="list-style-type: none"> <li>● iScience Online &amp; Digital Texts</li> <li>● iScience Materials</li> <li>● Chapter 11 - Lesson 1-3</li> <li>● Chapter 12 - Lesson 2-4</li> </ul>
<b>Essential Questions</b>	<ol style="list-style-type: none"> <li>1. What kinds of objects are in the solar system?</li> <li>2. What makes up the universe, and how does gravity affect the universe?</li> </ol>
<b>Essential Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Compare and contrast the inner planets and the outer planets.</li> <li>2. Describe how scientists classify stars, explain how stars shine, how they are layered, how they form, how mass affects their evolution, and how star matter is recycled in space.</li> </ol>
<b>Technology Infusion</b>	<ul style="list-style-type: none"> <li>● 8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools. Select and use applications effectively and productively.</li> <li>● 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications.</li> <li>● 8.1.8.A.3 Use and/or develop a simulation that solves or supports a real world problem or theory.</li> <li>● 8.1.8.A.4 Graph and calculate data within a spreadsheet and summarize the results</li> </ul>
<b>Standards</b>	<ul style="list-style-type: none"> <li>● <b>MS-ESS1-4:</b> Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history.</li> <li>● <b>MS-ESS2-1:</b> Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.</li> <li>● <b>MS-ESS2-2:</b> Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.</li> <li>● <b>MS-ESS2-3:</b> Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.</li> </ul>
<b>Integrated Accommodations and Modifications</b>	<ul style="list-style-type: none"> <li>● <b>Special Education Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>English Language Learners</b> <ul style="list-style-type: none"> <li>○ Invite students to explore different points of view on a topic of study and compare.</li> <li>○ Device used for translation purposes</li> </ul> </li> <li>● <b>504 Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>Gifted &amp; Talented Students</b> <ul style="list-style-type: none"> <li>○ Encourage students to explore concepts in depth and encourage independent studies or investigations.</li> <li>○ Modeling or independent student led research</li> </ul> </li> </ul>

<b>Assessments</b>	<ul style="list-style-type: none"> <li>● Simulation tasks and peer review</li> <li>● Formal Assessments by way of tests and quizzes</li> <li>● Multimedia presentation</li> <li>● Writing prompts</li> <li>● Vocabulary quizzes</li> <li>● Formative assessments in the form of quizzes, class participation, discussion, topic blogging, and/or journaling</li> </ul>
<b>Integration of 21st Century Learning Skills</b>	<ul style="list-style-type: none"> <li>● 9.2.8.B.1 Research careers within the 16 Career Clusters and determine attributes of career success.</li> <li>● 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> <li>● 9.2.8.B.6 Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.</li> <li>● 9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.</li> <li>● CRP1. Act as a responsible and contributing citizen and employee.</li> <li>● CRP2. Apply appropriate academic and technical skills.</li> <li>● CRP4. Communicate clearly and effectively and with reason.</li> <li>● CRP5. Consider the environmental, social and economic impacts of decisions.</li> <li>● CRP6. Demonstrate creativity and innovation.</li> <li>● CRP7: Employ valid and reliable research strategies.</li> <li>● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>● CRP9. Model integrity, ethical leadership and effective management.</li> <li>● CRP10. Plan education and career paths aligned to personal goals.</li> <li>● CRP11: Use technology to enhance productivity.</li> </ul>
<b>Career Education</b>	<p>The 12 Career Ready Practices: These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness. This unit addresses standard 9.2 (Career Awareness, Exploration, and Preparation) as it outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.</p>
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"> <li>● The science curriculum includes unifying themes such as systems, changes, and models. These themes combine with connected skills such as using measurement and representations. These themes and skills, along with the shared processes of observing and predicting, provide teachers with a myriad of opportunities for making meaningful cross-curricular connections.</li> <li>● For example, investigations of local issues can engage students in thinking about science and social science concepts and help develop their understanding of probability and data analysis, which are part of the mathematics standards. Learning, understanding, and using scientific vocabulary allows students to connect their ideas to content specific words and phrases. Students must understand appropriate levels of scientific terminology to be able to achieve the lesson objectives. In addition, teachers may use journals, writing prompts, lab reports, and outlines to provide students with opportunities to write in the science classroom.</li> </ul>

## Unit 5: Earth and Geologic Changes

<b>Timeframe</b>	February-April
<b>Overview</b>	Students will examine the geological past of the Earth and the organisms that inhabit it, and uncover the stories that these features reveal about the history of our planet.
<b>Resources</b>	<ul style="list-style-type: none"> <li>● iScience Online &amp; Digital Texts</li> <li>● iScience Materials</li> <li>● Chapter 13 - Lesson 1-3</li> <li>● Chapter 14 - Lesson 1-3</li> <li>● Chapter 15 - Lesson 1-2</li> <li>● Chapter 16 - Lesson 1-2</li> <li>● Chapter 17 - Lesson 1-4</li> </ul>
<b>Essential Questions</b>	<ol style="list-style-type: none"> <li>1. How are minerals and rocks formed, identified, classified, and used?</li> <li>2. What is the theory of plate tectonics?</li> <li>3. What causes earthquakes and volcanic eruptions?</li> <li>4. What evidence do scientists use to determine the ages of rocks?</li> <li>5. What have scientists learned about Earth's past by studying rocks and fossils?</li> </ol>
<b>Essential Learning Outcomes</b>	<ol style="list-style-type: none"> <li>1. Understand how minerals form, how they are used, and how they can be identified.</li> <li>2. List characteristics that can be used to classify rocks.</li> <li>3. Explain how the different types of rocks form, and how they are used in everyday life.</li> <li>4. Create a model to describe how surface processes contribute to the rock cycle, and explain how the rock cycle relates to plate tectonics.</li> <li>5. List evidence to support the idea of continental drift.</li> <li>6. Explain the concept of seafloor spreading and create a diagram that includes evidence to support the explanation.</li> <li>7. Describe the theory of plate tectonics, differentiate between the three types of plate boundaries, and explain the cause of tectonic plate movement.</li> <li>8. Describe what an earthquake is, where they occur and how scientists monitor earthquake activity.</li> <li>9. Explain how volcanoes form, what factors contribute to the type of eruption, and how volcanoes are classified.</li> <li>10. Understand what a fossil is, how it forms, and how they can reveal information about Earth's past.</li> <li>11. Define relative age and describe how the positions of rock layers determine the relative age of rocks.</li> <li>12. Explain how the geologic time scale was developed.</li> <li>13. List some causes of mass extinction and explain how evolution is affected by environmental changes.</li> <li>14. Describe major events of the Paleozoic, Mesozoic, and Cenozoic eras and relate how fossils were used as evidence for these events.</li> </ol>
<b>Technology Infusion</b>	<ul style="list-style-type: none"> <li>● 8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools. Select and use applications effectively and productively.</li> <li>● 8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications.</li> <li>● 8.1.8.A.3 Use and/or develop a simulation that solves or supports a real world problem or theory.</li> <li>● 8.1.8.A.4 Graph and calculate data within a spreadsheet and summarize the results</li> </ul>
<b>Standards</b>	<ul style="list-style-type: none"> <li>● <b>MS-ESS1-4:</b> Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6 billion-year-old history.</li> <li>● <b>MS-ESS2-1:</b> Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.</li> </ul>



	<ul style="list-style-type: none"> <li>● <b>MS-ESS2-2:</b> Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.</li> <li>● <b>MS-ESS2-3:</b> Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.</li> </ul>
<p><b>Integrated Accommodations and Modifications</b></p>	<ul style="list-style-type: none"> <li>● <b>Special Education Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>English Language Learners</b> <ul style="list-style-type: none"> <li>○ Invite students to explore different points of view on a topic of study and compare.</li> <li>○ Device used for translation purposes</li> </ul> </li> <li>● <b>504 Students</b> <ul style="list-style-type: none"> <li>○ Provide graphic organizers for additional support or encourage students to create digital multimedia to showcase knowledge.</li> <li>○ Extended time for revisions or opportunity to identify and develop areas of personal interest</li> </ul> </li> <li>● <b>Gifted &amp; Talented Students</b> <ul style="list-style-type: none"> <li>○ Encourage students to explore concepts in depth and encourage independent studies or investigations.</li> <li>○ Modeling or independent student led research</li> </ul> </li> </ul>
<p><b>Assessments</b></p>	<ul style="list-style-type: none"> <li>● Simulation tasks and peer review</li> <li>● Formal Assessments by way of tests and quizzes</li> <li>● Multimedia presentation</li> <li>● Writing prompts</li> <li>● Vocabulary quizzes</li> <li>● Formative assessments in the form of quizzes, class participation, discussion, topic blogging, and/or journaling</li> </ul>
<p><b>Integration of 21st Century Learning Skills</b></p>	<ul style="list-style-type: none"> <li>● 9.2.8.B.1 Research careers within the 16 Career Clusters and determine attributes of career success.</li> <li>● 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.</li> <li>● 9.2.8.B.6 Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.</li> <li>● 9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.</li> <li>● CRP1. Act as a responsible and contributing citizen and employee.</li> <li>● CRP2. Apply appropriate academic and technical skills.</li> <li>● CRP4. Communicate clearly and effectively and with reason.</li> <li>● CRP5. Consider the environmental, social and economic impacts of decisions.</li> <li>● CRP6. Demonstrate creativity and innovation.</li> <li>● CRP7: Employ valid and reliable research strategies.</li> <li>● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.</li> <li>● CRP9. Model integrity, ethical leadership and effective management.</li> <li>● CRP10. Plan education and career paths aligned to personal goals.</li> <li>● CRP11: Use technology to enhance productivity.</li> </ul>

<b>Career Education</b>	The 12 Career Ready Practices: These practices outline the skills that all individuals need to have to truly be adaptable, reflective, and proactive in life and careers. These are researched practices that are essential to career readiness. This unit addresses standard 9.2 (Career Awareness, Exploration, and Preparation) as it outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.
<b>Interdisciplinary Connections</b>	<ul style="list-style-type: none"><li>• The science curriculum includes unifying themes such as systems, changes, and models. These themes combine with connected skills such as using measurement and representations. These themes and skills, along with the shared processes of observing and predicting, provide teachers with a myriad of opportunities for making meaningful cross-curricular connections.</li><li>• For example, investigations of local issues can engage students in thinking about science and social science concepts and help develop their understanding of probability and data analysis, which are part of the mathematics standards. Learning, understanding, and using scientific vocabulary allows students to connect their ideas to content specific words and phrases. Students must understand appropriate levels of scientific terminology to be able to achieve the lesson objectives. In addition, teachers may use journals, writing prompts, lab reports, and outlines to provide students with opportunities to write in the science classroom.</li></ul>