

6th Grade Science Scope and Sequence 1st Quarter 2017-2018

HOP: Habits of Practice

Practice 1: Asking Questions/Defining Problems

Practice 4: Analyzing/Interpreting Data

Practice 7: Engaging in Argument from Evidence

Practice 2: Developing and Using Models

Practice 5: Using Math & Computational Thinking

Practice 8: Obtaining/Evaluating/Communicating Info

Practice 3: Planning/Carrying Out Investigations

Practice 6: Constructing Explanations/Designing Solutions

Practice 9: Metacognition

Sequence of Concepts	Rationale for Sequence	Prior Knowledge
<p><u>Scientific Method and Engineering Design</u></p>	<p>*These items are to be integrated throughout the content. However, you will find new resources for student practice with these concepts here.</p>	<p>Kindergarten through 5th grade: Inquiry and Engineering Design has been embedded</p>
<p><u>Classifying Organisms</u></p> <ul style="list-style-type: none"> • Organisms can be categorized as producers, consumers, decomposers, or scavengers depending on their role in a food chain or web. 	<p>Students must have an understanding of this classification of organisms before they can accurately describe the way that these different organisms pass energy through an ecosystem.</p>	<p>Students have had exposure to these vocabulary terms and their meanings in 5th grade.</p>
<p><u>Transfer of Matter and Energy</u></p> <ul style="list-style-type: none"> • The transfer of matter and energy within an ecosystem is shown through food chains, food webs, and energy pyramids. • The sun is the ultimate source of energy in these systems. 	<p>Now that students have an understanding of organisms' differentiated roles in their ecosystem, they can apply this knowledge to diagrams that show how energy is transferred throughout an ecosystem.</p>	<p>Students have covered food chains and webs in 5th grade, but energy pyramids are often not covered.</p>
<p><u>Biotic and Abiotic Elements</u></p> <ul style="list-style-type: none"> • Abiotic factors are the nonliving factors in an ecosystem and biotic factors are the living factors. 	<p>Students need to be familiar with these key terms before they can apply them to learning about the biomes of the world.</p>	<p>Students are familiar with the living and non-living factors in an environment, but may not be familiar with the terms.</p>
<p><u>Major Biomes</u></p> <ul style="list-style-type: none"> • Each major terrestrial biome has unique ecological conditions, including climate and plant and animal adaptations. 	<p>Biomes are categorized based on their abiotic factors, biotic adaptations, and interactions between biotic and abiotic factors.</p>	<p>Students have had exposure to biomes in elementary school, but have not covered them in depth with the focus on ecological dependency and adaptations.</p> <p>Also, students have been exposed to the difference between weather and climate in 4th grade.</p>

6th Grade Science Scope and Sequence 2nd Quarter 2016-2017

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<p><u>Heat Transfer/Sun's Energy</u></p> <ul style="list-style-type: none"> • There are three types of heat transfer (conduction, convection, and radiation) that contribute to the creation of wind and ocean currents. 	<p>In order for students to understand how wind and ocean currents form, they must understand the three methods of heat transfer.</p>	<p>Students learned physical properties in 4th grade.</p> <p>In 5th grade, students conducted an experiment on the transfer of heat energy through conduction, convection, and radiation.</p>
<p><u>Wind</u></p> <ul style="list-style-type: none"> • Global wind patterns are caused by the uneven heating of Earth's surface (differences in air pressure) and affect weather patterns. • Local winds, land breezes and sea breezes, are caused by differences in temperature between land and water. 	<p>Students must now apply what they have learned about the relationship between temperature and density to the movement of air, both on a global and local scale.</p>	
<p><u>Ocean Currents</u></p> <ul style="list-style-type: none"> • Warm surface ocean currents travel from the Equator to the poles, and cold surface ocean currents travel from the poles to the Equator. • Ocean current temperatures impact the coastal climates of land masses that they pass by. • Upwelling occurs when nutrient rich, cold ocean water is brought from the deep ocean to the surface. 	<p>Ocean currents are essentially caused by the same principles that students have already been exposed to in this unit. They can build on their understanding of these concepts by applying them to ocean currents.</p>	<p>Students have learned the different continents and oceans.</p>
<p><u>Weather</u></p> <ul style="list-style-type: none"> • Weather can be predicted based on the type of front in an area, the barometric pressure, the temperature, humidity, etc. • Extreme weather (hurricanes, tornadoes, thunderstorms) are classified using data tables. • Weather maps can be used to communicate current conditions and future predictions. 	<p>Weather is a culmination of heat transfer, wind, and ocean currents.</p>	<p>Students may have been exposed to cardinal directions on a map.</p> <p>Also, students have been exposed to the difference between weather and climate in the 4th grade.</p>

<p><u>Components and their Appearance in the Universe</u></p> <ul style="list-style-type: none">• There are many components in the universe that interact with one another, including moons, planets, comets, asteroids, stars, etc.• The further something is from Earth, the smaller and dimmer it appears to us. The closer something is to Earth, the larger, brighter, and more detailed it appears to us.	<p>We begin with this section because students need to be familiar with the different components of the universe before they can explore how they interact with one another (moon phases, eclipses, rotation, revolution, etc) in the rest of this unit.</p>	<p>Students have analyzed patterns, movements, and relationships in relation to the sun, moon, and earth in 4th grade.</p>
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6th Grade Science Scope and Sequence 3rd Quarter 2016-2017

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<p><u>Time and the Movement of Solar Bodies</u></p> <ul style="list-style-type: none"> Rotation determines the length of a day, revolution determines the length of a year, and for the moon to complete a cycle of phases takes about a month. 	<p>Students now will apply their knowledge of the components of the universe to their movement within the solar system. They must understand these movements in order to draw conclusions about tides, seasons, eclipses, and moon phases which will be taught subsequently.</p>	<p>Students have analyzed patterns, movements, and relationships in relation to the sun, moon, and earth in 4th grade.</p>
<p><u>Seasons</u></p> <ul style="list-style-type: none"> The seasons are caused by the tilt of Earth on its axis and students can determine which season is occurring in each hemisphere of Earth as it revolves around the sun by studying a diagram. 	<p>Students now understand the movement of Earth's movement around the sun, so they can now apply that knowledge to the cause of the seasons on Earth.</p>	<p>Students should have been exposed to learning the seasons in order.</p>
<p><u>Moon Phases</u></p> <ul style="list-style-type: none"> Conclusions about which phase of the moon will occur can be drawn from a diagram or model of the Earth, moon, and sun. This will be dependent on the position of the Earth, moon, and sun. 	<p>Before students can comprehend when eclipses and tides occur, they must understand the position of the Earth, moon, and sun throughout the changing phases of the moon.</p>	<p>Students have heard the names of the moon phases before, but have not had exposure to using a diagram to draw conclusions about the phases.</p>
<p><u>Eclipses</u></p> <ul style="list-style-type: none"> Solar eclipses happen during a new moon and lunar eclipses happen during a full moon. Both occur because the Earth, moon, and sun form a straight line creating shadows. 	<p>Now that students are familiar with diagrams of the moon orbiting Earth, they can use this knowledge to answer questions about observable phenomena on Earth such as eclipses.</p>	
<p><u>Tides</u></p> <ul style="list-style-type: none"> Tides are caused by the gravitational pull of the moon and occur twice daily in coastal locations. In a diagram, the location of the moon determines the location of high and low tides. Neap tides occur during a first and last quarter moon, when the Earth, moon, and sun form a right angle. Spring tides occur during a full and new moon, when the Earth, moon, and sun form a straight line. 	<p>Now that students are familiar with diagrams of the moon orbiting Earth, they can use this knowledge to answer questions about observable phenomena on Earth such as tides.</p>	

<p><u>Types of Energy</u></p> <ul style="list-style-type: none"> • Energy can occur in many types, including three types of potential or stored energy. 	<p>Before students can discuss how energy changes from one form to another, or apply the Law of Conservation of Energy, they must have a good understanding of the different forms of energy so that they can identify them in transformations.</p>	<p>In 5th grade students have learned about potential and kinetic energy.</p>
<p><u>Potential vs. Kinetic Energy</u></p> <ul style="list-style-type: none"> • Potential energy is greatest when an object is farthest from the ground. Kinetic energy is greatest when an object is at its fastest. • Kinetic energy increases and potential energy decreases as an object approaches the ground. 	<p>Students already have some understanding of how potential changes to kinetic from prior knowledge. This is a good transition into talking about other energy transformations.</p>	<p>In 5th grade students have learned about potential and kinetic energy.</p>
<p><u>Energy Transformations</u></p> <ul style="list-style-type: none"> • Energy changes from one form to another in observable examples. 	<p>Now that students know the various forms in which energy can occur, they should be able to look at examples and explain how energy changes from one form to another in different scenarios.</p>	
<p><u>Law of Conservation of Energy</u></p> <ul style="list-style-type: none"> • Energy can never be created or destroyed, only transformed. • Some energy in all transformations is given off as heat. 	<p>Students now should be familiar with how energy transforms and should be able to apply this law to examples.</p>	

6th Grade Science Scope and Sequence 4th Quarter 2016-2017

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<u>Insulators vs. Conductors</u> <ul style="list-style-type: none">Materials that are insulators do not conduct electricity and materials that are conductors do.	Students need to understand the difference between these terms so that they can apply them to the materials needed to build working circuits.	Students have been exposed to these terms before in 4 th grade.
<u>Simple Circuits</u> <ul style="list-style-type: none">In order for a circuit to transform energy from one kind to another, it must be closed and connected properly with conductive materials.	Now that students know that conductors carry electricity, they can apply this knowledge, along with their knowledge of energy transformations, to identify the transformations occurring within simple circuits and also to differentiate between a working and non-working circuit.	Students have been exposed (in 4 th grade) to how energy is transferred in a simple electric circuit, and how electricity requires a complete loop through which current can pass.

Websites Utilized:

Teacher Notes