

<p><u>Grade, Subject/Course:</u> 5th Grade Science</p>	
<p><u>Unit:</u> Ecosystems & the Food Web</p>	<p><u> x </u> Essential <u> </u> Important <u> </u> Compact</p>
<p><u>Big Idea:</u></p> <ul style="list-style-type: none"> ● Animals have external and internal sensory receptors that detect different kinds of information that then gets processed by the brain. ● Ecosystems are complex systems that include both living (biotic) and non-living (abiotic) components that interact with each other. ● To produce energy typically means to convert some stored energy into a desired form. ● Human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air. 	
<p><u>PA Core Content Standards/Anchors (or National Standards):</u></p> <p>3.1.5.A. Support an argument that plants get the materials they need for growth chiefly from air and water.</p> <p>3.1.5.B. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p> <p>3.2.5.G. Use models to describe that energy in animals’ food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p> <p>3.3.5.E. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p> <p>3.4.3-5.A Analyze how living organisms, including humans, affect the environment in which they live, and how their environment affects them.</p>	<p><u>Interdisciplinary Standards (if applicable):</u></p>
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> ● How do organisms detect, process, and use information about the environment? ● How do organisms interact with the living and nonliving environments to obtain matter and energy? ● How do food and fuel provide energy? 	<p><u>Understandings:</u> Students will know that...</p> <ul style="list-style-type: none"> ● organisms depend on one another and form an interconnected ecosystem. ● food chains, food webs, producers, consumers, and decomposers are important pieces of a complex interconnected ecosystem.

<ul style="list-style-type: none"> ● If energy is conserved, why do people say it is produced or used? ● How do humans change the planet? 	
<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> ● Plants acquire their material for growth chiefly from air and water. ● The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. ● Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases and water, from the environment, and release waste matter. ● The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). ● Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion (secondary). ● Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. 	<p><u>Do/Skills:</u> Students will be able to...</p> <ul style="list-style-type: none"> ● construct models of food chains to discover that different interrelationships exist between organisms. ● interpret data and figure out that water and air account for a plant's weight. ● conduct/interpret an investigation to realize that decomposers, like mold, break down and consume dead plant material. ● make observations of/interpret decomposers, like worms, to realize that they eat dead matter in an ecosystem and cycle nutrients into the soil. ● develop a model of a pond ecosystem and realize that interrelationships exist between decomposers, plants, and animals. ● interpret what happens in unbalanced ecosystems and how that can lead to an overabundance of an organism. ● develop a model of a food web to realize that blocking the sun's energy would have disastrous effects on the organisms that rely on this energy in the food web and cause the extinction of some entire species.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> ● argument ● evidence ● materials ● systems ● matter ● living ● non-living ● decomposers ● decomposition ● biotic ● abiotic ● food web 	<p><u>Core Resources:</u></p> <ul style="list-style-type: none"> ● Mystery Science ● Ag Day (High School FFA)

<ul style="list-style-type: none"> ● consumer ● producer ● energy ● components ● energy flow ● model ● chemical process ● conserved ● atmosphere ● human impact ● resources 	
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Ecosystems & the Food Web Unit Assessment ● Lesson Assessments ● Performance Tasks 	<p><u>Supplemental Resources:</u></p> <ul style="list-style-type: none"> ● Brainpop Jr. ● Discovery Education ● Generation Genius

<p><u>Grade, Subject/Course:</u> 5th Grade Science</p>	
<p><u>Unit:</u> Water Cycle & Earth's Systems</p>	<p><u> x </u> Essential <u> </u> Important <u> </u> Compact</p>
<p><u>Big Idea:</u></p> <ul style="list-style-type: none"> ● The atoms of some substances combine or rearrange to form new substances that have different properties. ● Observations of the sky can be explained by predictable patterns of the movement of Earth, moon, sun and planets. ● Plate tectonics explains the past and current movements and features of the rocks at Earth's surface. ● Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. ● Human activities in agriculture, industry, and everyday life have had major impacts on the land, rivers, ocean, and air. 	
<p><u>PA Core Content Standards/Anchors (or National Standards):</u></p> <p>3.2.5.D. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or</p>	<p><u>Interdisciplinary Standards (if applicable):</u></p>

mixing substances, the total weight of matter is conserved.

3.3.5.B. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

3.3.5.C. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

3.3.5.D. Describe and graph the amounts of saltwater and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

3.3.5.F. Generate and design possible solutions to a current environmental issue, threat, or concern.

3.4.3-5.B Make a claim about the environment and social impacts of design solutions and civic actions, including their own actions.

3.4.3-5.C Examine ways you influence your local environment and community by collecting and displaying data.

3.4.3-5.E Construct an argument to support whether action is needed on a selected environmental issue and propose possible solutions.

Essential Questions:

- How do substances combine or change (react) to make new substances?
- How does one characterize and explain these reactions and make predictions about them?
- What are the predictable patterns caused by Earth's movement in the solar system?
- Why do the continents move, and what causes earthquakes and volcanoes?
- What regulates weather and climate?
- How do humans change the planet?

Understandings: Students will know...

- importance of water as a natural resource.
- how the distribution and cycling of water through Earth's systems affects human societies.

<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> ● The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. ● No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) ● The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes. ● Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes, landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. ● Nearly all of Earth’s available water is in the ocean. Most freshwater is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. ● Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gasses, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment. 	<p><u>Do/Skills:</u> Students will be able to...</p> <ul style="list-style-type: none"> ● analyze and interpret data from world maps to determine the relative amounts of fresh, salt, and frozen water to understand what is accessible. ● create/interpret/analyze a model of the ocean to observe how salt seems to completely vanish when dissolved in water. Students measure and graph quantities to provide evidence that the salt is still in the solution, even though we can’t see it. ● gather evidence to determine the best place to settle based on freshwater resources, features of the landscape, and characteristics of the plants that thrive there. ● create/interpret/analyze a model of the ocean and sky to investigate how temperature influences evaporation and condensation. ● define and understand the environmental issue, including causes and effects to generate multiple innovative ideas for solving the problem.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> ● hardness ● mass ● moh’s scale ● porosity ● properties ● solubility ● volume ● scale ● standard units ● data ● graphical display 	<p><u>Core Resources:</u></p> <ul style="list-style-type: none"> ● Mystery Science ● Wetlands/Watershed experience

<ul style="list-style-type: none"> ● patterns ● representation ● shadows ● atmosphere ● biosphere ● chemical change ● geosphere ● hydrosphere ● model ● scientific principle ● distribution ● reservoir ● freshwater ● weight ● scientific question ● proportion ● weather ● climate ● environmental issue ● design solution ● design process ● empirical evidence ● conservationist 	
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Water Cycle & Earth’s Systems Unit Assessment ● Lesson Assessments ● Performance Tasks 	<p><u>Supplemental Resources:</u></p> <ul style="list-style-type: none"> ● Brainpop Jr. ● Discovery Education ● Generation Genius

<p><u>Grade, Subject/Course:</u> 5th Grade Science</p>	
<p><u>Unit:</u> Earth & Space Patterns</p>	<p><u> x </u> Essential <u> </u> Important <u> </u> Compact</p>
<p><u>Big Idea:</u></p> <ul style="list-style-type: none"> ● Observations of the sky can be explained by predictable patterns of the movement of Earth, moon, sun and planets. 	

<p><u>PA Core Content Standards/Anchors (or National Standards):</u></p> <p>3.3.5.B. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.</p>	<p><u>Interdisciplinary Standards (if applicable):</u></p>
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> • What are the predictable patterns caused by Earth’s movement in the solar system? 	<p><u>Understandings:</u> Students will know...</p> <ul style="list-style-type: none"> • the patterns of the Earth, Sun, Moon, and stars. • how shadows change throughout the day. • how the Sun's position changes throughout the year. • how stars change throughout the seasons.
<p><u>Knowledge:</u></p> <ul style="list-style-type: none"> • The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes. 	<p><u>Do/Skills:</u> Students will be able to...</p> <ul style="list-style-type: none"> • model the rotation of the Earth and investigate why the Sun looks like it’s moving across the sky. • investigate how the direction and length of shadows change with the position of the sun, which can tell the time of day and season of the year. • build/interpret/analyze a model of the universe and use it to explain why different stars are visible at different times of the year and support the claim that the Earth orbits the Sun. • build/interpret/analyze a physical model of the Sun and Moon to investigate and find patterns in how the Moon’s phase relates to its position relative to the Sun.
<p><u>Vocabulary:</u></p> <ul style="list-style-type: none"> • data • graphical display • patterns • representation • shadows 	<p><u>Core Resources:</u></p> <ul style="list-style-type: none"> • Mystery Science
<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> • Earth & Space Patterns Unit Assessment • Lesson Assessments • Performance Tasks 	<p><u>Supplemental Resources:</u></p> <ul style="list-style-type: none"> • Brainpop Jr. • Discovery Education • Generation Genius

Grade, Subject/Course: 5th Grade Science	
Unit: Stars & Planets	<u> x </u> Essential <u> </u> Important <u> </u> Compact
<p>Big Idea:</p> <ul style="list-style-type: none"> • We can infer information about stars based on observations we make from Earth. • All forces between objects, regardless of size or direction, arise from only a few types of interactions. 	
<p>PA Core Content Standards/Anchors (or National Standards):</p> <p>3.2.5.F. Support an argument that the gravitational force exerted by Earth on objects is directed down.</p> <p>3.3.5.A. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.</p>	<p>Interdisciplinary Standards (if applicable):</p>
<p>Essential Questions:</p> <ul style="list-style-type: none"> • What is the universe, and what is Earth’s place in it? • What underlying forces explain the variety of interactions observed? 	<p>Understandings: Students will know that...</p> <ul style="list-style-type: none"> • the brightness of the sun varies from each planet in our solar system in addition to stars of other solar systems in galaxies far away. • there are patterns to gravity on Earth and gravity on other planets.
<p>Knowledge:</p> <ul style="list-style-type: none"> • The gravitational force of Earth acting on an object near Earth’s surface pulls that object toward the planet’s center. • The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. 	<p>Do/Skills: Students will be able to...</p> <ul style="list-style-type: none"> • gather evidence to support an argument that the apparent brightness of the Sun is dependent upon an observer’s distance from the Sun. • use mathematics and computational thinking to calculate, analyze and interpret how high they could jump on planets and moons that have stronger or weaker gravity than Earth. • evaluate other solar systems, comparing their stars to our Sun.
<p>Vocabulary:</p> <ul style="list-style-type: none"> • apparent brightness • relative distance • stars • sun • gravitational force • cause and effect 	<p>Core Resources:</p> <ul style="list-style-type: none"> • Mystery Science

<p><u>Common Assessment(s):</u></p> <ul style="list-style-type: none"> ● Stars & Planets Unit Assessment ● Lesson Assessments ● Performance Tasks 	<p><u>Supplemental Resources:</u></p> <ul style="list-style-type: none"> ● Brainpop Jr. ● Discovery Education ● Generation Genius

<p><u>Grade, Subject/Course:</u> 5th Grade Science</p>	
<p><u>Unit:</u> Chemical Reactions & Properties of Matter</p>	<p><u> x </u> Essential <u> </u> Important <u> </u> Compact</p>
<p><u>Big Idea:</u></p> <ul style="list-style-type: none"> ● All forms of matter exist as a result of the combination or rearrangement of atoms. ● The atoms of some substances combine or rearrange to form new substances that have different properties. 	
<p><u>PA Core Content Standards/Anchors (or National Standards):</u></p> <p>3.2.5.A. Develop a model to describe that matter is made of particles too small to be seen.</p> <p>3.2.5.B. Make and communicate observations and measurements to identify materials based on their properties.</p> <p>3.2.5.C. Interpret and analyze data and observations to make decisions about how to utilize materials based on their properties.</p> <p>3.2.5.D. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.</p> <p>3.2.5.E. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.</p>	<p><u>Interdisciplinary Standards (if applicable):</u></p>
<p><u>Essential Questions:</u></p> <ul style="list-style-type: none"> ● How do particles combine to form the variety of matter one observes? ● How do substances combine or change (react) to make new substances? ● How does one characterize and explain these reactions and make predictions about them? 	<p><u>Understandings:</u> Students will know that...</p> <ul style="list-style-type: none"> ● matter is made of tiny particles ● different materials have different properties ● observations and data help us choose materials ● matter is always conserved ● some mixtures create new substances

Knowledge:

- Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gasses are made from matter particles that are too small to see and that are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects.
- Measurements of a variety of properties can be used to identify materials. (Boundary: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic scale mechanism of evaporation and condensation.)
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish.
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.)
- When two or more different substances are mixed, a new substance with different properties may be formed.

Do/Skills: Students will be able to...

- investigate and model reactions to provide evidence that substances can change other substances.
- investigate reactions between different substances to determine how known acids react with other materials.
- combine different substances together to discover that chemical reactions can create new substances, including ones made of particles too small to be seen.
- choose appropriate materials based on their properties and intended use.

Vocabulary:

- particles
- matter
- gases
- measurements
- materials
- observations
- characteristics
- substance
- reactions
- chemical reaction
- predictions
- react
- trials

Core Resources:

- Mystery Science

Common Assessment(s):

- Chemical Reactions & Properties of Matter Unit Assessment
- Lesson Assessments
- Performance Tasks

Supplemental Resources:

- Brainpop Jr.
- Discovery Education
- Generation Genius