

**Brigantine Public School District**

Science Curriculum

ENGAGING STUDENTS • FOSTERING ACHIEVEMENT • CULTIVATING 21<sup>ST</sup> CENTURY GLOBAL SKILLS

**Curriculum Design**

**Content Area: Science**

**Course Title: General Science**

**Grade Level: 8**

**Chemical Building Blocks**

**4 weeks**

**Chemistry in Action**

**4 weeks**

**Motion, Forces & Energy**

**4 weeks**

**Oceanography**

**4 weeks**

**Electricity /Magnetism**

**4 weeks**

**Earth's Structure**

**4 weeks**

**Earth's Resources/History**

**8 weeks**

**Meteorology**

**4 weeks**

**Astronomy**

**4 weeks**

**Date Created: July 2011**

**Board Approved on: August 25, 2011**

**Unit Overview**

**Content Area: Physical Science**

**Unit Title: Chemical Building Blocks**

**Target Course/Grade Level: 8<sup>th</sup> Grade**

**Unit Summary**

- All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.

**Primary interdisciplinary connections:**

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

**Learning Targets**

**Standards: 5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

**Content Statements**

- All matter is made of atoms. Matter made of only one type of atom is called an element.
- All substances are composed of one or more of approximately 100 elements.
- Properties of solids, liquids, and gases are explained by a model of matter as composed of tiny particles (atoms) in motion.
- The Periodic Table organizes the elements into families of elements with similar properties.
- Elements are a class of substances composed of a single kind of atom. Compounds are substances that are chemically formed and have physical and chemical properties that differ from the reacting substances.
- Substances are classified according to their physical and chemical properties. Metals are a class of elements that exhibit physical properties, such as conductivity, and chemical properties, such as producing salts when combined with nonmetals.
- Substances are classified according to their physical and chemical properties. Acids are a

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class of compounds that exhibit common chemical properties, including a sour taste, characteristic color changes with litmus and other acid/base indicators, and the tendency to react with bases to produce a salt and water.	
<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
5.2.8.A.1	Explain that all matter is made of atoms, and give examples of common elements.
5.2.8.A.2	Analyze and explain the implications of the statement “all substances are composed of elements.”
5.2.8.A.3	Use the kinetic molecular model to predict how solids, liquids, and gases would behave under various physical circumstances, such as heating or cooling.
5.2.8.A.4	Predict the physical and chemical properties of elements based on their positions on the Periodic Table.
5.2.8.A.5	Identify unknown substances based on data regarding their physical and chemical properties.
5.2.8.A.6	Determine whether a substance is a metal or nonmetal through student-designed investigations.
5.2.8.A.7	Determine the relative acidity and reactivity of common acids, such as vinegar or cream of tartar, through a variety of student-designed investigations.
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• How do the properties of materials determine their use?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• The structures of materials determine their properties.</li> </ul>
<b>Evidence of Learning</b>	
<b>Suggested Summative Assessment</b> <ul style="list-style-type: none"> <li>• NJ ASK 8</li> <li>• Unit exam</li> </ul>	
<b>Formative Assessments</b> <ul style="list-style-type: none"> <li>• <a href="http://www.njcccs.org">www.njcccs.org</a> Classroom Application Docs</li> <li>• Hands-on activities</li> <li>• Chapter tests</li> <li>• Performance assessments</li> <li>• Quizzes</li> <li>• Lab reports</li> </ul>	

**Unit Overview**

**Content Area: Physical Science**

**Unit Title: Chemistry in Action**

**Target Course/Grade Level: 8<sup>th</sup> Grade**

**Unit Summary**

- All objects and substances in the natural world are composed of matter. Matter has two fundamental properties: matter takes up space, and matter has inertia.
- Substances can undergo physical or chemical changes to form new substances. Each change involves energy.

**Primary interdisciplinary connections:**

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

**Learning Targets**

**Standards: 5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

**Content Statements**

- When substances undergo chemical change, the number and kinds of atoms in the reactants are the same as the number and kinds of atoms in the products. The mass of the reactants is the same as the mass of the products.
- Chemical changes can occur when two substances, elements, or compounds react and produce one or more different substances. The physical and chemical properties of the products are different from those of the reacting substances.
- Elements are a class of substances composed of a single kind of atom. Compounds are substances that are chemically formed and have physical and chemical properties that differ from the reacting substances.
- Substances are classified according to their physical and chemical properties. Acids are a class of compounds that exhibit common chemical properties, including a sour taste, characteristic

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color changes with litmus and other acid/base indicators, and the tendency to react with bases to produce a salt and water.	
<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
5.2.8.B.1	Explain, using an understanding of the concept of chemical change, why the mass of reactants and the mass of products remain constant.
5.2.8.B.2	Compare and contrast the physical properties of reactants with products after a chemical reaction, such as those that occur during photosynthesis and cellular respiration.
5.2.8.A.5	Identify unknown substances based on data regarding their physical and chemical properties.
5.2.8.A.7	Determine the relative acidity and reactivity of common acids, such as vinegar or cream of tartar, through a variety of student-designed investigations.
<b>Unit Essential Questions</b> <ul style="list-style-type: none"> <li>• How do the properties of materials determine their use?</li> <li>• How does conservation of mass apply to the interaction of materials in a closed system?</li> </ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"> <li>• The structures of materials determine their properties.</li> <li>• When materials interact within a closed system, the total mass of the system remains the same.</li> </ul>
<b>Evidence of Learning</b>	
<b>Suggested Summative Assessment</b> <ul style="list-style-type: none"> <li>• NJ ASK 8</li> <li>• Unit exam</li> </ul>	
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**Unit Overview**

**Content Area: Physical Science**

**Unit Title: Motion, Forces, and Energy**

**Target Course/Grade Level: 8<sup>th</sup> Grade**

**Unit Summary**

- Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.
- The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.
- It takes energy to change the motion of objects. The energy change is understood in terms of forces.
- The theory of plate tectonics provides a framework for understanding the dynamic processes within and on Earth

**Primary interdisciplinary connections:**

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

**Learning Targets**

**Standards: 5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

**5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

**Content Statements**

- A tiny fraction of the light energy from the Sun reaches Earth. Light energy from the Sun is Earth’s primary source of energy, heating Earth surfaces and providing the energy that

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results in wind, ocean currents, and storms.

- Energy is transferred from place to place. Light energy can be thought of as traveling in rays. Thermal energy travels via conduction and convection.
- When energy is transferred from one system to another, the quantity of energy before transfer equals the quantity of energy after transfer. As an object falls, its potential energy decreases as its speed, and consequently its kinetic energy, increases. While an object is falling, some of the object’s kinetic energy is transferred to the medium through which it falls, setting the medium into motion and heating it.
- Nuclear reactions take place in the Sun.
- In plants, light energy from the Sun is transferred to oxygen and carbon compounds, which in combination, have chemical potential energy (photosynthesis).
- An object is in motion when its position is changing. The speed of an object is defined by how far it travels divided by the amount of time it took to travel that far.
- Forces have magnitude and direction. Forces can be added. The net force on an object is the sum of all the forces acting on the object. An object at rest will remain at rest unless acted on by an unbalanced force. An object in motion at constant velocity will continue at the same velocity unless acted on by an unbalanced force.
- Earth’s magnetic field has north and south poles and lines of force that are used for navigation.

<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>				
5.2.8.C.1	Structure evidence to explain the relatively high frequency of tornadoes in “Tornado Alley.”				
5.2.8.C.2	Model and explain current technologies used to capture solar energy for the purposes of converting it to electrical energy.				
5.2.8.D.1	Relate the kinetic and potential energies of a roller coaster at various points on its path.				
5.2.8.D.2	Describe the flow of energy from the Sun to the fuel tank of an automobile.				
5.2.8.E.1	Calculate the speed of an object when given distance and time.				
5.2.8.E.2	Compare the motion of an object acted on by balanced forces with the motion of an object acted on by unbalanced forces in a given specific scenario.				
5.4.8.D.3	Explain why geomagnetic north and geographic north are at different locations.				
<table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;"><b>Unit Essential Questions</b></th> <th style="width: 50%;"><b>Unit Enduring Understandings</b></th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> <li>• How do we know that things have energy?</li> <li>• How can energy be transferred from one material to another? What happens to a material when energy is transferred to it?</li> </ul> </td> <td> <ul style="list-style-type: none"> <li>• Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy).</li> <li>• Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces.</li> </ul> </td> </tr> </tbody> </table>		<b>Unit Essential Questions</b>	<b>Unit Enduring Understandings</b>	<ul style="list-style-type: none"> <li>• How do we know that things have energy?</li> <li>• How can energy be transferred from one material to another? What happens to a material when energy is transferred to it?</li> </ul>	<ul style="list-style-type: none"> <li>• Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy).</li> <li>• Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces.</li> </ul>
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Different forces are responsible for the transfer of the different forms of energy.

**Evidence of Learning**

**Suggested Summative Assessment**

- NJ ASK 8
- Unit exam

**Formative Assessments**

- [www.njcccs.org](http://www.njcccs.org) Classroom Application Docs
- Hands-on activities
- Chapter tests
- Performance assessments
- Quizzes
- Lab reports



Unit Overview

Content Area: Physical Science

Unit Title: Oceanography

Target Course/Grade Level: 8<sup>th</sup> Grade

Unit Summary

- The theory of plate tectonics provides a framework for understanding the dynamic processes within and on Earth
- Internal and external sources of energy drive Earth systems.
- Earth’s weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere.
- The biogeochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity
- Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.

Primary interdisciplinary connections:

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

Learning Targets

**Standards: 5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

**5.2 Physical Science:** All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

**Content Statements**

- Water in the oceans holds a large amount of heat, and therefore significantly affects the global climate system.
- Investigations of environmental issues address underlying scientific causes and may inform possible solutions.
- The Sun provides energy for plants to grow and drives convection within the atmosphere and oceans, producing winds, ocean currents, and the water cycle.
- Weather (in the short term) and climate (in the long term) involve the transfer of energy and water in and out of the atmosphere.
- Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from the motion of plates. Sea floor spreading, revealed in mapping of the Mid-Atlantic Ridge, and subduction zones are evidence for the theory of plate tectonics.
- A tiny fraction of the light energy from the Sun reaches Earth. Light energy from the Sun is Earth’s primary source of energy, heating Earth surfaces and providing the energy that results in wind, ocean currents, and storms.

<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
5.4.8.G.1	Represent and explain, using sea surface temperature maps, how ocean currents impact the climate of coastal communities.
5.4.8.G.2	Investigate a local or global environmental issue by defining the problem, researching possible causative factors, understanding the underlying science, and evaluating the benefits and risks of alternative solutions.
5.2.8.C.1	Structure evidence to explain the relatively high frequency of tornadoes in “Tornado Alley.”
5.4.8.D.2	Present evidence to support arguments for the theory of plate motion.
5.4.8.E.1	Explain how energy from the Sun is transformed or transferred in global wind circulation, ocean circulation, and the water cycle.
5.4.8.F.3	Create a model of the hydrologic cycle that focuses on the transfer of water in and out of the atmosphere. Apply the model to different climates around the world.

**Unit Essential Questions**

- To what extent does the exchange of energy within the Earth drive geologic events on the surface?
- What is the role of the sun in energy transfer in the atmosphere and in the oceans?
- How do changes in one part of an Earth system affect other parts of the system?
- How do we know that things have energy?

**Unit Enduring Understandings**

- Energy flow and movement of material from the Earth’s interior causes geologic events on the Earth’s surface.
- The energy from the sun is transferred throughout the oceans and atmosphere.
- Earth’s components form systems. These systems continually interact at different rates of time, affecting the Earth regionally and globally.
- Earth’s components form systems that have cycles and patterns that allow us to make

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	<p>predictions. These systems continually interact at different rates of time, affecting the Earth locally and globally.</p> <ul style="list-style-type: none"><li>• Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy).</li></ul>
<p><b>Evidence of Learning</b></p>	
<p><b>Suggested Summative Assessment</b></p> <ul style="list-style-type: none"><li>• NJ ASK 8</li><li>• Unit exam</li></ul>	
<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"><li>• <a href="http://www.njcccs.org">www.njcccs.org</a> Classroom Application Docs</li><li>• Hands-on activities</li><li>• Chapter tests</li><li>• Performance assessments</li><li>• Quizzes</li><li>• Lab reports</li></ul>	

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Unit Overview	
<b>Content Area: Physical Science</b>	
<b>Unit Title: Electricity and Magnetism</b>	
<b>Target Course/Grade Level: 8<sup>th</sup> Grade</b>	
<p><b>Unit Summary</b></p> <ul style="list-style-type: none"> <li>The conservation of energy can be demonstrated by keeping track of familiar forms of energy as they are transferred from one object to another.</li> <li>It takes energy to change the motion of objects. The energy change is understood in terms of forces.</li> </ul> <p><b>Primary interdisciplinary connections:</b></p> <p><b>21<sup>st</sup> century themes: 9.1-</b> This unit will also infuse the 21<sup>st</sup> Century Life &amp; Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.</p>	
Learning Targets	
<p><b>Standards: 5.2 Physical Science:</b> All students will understand that physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.</p> <p><b>5.1.A.B.C.D Science Practices:</b> This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.</p>	
<p><b>Content Statements</b></p> <ul style="list-style-type: none"> <li>The flow of current in an electric circuit depends upon the components of the circuit and their arrangement, such as in series or parallel. Electricity flowing through an electrical circuit produces magnetic effects in the wires.</li> <li>Magnetic, electrical, and gravitational forces can act at a distance.</li> </ul>	
CPI #	Cumulative Progress Indicator (CPI)
5.2.6.D.1	Use simple circuits involving batteries and motors to compare and predict the current flow with different circuit arrangements.
5.2.6.E.2	Describe the force between two magnets as the distance between them is changed.
<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>How can energy be transferred from one material to another?</li> <li>How can energy be transferred from one material to another? What happens to a</li> </ul>	<p><b>Unit Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the transfer of the</li> </ul>

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<p>material when energy is transferred to it?</p> <ul style="list-style-type: none"><li>• What happens to a material when energy is transferred to it?</li></ul>	<p>different forms of energy.</p> <ul style="list-style-type: none"><li>• Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the transfer of the different forms of energy.</li></ul>
<p><b>Evidence of Learning</b></p>	
<p><b>Suggested Summative Assessment</b></p> <ul style="list-style-type: none"><li>• NJ ASK 8</li><li>• Unit exam</li></ul>	
<p><b>Formative Assessments</b></p> <ul style="list-style-type: none"><li>• <a href="http://www.njcccs.org">www.njcccs.org</a> Classroom Application Docs</li><li>• Hands-on activities</li><li>• Chapter tests</li><li>• Performance assessments</li><li>• Quizzes</li><li>• Lab reports</li></ul>	

Unit Overview	
<b>Content Area: Earth Science</b>	
<b>Unit Title: Earth's Structure</b>	
<b>Target Course/Grade Level: 8<sup>th</sup> Grade</b>	
<p><b>Unit Summary</b></p> <ul style="list-style-type: none"> <li>The theory of plate tectonics provides a framework for understanding the dynamic processes within and on Earth</li> <li>Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.</li> </ul> <p><b>Primary interdisciplinary connections:</b></p> <p><b>21<sup>st</sup> century themes: 9.1-</b> This unit will also infuse the 21<sup>st</sup> Century Life &amp; Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.</p>	
Learning Targets	
<p><b>Standards: 5.4 Earth Systems Science:</b> All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.</p> <p><b>5.1.A.B.C.D Science Practices:</b> This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.</p>	
<p><b>Content Statements</b></p> <ul style="list-style-type: none"> <li>Earth is layered with a lithosphere, a hot, convecting mantle, and a dense, metallic core.</li> <li>Major geological events, such as earthquakes, volcanic eruptions, and mountain building, result from the motion of plates. Sea floor spreading, revealed in mapping of the Mid-Atlantic Ridge, and subduction zones are evidence for the theory of plate tectonics.</li> <li>Soil consists of weathered rocks and decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers, each having a different chemical composition and texture.</li> <li>Physical and chemical changes take place in Earth materials when Earth features are modified through weathering and erosion.</li> </ul>	
CPI #	Cumulative Progress Indicator (CPI)
5.4.8.D.1	Model the interactions between the layers of Earth.
5.4.8.D.2	Present evidence to support arguments for the theory of plate motion.

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5.4.8.C.1	Determine the chemical properties of soil samples in order to select an appropriate location for a community garden.
5.4.8.C.2	Explain how chemical and physical mechanisms (changes) are responsible for creating a variety of landforms.
<b>Unit Essential Questions</b> <ul style="list-style-type: none"><li>• How do changes in one part of an Earth system affect other parts of the system?</li><li>• To what extent does the exchange of energy within the Earth drive geologic events on the surface?</li></ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"><li>• Energy flow and movement of material from the Earth’s interior causes geologic events on the Earth’s surface.</li></ul>
<b>Evidence of Learning</b>	
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### Unit Overview

**Content Area: Earth Science**

**Unit Title: Earth's Resources/History**

**Target Course/Grade Level: 8<sup>th</sup> Grade**

#### Unit Summary

- From the time that Earth formed from a nebula 4.6 billion years ago, it has been evolving as a result of geologic, biological, physical, and chemical processes.

#### Primary interdisciplinary connections:

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

### Learning Targets

**Standards: 5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

#### Content Statements

- Today's planet is very different than early Earth. Evidence for one-celled forms of life (bacteria) extends back more than 3.5 billion years.
- Fossils provide evidence of how life and environmental conditions have changed. The principle of Uniformitarianism makes possible the interpretation of Earth's history. The same Earth processes that occurred in the past occur today.
- The rock cycle is a model of creation and transformation of rocks from one form (sedimentary, igneous, or metamorphic) to another. Rock families are determined by the origin and transformations of the rock.

#### CPI #

#### Cumulative Progress Indicator (CPI)

5.4.8.B.1

Correlate the evolution of organisms and the environmental conditions on Earth as they changed throughout geologic time.

5.4.8.B.2

Evaluate the appropriateness of increasing the human population in a region (e.g., barrier islands, Pacific Northwest, Midwest United States) based on the region's history of catastrophic events, such as volcanic eruptions, earthquakes, and floods.



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5.4.6.C.2	Distinguish physical properties of sedimentary, igneous, or metamorphic rocks and explain how one kind of rock could eventually become a different kind of rock	
<b>Unit Essential Questions</b> <ul style="list-style-type: none"><li>• How do geologic events occurring today provide insight Earth’s past?</li><li>• How do changes in one part of an Earth system affect other parts of the system?</li></ul>	<b>Unit Enduring Understandings</b> <ul style="list-style-type: none"><li>• Earth’s components form systems. These systems continually interact at different rates of time, affecting the shape of the Earth’s surface regionally and globally.</li></ul>	
<b>Evidence of Learning</b>		
<b>Suggested Summative Assessment</b> <ul style="list-style-type: none"><li>• NJ ASK 8</li><li>• Unit exam</li></ul>		
<b>Formative Assessments</b> <ul style="list-style-type: none"><li>• <a href="http://www.njcccs.org">www.njcccs.org</a> Classroom Application Docs</li><li>• Hands-on activities</li><li>• Chapter tests</li><li>• Performance assessments</li><li>• Quizzes</li><li>• Lab reports</li></ul>		

**Unit Overview**

**Content Area: Earth Science**

**Unit Title: Meteorology**

**Target Course/Grade Level: 8<sup>th</sup> Grade**

**Unit Summary**

- The biogeochemical cycles in the Earth systems include the flow of microscopic and macroscopic resources from one reservoir in the hydrosphere, geosphere, atmosphere, or biosphere to another, are driven by Earth's internal and external sources of energy, and are impacted by human activity.
- Earth's weather and climate systems are the result of complex interactions between land, ocean, ice, and atmosphere.
- Earth's composition is unique, is related to the origin of our solar system, and provides us with the raw resources needed to sustain life.
- Internal and external sources of energy drive Earth systems.

**Primary interdisciplinary connections:**

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

**Learning Targets**

**Standards: 5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

**Content Statements**

- Earth's atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has a different physical and chemical composition at different elevations.
- The Sun provides energy for plants to grow and drives convection within the atmosphere

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- and oceans, producing winds, ocean currents, and the water cycle.
- Global patterns of atmospheric movement influence local weather.
  - Climate is influenced locally and globally by atmospheric interactions with land masses and bodies of water.
  - Weather (in the short term) and climate (in the long term) involve the transfer of energy and water in and out of the atmosphere.
  - Water in the oceans holds a large amount of heat, and therefore significantly affects the global climate system.

<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>
5.4.8.C.3	Model the vertical structure of the atmosphere using information from active and passive remote-sensing tools (e.g., satellites, balloons, and/or ground-based sensors) in the analysis.
5.4.8.E.1	Explain how energy from the Sun is transformed or transferred in global wind circulation, ocean circulation, and the water cycle.
5.4.8.F.1	Determine the origin of local weather by exploring national and international weather maps.
5.4.8.F.2	Explain the mechanisms that cause varying daily temperature ranges in a coastal community and in a community located in the interior of the country.
5.4.8.F.3	Create a model of the hydrologic cycle that focuses on the transfer of water in and out of the atmosphere. Apply the model to different climates around the world.
5.4.8.G.1	Represent and explain, using sea surface temperature maps, how ocean currents impact the climate of coastal communities.

<p><b>Unit Essential Questions</b></p> <ul style="list-style-type: none"> <li>• How do changes in one part of an Earth system affect other parts of the system?</li> <li>• What is the role of the sun in energy transfer in the atmosphere and in the oceans?</li> <li>• How do changes in one part of an Earth system affect other parts of the system?</li> <li>• How do changes in one part of the Earth system affect other parts of the system and in what ways can Earth processes be explained as interactions among spheres?</li> </ul>	<p><b>Unit Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>• The energy from the sun is transferred throughout the oceans and atmosphere.</li> <li>• Earth’s components form systems. These systems continually interact at different rates of time, affecting the Earth regionally and globally.</li> <li>• Earth’s components form systems that have cycles and patterns that allow us to make predictions. These systems continually interact at different rates of time, affecting the Earth locally and globally.</li> </ul>
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### Evidence of Learning

#### Suggested Summative Assessment

- NJ ASK 8
- Unit exam

#### Formative Assessments

- [www.njcccs.org](http://www.njcccs.org) Classroom Application Docs
- Hands-on activities
- Chapter tests
- Performance assessments
- Quizzes
- Lab reports

**Unit Overview**

**Content Area: Earth Science**

**Unit Title: Astronomy**

**Target Course/Grade Level: 8<sup>th</sup> Grade**

**Unit Summary**

- Our universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces. As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These same processes governed the formation of our solar system 4.6 billion years ago.

**Primary interdisciplinary connections:**

**21<sup>st</sup> century themes: 9.1-** This unit will also infuse the 21<sup>st</sup> Century Life & Careers standard 9.1, strands A-D. These strands include: Critical Thinking and Problem Solving; Creativity and Innovation; Collaboration, Teamwork and Leadership and Cross Cultural Understanding and Interpersonal Communication.

**Learning Targets**

**Standards: 5.4 Earth Systems Science:** All students will understand that Earth operates as a set of complex, dynamic, and interconnected systems, and is a part of the all-encompassing system of the universe.

**5.1.A.B.C.D Science Practices:** This unit will infuse the four strands of the Science Practices standard. These focus on understanding scientific explanations; generating scientific evidence through active investigation; reflecting on scientific knowledge; and participating productively in science.

**Content Statements**

- The relative positions and motions of the Sun, Earth, and Moon result in the phases of the Moon, eclipses, and the daily and monthly cycle of tides.
- Earth’s tilt, rotation, and revolution around the Sun cause changes in the height and duration of the Sun in the sky. These factors combine to explain the changes in the length of the day and seasons.
- Gravitation is a universal attractive force by which objects with mass attract one another. The gravitational force between two objects is proportional to their masses and inversely proportional to the square of the distance between the objects.
- The regular and predictable motion of objects in the solar system (Kepler’s Laws) is explained by gravitational forces.

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<b>CPI #</b>	<b>Cumulative Progress Indicator (CPI)</b>	
5.4.8.A.1	Analyze moon-phase, eclipse, and tidal data to construct models that explain how the relative positions and motions of the Sun, Earth, and Moon cause these three phenomena.	
5.4.8.A.2	Use evidence of global variations in day length, temperature, and the amount of solar radiation striking Earth’s surface to create models that explain these phenomena and seasons.	
5.4.8.A.3	Predict how the gravitational force between two bodies would differ for bodies of different masses or bodies that are different distances apart.	
5.4.8.A.4	Analyze data regarding the motion of comets, planets, and moons to find general patterns of orbital motion.	
<b>Unit Essential Questions</b>		<b>Unit Enduring Understandings</b>
<ul style="list-style-type: none"> <li>What predictable, observable patterns occur as a result of the interaction between the Earth, Moon, and Sun? What causes these patterns?</li> </ul>		<ul style="list-style-type: none"> <li>Observable, predictable patterns of movement in the Sun, Earth, Moon system occur because of gravitational interaction and energy from the Sun.</li> </ul>
<b>Evidence of Learning</b>		
<b>Suggested Summative Assessment</b>		
<ul style="list-style-type: none"> <li>NJ ASK 8</li> <li>Unit exam</li> </ul>		
<b>Formative Assessments</b>		
<ul style="list-style-type: none"> <li><a href="http://www.njcccs.org">www.njcccs.org</a> Classroom Application Docs</li> <li>Hands-on activities</li> <li>Chapter tests</li> <li>Performance assessments</li> <li>Quizzes</li> <li>Lab reports</li> </ul>		