



Full Option Science System (FOSS)

Grades K-8

Correlated to the

Maryland
Content Standards for Science



MARYLAND

Content Standards for Science K-8

Correlation with Full Option Science System (FOSS™)

This correlation shows representative examples of investigations and activities from the FOSS program that address the Science Content Standards. A citation does not reflect all of the investigations or activities that might address a particular standard or benchmark.

July 2007
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Kindergarten

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Topic

A. Constructing Knowledge

Indicator

1. Raise questions about the world around them and be willing to seek answers to some of them by making careful observations and trying things out.

Objectives	FOSS
<p>Describe what can be learned about things by just observing those things carefully and adding information by sometimes doing something to the things and noting what happens.</p>	<p>Wood and Paper Investigation 1, Parts 1-4, pp. 8-27 Animals Two by Two Investigation 1, Parts 1-4, pp. 10-29 Fabric Investigation 1, Parts 1-4, pp. 6-22</p>
<p>Seek information through reading, observation, exploration, and investigations.</p>	<p>Trees Investigation 2, Parts 1-3, pp. 6-19 FOSS Science Stories Wood and Paper Investigation 3, Parts 1-4, pp. 8-25 FOSS Science Stories Fabric Investigation 2, Parts 1-3, pp. 7-21 FOSS Science Stories</p>
<p>Use tools such as thermometers, magnifiers, rulers, or balances to extend their senses and gather data.</p>	<p>Fabric Investigation 1, Part 4, pp. 20-22 Animals Two by Two Investigation 4, Part 1, pp. 8-11 Trees Tools for Observing Weather, pp. 10-13</p>
<p>Explain that when a science investigation is done the way it was done before, we expect to get a very similar result.</p>	<p>FOSS provides the opportunity to address this objective. See for example: Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Animals Two by Two Investigation 1, Part 3, pp. 22-36</p>
<p>Participate in multiple experiences to verify that science investigations generally work the same way in different places.</p>	<p>FOSS provides the opportunity to address this objective. See for example: Wood and Paper Investigation 3, Parts 2-4, pp. 13-25 Animals Two by Two Investigation 1, Part 3, pp. 22-25 Fabric Investigation 3, Parts 1-3, pp. 7-21</p>
<p>Suggest things that you could do to find answers to questions raised by observing objects and/or phenomena (events such as, water disappearing from the classroom</p>	<p>FOSS provides the opportunity to address this objective. See for example: Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Fabric Investigation 3, Parts 1-3, pp. 7-21</p>

<p>aquarium or a pet's water bowl).</p> <p>Use whole numbers and simple, everyday fractions in ordering, counting, identifying, measuring, and describing things and experiences.</p>	<p>Animals Two by Two Investigation 3, Part 2, pp. 13-16</p> <p>Wood and Paper Investigation 1, Part 5, pp. 28-32</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. People are more likely to believe your ideas if you can give good reasons for them

Objectives	FOSS
<p>Provide reasons for accepting or rejecting ideas examined.</p> <p>Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas.</p> <p>Explain why it is important to make some fresh observations when people give different descriptions of the same thing.</p>	<p>FOSS is an inquiry-based program and the investigations provide the opportunity for the teacher to address these three objectives with the students.</p>

Topic

C. Communicating Scientific Information

Indicator

1. Ask, "How do you know?" in appropriate situations and attempt reasonable answers when others ask them the same question.

Objectives	FOSS
<p>Describe things as accurately as possible and compare observations with those of others.</p> <p>Describe and compare things in terms of number, shape, texture, size, weight, color, and motion.</p> <p>Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).</p> <p>Have opportunities to work with a team,</p>	<p>Animals Two by Two Investigation 4, Part 1, pp. 8-11</p> <p>Trees Investigation 2, Parts 1-3, pp. 6-19</p> <p>Fabric Investigation 2, Parts 1-2, pp. 6-15</p> <p>Wood and Paper Investigation 3, Parts 2-4, pp. 13-25</p> <p>Trees Investigation 2, Parts 1-3, pp. 6-19</p> <p>Fabric Investigation 2, Part 1, pp. 7-11</p> <p>Animals Two by Two Investigation 3, Part 3, pp. 17-20</p> <p>Animals Two by Two Investigation 1, Part 1, pp. 10-16</p> <p>Trees</p>

<p>share findings with others, and recognize that all team members should reach their own conclusions about what the findings mean.</p> <p>Recognize that everybody can do science and invent things and ideas.</p>	<p>Investigation 1, Part 7, pp. 31-34 Wood and Paper Investigation 1, Part 3, pp. 20-23 Animals To by Two Investigation 3, Part 1, pp. 8-12</p> <p>FOSS is an inquiry-based program and the investigations provide the opportunity for the teacher to address these three objectives with the students.</p>
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Topic

D. Technology

Indicator

1. Design and make things with simple tools and a variety of materials.

Objectives	FOSS
<p>Make something out of paper, cardboard, wood, plastic, metal, or existing objects that can actually be used to perform a task.</p> <p>Recognize that tools are used to do things better or more easily and to do some things that could not otherwise be done at all.</p> <p>Assemble, describe, take apart and reassemble constructions using interlocking blocks, erector sets and the like.</p> <p>Recognize that some kinds of materials are better than others for making any particular thing, for example, materials that are better in some ways (such as stronger and cheaper) may be worse in other ways (such as heavier and harder to cut).</p> <p>Explain that sometimes it is not possible to make or do everything that is designed.</p>	<p>Wood and Paper Investigation 4, Part 2, pp. 14-18 Fabric Investigation 1, Part 5, pp. 23-28</p> <p>Fabric Investigation 4, Parts 4-6, pp. 20-23</p> <p>Wood and Paper Investigation 2, Parts 3-4, pp. 16-23 Investigation 4, Part 2, pp. 14-18 Fabric Investigation 1, Part 5, pp. 23-28</p> <p>FOSS provides the opportunity to address this objective.</p>

Indicator

2. Practice identifying the parts of things and how one part connects to and affects another.

Objectives	FOSS
<p>Investigate a variety of objects to identify that most things are made of parts</p> <p>Explain that something may not work if some of its parts are missing.</p>	<p>Animals Two by Two Investigation 1, Part 1, pp. 10-16 Fabric Investigation 1, Parts 4-5, pp. 20-28 Wood and Paper Investigation 2, Parts 3-4, pp. 16-23</p> <p>FOSS provides the opportunity to address this objective. See for example: Animals Two by Two</p>

<p>Explain that when parts are put together, they can do things that they couldn't do by themselves.</p>	<p>Investigation 1, Part 1, pp. 10-16 Fabric Investigation 1, Parts 4-5, pp. 20-28 Wood and Paper Investigation 2, Parts 3-4, pp. 16-23</p> <p>FOSS provides the opportunity to address this objective. See for example: Wood and Paper Investigation 2, Parts 3-4, pp. 16-23 Investigation 4, Parts 1-2, pp. 8-18</p>
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Indicator

3. Examine a variety of physical models and describe what they teach about the real things they are meant to resemble.

Objectives	FOSS
<p>Explain that a model of something is different from the real thing but can be used to learn something about the real thing.</p> <p>Realize that one way to describe something is to say how it is like something else.</p>	<p>Animals Two by Two Investigation 1, Part 1, pp. 10-16 Trees Investigation 1, Parts 4-5, pp. 23-27 Wood and Paper Investigation 2, Parts 3-4, pp. 16-23</p> <p>FOSS provides the opportunity to address this objective. See for example: Animals Two by Two Investigation 1, Part 4, pp. 26-29 Investigation 3, Part 3, pp. 17-20 Fabric Investigation 1, Part 2, pp. 12-15, pp. 20-28</p>

Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

A. Materials and Processes That Shape A Planet

Indicator

1. Investigate objects and materials in the environment.

Objectives	FOSS
<p>Observe and describe a variety of natural and human-made objects found in familiar environments (school, neighborhood, etc.).</p> <p>Examine and describe Earth materials. rocks soil</p>	<p>Wood and Paper Investigation 1, Parts 1-2, pp. 8-19 Investigation 2, Parts 1-4, pp. 8-23 Science Stories, pp. 3-8, 13-18 Animals Two by Two Investigation 3, Parts 1, 3, pp. 8-12, 17-20 Trees Investigation 3, Parts 1-6, pp. 10-28 Science Stories, pp. 3-12</p>

water	
Using examples, describe that objects and materials, such as trees, rocks, and hills on Earth's surface can change.	Trees Investigation 3, Parts 3-9, pp. 15-38 Science Stories, pp. 14-23 Animals Two by Two Investigation 5, Parts 1-3, pp. 10-24 Science Stories, pp. 20-23

Topic

D. Astronomy

Indicator

1. Observe celestial objects that are visible in the day and night sky.

Objectives	FOSS
Identify and describe the sun, moon and stars.	
Describe ways in which the daytime and nighttime skies are different.	

Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

2. Investigate and gather information about changes in weather.

Objectives	FOSS
Observe and describe different weather conditions using senses.	Trees Tools for Observing Weather, pp. 6-17, 22-24
Record observations using pictures, pictographs, or written/oral language.	Trees Tools for Observing Weather, pp. 6-13, 16-17
Describe qualitative changes in weather, such as temperatures, precipitation, wind, etc	Trees Tools for Observing Weather, pp. 6-9

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

A. Diversity of Life

Indicator

1. Observe a variety of familiar animals and plants (perhaps on the school grounds, in the neighborhood, and at home) to discover patterns of similarity and difference among them.

Objectives	FOSS
Identify and describe features (observable parts) of animals and plants that make some of them alike in the way they look and the things they do.	Animals Two by Two Investigation 1, Part 4, pp. 26-29 Investigation 2, Parts 1, 3, pp. 9-13, 18-21 Science Stories, pp. 5-11 Trees Investigation 1, Part 1, pp. 7-14

<p>Compare descriptions of the features that make some animals and some plants very different from one another.</p> <p>Identify a feature that distinguishes animals that fly (as an example) from animals that cannot and examine a variety of animals that can fly to discover other similar features they might share.</p> <p>Compare ideas about how the features of animals and plants affect what these animals are able to do.</p>	<p>Investigation 2, Part 1, pp. 6-9</p> <p>Animals Two by Two Investigation 1, Part 4, pp. 26-29 Investigation 2, Part 3, pp. 18-21 Investigation 3, Part 3, pp. 17-20 Science Stories, pp. 5-19</p> <p>Trees Investigation 2, Part 3, pp. 16-19</p> <p>Animals Two by Two Investigation 1, Parts 1, 4, pp. 10-16, 26-29 Investigation 2, Parts 1, 3, pp. 9-13, 18-21 Science Stories, pp. 4-11</p> <p>Animals Two by Two Investigation 1, Parts 1, 4, pp. 10-16, 26-29 Investigation 2, Parts 1, 3, pp. 9-13, 18-21 Investigation 3, Part 1, pp. 8-12 Science Stories, pp. 4-11</p>
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Indicator

2. Gather information and direct evidence that humans have different external features, such as size, shape, etc., but that they are more like one another than like other animals.

Objectives	FOSS
<p>Organize data collected and draw conclusions about similarities and differences among humans.</p> <p>Explain ways in which humans are more like one another than like other animals.</p> <p>Describe similarities in what both humans and other animals are able to do because they possess certain external features.</p>	

Topic

C. Genetics

Indicator

1. Observe, describe and compare the life cycles of different kinds of animals and plants.

Objectives	FOSS
<p>Identify and draw pictures that show what an animal (egg to frog) and a plant (seed to tree) looks like at each stage of its life cycle.</p> <p>Describe and compare the changes that occur in the life cycle of two different animals, such as a frog and a puppy and two different plants, such as a rosebush and a maple tree.</p> <p>Identify and describe the changes that</p>	<p>Animals Two by Two Investigation 5, Parts 1-3, pp. 10-24 Science Stories, pp. 20-23</p>

<p>occur in humans as they develop. Size Weight Appearance of different parts</p>	
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Topic

D. Evolution

Indicator

1. Recognize that living things are found almost everywhere in the world and that there are somewhat different kinds of living things in different places.

Objectives	FOSS
<p>Observe, describe, and give examples and describe the many kinds of living things found in different places in Maryland.</p>	<p>Local Objective See: Animals Two by Two Investigation 1-4 Science Stories, pp. 8-21 Trees Investigation 1, Part 1, pp. 7-14 Investigation 2, Part 1, pp. 6-10 Investigation 3, Part 4, pp. 19-21 Science Stories, pp. 4-5, 14-17</p>
<p>Using pictures, films and illustrated texts identify, describe and compare living things found in other states such as Texas and Alaska to those found in Maryland.</p>	<p>Local Objective See: Animals Two by Two Investigation 1-4 Science Stories, pp. 4-12, 18-23 Trees Investigation 1, Part 1, pp. 7-14 Investigation 2, Part 1, pp. 6-10 Investigation 3, Part 4, pp. 19-21 Science Stories, pp. 8-21</p>
<p>Explain that the external features of plants and animals affect how well they thrive in different kinds of places.</p>	<p>Animals Two by Two Investigation 1, Part 1, pp. 10-16 Investigation 2, Parts 1, 3, pp. 9-13, 18-21 Investigation 3, Parts 1, 3, pp. 8-12, 17-20 Science Stories, pp. 4-19 Trees Science Stories, pp. 4-12</p>

Topic

E. Flow of Matter and Energy

Indicator

1. Develop an awareness of the relationship of features of living things and their ability to satisfy basic needs that support their growth and survival.

Objectives	FOSS
<p>Make observations of the features and behaviors of many different kinds of animals within an environment to identify and begin building a list of some of the basic needs these organisms share, such as water, air, etc.</p>	<p>Animals Two by Two Investigation 1, Parts 1-2, pp. 10-21 Investigation 3, Part 1, pp. 8-12 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 6,8, 10, 12, 16</p>
<p>Describe ways that people and other animals manage to bring the things they need</p>	<p>Animals Two by Two Investigation 1, Part 1, pp. 10-16</p>

<p>from their environment into their bodies.</p> <p>Make observations of the features of many different kinds of plants within an environment to identify and begin building a list of some of the basic needs these organisms share, such as water, light, etc.</p> <p>Describe the way that most plants manage to bring water from the environment into the plant.</p>	<p>Investigation 5, Part 4, pp. 25-27 Science Stories, pp. 6, 10, 18</p> <p>Trees Investigation 1, Parts 2, 8, pp. 15-19, 35-37 Science Stories, p. 3</p> <p>Trees Investigation 1, Parts 2, 8, pp. 15-19, 35-37</p>
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Topic

F. Ecology

Indicator

1. Investigate a variety of familiar places where plants and animals live to describe the place and the living things found there.

Objectives	FOSS
<p>Describe observations using drawings, oral or written text of the place and some of the living things found there.</p> <p>Based on the observations collected at each place compare the plants and animals found there.</p> <p style="padding-left: 40px;">Location Activity Movement Features</p> <p>Describe ways that animals and plants found in each place interact with each other and with their environment.</p>	<p>Animals Two by Two Investigation 1, Parts 1-3, pp. 10-25 Investigation 3, Parts 1-2, pp. 8-16 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 4-23</p> <p>Trees Investigation 1, Part 1, pp. 7-14 Investigation 2, Part 1, pp. 6-9 Science Stories, pp. 3-12</p> <p>FOSS provides the opportunity to address this objective. See for example:</p> <p>Animals Two by Two Investigation 1, Parts 1-4, pp. 10-29 Investigation 3, Part 1, pp. 8-12 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 4-23</p> <p>Trees Investigation 1, Part 1, pp. 7-14 Investigation 2, Part 1, pp. 6-9 Science Stories, pp. 3-12</p> <p>Animals Two by Two Investigation 1, Parts 2-3, pp. 17-25 Investigation 3, Parts 1-2, pp. 8-16 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 8-12, 16, 20-23</p> <p>Trees FOSS Web, Activity: Who Lives Here</p>

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

A. Structure of Matter

Indicator

1. Compare the observable properties of a variety of objects and the materials they are made of using evidence from investigations.

Objectives	FOSS
<p>Examine and describe various objects in terms of the materials, such as clay, cloth, paper, etc. from which they are made.</p>	<p>Wood and Paper Investigation 1, Parts 1-2, pp. 8-19 Investigation 2, Parts 1-4, pp. 8-23 Investigation 4, Parts 1-2, pp. 8-18 Science Stories, pp. 3-8, 13-18 FOSS Web, Activity: Where is Wood?</p> <p>Fabric Investigation 1, Parts 2, 4, pp. 12-15, 20-22 Science Stories, pp. 3-13</p>
<p>Based on data, describe the observable properties, such as size, shape, color, and texture of a variety of objects.</p>	<p>Wood and Paper Investigation 1, Parts 1-3, pp. 8-23 Investigation 3, Parts 8-24</p> <p>Fabric Investigation 1, Parts 1-2, pp. 6-15 Investigation 2, Part 1, pp. 7-11</p>
<p>Identify and compare the properties of materials objects are made of and the properties of the objects.</p>	<p>Wood and Paper Investigation 1, Part 3, pp. 20-23 Investigation 2, Parts 1-4, pp. 8-23 Investigation 3, Parts 1-4, pp. 8-25</p> <p>Fabric Investigation 2, Part 1, pp. 7-11 Science Stories, pp. 16-23</p>

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

A. Mechanics

Indicator

1. Compare the different ways objects move.

Objectives	FOSS
<p>Given many different objects, make them move and describe and compare how they move.</p> <p align="center">Straight Round and round</p>	<p>Fabric Investigation 1, Parts 5-6, pp. 23-33</p> <p>Wood and Paper Investigation 1, Part 4, pp. 24-27 Investigation 2, Part 1, pp. 8-11 Investigation 3, Part 2-3, pp. 13-21</p>

Back and forth Zig-Zag	
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Indicator

2. Explain that there must be a cause for changes in the motion of an object

Objectives	FOSS
<p>Observe and describe the ways in which a variety of objects' motion can be changed.</p> <p>Sped up from a standstill Slow down to a stop Go faster Go slower No change Change direction</p> <p>Based on observations, identify what caused the changes in an object's motion. Push Pull</p>	<p>Wood and Paper Investigation 1, Part 4, pp. 24-27 Investigation 2, Part 1, pp. 8-11</p> <p>Fabric Investigation 1, Parts 5-6, pp. 23-33</p> <p>Wood and Paper Investigation 1, Part 4, pp. 24-27 Investigation 2, Part 1, pp. 8-11</p> <p>Fabric Investigation 1, Parts 5-6, pp. 23-33</p>

Topic

B. Thermodynamics

Indicator

1. Describe that sunlight warms the land, air, and water using observations and age appropriate tools.

Objectives	FOSS
<p>Recognize and describe temperature changes of the land, air, and water before and after the sun warms them using senses and thermometers.</p>	<p>Trees Tools for Observing Weather, pp. 10-13</p>

Topic

C. Electricity and Magnetism

Indicator

3. Observe and gather information from the explorations to describe how magnets affect some objects.

Objectives	FOSS
<p>Observe and describe what happens when magnets are placed on or near objects made of different materials.</p> <p>Raise and seek answers to questions about what happened to the objects investigated and/or to the magnet.</p>	

Topic

D. Wave Interactions

Indicator

2. Observe and describe that sound is produced by vibrating objects.

Objectives	FOSS
<p>Observe and relate the vibrations of objects that make sounds (drums, guitar strings, and tuning forks) to the sounds felt and heard.</p> <p>Based on information from observations identify the source of vibrations in familiar objects that produce sounds.</p>	

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

B. Environmental Issues

Indicator

1. Identify aspects of the environment that are made by humans and those that are not made by humans.

Objectives	FOSS
<p>Identify features of the natural environment, such as parks, zoos, buildings, etc. that are made by humans.</p> <p>Identify features of the natural environment that are not made by humans.</p>	<p>Trees Science Stories, pp. 4, 12</p> <p>Fabric Science Stories, pp. 12-13, 17</p> <p>Wood and Paper Investigation 2, Parts 3-4, pp. 16-23 Science Stories, pp. 2, 6-7, 13, 19</p> <p>Fabric Science Stories, pp. 4, 6, 8, 10</p> <p>Wood and Paper Science Stories, pp. 4, 12</p> <p>Trees Investigation 1-3 Science Stories, pp. 3-12, 14-17</p> <p>Animals Two by Two Investigation 1-5 Science Stories, pp. 4-23</p>

Grade One

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Topic

A. Constructing Knowledge

Indicator

1. Raise questions about the world around them and be willing to seek answers to some of them by making careful observations and trying things out.

Objectives	FOSS
<p>Describe what can be learned about things by just observing those things carefully and adding information by sometimes doing something to the things and noting what happens.</p>	<p>Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22</p> <p>Balance and Motion Investigation 2, Parts 1-3, pp. 8-24</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Insects and Plants Investigation 3, Parts 1-3, pp. 129-151</p>
<p>Seek information through reading, observation, exploration, and investigations.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25 Science Stories, pp. 3-47</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Science Stories, pp. 3-31</p> <p>New Plants Investigation 2, Parts 1-3, pp. 8-28 Science Stories, pp. 3-43</p> <p>Plants and Animals Investigation 3, Parts 1-3, pp. 120-140</p> <p>Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>
<p>Use tools such as thermometers, magnifiers, rulers, or balances to extend their senses and gather data.</p>	<p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Insects Investigation 2, Parts 1-3, pp. 8-24</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-3, pp. 8-23</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 5, Parts 1-3, pp. 206-225</p>
<p>Explain that when a science investigation is done the way it was done before, we expect to get a very similar result.</p>	<p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1, 3, pp. 8-14, 19-25</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>

<p>Participate in multiple experiences to verify that science investigations generally work the same way in different places.</p> <p>Suggest things that you could do to find answers to questions raised by observing objects and/or phenomena (events such as, water disappearing from the classroom aquarium or a pet's water bowl).</p> <p>Use whole numbers and simple, everyday fractions in ordering, counting, identifying, measuring, and describing things and experiences.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25</p> <p>Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22</p> <p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 5, Parts 1-3, pp. 206-225</p> <p>Solids and Liquids Investigation 4, Part 3, pp. 23-27</p> <p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Pebbles, Sand and Silt Investigation 4, Part 3, pp. 19-25</p> <p>Plants and Animals Investigation 2, Parts 1-3, pp. 87-108</p> <p>Balance and Motion Investigation 1, Math Extension, p. 27</p> <p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Pebbles, Sand and Silt Investigation 2, Math Extension, p. 31</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. People are more likely to believe your ideas if you can give good reasons for them.

Objectives	FOSS
<p>Provide reasons for accepting or rejecting ideas examined.</p> <p>Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas.</p>	<p>FOSS provides opportunity for students to address this objective through investigations and discussions. See below:</p> <p>New Plants Investigation 2, Parts 1-2, pp. 8-19</p> <p>Air and Weather Investigation 1, Parts 2, 5, pp. 13-16, 27-33</p> <p>Balance and Motion Investigation 1, Part 2, pp. 14-18</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p> <p>Air and Weather Investigation 1, Parts 4-6, pp. 21-38</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 3-4, pp. 18-29</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 3, Parts 1-3, pp. 129-151 Investigation 5, Parts 1-3, pp. 206-225</p>

<p>Explain why it is important to make some fresh observations when people give different descriptions of the same thing.</p>	<p>FOSS provides opportunity to address this objective through investigations and activities. See below:</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p> <p>Air and Weather Investigation 1, Parts 4-6, pp. 21-38</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 3-4, pp. 18-29</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p>
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Topic

C. Communicating Scientific Information

Indicator

1. Ask, "How do you know?" in appropriate situations and attempt reasonable answers when others ask them the same question.

Objectives	FOSS
<p>Describe things as accurately as possible and compare observations with those of others.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25</p> <p>Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-17</p> <p>New Plants Investigation 1, Part 3, pp. 23-30</p> <p>Plants and Animals Investigation 1, Parts 1-3, pp. 47-62</p> <p>Insects and Plants Investigation 2, Part 3, pp. 105-115 Investigation 3, Parts 1-3, pp. 129-151</p>
<p>Describe and compare things in terms of number, shape, texture, size, weight, color, and motion.</p>	<p>Solids and Liquids Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 1-3, pp. 10-27</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29</p> <p>Balance and Motion Investigation 2, Parts 1-3, pp. 8-25</p> <p>Plants and Animals Investigation 4, Parts 1-2, pp. 151-163</p> <p>Insects and Plants Investigation 2, Part 3, pp. 105-115</p>
<p>Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).</p>	<p>Insects Investigation 1, Part 1, pp. 8-16</p> <p>New Plants Investigation 2, Part 1, pp. 8-14</p> <p>Solids and Liquids Investigation 2, Part 3, pp. 21-27</p> <p>Plants and Animals Investigation 1, Part 3, pp. 63-72</p> <p>Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 5, Part 3, pp. 219-225</p>

<p>Have opportunities to work with a team, share findings with others, and recognize that all team members should reach their own conclusions about what the findings mean.</p>	<p>FOSS investigations have students working in teams for most investigations. See below: New Plants Investigation 1, Parts 1-3, pp. 8-30 Insects Investigation 4, Parts 1-5, pp. 10-31 Air and Weather Investigation 2, Part 2, pp. 14-19 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>
<p>Recognize that everybody can do science and invent things and ideas.</p>	<p>FOSS provides the opportunity for teachers to address this objective. See below: Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Air and Weather Investigation 1, Parts 4-6, pp. 21-38 Pebbles, Sand and Silt Investigation 2, Parts 3-4, pp. 18-29</p>

Topic

D. Technology

Indicator

1. Design and make things with simple tools and a variety of materials.

Objectives	FOSS
<p>Make something out of paper, cardboard, wood, plastic, metal, or existing objects that can actually be used to perform a task.</p>	<p>Pebbles, Sand and Silt Investigation 3, Parts 2-5, pp. 12-29 Air and Weather Investigation 1, Part 3, pp. 17-20 Investigation 3, Part 3, pp. 17-21</p>
<p>Recognize that tools are used to do things better or more easily and to do some things that could not otherwise be done at all.</p>	<p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27 Pebbles, Sand and Silt Investigation 2, Parts 1-3, pp. 8-23 Insects Investigation 1, Parts 1-3, pp. 8-25 Insects and Plants Investigation 3, Parts 1-3, pp. 129-151 Investigation 5, Parts 1-3, pp. 206-225</p>
<p>Assemble, describe, take apart and reassemble constructions using interlocking blocks, erector sets and the like.</p>	<p>Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 2, Parts 1-3, pp. 8-25 Investigation 3, Parts 1-2, pp. 6-18 Solids and Liquids Investigation 1, Part 3, pp. 21-24 Investigation 1, Science Extension, p. 28</p>
<p>Recognize that some kinds of materials are better than others for making any particular thing, for example, materials that are better in some ways (such as stronger and cheaper) may be worse in other ways (such as heavier</p>	<p>Pebbles, Sand and Silt Investigation 3, Parts 2-5, pp. 12-29 Air and Weather Investigation 1, Part 3, pp. 17-20 Investigation 3, Parts 3, 5, pp. 17-21, 28-33</p>

and harder to cut). Explain that sometimes it is not possible to make or do everything that is designed.	FOSS provides the opportunity for teachers to address this objective in the above investigations.
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Indicator

2. Practice identifying the parts of things and how one part connects to and affects another.

Objectives	FOSS
Investigate a variety of objects to identify that most things are made of parts	Balance and Motion Investigation 3, Parts 1-2, pp. 6-18 Air and Weather Investigation 1, Part 6, pp. 34-38 Insects Investigation 1, Part 1, pp. 8-15 Plants and Animals Investigation 2, Parts 1-3, pp. 87-108 Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 2, Part 3, pp. 105-115
Explain that something may not work if some of its parts are missing.	Pebbles, Sand and Silt Investigation 3, Part 6, pp. 24-29 Air and Weather Investigation 1, Parts 3, 6, pp. 17-20, 34-38 Balance and Motion Investigation 1, Part 4, pp. 24-28 Insects and Plants Investigation 1, Part 1, pp. 52-61
Explain that when parts are put together, they can do things that they couldn't do by themselves.	Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 2, Part 1, pp. 8-13 Investigation 3, Parts 1-2, pp. 6-18 Air and Weather Investigation 1, Part 3, pp. 17-20 Pebbles, Sand and Silt Investigation 3, Part 6, pp. 24-29

Indicator

3. Examine a variety of physical models and describe what they teach about the real things they are meant to resemble.

Objectives	FOSS
Explain that a model of something is different from the real thing but can be used to learn something about the real thing.	FOSS provides the opportunity to address this objective. See below: Air and Weather Investigation 1, Parts 3, 6, pp. 17-21, 34-38 Pebbles, Sand and Silt Investigation 3, Part 5, pp. 24-29 Balance and Motion Investigation 1, Part 3, pp. 19-23
Realize that one way to describe something is to say how it is like something	FOSS provides the opportunity to address this objective. See below: Solids and Liquids

else	Investigation 4, Part 3, pp. 23-27 Pebbles, Sand and Silt Investigation 4, Part 3, pp. 19-25 Air and Weather Investigation 1, Part 6, pp. 34-38
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Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

D. Astronomy

Indicator

2. Recognize that there is a relationship between the sun and the earth.

Objectives	FOSS
Identify ways that the sun affects the earth including that the sun warms the earth and provides light.	Air and Weather Investigation 2, Part 2, pp. 14-19 Science Stories, pp. 7, 10, 18-21 FOSS Web, Activity: What's the Weather

Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

1. Describe observable changes in water on the surface of the Earth.

Objectives	FOSS
<p>Cite examples of the sun's effect on what happens to water on the Earth's surface.</p> <p>Water disappears from puddles, wet surfaces after rain, any open container, etc.</p> <p>Water can be a liquid or a solid and go back and forth from one form to another</p>	Solids and Liquids Investigation 2, Science Extension, p. 31 Investigation 4, Science Extension, p.29 Science Stories, pp. 16, 21

Indicator

2. Describe that some events in nature have repeating patterns.

Objectives	FOSS
Observe and compare day-to-day weather changes.	Air and Weather Investigation 2, Parts 1-4, pp. 8-27 Investigation 4, Part 1, pp. 8-11
Observe, record, and compare weather changes from month to month.	Air and Weather Investigation 4, Parts 1-2, pp. 8-18
Compare temperatures and type and amount of precipitation across the months.	Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27
Identify the impact of weather changes	Air and Weather

on daily activities.	Science Stories, pp. 18-21 FOSS Web, Activity: What's the Weather
Identify and describe patterns of weather conditions based on data collected.	Air and Weather Investigation 4, Parts 1-2, pp. 8-18

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

A. Diversity of Life

Indicator

1. Compare and explain how external features of plants and animals help them survive in different environments.

Objectives	FOSS
Use the senses and magnifying instruments to examine a variety of plants and animals to describe external features and what they do.	Insects Investigation 1, Parts 1-3, pp. 8-25 Investigation 2, Parts 1-3, pp. 8-24 New Plants Investigation 1, Part 3, pp. 23-30 Investigation 2, Parts 1-3, pp. 8-28 Plants and Animals Investigation 3, Parts 1-2, pp. 120-134 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 4, Parts 1-5, pp. 166-191
Compare similar features in some animals and plants and explain how each of these enables the organism to satisfy basic needs.	New Plants Investigation 1, Part 2, pp. 13-22 Investigation 2, Part 1, pp. 8-14 Science Stories, pp. 3-7 Insects Investigation 1, Part 1, pp. 8-15 Investigation 3, Part 2, pp. 12-20 Investigation 4, Parts 2-3, pp. 14-22 Science Stories, pp. 6-15 Plants and Animals Investigation 3, Part 2, pp. 128-134 Science Resources, pp. 3-7, 21-24, 47-50 Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 3, Part 2, pp. 134-14 Investigation 4, Parts 2-3, pp. 170-78 Science Resources, pp. 30-33
Use the information collected to ask and compare answers to questions about how an organism's external features contribute to its ability to survive in an environment.	New Plants Investigation 1, Part 3, pp. 23-30 Investigation 2, Part 2, pp. 15-19 Science Stories, pp. 3-7, 22-43 Insects Investigation 1, Part 1, pp. 8-15 Investigation 4, Parts 3-4, pp. 19-27 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 6-15 Plants and Animals

<p>Classify organisms according to one selected feature, such as body covering, and identify other similarities shared by organisms within each group formed.</p>	<p>Investigation 2, Part 2, pp. 96-103 Investigation 3, Parts 2-3, pp. 128-140 Science Resources, pp. 29-30, 32-36, 41-42, 44-45, 47-50</p> <p>Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 4, Parts 3-4, pp. 175-186 Science Resources, pp. 26-33</p> <p>Insects Investigation 1, Part 2, pp. 16-21 Investigation 3, Part 3, pp. 21-26 Investigation 5, Part 3, pp. 20-24 Science Stories, pp. 12-13</p> <p>Insects and Plants Investigation 1, Part 2, pp. 62-70 Investigation 3, Part 3, pp. 105-115 Investigation 5, Part 3, pp. 219-225 Science Resources, pp. 30-33</p>
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Topic

B. Cells

Indicator

1. Describe evidence from investigations that living things are made of parts too small to be seen with the unaided eye

Objectives	FOSS
<p>Use magnifying instruments to observe parts of a variety of living things, such as leaves, seeds, insects, worms, etc. to describe (drawing or text) parts seen with the magnifier.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25 Investigation 2, Parts 1-3, pp. 8-24 Investigation 3, Parts 1-3, pp. 8-26</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 3, Parts 1-3, pp. 145-151 Investigation 5, Parts 1-3, pp. 206-225</p>
<p>Use information gathered from observations to compare the descriptions (drawings or text) of the different parts seen.</p>	<p>Insects Investigation 4, Parts 1-5, pp. 10-31 Investigation 5, Parts 1-3, pp. 10-24 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 12-25</p> <p>Insects and Plants Investigation 4, Parts 1-5, pp. 166-191 Investigation 5, parts 1-3, pp. 206-225 Science Resources, pp. 30-33</p>
<p>Describe some of the ideas or questions that might result from examining organisms more closely.</p>	<p>FOSS provides the opportunity to address this objective. See examples above.</p>

Indicator

2. Provide evidence that all organisms are made of parts that help them carry out the basic functions of life.

Objectives	FOSS
<p>Gather information and direct evidence that humans and other animals have different</p>	<p>Insects Investigation 1, Parts 1-2, pp. 8-21</p>

<p>body parts used to seek, find, and take in food.</p> <p>Investigate and identify parts of the body that alert humans and other animals to danger and help them to fight, hide or get out of danger.</p> <p>Describe some parts of plants and describe what they do for the plant.</p> <p>Respond, giving reasons to support the response, to the statement "All living things are made of parts."</p>	<p>Investigation 2, Parts 1-2, pp. 8-19 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 6-15 New Plants Science Stories, pp. 22-43 Plants and Animals Investigation 3, Parts 2-3, pp. 120-134 Science Resources, pp. 22-23, 30, 35-36, 41-42, 44, 47-50 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 3, Parts 2-3, pp. 134-151 Science Resources, pp. 30-33</p> <p>Insects Investigation 2, Part 2, pp. 14-19 Investigation 5, Part 3, pp. 20-24 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 8-11 New Plants Science Stories, pp. 23, 27, 29, 30, 32, 35, 39 Plants and Animals Science Resources 35, 38, 41-42, 45 Insects and Plants Investigation 5, Part 3, pp. 219-225 Science Resources, pp. 26-29</p> <p>New Plants Investigation 1, Part 3, pp. 23-30 Investigation 3, Parts 1-3, pp. 8-25 Investigation 4, Part 1, pp. 7-12 Science Stories, pp. 3-15 FOSS Web, Activity: Watch It Grow Plants and Animals Investigation 2, Parts 1-3, pp. 87-108 Investigation 4, Part 1, pp. 151-163 Science Resources, pp. 3-7 Insects and Plants Investigation 2, Part 3, pp. 105-115 Science Resources, pp. 15-19</p> <p>Insects Investigation 1, Parts 1-2, pp. 8-21 Investigation 4, Parts 2-5, pp. 14-31 Investigation 5, Part 3, pp. 20-24 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 3-15 New Plants Investigation 1, Part 3, pp. 23-30 Investigation 2, Parts 1-3, pp. 8-28 Science Stories, pp. 40-43 Plants and Animals Investigation 2, Parts 1-3, pp. 87-108 Science Resources, pp. 3-7, 47-50 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 4, Parts 2-5, pp. 170-191 Science Resources, pp. 15-19, 30-33</p>
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Topic

C. Genetics

Indicator

1. Explain that there are differences among individuals in any population.

Objectives	FOSS
<p>Examine a variety of populations of plants and animals (including humans), to identify ways that individual members of that population are different from one another.</p> <p>Make a list of possible advantages and disadvantages of differences of individuals in a population of organisms.</p>	<p>Insects Investigation 1, Parts 1-2, pp. 8-21 Investigation 3, Parts 2-3, pp. 12-26 Investigation 4, Part 4, pp. 23-27 Investigation 6, Parts 1-2, pp. 8-17 Science Stories, pp. 36-38, 42-46</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 3, Parts 2-3, pp. 134-151 Science Resources, pp. 2-23, 42</p> <p>FOSS provides the opportunity to address this objective. See above.</p>

Indicator

2. Recognize that all living things have offspring, usually with two parents involved.

Objectives	FOSS
<p>Examine a variety of living things and their offspring and describe what each parent and offspring looks like.</p> <p>Identify similarities and differences among the offspring and between the offspring and each parent.</p> <p>Based on observations, construct an appropriate response to the question "Are parents and offspring more similar than they are different?"</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25 Investigation 2, Parts 1-3, pp. 8-24 Investigation 3, Parts 1-3, pp. 8-26 Investigation 5, Parts 1-3, pp. 10-24 Science Stories, pp. 16-33</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 3, Parts 1-3, pp. 129-151 Investigation 5, Parts 1-3, pp. 206-225 Science Resources, pp. 37-55</p> <p>Insects Investigation 1, Parts 1-3, pp. 8-25 Investigation 2, Parts 1-3, pp. 8-24 Investigation 3, Parts 1-3, pp. 8-26 Investigation 5, Parts 1-3, pp. 10-24 Science Stories, pp. 16-33</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 3, Parts 1-3, pp. 129-151 Investigation 5, Parts 1-3, pp. 206-225 Science Resources, pp. 37-55</p> <p>FOSS provides the opportunity to address this objective. See above.</p>

Topic

E. Flow of Matter and Energy

Indicator

1. Describe some of the ways in which animals depend on plants and on each other.

Objectives	FOSS
Examine organisms in a wide variety of environments to gather information on how animals satisfy their need for food. Some animals eat only plants Some animals eat only other animals Some animals eat both plants and other animals	Insects Investigation 1, Part 1, pp. 8-15 Investigation 3, Part 2, pp. 12-20 Investigation 4, Part 2, pp. 14-18 Science Stories, pp. 6-7 New Plants Science Stories, pp. 23-24, 26-27, 29-30, 32-33, 35-36, 38-39, 40-43 Plants and Animals Investigation 3, Parts 2-3, pp. 128-140 Science Resources, pp. 22-23, 30, 32-34, 35-36, 38-42, 44-45, 47-50 Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 3, Part 2, pp. 134-144 Investigation 4, Part 2, pp. 170-174 Science Resources, pp. 6-7

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Objectives	FOSS
none	

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

C. Electricity and Magnetism

Indicator

3. Describe the effect magnets have on a variety of objects.

Objectives	FOSS
Classify materials based on their behavior in the presence of a magnet.	Balance and Motion Science Stories, pp. 18-21 Solids and Liquids Investigation 3, Science Extension, p. 31
Describe how the magnet affects the behavior of objects within each group.	Solids and Liquids Investigation 3, Science Extension, p. 31 Balance and Motion Science Stories, pp. 18-21

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

B. Environmental Issues

Indicator

1. Recognize that caring about the environment is an important human activity.

Objectives	FOSS
<p>Recognize and describe that individual and group actions, such as recycling, help the environment.</p> <p>Recognize and describe that individual and group actions, such as littering, harm the environment.</p> <p>Give reasons why people should take care of their environments.</p>	<p>New Plants Investigation 1, p. 29</p> <p>Insects and Plants Investigation 2, Part 3, p. 113</p>

Grade Two

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Topic

A. Constructing Knowledge

Indicator

1. Raise questions about the world around them and be willing to seek answers to some of them by making careful observations and trying things out.

Objectives	FOSS
<p>Describe what can be learned about things by just observing those things carefully and adding information by sometimes doing something to the things and noting what happens.</p>	<p>Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22</p> <p>Balance and Motion Investigation 2, Parts 1-3, pp. 8-24</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Insects and Plants Investigation 3, Parts 1-3, pp. 129-151</p>
<p>Seek information through reading, observation, exploration, and investigations.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25 Science Stories, pp. 3-47</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Science Stories, pp. 3-31</p> <p>New Plants Investigation 2, Parts 1-3, pp. 8-28 Science Stories, pp. 3-43</p> <p>Plants and Animals Investigation 3, Parts 1-3, pp. 120-140</p> <p>Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>
<p>Use tools such as thermometers, magnifiers, rulers, or balances to extend their senses and gather data.</p>	<p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Insects Investigation 2, Parts 1-3, pp. 8-24</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-3, pp. 8-23</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 5, Parts 1-3, pp. 206-225</p>
<p>Explain that when a science investigation is done the way it was done before, we expect to get a very similar result.</p>	<p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1, 3, pp. 8-14, 19-25</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>
<p>Participate in multiple experiences to verify that science investigations generally</p>	<p>FOSS provides the opportunity to address this</p>

<p>work the same way in different places.</p> <p>Suggest things that you could do to find answers to questions raised by observing objects and/or phenomena (events such as, water disappearing from the classroom aquarium or a pet's water bowl).</p> <p>Use whole numbers and simple, everyday fractions in ordering, counting, identifying, measuring, and describing things and experiences.</p>	<p>objective. See below:</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25</p> <p>Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22</p> <p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 5, Parts 1-3, pp. 206-225</p> <p>Solids and Liquids Investigation 4, Part 3, pp. 23-27</p> <p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Pebbles, Sand and Silt Investigation 4, Part 3, pp. 19-25</p> <p>Plants and Animals Investigation 2, Parts 1-3, pp. 87-108</p> <p>Balance and Motion Investigation 1, Math Extension, p. 27</p> <p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Pebbles, Sand and Silt Investigation 2, Math Extension, p. 31</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. People are more likely to believe your ideas if you can give good reasons for them.

Objectives	FOSS
<p>Provide reasons for accepting or rejecting ideas examined.</p> <p>Develop reasonable explanations for observations made, investigations completed, and information gained by sharing ideas and listening to others' ideas.</p> <p>Explain why it is important to make</p>	<p>FOSS provides opportunity for students to address this objective through investigations and discussions. See below:</p> <p>New Plants Investigation 2, Parts 1-2, pp. 8-19</p> <p>Air and Weather Investigation 1, Parts 2, 5, pp. 13-16, 27-33</p> <p>Balance and Motion Investigation 1, Part 2, pp. 14-18</p> <p>Plants and Animals Investigation 1, Parts 1-2, pp. 47-62</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p> <p>Air and Weather Investigation 1, Parts 4-6, pp. 21-38</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 3-4, pp. 18-29</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 3, Parts 1-3, pp. 129-151 Investigation 5, Parts 1-3, pp. 206-225</p> <p>FOSS provides opportunity to address this</p>

<p>some fresh observations when people give different descriptions of the same thing.</p>	<p>objective through investigations and activities. See below: Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Air and Weather Investigation 1, Parts 4-6, pp. 21-38 Pebbles, Sand and Silt Investigation 2, Parts 3-4, pp. 18-29 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p>
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Topic

C. Communicating Scientific Information

Indicator

1. Ask, "How do you know?" in appropriate situations and attempt reasonable answers when others ask them the same question.

Objectives	FOSS
<p>Describe things as accurately as possible and compare observations with those of others.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25 Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-17 New Plants Investigation 1, Part 3, pp. 23-30 Plants and Animals Investigation 1, Parts 1-3, pp. 47-72 Insects and Plants Investigation 2, Part 3, pp. 105-115 Investigation 3, Parts 1-3, pp. 129-151</p>
<p>Describe and compare things in terms of number, shape, texture, size, weight, color, and motion.</p>	<p>Solids and Liquids Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 1-3, pp. 10-27 Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Balance and Motion Investigation 2, Parts 1-3, pp. 8-25 Plants and Animals Investigation 4, Parts 1-2, pp. 151-163 Insects and Plants Investigation 2, Part 3, pp. 105-115</p>
<p>Draw pictures that correctly portray at least some features of the thing being described and sequence events (seasons, seed growth).</p>	<p>Insects Investigation 1, Part 1, pp. 8-16 New Plants Investigation 2, Part 1, pp. 8-14 Solids and Liquids Investigation 2, Part 3, pp. 21-27 Plants and Animals Investigation 1, Part 3, pp. 63-72 Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 5, Part 3, pp. 219-225</p>
<p>Have opportunities to work with a team, share findings with others, and recognize that all team members should reach their own</p>	<p>FOSS investigations have students working in teams for most investigations. See below: New Plants</p>

<p>conclusions about what the findings mean.</p> <p>Recognize that everybody can do science and invent things and ideas.</p>	<p>Investigation 1, Parts 1-3, pp. 8-30 Insects Investigation 4, Parts 1-5, pp. 10-31 Air and Weather Investigation 2, Part 2, pp. 14-19 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p> <p>FOSS provides the opportunity for teachers to address this objective. See below: Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Air and Weather Investigation 1, Parts 4-6, pp. 21-38 Pebbles, Sand and Silt Investigation 2, Parts 3-4, pp. 18-29</p>
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Topic

D. Technology

Indicator

1. Design and make things with simple tools and a variety of materials.

Objectives	FOSS
<p>Make something out of paper, cardboard, wood, plastic, metal, or existing objects that can actually be used to perform a task.</p> <p>Recognize that tools are used to do things better or more easily and to do some things that could not otherwise be done at all.</p> <p>Assemble, describe, take apart and reassemble constructions using interlocking blocks, erector sets and the like.</p> <p>Recognize that some kinds of materials are better than others for making any particular thing, for example, materials that are better in some ways (such as stronger and cheaper) may be worse in other ways (such as heavier and harder to cut).</p> <p>Explain that sometimes it is not</p>	<p>Pebbles, Sand and Silt Investigation 3, Parts 2-5, pp. 12-29 Air and Weather Investigation 1, Part 3, pp. 17-20 Investigation 3, Part 3, pp. 17-21</p> <p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27 Pebbles, Sand and Silt Investigation 2, Parts 1-3, pp. 8-23 Insects Investigation 1, Parts 1-3, pp. 8-25 Insects and Plants Investigation 3, Parts 1-3, pp. 129-151 Investigation 5, Parts 1-3, pp. 206-225</p> <p>Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 2, Parts 1-3, pp. 8-25 Investigation 3, Parts 1-2, pp. 6-18 Solids and Liquids Investigation 1, Part 3, pp. 21-24 Investigation 1, Science Extension, p. 28</p> <p>Pebbles, Sand and Silt Investigation 3, Parts 2-5, pp. 12-29 Air and Weather Investigation 1, Part 3, pp. 17-20 Investigation 3, Parts 3, 5, pp. 17-21, 28-33</p> <p>FOSS provides the opportunity for teachers to</p>

possible to make or do everything that is designed.	address this objective in the above investigations.
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Indicator

2. Practice identifying the parts of things and how one part connects to and affects another.

Objectives	FOSS
Investigate a variety of objects to identify that most things are made of parts	<p>Balance and Motion Investigation 3, Parts 1-2, pp. 6-18</p> <p>Insects Investigation 1, Part 1, pp. 8-15</p> <p>Plants and Animals Investigation 2, Parts 1-3, pp. 87-108</p> <p>Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 2, part 3, pp. 105-115</p>
Explain that something may not if some of its parts are missing. work	<p>Pebbles, Sand and Silt Investigation 3, Part 6, pp. 24-29</p> <p>Air and Weather Investigation 1, Parts 3, 6, pp. 17-20, 34-38</p> <p>Balance and Motion Investigation 1, Part 4, pp. 24-28</p>
Explain that when parts are put together, they can do things that they couldn't do by themselves.	<p>Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 2, Part 1, pp. 8-13 Investigation 3, Parts 1-2, pp. 6-18</p> <p>Air and Weather Investigation 1, Part 3, pp. 17-20</p> <p>Pebbles, Sand and Silt Investigation 3, Part 6, pp. 24-29</p>

Indicator

3. Examine a variety of physical models and describe what they teach about the real things they are meant to resemble.

Objectives	FOSS
Explain that a model of something is different from the real thing but can be used to learn something about the real thing.	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Air and Weather Investigation 1, Parts 3, 6, pp. 17-21, 34-38</p> <p>Pebbles, Sand and Silt Investigation 3, Part 5, pp. 24-29</p> <p>Balance and Motion Investigation 1, Part 3, pp. 19-23</p>
Realize that one way to describe something is to say how it is like something else.	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Solids and Liquids Investigation 4, Part 3, pp. 23-27</p> <p>Pebbles, Sand and Silt Investigation 4, Part 3, pp. 19-25</p> <p>Air and Weather Investigation 1, Part 6, pp. 34-38</p>

Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

A. Materials and Processes That Shape A Planet

Indicator

1. Describe and compare properties of a variety of Earth materials.

Objectives	FOSS
<p>Classify a collection of rocks based on the properties that distinguish one type from another.</p>	<p>Pebbles, Sand and Silt Investigation 1, Parts 1-5, pp. 8-29 Investigation 1, Science Extension, p. 34 Science Stories, pp. 8-9</p>
<p>Collect soil from different locations and compare the properties of the samples.</p> <ul style="list-style-type: none"> Color Texture Reaction to water Remains of living things 	<p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25 Science Stories, pp. 20-21</p>
<p>Use examples of observations from places around the school and neighborhood to describe ways Earth materials can change.</p> <ul style="list-style-type: none"> Changes caused by humans and other animals Changes caused by water, wind, etc. 	<p>Pebbles, Sand and Silt Science Stories, pp. 3-5, 10-13, 16-19</p>

Topic

D. Astronomy

Indicator

1. Observe and describe changes over time in the properties, location, and motion of celestial objects.

Objectives	FOSS
<p>Identify and record observable properties of the sun, moon, and stars.</p>	<p>Air and Weather Investigation 4, Part 3, pp. 19-24</p>
<p>Identify and record the apparent visible changes in the shape of the moon over two months of observations.</p>	<p>Air and Weather Investigation 4, Part 3, pp. 19-24</p>
<p>Observe and record changes in the location of the sun and moon in the sky over time.</p>	<p>Air and Weather Investigation 4, Part 3, pp. 19-24</p>
<p>Describe and compare the patterns of change that occur in the sun and the moon.</p>	<p>Air and Weather Investigation 4, Part 3, pp. 19-24</p>

Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

1. Recognize and describe that the surface of Earth is more than half covered with water.

Objectives	FOSS
Identify the many locations where water is found.	
Describe the changes that occur to water found anywhere.	

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

C. Genetics

Indicator

1. Explain that there are identifiable stages in the life cycles (growth, reproduction, and death) of plants and animals.

Objectives	FOSS
Investigate and describe that seeds change and grow into plants.	New Plants Investigation 1, Parts 2-3, pp. 13-30 Investigation 2, Parts 1-3, pp. 8-28 Science Stories, pp. 8-11, 16-19 FOSS Web, Activity: Watch It Grow
Compare and describe the changes that occur in humans during their life cycle (birth, newborn, child, adolescent, adult, elder).	Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Science Resources, pp. 9-12 Insects and Plants Investigation 2, Parts 1-3, pp. 91-115 Science Resources, pp. 15-18
Given pictures of stages in the life cycle of a plant or an animal, determine the sequence of the stages in the life cycle.	FOSS provides the opportunity to address this objective. See below: Insects Investigation 1, Part 3, pp. 22-25 Investigation 2, Part 3, pp. 20-24 Investigation 3, Part 3, pp. 21-26 Investigation 5, Part 3, pp. 20-24 Science Stories, p. 24 Insects and Plants Investigation 1, Part 3, pp. 71-75 Investigation 3, Part 3, pp. 145-151 Investigation 4, Part 5, pp. 187-191 Investigation 5, Part 3, pp. 219-225 Science Resources, p. 46

Provide examples, using observations and information from readings that life cycles differ from species to species.	Insects Investigations 1-5 Science Stories, pp. 16-33 Insects and Plants Investigation 1, Part 3, pp. 71-75 Investigation 3, Part 3, pp. 145-151 Investigation 4, Part 5, pp. 187-191 Investigation 5, Part 3, pp. 219-225 Science Resources, pp. 37-53
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Topic

D. Evolution

Indicator

1. Observe and describe examples of variation (differences) among individuals of one kind within a population.

Objectives	FOSS
Observe and describe individuals in familiar animal populations, such as cats or dogs, to identify how they look alike and how they are different.	Insects Investigation 1, Parts 1-2, pp. 8-21 Investigation 2, Parts 1-23, p. 8-19 Investigation 5, Parts 1, 3, pp. 10-45, 20-24 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 36-28, 42-46 Plants and Animals Investigation 3, Part 2, pp. 128-134 Insects and Plants Investigation 1, Parts 1-2, pp. 52-70 Investigation 3, Part 3, pp. 145-151 Investigation 5, Parts 1, 3, pp. 206-211, 219-225 Science Resources, pp. 20-24
Examine pictures of organisms that lived long ago, such as dinosaurs, and describe how they resemble organisms that are alive today.	Pebbles, Sand and Silt Science Stories, pp. 26-31
Recognize that some kinds of organisms have completely disappeared.	Pebbles, Sand and Silt Science Stories, pp. 26-31

Topic

F. Ecology

Indicator

1. Explain that organisms can grow and survive in many very different habitats.

Objectives	FOSS
Investigate a variety of familiar and unfamiliar habitats and describe how animals and plants found there maintain their lives and survive to reproduce.	New Plants Science Stories, pp. 22-39 Animals and Plants Investigation 3, Parts 1-2, pp. 120-127 Science Resources, pp. 28-45
Explain that organisms live in habitats that provide their basic needs. Food Water	New Plants Science Stories, pp. 22-39 Animals and Plants Investigation 3, Parts 1-2, pp. 120-127 Science Resources, pp. 28-45

Air Shelter	
Explain that animals and plants sometimes cause changes in their environments.	New Plants Science Stories, pp. 30, 35 Pebbles, Sand and Silt Science Stories, p. 22 Animals and Plants Science Resources, pp. 9-11, 36

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

A. Structure of Matter

Indicator

1. Cite evidence from investigations that most things are made of parts.

Objectives	FOSS
Examine a variety of objects, such as toys, objects made from Legos or Tinker Toys to identify and describe the parts from which they are made.	Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 2, Parts 1-2, pp. 8-19 Investigation 3, Parts 1-2, pp. 6-18 Science Stories, pp. 23-24, 27 Air and Weather Investigation 1, Part 3, 6, pp. 17-20, 34-38 Investigation 3, Part 3, 5, pp. 17-21, 28-33
Take objects apart and rearrange the parts to identify and describe the ways the parts work together.	Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 3, Parts 1-2, pp. 6-18
Ask and seek answers to "What if" questions about the changes made to the objects and how they affect the way objects work, for example, if a part were left out of the object would it make a difference in how the object works?	Balance and Motion Investigation 1, Part 4, pp. 24-28 Investigation 3, Parts 1-2, pp. 6-18

Topic

B. Conservation of Matter

Indicator

1. Provide evidence from investigations that things can be done to materials to change some of their properties.

Objectives	FOSS
Based on evidence from investigations describe that materials, such as clay are not changed by certain actions, such as reshaping or breaking into pieces.	Pebbles, Sand and Silt Investigation 3, Parts 3-4, pp. 16-23
Ask and seek answers to questions about what happened to the materials if other things were done to them, such as being	Solids and Liquids Investigation 4, Parts 1-2, pp. 7-22 Investigation 4, Science Extension, p. 29 FOSS Web, Activity: Change It!

placed in a freezer, heated, etc.	
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Topic

D. Physical and Chemical Changes

Indicator

1. Provide evidence from investigations to identify processes that can be used to change physical properties of materials.

Objectives	FOSS
<p>Based on investigations, describe what changes occur to the observable properties of various materials when they are subjected to the processes of wetting, cutting, bending, and mixing.</p>	<p>Solids and Liquids Investigation 1, Parts 1-2, pp. 7-22 Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-17</p>
<p>Compare the observable properties of objects before and after they have been subjected to various processes.</p>	<p>Solids and Liquids Investigation 1, Parts 1-2, pp. 7-22 Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-17 FOSS Web, Activity: Change It!</p>
<p>Ask and seek answers to "What if" questions about what might happen to the materials if different processes, such as heating, freezing, and dissolving were used to change them.</p>	<p>Solids and Liquids Investigation 1, Parts 1-2, pp. 7-22 Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-17 FOSS Web, Activity: Change It!</p>

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur

Introduction

Topic

B. Thermodynamics

Indicator

1. Identify and describe ways in which heat can be produced.

Objectives	FOSS
<p>Recognize that things that give off light also give off heat.</p>	
<p>Describe methods of producing heat. Burning Friction between surfaces Electricity in wires</p>	
<p>Identify fuels that are used to produce light and heat in homes and schools.</p>	

Topic

C. Electricity and Magnetism

Indicator

1. Identify and describe the sources and uses of electricity in daily life.

Objectives	FOSS
<p>Identify sources of electricity.</p> <p>Electrical outlets Batteries</p> <p>Identify the devices that use electricity to produce light, heat, and sound. (Students should be cautioned not to experiment with sources of electricity without adult supervision.)</p>	

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

A. Natural Resources and Human Needs

Indicator

1. Recognize and explain how Earth's natural resources from the natural environment are used to meet human needs.

Objectives	FOSS
<p>Describe natural resources as something from the natural environment that is used to meet one's needs.</p> <p>Identify water, air, soil, minerals, animals, and plants as basic natural resources.</p> <p>Explain that food, fuels, and fibers are produced from basic natural resources.</p> <p>Identify ways that humans use Earth's natural resources to meet their needs.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Air and Weather Science Stories, pp. 3-6</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25 Science Stories, pp. 16-19, 20-21</p> <p>New Plants Science Stories, pp. 16-21</p> <p>Animals and Plants Science Resources, pp. 9-14</p> <p>New Plants Science Stories, pp. 16-21</p> <p>Animals and Plants Science Resources, pp. 9-14</p> <p>Pebbles, Sand and Silt Investigation 3, Parts 1-5, pp. 8-29 Science Stories, pp. 16-19</p> <p>New Plants Science Stories, pp. 16-121</p> <p>Animals and Plants Science Resources, pp. 9-14</p>

<p>Explain that some natural resources are limited and need to be used wisely.</p>	
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Topic

B. Environmental Issues

Indicator

1. Recognize and describe that the activities of individuals or groups of individuals can affect the environment.

Objectives	FOSS
<p>Identify and describe that individual and group actions, such as turning off lights, conserving water, recycling, picking up litter, or joining an organization can extend the natural resources of the environment.</p> <p>Identify and describe that individual and group actions, such as leaving lights on, wasting water, or throwing away recyclables, can limit the natural resources of the environment.</p>	<p>New Plants Investigation 1, p. 29</p> <p>Animals and Plants Investigation 2, Part 3, p. 113</p>

Grade Three

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Introduction

Topic

A. Constructing Knowledge

Indicator

1. Gather and question data from many different forms of scientific investigations which include reviewing appropriate print resources, observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.

Objectives	FOSS
<p>Support investigative findings with data found in books, articles, and databases, and identify the sources used and expect others to do the same.</p>	<p>FOSS provides the opportunity to address this objective. Student investigative findings could be researched to locate supportive evidence. FOSS Science Stories and Resources also lend support for some investigations.</p>
<p>Select and use appropriate tools hand lens or microscope (magnifiers), centimeter ruler (length), spring scale (weight), balance (mass), Celsius thermometer (temperature), graduated cylinder (liquid volume), and stopwatch (elapsed time) to augment observations of objects, events, and processes.</p>	<p>Measurement Investigations 1-4 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-22 Earth Materials Investigation 1, Part 1, pp. 8-15 Water Investigation 2, Part 3, pp. 19-24 Sun, Moon and Stars Investigation 1, Part 1, pp. 42-55 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160 Investigation 4, Part 1, pp. 171-180</p>
<p>Explain that comparisons of data might not be fair because some conditions are not kept the same.</p>	<p>FOSS provides the opportunity to address this objective. See below: Human Body Investigation 4, Part 2, pp. 17-19 Measurement Investigation 2, Part 3, pp. 18-24 Water Investigation 3, Parts 2-3, pp. 12-20 Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
<p>Recognize that the results of scientific investigations are seldom exactly the same, and when the differences are large, it is important to try to figure out why.</p>	<p>FOSS provides the opportunity to address this objective. See below: Human Body Investigation 4, Part 2, pp. 17-19 Measurement Investigation 2, Part 3, pp. 18-24 Water Investigation 3, Parts 2-3, pp. 12-20 Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Sun, Moon and Stars</p>

<p>Follow directions carefully and keep accurate records of one's work in order to compare data gathered.</p> <p>Identify possible reasons for differences in results from investigations including unexpected differences in the methods used or in the circumstances in which the investigation is carried out, and sometimes just because of uncertainties in observations.</p> <p>Judge whether measurements and computations of quantities are reasonable in a familiar context by comparing them to typical values when measured to the nearest:</p> <ul style="list-style-type: none"> Millimeter - length Square centimeter - area Milliliter - volume Newton - weight Gram - mass Second - time Degree ° - temperature 	<p>Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 3, Part 2, pp. 139-150</p> <p>FOSS provides the opportunity to address this objective. See citations above. Also, FOSS student worksheets and journals are provided for record-keeping.</p> <p>FOSS provides the opportunity to address this objective during post investigation discussions. See below: Human Body Investigation 4, Part 2, pp. 17-19 Measurement Investigation 2, Part 3, pp. 18-24 Water Investigation 3, Parts 2-3, pp. 12-20 Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Matter and Energy Investigation 3, Part 2, pp. 139-150 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p> <p>FOSS provides the opportunity to address this objective. See below: Measurement Investigations 1-4 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-22 Earth Materials Investigation 1, Part 1, pp. 8-15 Water Investigation 2, Part 3, pp. 19-24 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160 Investigation 4, Part 1, pp. 174-180</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. Seek better reasons for believing something than "Everybody knows that..." or "I just know" and discount such reasons when given by others.

Objectives	FOSS
<p>Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.</p>	<p>Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17 Matter and Energy Investigation 2, Part 2, pp. 103-114 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Investigation 2, Parts 1-2, pp. 79-100</p>

<p>Offer reasons for their findings and consider reasons suggested by others.</p>	<p>FOSS provides the opportunity to address this objective. See below: Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 79-100 Matter and Energy Investigation 4, Part 2, pp. 181-192</p>
<p>Review different explanations for the same set of observations and make more observations to resolve the differences.</p>	<p>FOSS provides the opportunity to address this objective. See below: Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Matter and Energy Investigation 2, Part 2, pp. 103-114 Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17</p>
<p>Keep a notebook that describes observations made, carefully distinguishes actual observations from ideas and speculations about what was observed, and is understandable weeks or months later.</p>	<p>FOSS provides the opportunity to address this objective. The Earth Materials module includes a journal for investigations. All modules advocate using the student record and response sheets as a possible student portfolio.</p>

Topic

C. Communicating Scientific Information

Indicator

1. Recognize that clear communication is an essential part of doing science because it enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world.

Objectives	FOSS
<p>Make use of and analyze models, such as tables and graphs to summarize and interpret data.</p> <p>Avoid choosing and reporting only the</p>	<p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-29 Measurement Investigation 4, Part 2, pp. 14-47 Human Body Investigation 4, Parts 1-3, pp. 8-29 Water Investigation 4, Part 3, pp. 19-23 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160</p> <p>FOSS investigations would provide the</p>

<p>data that show what is expected by the person doing the choosing.</p> <p>Submit work to the critique of others which involves discussing findings, posing questions, and challenging statements to clarify ideas.</p> <p>Construct and share reasonable explanations for questions asked.</p> <p>Recognize that doing science involves many different kinds of work and engages men and women of all ages and backgrounds.</p>	<p>opportunity to address this objective.</p> <p>FOSS provides the opportunity to address this objective through its post investigation discussions.</p> <p>FOSS provides the opportunity to address this objective through its post investigation discussions.</p> <p>Measurement Science Stories, pp. 14-15</p> <p>Ideas and Inventions Science Stories, pp. 18-22</p> <p>Magnetism and Electricity Science Stories, pp. 20-23</p> <p>Solids and Liquids Science Stories, pp. 6-9</p> <p>Sun, Moon and Stars Science Resources, pp. 44-46</p>
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Topic

D. Technology

Indicator

1. Develop designs and analyze the products: "Does it work?" "Could I make it work better?" "Could I have used better materials?"

Introduction

Objectives	FOSS
<p>Choose appropriate common materials for making simple mechanical constructions and repairing things.</p> <p>Realize that there is no perfect design and that usually some features have to be sacrificed to get others, for example, designs that are best in one respect (safety or ease of use) may be inferior in other ways (cost or appearance).</p> <p>Identify factors that must be considered in any technological design—cost, safety, environmental impact, and what will happen if the solution fails.</p>	<p>Magnetism and Electricity Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>FOSS provides the opportunity to address this objective through the above citations. See also:</p> <p>Magnetism and Electricity Science Stories, pp. 16-19</p> <p>Ideas and Inventions Science Stories, p. 21</p>

Indicator

2. Investigate a variety of mechanical systems and analyze the relationship among the parts.

Introduction

Objectives	FOSS
<p>Realize that in something that consists of many parts, the parts usually influence one another.</p> <p>Explain that something may not work as well (or at all) if a part of it is missing, broken, worn out, mismatched, or misconnected.</p>	<p>Magnetism and Electricity Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Matter and Energy Investigation 1, Part 1, pp. 50-62</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Magnetism and Electricity Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Matter and Energy Investigation 1, Part 1, pp. 50-62</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p>

Indicator

3. Examine and modify models and discuss their limitations.

Introduction

Objectives	FOSS
<p>Explain that a model is a simplified imitation of something and that a model's value lies in suggesting how the thing modeled works.</p> <p>Investigate and describe that seeing how a model works after changes are made to it may suggest how the real thing would work if the same were done to it.</p> <p>Explain that models, such as geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories can be used to represent objects, events, and processes in the real world, although such</p>	<p>Magnetism and Electricity Investigation 4, Part 1, pp. 8-13 Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 2, Part 1, pp. 8-13</p> <p>Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Investigation 3, Part 1, pp. 114-125 Science Resources, pp. 10-11, 16-17, 20-24</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Magnetism and Electricity Investigation 4, Part 1, pp. 8-13 Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 2, Part 1, pp. 8-13</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-29 Investigation 5, Part 1, pp. 8-14</p>

<p>representations can never be exact in every detail.</p> <p>Realize that one way to make sense of something is to think how it is like something more familiar.</p>	<p>Earth Materials Investigation 1, Parts 1-3, pp. 8-29</p> <p>Measurement Investigation 4, Part 2, pp. 14-17</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Matter and Energy Investigation 2, Part 1, pp. 93-103</p> <p>Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Investigation 3, Part 1, pp. 114-125</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Ideas and Inventions Investigation 2, Part 1, pp. 8-15</p> <p>Human Body Investigation 2, Part 3, pp. 18-22</p> <p>Sun, Moon and Stars Investigation 3, Part 1, pp. 114-125</p>
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Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

C. Plate Tectonics

Indicator

1. Gather information and provide evidence about the physical environment, becoming familiar with the details of geological features, observing and mapping locations of hills, valleys, rivers, and canyons.

Objectives	FOSS
<p>Identify and describe some natural features of continents.</p> <p style="padding-left: 40px;">Mountains Valleys Rivers Canyons</p> <p>Describe the natural features in their immediate outdoor environment, and compare the features with those of another region in Maryland.</p> <p>Identify and describe some features of the ocean floor.</p> <p style="padding-left: 40px;">Mountains Valleys Canyons</p> <p>Recognize and explain that an ocean</p>	<p>Earth Materials Science Stories, pp. 5-7</p> <p>Water Science Stories, pp. 9, 12</p> <p>Local Objective</p>

floor is land covered by water.	
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Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

1. Recognize and describe that water can be found as a liquid or a solid on the Earth's surface and as a gas in the Earth's atmosphere.

Objectives	FOSS
Describe that air is a substance that surrounds us and contains such things as oxygen, water vapor (gas), pollen, dust, etc.	Water Science Stories, p. 14
Observe and explain what happens when liquid water disappears. Turns into water vapor (gas) in the air Can reappear as a liquid or solid when cooled, such as clouds, fog, rain, snow, etc.	Water Investigation 3, Parts 1-4, pp. 8-26 Science Stories, pp. 13-16 FOSS Web, Activity: Evaporation Matter and Energy Investigation 4, Part 2, pp. 181-192 Science Resources, pp. 54-59

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

B. Cells

Indicator

1. Explore the world of minute living things to describe what they look like, how they live, and how they interact with their environment.

Objectives	FOSS
Use magnifying instruments to observe and describe using drawings or text (oral or written) minute organisms, such as brine shrimp, algae, aphids, etc. that are found in different environments.	
Describe any observable activity displayed by these organisms.	
Provide reasons that support the conclusion that these organisms are alive.	
Use information gathered about these minute organisms to compare mechanisms they have to satisfy their basic needs to those used by larger organisms.	

Topic

E. Flow of Matter and Energy

Indicator

1. Recognize that materials continue to exist even though they change from one form to another.

Objectives	FOSS
Identify and compile a list of materials that can be recycled.	Water Science Stories, pp. 17-19
Identify what happens to materials when they are recycled.	Water Science Stories, pp. 17-19
Observe and record the sequence of changes that occur to plants and animals that die and decay.	
Ask and develop possible answers to questions about what happens to the materials that living things are made of when they die.	

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

A. Structure of Matter

Indicator

1. Identify ways to classify objects using supporting evidence from investigations of observable properties.

Objectives	FOSS
Classify objects based on their observable properties.	Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19 Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Human Body Investigation 2, Part 3, pp. 18-22 Earth Materials Investigation 2, Part 2, pp. 14-21 Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 37-42
Provide reasons for placing the objects into groups.	Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19 Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Human Body Investigation 2, Part 3, pp. 18-22 Earth Materials Investigation 2, Part 2, pp. 14-21 Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 37-42

Compare classifications with those of others.	FOSS provides the opportunity to address this objective. See below: Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19 Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Human Body Investigation 2, Part 3, pp. 18-22 Earth Materials Investigation 2, Part 2, pp. 14-21
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Indicator

2. Identify and describe structures of objects too small to be seen clearly with the unaided eye.

Objectives	FOSS
Identify and describe minute objects, such as grains of sand and crystals of salt after examining them with a magnifying instrument.	Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19
Identify and describe the minute features of objects, such as the lines (grain) in a piece of wood and the fibers in a paper napkin after examining with a magnifying instrument.	Earth Materials Investigation 1, Part 1, pp. 8-15 Investigation 4, Part 1, pp. 8-13 Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19

Topic

C. States of Matter

Indicator

1. Provide evidence from investigations to describe the effect that changes in temperature have on the properties of materials.

Objectives	FOSS
Based on data gathered from investigations, identify and describe the changes that occur to the observable properties of materials when different degrees of heat is applied to them, such as melting chocolate pieces, boiling an egg.	Water Investigation 2, Parts 2-3, pp. 14-24 Matter and Energy Investigation 4, Part 2, pp. 181-192 Science Resources, pp. 54-59
Observe and describe the changes cooling causes to the observable properties of materials when they are cooled, such as freezing water in a straw, milk in an ice cream maker.	Water Investigation 2, Parts 2-3, pp. 14-24 Investigation 2, Science Extension, p. 27
Cite examples of similar changes that heating and cooling have on the observable properties of various other materials.	Water Investigation 2, Parts 2-3, pp. 14-24 Investigation 2, Science Extension, p. 27 FOSS Web, Activity: Evaporation Matter and Energy Investigation 4, Part 2, pp. 181-192 Science Resources, pp. 54-59

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

A. Mechanics

Indicator

1. Cite evidence from observations to describe the motion of an object using position and speed.

Objectives	FOSS
<p>Describe the position of an object by locating it relative to another object or to its the background.</p> <p>Using information from multiple trials, compare the speeds (faster or slower) of objects that travel the same distance in different amounts of time.</p> <p>Using information from multiple trials, compare the distances that objects moving at different speeds travel in the same amount of time.</p>	<p>Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17</p> <p>Human Body Investigation 1, Part 2, pp. 16-20</p> <p>Water Investigation 2, Part 2, pp. 14-18</p>

Indicator

2. Explain that changes in the ways objects move are caused by forces.

Objectives	FOSS
<p>Observe and describe the way an object's motion changes in a variety of situations (rolling a ball, bouncing a ball, dropping a yo-yo, winding up a toy, etc.) and identify what may have caused the change.</p> <p>Describe changes in the motion of objects as they move across different textured surfaces and suggest possible causes for the change.</p> <p>Observe and describe that objects fall to the ground unless something holds them up (gravity).</p>	<p>Water Investigation 1, Part 3, pp. 19-23 Investigation 4, Part 2, pp. 14-18</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Physics of Sound Investigation 1, Parts 1-2, pp. 8-20</p> <p>Human Body Investigation 4, Part 3, pp. 20-24</p>

Topic

B. Thermodynamics

Indicator

1. Recognize and describe that heat is transferred between objects that are at different temperatures.

Objectives	FOSS
Recognize and describe that the temperature of an object increases when heat is added and decreases when heat is removed.	Water Investigation 2, Part 1, pp. 8-13 Measurement Investigation 4, Part 2, pp. 14-17 Matter and Energy Investigation 4, Part 1, pp. 18174-180
Recognize and describe that heat will flow between object at different temperatures until they reach the same temperature.	Water Investigation 4, Part 1, pp. 8-13

Topic

D. Wave Interactions

Indicator

2. Identify and describe the relationship between a sound and the vibrations that produce it.

Objectives	FOSS
Based on observations of objects that produce sound, relate vibration to the back and forth motion of parts of the object.	Physics of Sound Investigation 1, Part 3, pp. 21-29 Investigation 3, Parts 1-2, pp. 8-19 Science Stories, p. 6
Pose questions concerning the relationship between loudness or pitch and the vibration of an object.	Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Science Stories, pp. 11-13

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Objectives	FOSS
none	

Grade Four

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Introduction

Topic

A. Constructing Knowledge

Indicator

1. Gather and question data from many different forms of scientific investigations which include reviewing appropriate print resources, observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.

Objectives	FOSS
<p>Support investigative findings with data found in books, articles, and databases, and identify the sources used and expect others to do the same.</p>	<p>FOSS provides the opportunity to address this objective. Student investigative findings could be researched to locate supportive evidence. FOSS Science Stories and Resources also lend support for some investigations.</p>
<p>Select and use appropriate tools hand lens or microscope (magnifiers), centimeter ruler (length), spring scale (weight), balance (mass), Celsius thermometer (temperature), graduated cylinder (liquid volume), and stopwatch (elapsed time) to augment observations of objects, events, and processes.</p>	<p>Measurement Investigations 1-4 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-22 Earth Materials Investigation 1, Part 1, pp. 8-15 Water Investigation 2, Part 3, pp. 19-24 Sun, Moon and Stars Investigation 1, Part 1, pp. 42-55 Matter and Energy Investigation 3, Parts 2-3, pp. 1139-160 Investigation 4, Part 1, pp. 171-180</p>
<p>Explain that comparisons of data might not be fair because some conditions are not kept the same.</p>	<p>FOSS provides the opportunity to address this objective. See below: Human Body Investigation 4, Part 2, pp. 17-19 Measurement Investigation 2, Part 3, pp. 18-24 Water Investigation 3, Parts 2-3, pp. 12-20 Matter and Energy Investigation 3, Part 2, pp. 139-150 Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22</p>
<p>Recognize that the results of scientific investigations are seldom exactly the same, and when the differences are large, it is important to try to figure out why.</p>	<p>FOSS provides the opportunity to address this objective. See below: Human Body Investigation 4, Part 2, pp. 17-19 Measurement Investigation 2, Part 3, pp. 18-24 Matter and Energy Investigation 3, Part 2, pp. 139-150 Water Investigation 3, Parts 2-3, pp. 12-20</p>

<p>Follow directions carefully and keep accurate records of one's work in order to compare data gathered.</p> <p>Identify possible reasons for differences in results from investigations including unexpected differences in the methods used or in the circumstances in which the investigation is carried out, and sometimes just because of uncertainties in observations.</p> <p>Judge whether measurements and computations of quantities are reasonable in a familiar context by comparing them to typical values when measured to the nearest:</p> <ul style="list-style-type: none"> Millimeter - length Square centimeter - area Milliliter - volume Newton - weight Gram - mass Second - time Degree C° - temperature 	<p>Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22</p> <p>Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Investigation 2, Parts 1-2, pp. 79-100</p> <p>FOSS provides the opportunity to address this objective. See citations above. Also, FOSS student worksheets and journals are provided for record-keeping.</p> <p>FOSS provides the opportunity to address this objective during post investigation discussions. See below:</p> <p>Human Body Investigation 4, Part 2, pp. 17-19</p> <p>Measurement Investigation 2, Part 3, pp. 18-24</p> <p>Water Investigation 3, Parts 2-3, pp. 12-20</p> <p>Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p> <p>Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Measurement Investigations 1-4</p> <p>Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-22</p> <p>Earth Materials Investigation 1, Part 1, pp. 8-15</p> <p>Water Investigation 2, Part 3, pp. 19-24</p> <p>Matter and Energy Investigation 3, Parts 2-3, pp. 139-160 Investigation 4, Part 1, pp. 174-180</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. Seek better reasons for believing something than "Everybody knows that..." or "I just know" and discount such reasons when given by others.

Objectives	FOSS
<p>Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.</p>	<p>Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22</p> <p>Water Investigation 3, Parts 2-4, pp. 12-26</p> <p>Physics of Sound Investigation 2, Parts 1-3, pp. 8-24</p> <p>Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17</p> <p>Matter and Energy Investigation 2, Part 2, pp. 103-114</p> <p>Sun, Moon and Stars</p>

<p>Offer reasons for their findings and consider reasons suggested by others.</p>	<p>Investigation 1, Parts 1-2, pp. 42-64 Investigation 2, parts 1-2, pp. 79-100</p> <p>FOSS provides the opportunity to address this objective. See below: Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17 Matter and Energy Investigation 4, Part 2, pp. 181-192 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p>
<p>Review different explanations for the same set of observations and make more observations to resolve the differences.</p>	<p>FOSS provides the opportunity to address this objective. See below: Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22 Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Matter and Energy Investigation 2, Part 2, pp. 103-114 Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17</p>
<p>Keep a notebook that describes observations made, carefully distinguishes actual observations from ideas and speculations about what was observed, and is understandable weeks or months later.</p>	<p>FOSS provides the opportunity to address this objective. The Earth Materials module includes a journal for investigations. All modules advocate using the student record and response sheets as a possible student portfolio.</p>

Topic

C. Communicating Scientific Information

Indicator

1. Recognize that clear communication is an essential part of doing science because it enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world.

Objectives	FOSS
<p>Make use of and analyze models, such as tables and graphs to summarize and interpret data.</p>	<p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-29 Measurement Investigation 4, Part 2, pp. 14-47 Human Body Investigation 4, Parts 1-3, pp. 8-29 Water Investigation 4, Part 3, pp. 19-23 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Matter and Energy</p>

<p>Avoid choosing and reporting only the data that show what is expected by the person doing the choosing.</p> <p>Submit work to the critique of others which involves discussing findings, posing questions, and challenging statements to clarify ideas.</p> <p>Construct and share reasonable explanations for questions asked.</p> <p>Recognize that doing science involves many different kinds of work and engages men and women of all ages and backgrounds.</p>	<p>Investigation 3, Parts 2-3, pp. 139-160</p> <p>FOSS investigations would provide the opportunity to address this objective.</p> <p>FOSS provides the opportunity to address this objective through its post investigation discussions.</p> <p>FOSS provides the opportunity to address this objective through its post investigation discussions.</p> <p>Measurement Science Stories, pp. 14-15</p> <p>Ideas and Inventions Science Stories, pp. 18-22</p> <p>Magnetism and Electricity Science Stories, pp. 20-23</p> <p>Solids and Liquids Science Stories, pp. 6-9</p> <p>Sun, Moon and Stars Science Resources, pp. 44-46</p>
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Topic

D. Technology

Indicator

1. Develop designs and analyze the products: "Does it work?" "Could I make it work better?" "Could I have used better materials?"

Introduction

Objectives	FOSS
<p>Choose appropriate common materials for making simple mechanical constructions and repairing things.</p> <p>Realize that there is no perfect design and that usually some features have to be sacrificed to get others, for example, designs that are best in one respect (safety or ease of use) may be inferior in other ways (cost or appearance).</p> <p>Identify factors that must be considered in any technological design-cost, safety, environmental impact, and what will happen if the solution fails.</p>	<p>Magnetism and Electricity Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>FOSS provides the opportunity to address this objective through the above citations. See also:</p> <p>Magnetism and Electricity Science Stories, pp. 16-19</p> <p>Ideas and Inventions Science Stories, p. 21</p>

Indicator

2. Investigate a variety of mechanical systems and analyze the relationship among the parts.

Introduction

Objectives	FOSS
<p>Realize that in something that consists of many parts, the parts usually influence one another.</p> <p>Explain that something may not work as well (or at all) if a part of it is missing, broken, worn out, mismatched, or misconnected.</p>	<p>Magnetism and Electricity Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Matter and Energy Investigation 1, Part 1, pp. 50-62 Investigation 2, Part 1, pp. 93-102</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Magnetism and Electricity Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Matter and Energy Investigation 1, Part 1, pp. 50-62 Investigation 2, Part 1, pp. 93-102</p>

Indicator

3. Examine and modify models and discuss their limitations.

Introduction

Objectives	FOSS
<p>Explain that a model is a simplified imitation of something and that a model's value lies in suggesting how the thing modeled works.</p> <p>Investigate and describe that seeing how a model works after changes are made to it may suggest how the real thing would work if the same were done to it.</p> <p>Explain that models, such as geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories can</p>	<p>Magnetism and Electricity Investigation 4, Part 1, pp. 8-13 Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 2, Part 1, pp. 8-13</p> <p>Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Investigation 3, part 1, pp. 114-125 Science Resources, pp. 10-11, 16-17, 20-24</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Magnetism and Electricity Investigation 4, Part 1, pp. 8-13 Investigation 5, Part 1, pp. 8-14</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Water Investigation 2, Part 1, pp. 8-13</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Magnetism and Electricity</p>

<p>be used to represent objects, events, and processes in the real world, although such representations can never be exact in every detail.</p> <p>Realize that one way to make sense of something is to think how it is like something more familiar.</p>	<p>Investigation 1, Part 3, pp. 23-29 Investigation 5, Part 1, pp. 8-14 Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Measurement Investigation 4, Part 2, pp. 14-17 Water Investigation 4, Part 2, pp. 14-18 Matter and Energy Investigation 2, Part 1, pp. 93-102 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Investigation 3, Part 1, pp. 114-125</p> <p>FOSS provides the opportunity to address this objective. See below: Ideas and Inventions Investigation 2, Part 1, pp. 8-15 Human Body Investigation 2, Part 3, pp. 18-22 Sun, Moon and Stars Investigation 3, Part 1, pp. 114-125</p>
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Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

A. Materials and Processes That Shape A Planet

Indicator

2. Recognize and explain how physical weathering and erosion cause changes to the earth's surface.

Objectives	FOSS
<p>Investigate and describe how weathering wears down Earth's surface.</p> <p>Water Ice Wind</p> <p>Cite evidence to show that erosion shapes and reshapes the earth's surface as it moves from one location to another.</p> <p>Water Ice Wind</p>	<p>Earth Materials Science Stories, pp. 5-7</p> <p>Earth Materials Science Stories, pp. 5-7</p>

Topic

B. Earth History

Indicator

2. Recognize and explain that fossils provide evidence about the plants and animals that lived long ago and about the nature of the environment at that time.

Objectives	FOSS
<p>Recognize and explain that the remains or imprints of plants or animals can become fossils.</p>	<p>Structures of Life Science Stories, pp. 45-48</p>
<p>Describe the physical structures of an animal or plant based on its fossil remains.</p>	<p>Structures of Life Science Stories, pp. 45-48</p>
<p>Identify what an animal or plant fossil is able to tell about the environment in which it lived.</p> <p style="padding-left: 40px;">Water Land</p>	<p>Structures of Life Science Stories, pp. 45-48</p>

Topic

D. Astronomy

Indicator

1. Identify and describe the variety of objects in the universe through first-hand observations using the unaided eye, binoculars or telescopes or videos and/or pictures from reliable sources.

Objectives	FOSS
<p>Observe and describe the stars and the planets as seen through a telescope, graphically in pictures or in video clips from reliable sources.</p>	<p>Ideas and Inventions Science Stories, pp. 37-38 Sun, Moon and Stars Investigation 3, Part 2, pp. 126-132 Science Resources, pp. 15, 35, 39, 42-43</p>
<p>Identify the sun as the Earth's closest star.</p>	<p>Sun, Moon and Stars Science Resources, pp. 15-35</p>
<p>Recognize that stars are like the sun, some are smaller and some larger.</p>	<p>Ideas and Inventions Science Stories, p. 37 Sun, Moon and Stars Science Resources , pp. 15, 35</p>
<p>Recognize and describe that the stars are not all the same in apparent brightness.</p>	<p>Sun, Moon and Stars Investigation 3, Part 2, pp. 126-132</p>
<p>Recognize that the pattern of stars in the sky stays the same although their locations in the sky appear to change with the seasons.</p>	<p>Sun, Moon and Stars Investigation 3, Part 1, pp. 114-125 Science Resources, pp. 37-39</p>

Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

2. Recognize and describe that each season has different weather conditions

Objectives	FOSS
<p>Describe different seasonal weather conditions using data collected from weather instruments, models or drawings.</p> <p>Compare average daily temperatures during different seasons.</p> <p>Compare average daily wind speed and direction during different seasons.</p> <p>Compare average daily precipitation during different seasons. Amount Type</p>	

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

A. Diversity of Life

Indicator

1. Explain how animals and plants can be grouped according to observable features.

Objectives	FOSS
<p>Observe and compile a list of a variety of animals or plants in both familiar and unfamiliar environments.</p> <p>Classify a variety of animals and plants according to their observable features and provide reasons for placing them into different groups.</p> <p>Given a list of additional animals or plants, decide whether or not they could be placed within the established groups or does a new group have to be added.</p> <p>Describe what classifying tells us about the relatedness among the animals or plants placed within any group.</p>	<p>Structures of Life Science Stories, pp. 17-31, 41-42 FOSS Web, Pictures</p> <p>Human Body Science Stories, p. 11</p> <p>Structures of Life Science Stories, pp. 17-31, 41-42 FOSS Web, Pictures</p> <p>Human Body Science Stories, p. 11</p>

Topic

C. Genetics

Indicator

1. Explain that in order for offspring to resemble their parents, there must be a reliable way to transfer information from one generation to the next.

Objectives	FOSS
<p>Describe traits found in animals and plants, such as eye color, height, leaf shape, seed type that are passed from one generation to another</p> <p>Explain that some likenesses between parents and offspring are inherited (such as eye color in humans, nest building in birds, or flower color in plants) and other likenesses are learned (such as language in humans or songs in birds).</p> <p>Raise questions based on observations of a variety of parent and offspring likenesses and differences, such as "Why don't all the puppies have the same traits, such as eye color and size as their parents?" or "How do traits get transferred?"</p> <p>Develop a reasonable explanation to support the idea that information is passed from parent to offspring.</p>	

Topic

D. Evolution

Indicator

1. Explain that individuals of the same kind differ in their characteristics, and sometimes the differences give individuals an advantage in surviving and reproducing.

Objectives	FOSS
<p>Describe ways in which organisms in one habitat differ from those in another habitat and consider how these differences help them survive and reproduce.</p> <p>Explain that the characteristics of an organism affect its ability to survive and reproduce.</p> <p>Examine individuals in a group of the same kind of animals or plants to identify differences in characteristics, such as hearing ability in rabbits or keenness of vision in hawks that might give those individuals an advantage in surviving and reproducing.</p> <p>Examine and compare fossils to one another and to living organisms as evidence</p>	<p>Structures of Life Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Parts 1-2, pp. 8-19 Science Stories, pp. 22-34</p> <p>Structures of Life Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Parts 1-2, pp. 8-19 Science Stories, pp. 22-34</p> <p>Structures of Life Science Stories, pp. 45-48</p>

that some individuals survive and reproduce.	
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Topic

E. Flow of Matter and Energy

Indicator

1. Recognize food as the source of materials that all living things need to grow and survive.

Objectives	FOSS
<p>Classify the things that people and animals take into their bodies as food or not food.</p> <p>Describe what happens to food in plants and animals.</p> <ul style="list-style-type: none"> Contributes to growth Supports repair Provides energy Is stored for future use Is eliminated <p>Identify the things that are essential for plants to grow and survive.</p>	<p>Structures of Life Science Stories, pp. 4-5, 10-11, 18, 23-24, 26, 28, 29, 31-32, 43</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Structures of Life Science Stories, pp. 4-5, 10-11, 18, 23-24, 26, 28, 29, 31-32, 43</p> <p>Structures of Life Investigation 2, Part 2, pp. 14-17 Science Stories, pp. 4-5, 10-11</p>

Topic

F. Ecology

Indicator

1. Explain ways that individuals and groups of organisms interact with each other and their environment.

Objectives	FOSS
<p>Identify and describe the interactions of organisms present in a habitat.</p> <p>Competition for space, food, and water</p> <p>Beneficial interactions: nesting, pollination, seed dispersal, oysters filtering as in the Chesapeake Bay, etc</p> <p>Roles within food chains and webs: scavengers, decomposers, producers, consumers.</p> <p>Explain that changes in an organism's habitat are sometimes beneficial to it and sometimes harmful.</p>	<p>Structures of Life Science Stories, pp. 22-34, 35-38, 43</p> <p>Structures of Life Science Stories, pp. 34-36</p>

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

A. Structure of Matter

Indicator

1. Provide evidence to support the fact that matter has observable and measurable properties

Objectives	FOSS
<p>Identify examples of matter.</p>	<p>Earth Materials Investigation 2, Part 1, pp. 8-13 Science Stories, pp. 12-15, 30-33</p> <p>Water Investigation 1, Part 1, pp. 8-13 Science Stories, pp. 1-2</p> <p>Measurement Science Stories, pp. 30-31</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 39-42</p>
<p>Describe and compare the physical properties of samples of matter.</p> <p style="padding-left: 40px;">Strength Hardness Flexibility Ability to conduct heat Ability to conduct electricity Ability to be attracted by magnets</p>	<p>Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Science Stories, pp. 30-33</p> <p>Water Investigation 2, Part 2, pp. 14-18</p> <p>Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Investigation 2, Part 3, pp. 20-25</p>
<p>Compare samples of like materials using appropriate tools to measure, estimate, and calculate size, capacities, masses and weights.</p>	<p>Earth Materials Investigation 2, Part 2, pp. 14-21</p> <p>Water Investigation 2, Part 3, pp. 19-24</p>
<p>Cite evidence that supports the statement, "All matter takes up space and contains a certain amount of material."</p>	<p>Water Investigation 2, Part 3, pp. 19-24</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 39-42</p>

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

B. Thermodynamics

Indicator

1. Provide evidence that heat can be transferred in different ways.

Objectives	FOSS
<p>Recognize and explain that heat can be</p>	<p>Water</p>

<p>transferred either by direct contact between objects at different temperatures or without direct contact.</p> <p style="text-align: center;">A spoon in hot water Heat from a flame</p> <p>Observe, describe, and compare materials that readily conduct heat and those that do not conduct heat very well.</p> <p>Classify materials as conductors or insulators based on how easily heat flows through them.</p>	<p>Investigation 2, Part 1, pp. 8-13 Measurement Science Stories, p. 33 Matter and Energy Investigation 4, Part 1, pp. 174-180</p>
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Topic

C. Electricity and Magnetism

Indicator

1. Recognize and describe the effects of static electric charges.

Objectives	FOSS
<p>Observe and describe how to produce static charges by friction between two surfaces.</p> <p>Observe the phenomena produced by the static charges.</p> <ul style="list-style-type: none"> Light Sound Feeling a shock Attracting lightweight materials over a distance without making contact 	<p>Magnetism and Electricity Science Stories, pp. 10-11</p> <p>Magnetism and Electricity Science Stories, pp. 10-11</p>

Indicator

2. Investigate and provide evidence that electricity requires a closed loop in order to produce measurable effects.

Objectives	FOSS
<p>Identify the source of electricity needed to produce various effects:</p> <ul style="list-style-type: none"> Light - flashlight (battery) Heat - hot plate, hairdryer (outlet, battery) Sound - Ipod (battery) , doorbell (electrical wiring) Movement - mechanical toys (battery, outlet) <p>Investigate and describe (orally or with diagrams) how to light a light bulb or sound a buzzer given a battery, wires, and light bulb or buzzer.</p>	<p>Magnetism and Electricity Investigation 2, Parts 1-2, pp. 8-19 Investigation 3, Parts 1-3, pp. 10-26 Matter and Energy Investigation 1, Parts 1-3, pp. 50-82 Science Resources, pp. 6-7</p> <p>Magnetism and Electricity Investigation 2, Parts 1-2, pp. 8-19 Investigation 3, Parts 1-3, pp. 10-26 Matter and Energy Investigation 1, Parts 1,3, pp. 50-62, 71-82</p>

<p>Describe and compare the path of electricity (circuit) within this system that caused the light to light or the buzzer to sound to those that do not affect the light or buzzer.</p> <p>Observe, describe and compare materials that readily conduct electricity and those that do not conduct electricity.</p> <p>Provide evidence from observations and investigations that electrical circuits require a complete loop through which electricity can pass.</p>	<p>Magnetism and Electricity Investigation 2, Parts 1-2, pp. 8-19 Investigation 3, Parts 1-3, pp. 10-26</p> <p>Matter and Energy Investigation 1, Parts 1,3, pp. 50-62, 71-82</p> <p>Magnetism and Electricity Investigation 2, Part 3, pp. 20-25</p> <p>Magnetism and Electricity Investigation 2, Parts 1-4, pp. 8-29 Investigation 3, Parts 1-3, pp. 10-26 Investigation 4, Parts 1-3, pp. 8-22</p> <p>Matter and Energy Investigation 1, Parts 1,3, pp. 50-62, 71-82</p>
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Indicator

3. Cite evidence supporting that forces can act on objects without touching them.

Objectives	FOSS
<p>Investigate and describe the effect that two magnets have on each other.</p> <p>Like poles repel Opposite poles attract</p> <p>Based on observations, describe the effect of a magnet on a variety of objects including those that are metallic or non-metallic; those made with iron or made with other metals; and on other magnets.</p> <p>Compare a compass to a magnet based on observations of the effect a variety of objects (metallic or non-metallic; those made with iron or other metals; and magnets) have on a compass.</p> <p>Provide examples to demonstrate the different ways a magnet acts on objects and how the objects respond.</p> <p>Investigate and describe how electricity in a wire affects the needle of a compass.</p> <p>Describe how to make a simple electromagnet with a battery, a nail, and wire.</p> <p>Cite examples showing that magnetic, electrical, and gravitational forces can act at a distance.</p>	<p>Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Science Stories, pp. 6-9</p> <p>Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Science Stories, pp. 1-4</p> <p>Magnetism and Electricity Science Stories, pp. 6-9</p> <p>Magnetism and Electricity Investigation 1, Parts 1-2, pp. 8-23 Science Stories, pp. 1-4</p> <p>Magnetism and Electricity Investigation 4, Part 1, pp. 8-13 FOSS Web, Activity: Electromagnet</p> <p>Magnetism and Electricity Investigation 1, Part 4, pp. 30-34 Science Stories, pp. 5, 8-9</p>

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

B. Environmental Issues

Indicator

1. Recognize and describe that people in Maryland depend on, change, and are affected by the environment.

Objectives	FOSS
Identify and describe that human activities in a community or region are affected by environmental factors Presence and quality of water Soil type Temperature Precipitation	Water Science Stories, 17-20, 23

Grade Five

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Introduction

Topic

A. Constructing Knowledge

Indicator

1. Gather and question data from many different forms of scientific investigations which include reviewing appropriate print resources, observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments

Objectives	FOSS
<p>Support investigative findings with data found in books, articles, and databases, and identify the sources used and expect others to do the same.</p>	<p>FOSS provides the opportunity to address this objective. Student investigative findings could be researched to locate supportive evidence. FOSS Science Stories also lend support for some investigations.</p>
<p>Select and use appropriate tools hand lens or microscope (magnifiers), centimeter ruler (length), spring scale (weight), balance (mass), Celsius thermometer (temperature), graduated cylinder (liquid volume), and stopwatch (elapsed time) to augment observations of objects, events, and processes.</p>	<p>Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Food and Nutrition Investigation 2, Parts 1-2, pp. 8-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 8-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 2, Part 1, pp. 85-98</p>
<p>Explain that comparisons of data might not be fair because some conditions are not kept the same.</p>	<p>FOSS provides the opportunity to address this objective. See below: Variables Investigation 3, Parts 2-3, pp. 17-19 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Landforms Investigation 3, Parts 1-3, pp. 8-24 Water Planet Investigation 2, Parts 2-3, pp. 86-100 Living Systems Investigation 3, Part 3, pp. 136-141</p>
<p>Recognize that the results of scientific investigations are seldom exactly the same, and when the differences are large, it is important to try to figure out why.</p>	<p>FOSS provides the opportunity to address this objective. See below: Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Food and Nutrition Investigation 2, Parts 1-2, pp. 8-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 8-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet</p>

<p>Follow directions carefully and keep accurate records of one's work in order to compare data gathered.</p> <p>Identify possible reasons for differences in results from investigations including unexpected differences in the methods used or in the circumstances in which the investigation is carried out, and sometimes just because of uncertainties in observations.</p> <p>Judge whether measurements and computations of quantities are reasonable in a familiar context by comparing them to typical values when measured to the nearest:</p> <ul style="list-style-type: none"> Millimeter - length Square centimeter - area Milliliter - volume Newton - weight Gram - mass Second - time Degree ° - temperature 	<p>Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 3, Part 3, pp. 136-141</p> <p>FOSS provides the opportunity to address this objective. See citations above. Also, FOSS student worksheets and journals are provided for record –keeping.</p> <p>FOSS provides the opportunity to address this objective during post investigation discussions. See below:</p> <p>Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Food and Nutrition Investigation 2, Parts 1-2, pp. 8-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 8-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 2, Parts 2-3, pp. 86-100 Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Variables Investigation 3, Parts –3, pp. 14-23 Models and Designs Investigation 3, Part 3, pp. 20-23 Levers and Pulleys Investigation 3, Parts 1-2, pp. 8-20 Mixtures and Solutions Investigation 1, Parts 1-2, pp. 18-20 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 2, Part 1, pp. 85-98 Investigation 3, Part 3, pp. 136-141</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. Seek better reasons for believing something than "Everybody knows that..." or "I just know" and discount such reasons when given by others.

Objectives	FOSS
<p>Develop explanations using knowledge possessed and evidence from observations, reliable print resources, and investigations.</p>	<p>Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Food and Nutrition Investigation 2, Parts 1-2, pp. 8-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 8-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 2, Parts 1-4, pp. 80-116</p>

<p>Offer reasons for their findings and consider reasons suggested by others.</p>	<p>FOSS provides the opportunity to address this objective. See below: Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Food and Nutrition Investigation 2, Parts 1-2, pp. 8-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 8-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 3, Part 3, pp. 136-141</p>
<p>Review different explanations for the same set of observations and make more observations to resolve the differences.</p>	<p>FOSS provides the opportunity to address this objective. See below: Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Food and Nutrition Investigation 2, Parts 1-2, pp. 8-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 8-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 3, Part 3, pp. 136-141</p>
<p>Keep a notebook that describes observations made, carefully distinguishes actual observations from ideas and speculations about what was observed, and is understandable weeks or months later.</p>	<p>FOSS provides the opportunity to address this objective. The <u>Landforms</u>, <u>Food and Nutrition</u> and <u>Solar Energy</u> modules include a journal for investigations. All modules advocate using the student record and response sheets as a possible student portfolio.</p>

Topic

C. Communicating Scientific Information

Indicator

1. Recognize that clear communication is an essential part of doing science because it enables scientists to inform others about their work, expose their ideas to criticism by other scientists, and stay informed about scientific discoveries around the world.

Objectives	FOSS
<p>Make use of and analyze models, such as tables and graphs to summarize and interpret data.</p>	<p>Variables Investigation 3, Part 4, pp. 24-27 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Food and Nutrition Investigation 2, Part 2, pp. 18-21 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 2, Part 1, pp. 85-98</p>

<p>Avoid choosing and reporting only the data that show what is expected by the person doing the choosing.</p> <p>Submit work to the critique of others which involves discussing findings, posing questions, and challenging statements to clarify ideas.</p> <p>Construct and share reasonable explanations for questions asked.</p> <p>Recognize that doing science involves many different kinds of work and engages men and women of all ages and backgrounds.</p>	<p>FOSS investigations would provide the opportunity to address this objective.</p> <p>FOSS provides the opportunity to address this objective through its post investigation discussions.</p> <p>FOSS provides the opportunity to address this objective through its post investigation discussions.</p> <p>Mixtures and Solutions Science Stories, pp. 5, 8-9, 29-31, 43-45</p> <p>Food and Nutrition Science Stories, pp. 24-26, 34-35</p> <p>Models and Designs Science Stories, pp. 4-10, 14-16</p> <p>Variables Science Stories, pp. 4-6, 8-9</p> <p>Water Planet Science Resources, pp. 15, 18-19</p>
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Topic

D. Technology

Indicator

1. Develop designs and analyze the products: "Does it work?" "Could I make it work better?" "Could I have used better materials?"

Introduction

Objectives	FOSS
<p>Choose appropriate common materials for making simple mechanical constructions and repairing things.</p> <p>Realize that there is no perfect design and that usually some features have to be sacrificed to get others, for example, designs that are best in one respect (safety or ease of use) may be inferior in other ways (cost or appearance).</p> <p>Identify factors that must be considered in any technological design-cost, safety, environmental impact, and what will happen if the solution fails.</p>	<p>Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11</p> <p>Models and Designs Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Parts 1-2, pp. 6-15</p> <p>Solar Energy Investigation 4, Parts 1-3, pp. 8-28</p> <p>FOSS provides the opportunity to address this objective through the above citations. See:</p> <p>Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11</p> <p>Models and Designs Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Parts 1-2, pp. 6-15</p> <p>Solar Energy Investigation 4, Parts 1-3, pp. 8-28</p>

Indicator

2. Investigate a variety of mechanical systems and analyze the relationship among the parts.

Introduction

Objectives	FOSS
<p>Realize that in something that consists of many parts, the parts usually influence one another.</p> <p>Explain that something may not work as well (or at all) if a part of it is missing, broken, worn out, mismatched, or misconnected.</p>	<p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-2, pp. 8-19</p> <p>Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11</p> <p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-2, pp. 8-19</p> <p>Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11</p> <p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28</p>

Indicator

3. Examine and modify models and discuss their limitations.

Introduction

Objectives	FOSS
<p>Explain that a model is a simplified imitation of something and that a model's value lies in suggesting how the thing modeled works.</p> <p>Investigate and describe that seeing how a model works after changes are made to it may suggest how the real thing would work if the same were done to it.</p> <p>Explain that models, such as geometric figures, number sequences, graphs, diagrams, sketches, number lines, maps, and stories can be used to represent objects, events, and processes in the real world, although such representations can never be exact in every detail.</p>	<p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-2, pp. 8-19</p> <p>Variables Investigation 4, Part 1, pp. 8-11</p> <p>Landforms Investigation 1, Parts 1-3, pp. 8-24</p> <p>Water Planet Investigation 4, Part 3, pp. 204-211</p> <p>Living Systems Investigation 1, Parts 1-2, pp. 51-65</p> <p>Models and Designs Investigation 3, Parts 1-2, pp. 8-19</p> <p>Variables Investigation 4, Parts 2-3, pp. 12-23</p> <p>Solar Energy Investigation 4, Part 3, pp. 24-29</p> <p>Variables Investigation 3, Parts 3-4, pp. 20-27</p> <p>Landforms Investigation 1, Part 3, pp. 20-24</p> <p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24</p> <p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28</p> <p>Water Planet Investigation 3, Parts 1-2, pp. 125-144</p>

<p>Realize that one way to make sense of something is to think how it is like something more familiar.</p>	<p>Investigation 4, Part 3, pp. 204-211</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Solar Energy Investigation 4, Parts 1-2, pp. 8-23</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Variables Investigation 4, Part 1, pp. 8-11</p> <p>Water Planet Investigation 3, Part 2, pp. 136-144</p>
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Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

A. Materials and Processes That Shape A Planet

Indicator

2. Cite and describe the processes that cause rapid or slow changes in Earth's surface.

Objectives	FOSS
<p>Identify and describe events such as tornadoes, hurricanes, volcanic eruptions, earthquakes, and flooding which change surface features rapidly.</p>	<p>Landforms Investigation 3, Part 2, pp. 15-19 Science Stories, pp. 22-24 FOSS Web, Movie: Volcanic Eruption</p> <p>Solar Energy Science Stories, pp. 23-24</p> <p>Water Planet Investigation 4, Part 2, pp. 198-203 Science Resources, pp. 71-79</p>
<p>Recognize that the natural force of gravity causes changes in the Earth's surface features as it pulls things towards Earth, as in mud and rock slides, avalanches, etc.</p>	<p>Landforms Investigation 3, Part 1, pp. 8-14 Science Stories, p. 26</p>
<p>Cite examples that demonstrate how the natural agents of wind, water, and ice produce snow changes on the Earth's surface such as carving out deep canyons and building up sand dunes.</p>	<p>Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-24 Science Stories, pp. 15-17, 25-29</p>

Indicator

3. Explain how rock is formed from combinations of different minerals and that smaller rocks come from the breakage and weathering of bedrock (solid rock underlying soil components) and larger rocks; soil is made partly from weathered rock, partly from plant remains-and also contains many living organisms.

Objectives	FOSS
<p>Observe and classify a collection of minerals based on their physical properties.</p> <p style="text-align: center;">Color</p>	

<p>Luster Hardness Streak</p> <p>Identify components of a variety of rocks and compare the physical properties of rocks with those of minerals to note major differences.</p> <p>Describe ways that the following processes contribute to changes always occurring to the Earth's surface.</p> <p>Erosion Transport Deposit</p>	<p>Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-24 Science Stories, pp. 15-17, 25-29</p>
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Topic

D. Astronomy

Indicator

1. Identify and compare properties, location, and movement of celestial objects in our solar system.

Objectives	FOSS
<p>Recognize that like all planets and stars, the Earth is spherical in shape.</p> <p>Identify the properties of the planet Earth that make it possible for the survival of life as we know it.</p> <p>Temperature Location Presence of an atmosphere Presence of water (solid, liquid, and gas)</p> <p>Compare the properties of at least one other planet in our solar system to those of Earth to determine if it could support life, as we know it.</p> <p>Identify and describe physical properties of comets, asteroids, and meteors.</p> <p>Provide evidence that supports the idea that our solar system is sun-centered.</p>	<p>Solar Energy Science Stories, pp. 40-41 Water Planet Investigation 1, Part 1, pp. 50-58 Science Resources, pp. 1-13</p> <p>Solar Energy Science Stories, p. 42 Water Planet Investigation 1, Part 1, pp. 50-58 Science Resources, p. 6</p> <p>Solar Energy Science Stories, pp. 40-43 Water Planet Investigation 1, Part 1, pp. 50-58 Science Resources, p. 6</p> <p>Solar Energy Science Stories, p. 43 Water Planet Science Resources, pp. 8, 13</p> <p>Solar Energy Science Stories, pp. 43-44 Models and Designs Science Stories, pp. 6-7, 9 Water Planet Investigation 1, Part s1-2, pp. 50-66 Science Resources, pp. 1-13, 16-17</p>

Indicator

2. Recognize and describe the causes of the repeating patterns of celestial events.

Objectives	FOSS
<p>Describe the rotation of the planet Earth on its axis.</p> <p>Recognize and describe that the rotation of planet Earth produces observable effects</p> <p style="padding-left: 40px;">The day and night cycle. The apparent movement of the sun, moon, planets, and stars</p> <p>Describe the revolution of the planet Earth around the sun.</p> <p>Recognize and describe that the revolution of the planet Earth produces effects.</p> <p style="padding-left: 40px;">The observable patterns of stars in the sky stay the same although different stars can be seen in different seasons. Length of year</p> <p>Verify with models and cite evidence that the moon's apparent shape and position change.</p>	

Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

1. Recognize and describe that the amount of water on Earth continues to stay the same even though it may change from one form to another.

Objectives	FOSS
<p>Describe how water on Earth changes.</p> <p style="padding-left: 40px;">Condensation Precipitation Evaporation</p> <p>Explain that the sun is the main source of energy that causes the changes in the water on Earth.</p> <p>Describe the relationship between the amount of energy from the sun and the quantity of water that is changed.</p> <p>Describe the processes that maintain a continuous water cycle.</p>	<p>Solar Energy Science Stories, pp. 23-24</p> <p>Water Planet Investigation 2, Parts 1-4, pp. 80-110 Science Resources, pp. 26-39</p> <p>Solar Energy Investigation 2, Part 2, pp. 16-24 Science Stories, pp. 22-24</p> <p>Water Planet Science Resources, pp. 26-27, 33-37, 46-51</p> <p>Solar Energy Science Stories, pp. 2, 22-24</p> <p>Water Planet</p>

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

A. Diversity of Life

Indicator

1. Explain the idea that in any particular environment, some kinds of plants and animals survive well, some less well, and some cannot survive at all.

Objectives	FOSS
<p>Identify and describe features of some of the plants and animals living in a familiar environment and explain ways that these organisms are well suited to their environment.</p> <p>Based on information about the features and behaviors of animals and plants from very different environments describe reasons that they might not survive if their environment changed or if they were moved from one environment to another.</p> <p>State reasons why certain animals such as whales, salmon, could not survive in the Chesapeake Bay.</p> <p>Research the kind of environment needed by the Maryland blue crab, the Black-eyed Susan (Maryland's state flower), or another Maryland native organism.</p> <p>Explain that the survival of individual organisms and entire populations can be affected by sudden (flood, Tsunami) or slow (global warming, air pollution) changes in the environment.</p>	<p>Environments Investigation 1, Parts 1-2, pp. 8-19 Investigation 4, Parts 1-3, pp. 8-22 Investigation 5, Parts 1-2, pp. 8-18 Science Stories, pp. 1-22</p> <p>Environments Investigation 3, Parts 1-3, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-22 Investigation 6, Parts 1-2, pp. 8-17</p> <p>Local Objective</p> <p>Local Objective</p> <p>Environments Science Stories, pp. 43-45, 49-52</p>

Topic

B. Cells

Indicator

1. Provide evidence from observations and investigations to support the idea that some organisms consist of a single cell.

Objectives	FOSS
<p>Use microscopes, other magnifying instruments, or video technology to observe, describe, and compare single celled organisms, such as amoeba, euglena, paramecium, etc.</p>	

<p>Describe the observable behaviors of single celled organisms</p> <p>Cite evidence from data gathered that supports the idea that most single celled organisms have needs similar to those of multicellular organisms.</p>	
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Indicator

2. Investigate and provide evidence that living things are made mostly of cells that can be seen and studied only through a microscope.

Objectives	FOSS
<p>Use microscopes and/or other video technology to investigate and describe that some organisms are composed of a collection of similar cells working together to meet basic needs of a "colony" of cells.</p> <p>Use microscopes and pictures to investigate, describe with drawings, and compare the cells in a variety of multicellular organisms, such as cells in elodea and onions; muscle cells, nerve cells, skin cells, etc in animals.</p> <p>Select information gathered from readings that supports the need for specialized (different types) cells in multicellular organisms.</p>	<p>Food and Nutrition Science Stories, pp. 41-42</p> <p>Living Systems Science Resources, pp. 3, 5, 16-19</p> <p>Food and Nutrition Science Stories, pp. 41-43, 44-50</p> <p>Living Systems Science Resources, pp. 2-13, 16-20</p>

Topic

E. Flow of Matter and Energy

Indicator

1. Recognize that some source of energy is needed for all organisms to grow and survive.

Objectives	FOSS
<p>Identify the sun as the primary source of energy for all living organisms.</p> <p>Plants use sunlight to make food</p> <p>Plants and animals use food for energy and growth</p> <p>Cite evidence from observations and research that some insects and various other organisms depend on dead plant and animal material for food.</p> <p>Provide examples that justify the statement "Most animals' food can be traced back to plants."</p>	<p>Environments Science Stories, pp. 38-41, 53</p> <p>Food and Nutrition Science Stories, p. 43</p> <p>Living Systems Investigation 3, Parts 1-2, pp. 118-135 Science Resources, pp. 31-36, 47-48</p> <p>Environments Science Stories, pp. 40-41</p> <p>Environments Science Stories, pp. 39-41</p> <p>Food and Nutrition Science Stories, p. 43</p> <p>Living Systems</p>

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

B. Conservation of Matter

Indicator

1. Cite evidence to support the statement that, "No matter how many parts of an object are assembled, the mass of the whole object made is always the same as the sum of the parts."

Objectives	FOSS
<p>Use magnifying instruments to investigate samples of matter, such as a leaf, sugar cube, color photograph, and granite to describe the minute parts from which they are made.</p> <p>Use evidence from investigations with a variety of materials, such as water to describe how matter can change from one form to another without the loss of any mass.</p> <p>Describe the relationship between the masses of whole objects to the sum of the mass of their parts using appropriate tools to gather supporting data.</p>	<p>Mixtures and Solutions Investigation 1, Parts 1, 3-4, pp. 8-15, 21-29 Investigation 2, Part 4, pp. 26-28</p> <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p> <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p>

Topic

C. States of Matter

Indicator

1. Provide evidence from investigations to identify the processes that can be used to change materials from one state of matter to another.

Objectives	FOSS
<p>Observe and describe the changes heating and cooling cause to the different states in which water exists.</p> <p>Heating causes: ice (solid) to melt forming liquid water; liquid water to evaporate forming water vapor (gas). Cooling causes: liquid water to freeze forming ice (solid); water vapor (gas) to form liquid water.</p> <p>Based on data explain the importance of water's ability to exist in all three states within the temperatures normally found on</p>	<p>Mixtures and Solutions Investigation 1, Parts 2, 4, pp. 16-20, 25-29 Water Planet Investigation 2, Parts 1-4, pp. 80-110 Science Resources, pp. 26-40</p>

<p>Earth.</p> <p>Analyze data from observations to support the idea that when materials change from one state to another the amount of material stays the same.</p>	<p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p>
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Topic

D. Physical and Chemical Changes

Indicator

1. Provide evidence to illustrate that when a new material is made by combining two or more materials, its properties are different from the original materials.

Objectives	FOSS
<p>Investigate and describe what happens to the properties of materials when several materials are combined to make a mixture, such as table salt and pepper; various kinds of nuts, chocolate pieces, and coconut; sugar dissolved in milk</p> <p>Based on observations from investigations and video technology, describe what happens to the observable properties of materials when several materials are combined to make a new material, such as: Baking soda combined with vinegar</p> <p>Share data gathered and construct a reasonable explanation of the results.</p>	<p>Mixtures and Solutions Investigation 1, Parts 1, 4, pp. 8-15, 25-29 Investigation 2, Parts 1-2, pp. 8-20 Investigation 3, Parts 1-3, pp. 8-24</p> <p>Mixtures and Solutions Investigation 4, Parts 1-3, pp.8-24 Science Stories, pp. 23-24 FOSS Web, Movie: Physical and Chemical Changes</p> <p>Mixtures and Solutions Investigation 4, Parts 1-3, pp.8-24</p>

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

A. Mechanics

Indicator

1. Describe the motion of objects using distance traveled, time, direction, and speed.

Objectives	FOSS
<p>Observe, describe, and compare types of motion.</p> <p>Uniform motion as equal distances traveled in equal times, such as escalators, conveyor belts.</p> <p>Variable motion as different distances traveled in equal times, such as an accelerating car, falling objects.</p>	<p>Variables Investigation 1, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-3, pp. 8-22 Investigation 4, Parts 1-3, pp. 8-23</p> <p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15</p>

<p>Periodic motion as motion that repeats itself, such as a child on a swing, a person on a pogo stick.</p> <p>Use measurements to describe the distance traveled as the change in position.</p> <p>Based on data describe speed as the distance traveled per unit of time.</p>	<p>Variables Investigation 3, Parts 1-4, pp. 8-27 Investigation 4, Parts 2-3, pp. 12-23</p> <p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23</p> <p>Levers and Pulleys Investigation 4, Part 2, pp. 14-20</p>
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Indicator

2. Explain that the changes in the motion of objects are determined by the mass of an object and the amount (size) of the force applied to it.

Objectives	FOSS
<p>Observe and give examples that show changes in speed or direction of motion are caused by an interaction of forces acting on an object:</p> <p style="text-align: center;">Friction Gravity</p> <p>Observe and explain the changes in selected motion patterns using the relationship between force and mass.</p>	<p>Variables Investigation 3, Parts 1-3, pp. 8-22 Investigation 4, Parts 1-2, pp. 8-15</p> <p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Science Stories, pp. 37-41</p>

Indicator

4. Cite evidence that energy in various forms exists in mechanical systems.

Objectives	FOSS
<p>Identify ways of storing energy (potential) in an object.</p> <p style="text-align: center;">Raising an object above the ground Putting it on the end of a compressed or extended spring or rubber band</p> <p>Identify that an object has energy (kinetic) related to its motion. The greater the mass, the greater the energy The greater the speed, the greater the energy</p>	<p>Variables Investigation 1, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-22 Investigation 4, Parts 1-3, pp. 8-23</p> <p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Variables Investigation 1, Parts 1-3, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-22 Investigation 4, Parts 1-2, pp. 8-15</p> <p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23</p>

<p>Observe and cite examples showing that stored energy may be converted to energy of motion and vice versa.</p>	<p>FOSS provides the opportunity to address this objective. See below: Variables Investigation 1, Parts 1-3, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-22 Investigation 4, Parts 1-2, pp. 8-15 Models and Designs Investigation 3, Parts 1-3, pp. 8-23</p>
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Topic

D. Wave Interactions

Indicator

3. Provide evidence to show that light travels in a straight line until it is reflected or refracted.

Objectives	FOSS
<p>Observe and describe the images formed by a plane mirror.</p> <p>Size of the image Apparent distance of the image from the mirror Front-to-back reversal in the image.</p> <p>Based on observations trace the path of a ray of light before and after it is reflected (bounces) off a plane mirror.</p> <p>Observe and describe that a ray of light changes direction when it crosses the boundary between two materials such as air and water or air to glass.</p>	

Indicator

4. Recognize and describe how light interacts with different materials.

Objectives	FOSS
<p>Classify materials as translucent, transparent or opaque.</p> <p>Explain that shadows are formed when objects block light.</p> <p>Observe and describe that prisms separate white light into its component colors.</p> <p>Pose questions about why objects appear to be different colors.</p>	<p>Solar Energy Science Stories, pp. 8-9</p>

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

A. Natural Resources and Human Needs

Indicator

1. Recognize and explain how renewable and nonrenewable natural resources found in Maryland are used by humans to meet basic needs.

Objectives	FOSS
<p>Identify and compare Maryland's renewable resources and nonrenewable resources.</p> <p>Describe how humans use renewable natural resources, such as plants, soil, water, animals.</p> <p>Describe how humans use nonrenewable natural resources, such as oil, coal, natural gas, minerals, including metals</p>	<p>Local Objective See: Solar Energy FOSS Web, Activity: Resource Identification</p> <p>Landforms Science Stories, pp. 13-14 Solar Energy Science Stories, pp. 29-39 Environments Science Stories, pp. 43-44, 46-48 Food and Nutrition Science Stories, pp. 1-4, 10-13, 30-33</p> <p>Models and Designs Science Stories, pp.25-26</p>

Topic

B. Environmental Issues

Indicator

1. Recognize and explain that decisions influencing the use of natural resources may have benefits, drawbacks, unexpected consequences, and tradeoffs.

Objectives	FOSS
<p>Identify and describe personal and community behaviors that waste natural resources and/or cause environmental harm and those behaviors that maintain or improve the environment.</p> <p>Identify and describe that individuals and groups assess and manage risk to the environment differently.</p>	<p>Mixtures and Solutions Science Stories, pp. 21-22 Landforms Science Stories, pp 13-14 Environments Science Stories, pp. 36-37, 43-44, 51-52</p>

Indicator

2. Recognize and describe that consequences may occur when Earth's natural resources are used.

Objectives	FOSS
<p>Explain how human activities may have positive consequences on the natural</p>	

<p>environment.</p> <p>Recycling centers Native plantings Good farming practice</p> <p>Explain how human activities may have a negative consequence on the natural environment.</p> <p>Damage or destruction done to habitats Air, water, and land pollution</p> <p>Identify and describe that an environmental issue affects individuals and groups differently.</p>	<p>Landforms Science Stories, pp. 13-14</p> <p>Environments Science Stories, pp. 36-37, 43-44, 51-52</p> <p>Mixtures and Solutions Science Stories, pp. 21-22</p>
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Grade Six

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Introduction

Topic

A. Constructing Knowledge

Indicator

1. Design, analyze, or carry out simple investigations and formulate appropriate conclusions based on data obtained or provided.

Objectives	FOSS
<p>Explain that scientists differ greatly in what phenomena they study and how they go about their work.</p>	<p>Variables Science Stories, pp. 4-6</p> <p>Mixtures and Solutions Science Stories, pp. 29-36</p> <p>Food and Nutrition Science Stories, pp. 24-26</p> <p>Water Planet Science Resources, pp. 15, 18-19</p> <p>Planetary Science Resources, pp. 71-73</p> <p>Earth History Resources, pp. 83-85</p> <p>Populations and Ecosystems Resources, pp. 46-52</p> <p>Chemical Interactions Resources, pp. 81-5</p>
<p>Develop the ability to clarify questions and direct them toward objects and phenomena that can be described, explained, or predicted by scientific investigations.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning. See for example:</p> <p>Variables Investigation 3, Parts 2-3, pp. 14-23</p> <p>Water Planet Investigation 3, Part 1, pp. 125-136</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p>
<p>Explain and provide examples that all hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Locate information in reference books, back issues of newspapers, magazines and compact disks, and computer databases.</p>	<p>FOSS provides the opportunity to address this objective in select investigations and through the use of FOSS Science Stories and FOSS Resources. See below:</p> <p>Environments Investigation 6, Part 3, pp. 18-22</p> <p>Landforms Investigation 5, Part 4, pp. 27-31</p> <p>Water Planet Science Resources, pp. 96-97</p> <p>Populations and Ecosystems</p>

<p>Explain that if more than one variable changes at the same time in an investigation, the outcome of the investigation may not be clearly attributable to any one of the variables.</p> <p>Give examples of when further studies of the question being investigated may be necessary.</p> <p>Give reasons for the importance of waiting until an investigation has been repeated many times before accepting the results as correct.</p> <p>Use mathematics to interpret and communicate data.</p>	<p>Investigation 7, pp. 210-215 Planetary Science Investigation 2, Part 1, pp. 64-70</p> <p>FOSS provides the opportunity to address this objective. See below: Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Part 3, pp. 20-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Water Planet Investigation 2, Parts 2-3, pp. 56-110 Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Diversity of Life Investigation 8, Part 2, pp. 244-252 Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>FOSS provides the opportunity to address this objective. See below: Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Part 3, pp. 20-24 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 2, Part 1, pp. 85-98 Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Diversity of Life Investigation 8, Part 2, pp. 244-252</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>Variables Investigation 1, Parts 2-3, pp. 16-27 Levers and Pulleys Investigation 4, Parts 1-2, pp. 8-20 Mixtures and Solutions Investigation 1, Part 2, pp. 16-20 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 2, Part 1, pp. 85-98 Planetary Science Investigation 8, Part 4, pp. 265-270 Weather and Water Investigation 5, Part 1, pp. 152-162 Chemical Interactions Investigation 5, Parts 1, 3, pp. 153-158, 165-171</p>
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<p>Explain why accurate recordkeeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society.</p>	<p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment.

Objectives	FOSS
<p>Verify the idea that there is no fixed set of steps all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain that what people expect to observe often affects what they actually do observe and that scientists know about this danger to objectivity and take steps to try to avoid it when designing investigations and examining data.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain that even though different explanations are given for the same evidence, it is not always possible to tell which one is correct.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Describe the reasoning that lead to the interpretation of data and conclusions drawn.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Question claims based on vague statements or on statements made by people outside their area of expertise.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>

Topic

C. Communicating Scientific Information

Indicator

1. Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.

Objectives	FOSS
<p>Organize and present data in tables and graphs and identify relationships they</p>	<p>Variables Investigation 3, Part 4, pp. 24-27 Solar Energy Investigation 2, Parts 1-2, pp. 8-24</p>

<p>reveal.</p> <p>Interpret tables and graphs produced by others and describe in words the relationships they show.</p> <p>Give examples of how scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.</p> <p>Criticize the reasoning in arguments in which</p> <ul style="list-style-type: none"> Fact and opinion are intermingled Conclusions do not follow logically from the evidence given. Existence of control groups and the relationship to experimental groups is not made obvious. Samples are too small, biased, or not representative. <p>Explain how different models can be</p>	<p>Levers and Pulleys Investigation 1, Parts 1-2, pp. 18-28</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Electronics Investigation 6, Part 3, pp. 195-200</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>Chemical Interactions Investigation 5, Part 3, pp. 165-171</p> <p>Food and Nutrition Science Stories, pp. 28-29, 32, 35</p> <p>Variables Science Stories, p. 11</p> <p>Mixtures and Solutions Science Stories, p. 11</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Force and Motion Resources, pp. 28-30, 34-35</p> <p>Planetary Science Resources, pp. 35-38, 43</p> <p>Weather and Water Resources, pp. 19, 29, 30, 45</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Variables Science Stories, pp. 4-5</p> <p>Models and Designs Science Stories, pp. 5-7</p> <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Chemical Interactions Resources, pp. 3-6</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>FOSS provides the opportunity to address this</p>
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<p>used to represent the same thing. What kind of a model to use and how complex it should be depend on its purpose. Choosing a useful model is one of the instances in which intuition and creativity come into play in science, mathematics, and engineering</p> <p>Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.</p> <p>Recognize that important contributions to the advancement of science, mathematics, and technology have been made by different kinds of people, in different cultures, at different times.</p>	<p>objective through its investigations and its inquiry approach to learning.</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>Mixtures and Solutions Science Stories, pp. 5, 9, 10, 33, 35, 36</p> <p>Variables Science Stories, pp. 4-6, 8-9</p> <p>Food and Nutrition Science Stories, pp. 24-26</p> <p>Water Planet Science Resources, pp. 15, 18-19</p> <p>Earth History Resources, pp. 83-86</p> <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Force and Motion Resources, pp. 50-52</p> <p>Chemical Interactions Resources, pp. 7-8</p>
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Topic

D. Technology

Indicator

1. Explain that complex systems require control mechanisms.

Introduction

Objectives	FOSS
<p>Explain that the choice of materials for a job depends on their properties and on how they interact with other materials.</p> <p>Demonstrate that all control systems have inputs, outputs, and feedback.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15</p> <p>Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p> <p>Food and Nutrition Science Stories, pp. 44-50</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Variables Investigation 3, Part 1, pp. 8-13</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses</p>

<p>Realize that design usually requires taking constraints into account. (Some constraints, such as gravity or the properties of the materials to be used, are unavoidable. Other constraints, including economic, political, social, ethical, and aesthetic ones also limit choices.)</p> <p>Identify reasons that systems fail—they have faulty or poorly matched parts, are used in ways that exceed what was intended by the design, or were poorly designed to begin with.</p>	<p>Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74 Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p> <p>FOSS provides the opportunity to address this objective. See below: Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11 Electronics Resources, pp. 18-21 Force and Motion Investigation 8, Part 2, pp. 294-301</p> <p>FOSS provides the opportunity to address this objective. See below: Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Variables Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11 Electronics Resources, pp. 18-21 Force and Motion Investigation 8, Part 2, pp. 294-301</p>
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Indicator

2. Analyze, design, assemble and troubleshoot complex systems.

Introduction

Objectives	FOSS
<p>Provide evidence that a system can include processes as well as things.</p> <p>Explain that thinking about things as systems means looking for how every part relates to others. (The output from one part of a system (which can include material, energy, or information) can become the input to other parts. Such feedback can serve to control what</p>	<p>Food and Nutrition Science Stories, pp. 44-50 Models and Designs Investigation 3, Parts 1-2, pp. 8-13 Variables Investigation 3, Part 1, pp. 8-13 Living Systems Investigation 1, Parts 1-2, pp. 51-65 Science Resources, pp. 2-10 Electronics Investigation 4, Part 1, pp. 143-148 Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74 Force and Motion Investigation 1, Part 1, pp. 47-56</p> <p>Food and Nutrition Science Stories, pp. 44-50 Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Variables Investigation 3, Part 1, pp. 8-13</p>

<p>goes on in the system as a whole.)</p> <p>Analyze any system to determine its connection, both internally and externally to other systems and explain that a system may be thought of as containing subsystems and as being a subsystem of a larger system.</p>	<p>Living Systems Investigation 1, Parts 1-2, pp. 51-65 Science Resources, pp. 2-10</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p> <p>Food and Nutrition Science Stories, pp. 44-50</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Variables Investigation 3, Part 1, pp. 8-13</p> <p>Living Systems Investigation 1, Parts 1-2, pp. 51-65 Science Resources, pp. 2-10</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p>
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Indicator

3. Analyze the value and the limitations of different types of models in explaining real things and processes.

Introduction

Objectives	FOSS
<p>Explain that the kind of model to use and how complex it should be depends on its purpose and that it is possible to have different models used to represent the same thing.</p> <p>Explain, using examples that models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous.</p>	<p>Variables Investigation 2, Parts 1-2, pp. 8-18</p> <p>Landforms Investigation 1, Parts 1-3, pp. 8-24</p> <p>Solar Energy Investigation 4, Parts 1-3, pp. 8-28</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58 Investigation 4, Part 3, pp. 204-211</p> <p>Chemical Interactions Investigation 5, Part 2, pp. 159-164</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98</p> <p>Human Brain and Senses Investigation 3, Part 3, pp. 106-110</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Variables Investigation 2, Parts 1-2, pp. 8-18</p> <p>Landforms Investigation 1, Parts 1-3, pp. 8-24</p> <p>Solar Energy</p>

<p>caused by each of the chemical weathering processes listed:</p> <p style="padding-left: 40px;">Rusting/tarnishing Dissolving by acid rain</p> <p>Compare physical and chemical weathering and provide examples if changes caused in Earth materials or features by each of these processes.</p>	<p>Science Stories, pp. 28-29</p> <p>Earth History Investigation 4, Part 4, pp. 147-149 Video: Weathering and Erosion</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-24 Science Stories, pp. 15-17, 25-29 FOSS Web, Movie: Grand Canyon Rapids</p> <p>Earth History Investigation 4, Part 4, pp. 147-149 Video: Weathering and Erosion</p>
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Indicator

4. Differentiate among sedimentary, igneous, and metamorphic rocks based upon the processes by which they are formed.

Objectives	FOSS
<p>Identify and describe the processes that form sedimentary rock.</p> <p style="padding-left: 40px;">Deposition Compaction Cementation</p>	<p>Earth History Investigation 4, Parts 5-6, pp. 150-162 Investigation 5, Parts 1-2, pp. 175-182 CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks</p>
<p>Identify and describe the processes that form igneous rocks.</p> <p style="padding-left: 40px;">Volcanic eruptions Igneous intrusions</p>	<p>Earth History Investigation 8, Parts 1-2, pp. 254-265 CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks</p>
<p>Identify and describe the processes that form metamorphic rocks.</p> <p style="padding-left: 40px;">High Temperature Pressure</p>	<p>Earth History Investigation 8, Part 1, pp. 254-258 Resources, pp. 93-97 CD, Geology Lab: Metamorphic Processes CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks</p>
<p>Cite features that can be used as evidence to distinguish among the three types of rocks and relate these features to the processes that form each rock type.</p>	<p>Earth History Investigation 8, Part 3, pp. 266-270 CD, Geology lab: Rock Data Base</p>
<p>Describe the processes that change one form of rock into another (rock cycle).</p>	<p>Earth History Investigation 8, Part 1, pp. 254-258 Resources, pp. 93-97 CD, Geology Lab: Metamorphic Processes CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks</p>

Topic

C. Plate Tectonics

Indicator

1. Recognize and describe the internal and external structure of the Earth.

Objectives	FOSS
Recognize and describe that the Earth's mantle Lies between the core and the crust Is very hot Has properties of both solids and liquid	Landforms Science Stories, pp. 22-23 Earth History Resources, pp. 100-103
Recognize and describe that the Earth's core Is at the center of the Earth Is very hot Is dense and metallic	Earth History Resources, p. 100
Identify and describe the Earth's crust. The solid crust consists of separate plates The plates constantly move at a slow pace in different directions The plates interact with one another as a result of plate motion.	Landforms Science Stories, pp. 22-23 Earth History Resources, pp. 100-103

Indicator

2. Recognize and explain how major geologic events are a result of the movement of Earth's crustal plates.

Objectives	FOSS
Recognize and describe the evidence for plate movement. Shape of continents Continuity of geologic features and fossils on the continents Ocean rifts, seafloor spreading Global patterns of earthquakes and volcanoes	Landforms Science Stories, pp. 22-23 Earth History Resources, pp. 102-103
Recognize and explain that major geologic events (earthquakes, volcanic activity, sea floor spreading) occur along crustal plate boundaries.	Landforms Science Stories, pp. 22-25 Earth History Resources, pp. 101-103

Topic
D. Astronomy
Indicator

1. Recognize that objects of our solar system are interrelated.

Objectives	FOSS
<p>Recognize that Earth and its closest star, the sun, are part of a disk-shape galaxy of stars and that our galaxy is one of billions of galaxies.</p>	<p>Solar Energy Science Stories, p. 40 Water Planet Science Resources, p. 3 Planetary Science Resources, p. 100</p>
<p>Construct models with accurate scale that represent the position of the Earth relative to the sun and to other planets.</p>	<p>Solar Energy Science Stories, p. 41 Water Planet Investigation 1, Part 1, pp. 50-58 Planetary Science Resources, p. 83</p>
<p>Identify and describe the general pattern of movement of all objects in our solar system.</p>	<p>Water Planet Investigation 1, Parts 1-2, pp. 50-66 Science Resources, pp. 3-13 Planetary Science Investigation 3, Parts 1-2, pp. 89-98 Investigation 9, Part 2, pp. 288-292 CD, Day/Night Simulation; Phases of the Moon</p>
<p>Recognize that the pull of gravity causes the pattern of motion of celestial objects.</p>	<p>Solar Energy Science Stories, p. 43-44 Water Planet Investigation 1, Part 2, pp. 59-66 Science Resources, pp. 16-17 Planetary Science Resources, pp. 84-85, 70 Force and Motion Resources, pp. 67-68</p>

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic
D. Evolution
Indicator

1. Explain that in any particular environment, the growth and survival of organisms and species depend on the physical conditions.

Objectives	FOSS
<p>Cite examples and describe that small differences between parents and offspring can accumulate (through selective breeding) in successive generations so that descendants are very different from their ancestors.</p> <p>Explain that in all environments- freshwater, marine, forest, desert, grassland,</p>	<p>Environments Science Stories, pp. 47-48 Populations and Ecosystems Investigation 10, Parts 1-3, pp. 302-317 Resources, pp. 58-61 Video: Voyage to the Galapagos</p>

<p>mountain, and others-organisms with similar needs may compete with one another for resources, including food, space, water, air, and shelter.</p> <p>Explain that in any particular environment individual organisms with certain traits are more likely than others to survive and have offspring.</p> <p>Explain, with examples, ways that people control some characteristics of plants and animals they raise by selective breeding.</p> <p>Describe ways in which changes in environmental conditions can affect the survival of individual organisms and entire species.</p> <p>Describe how sediments of sand and smaller particles (sometimes containing the remains of organisms) are gradually buried and are cemented together by dissolved minerals to form solid rock; and describe that such fossils provide evidence for the long history of changing life forms whose remains are found in the rocks.</p> <p>Explain that the more recently deposited rock layers are likely to contain fossils resembling existing species.</p>	<p>Populations and Ecosystems Investigation 10, Parts 1-3, pp. 302-317 Resources, pp. 58-61</p> <p>Environments Science Stories, pp. 47-48 Populations and Ecosystems Resources, pp. 58-59</p> <p>Environments Science Stories, pp. 49-52 Populations and Ecosystems Investigation 10, Part 1, pp. 302-310 Resources, pp. 58-61</p> <p>Earth History Investigation 6, Part 3, pp. 215-219 Resources, pp. 76-77, 84-86 CD, Geology Lab: Fossilization Process</p> <p>Earth History Investigation 6, Part 3, pp. 215-219 Investigation 7, Part 1, pp. 234-242 Resources, pp. 76-77, 84-86 CD, Time Room</p>
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Topic

F. Ecology

Indicator

1. Give reasons supporting the fact that the number of organisms an environment can support depends on the physical conditions and resources available.

Objectives	FOSS
<p>Explain that populations increase or decrease relative to the availability of resources and the conditions of the environment.</p> <p>Identify and describe factors that could limit populations within any environment, such as disease, introduction of a nonnative species, depletion of resources, etc.</p>	<p>Environments Investigation 3, Parts 1-3, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-21 Investigation 6, Parts 1-2, pp. 8-17 Science Stories, pp. 43-45 Populations and Ecosystems Investigation 6, Parts 1-3, pp. 179-197 Resources, pp. 22-24, 25-29</p> <p>Environments Investigation 3, Parts 1-3, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-21 Investigation 6, Parts 1-2, pp. 8-17 Science Stories, pp. 43-45 Populations and Ecosystems</p>

<p>Explain that within any environment organisms with similar needs may compete with one another for resources.</p> <p>Cite examples to illustrate that competition is reduced when organisms use different sets of resources, such as birds in a forest eat different kinds and sizes of seeds.</p>	<p>Investigation 6, Parts 2-3, pp. 187-197 Resources, pp. 22-24, 25-29</p> <p>Environments Science Stories, pp. 43-45 Populations and Ecosystems Investigation 3, Part 2, pp. 103-107 Investigation 4, Part 2, pp. 122-129 Resources, pp. 8-13, 17-21</p>
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Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

C. States of Matter

Indicator

1. Provide evidence and examples illustrating that many substances can exist as a solid, liquid, or gas depending on temperature.

Objectives	FOSS
<p>Use evidence from investigations to describe the effect that adding heat energy to different types of matter has on the rate at which the matter changes from one state to another.</p> <p>Based on data from investigations describe the effect that removing heat energy from different types of matter has on the rate at which the matter changes from one state to another.</p> <p>Analyze data gathered and formulate a conclusion on the effects of temperature change on most substances.</p>	<p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 7, Parts 2-3, pp. 210-221 Resources, pp. 28-31</p> <p>Chemical Interactions Investigation 7, Parts 4, pp. 222-228 Resources, pp. 38-41</p> <p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 CD, Particles in Solid, Liquid and Gas</p>

Topic

D. Physical and Chemical Changes

Indicator

1. Cite evidence to support the fact that some substances can be separated into the original substances from which they were made.

Objectives	FOSS
<p>Investigate and identify ways to describe and classify mixtures using the observable and measurable properties of their components.</p>	<p>Mixtures and Solutions Investigation 1, Part 1, pp. 8-15 Investigation 2, Parts 1-2, pp. 8-20 Investigation 3, Parts 1-2, pp. 8-20 Science Stories, pp 1-3</p>

<p>Magnetism Boiling Point Solubility in water</p> <p>Based on data gathered, identify and describe various processes used to separate mixtures.</p> <p>Filtration Evaporation Paper Chromatography</p> <p>Use data gathered to provide a reasonable explanation for the idea that the mass of a mixture is equal to the sum of the masses of its components.</p>	<p>Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Investigation 8, Parts 1-3, pp. 248-268 Resources, pp. 49-53</p> <p>Mixtures and Solutions Investigation 1, Parts 2-4, pp. 16-29 Investigation 2, Part 4, pp. 26-28</p> <p>Chemical Interactions Investigation 1, Part 2, pp. 46-58 Investigation 8, Part 1, pp. 248-255</p> <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p> <p>Chemical Interactions Investigation 9, Part 2, pp. 288-297 Resources, pp. 63-68, 71</p>
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Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

C. Electricity and Magnetism

Indicator

2. Cite evidence supporting that electrical energy can be produced from a variety of energy sources and can itself be transformed into almost any other form of energy.

Objectives	FOSS
<p>Research and identify various energy sources and the energy transforming devices used to produce electrical energy</p> <p>Wind (generators, wind mills) Sun (solar cells) Water (turbines) Fossil fuels (engines)</p> <p>Cite examples that demonstrate the transformation of electrical energy into other forms of energy.</p> <p>Investigate and describe that some materials allow the quick, convenient, and safe transfer of electricity (conductors), while others prevent the transfer of electricity (insulators).</p> <p>Identify and describe the energy transformations in simple electric circuits.</p>	<p>Solar Energy Science Stories, pp. 30-31, 36, 38-39 FOSS Web, Activity: Solar Road Race</p> <p>Electronics Resources, pp. 12-13</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Investigation 4, Parts 1-2, pp. 143-151 Resources, pp. 1-2</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Resources, pp. 1-2</p>

Indicator

3. Identify and describe magnetic fields and their relationship to electric current.

Objectives	FOSS
<p>Investigate and describe the magnetic fields surrounding various types of magnets using materials, such as iron filings and small compasses.</p> <p style="padding-left: 40px;">A single bar magnet Two bar magnets with like poles facing Two bar magnets with opposite poles facing A horseshoe magnet</p> <p>Investigate and explain ways to change the strength of a simple electromagnet by varying the number of coils wrapped, the amount of electricity in the wire, the number of batteries used, and whether or not an iron core is used.</p> <p>Describe how the electromagnet demonstrates the relationship of magnetism and electricity and identify common devices that demonstrate application of this relationship.</p> <p style="padding-left: 40px;">Electric motors (fans, hair dryers, can openers) Electrical generators (turbine)</p> <p>Based on investigations describe that electricity moving through a wire produces a magnetic force on materials placed near the wire.</p> <p style="padding-left: 40px;">Iron filings Compasses</p>	

Topic

D. Wave Interactions

Indicator

1. Identify and describe the relationships among the various properties of waves.

Objectives	FOSS
<p>Cite examples to show that waves transfer energy from one place to another.</p> <p style="padding-left: 40px;">Light Sound Earthquake waves</p> <p>Measure and describe the wavelength, frequency, and amplitude of waves using:</p> <p style="padding-left: 40px;">Water Ropes</p>	

Springs	
Measure and describe the relationship between the frequency and the wavelength of a wave.	

Indicator

2. Provide evidence to demonstrate the relationship among the properties of waves using sound.

Objectives	FOSS
<p>Investigate and describe that the pitch of sounds can be varied by changing the rate of vibration.</p> <p>Identify and describe the relationship among frequency, wavelength, and pitch.</p> <p>Observe and describe the relationship between amplitude and loudness.</p> <p>Cite evidence that sound waves transfer energy using observation of sympathetic tuning forks, tuned guitar strings, etc.</p>	

Indicator

3. Investigate and cite the rules that govern behaviors of light.

Objectives	FOSS
<p>Based on data generalize the law of reflection.</p> <p>Cite evidence from observations and research to support the fact that something can be "seen" when light waves emitted or reflected by it enter the eye.</p> <p>Based on observations predict the change in the direction (refraction) of light as it travels from one material to another.</p> <p>Cite evidence that the amount of light energy absorbed or reflected depends on the color of the object illuminated.</p>	<p>Human Brain and Senses Investigation 3, Part 3, pp. 106-110 Resources, pp. 31-33, 65-66</p> <p>Human Brain and Senses Investigation 3, Part 1, pp. 92-100 Resources, pp. 31-33 CD, Optics Bench</p>

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

A. Natural Resources and Human Needs

Indicator

1. Recognize and compare how different parts of the world have varying amounts and types of natural resources and how the use of those resources impacts environmental quality.

Objectives	FOSS
<p>Identify and describe natural resources as</p> <ul style="list-style-type: none"> Land Fossil Fuels Forests Water Wind Minerals Wildlife <p>Identify and describe the distribution of natural resources around the Earth</p> <p>Identify and describe how the natural change processes may be affected by human activities.</p> <ul style="list-style-type: none"> Agriculture Beach Preservation Mining Development/construction Stream/river alteration <p>Identify and describe problems associated with obtaining, using, and distributing natural resources.</p> <p>Identify possible solutions to problems associated with obtaining, using, and distributing natural resources.</p>	<p>Solar Energy FOSS Web, Activity: Resource Identification</p> <p>Weather and Water Resources, pp. 45-47</p> <p>Electronics Resources, p. 13</p> <p>Weather and Water Resources, pp. 43-47</p> <p>Landforms Science Stories, pp. 13-14, 15-21</p> <p>Environments Science Stories, pp. 43-45</p> <p>Earth History Resources, pp. 64-67</p> <p>Populations and Ecosystems Investigation 7, pp. 210-215 Resources, pp. 31-41</p>

Topic

B. Environmental Issues

Indicator

1. Recognize and explain that human-caused changes have consequences for Maryland's environment as well as for other places and future times.

Objectives	FOSS
<p>Identify and describe a range of local issues that have an impact on people in other places.</p> <p>Recognize and describe how environmental change in one part of the world</p>	<p>Weather and Water Investigation 9, Part 4, pp. 315-318</p>

<p>can have consequences for other parts of the world.</p> <p>Identify and describe that ecosystems can be impacted by human activities.</p> <ul style="list-style-type: none"> Protection of the Chesapeake Bay watershed Resource acquisition and use Land use decisions (agriculture, mining, and development) Recycling Use and disposal of toxic substances 	<p>Resources, pp. 63-66</p> <p>Mixtures and Solutions Science Stories, p. 21</p> <p>Environments Science Stories, pp. 43-45</p> <p>Landforms Science Stories, pp. 13-14</p> <p>Populations and Ecosystems Investigation 7, pp. 21-215 Resources, pp. 31-41</p>
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Grade Seven

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Introduction

Topic

A. Constructing Knowledge

Indicator

1. Design, analyze, or carry out simple investigations and formulate appropriate conclusions based on data obtained or provided.

Objectives	FOSS
<p>Explain that scientists differ greatly in what phenomena they study and how they go about their work.</p>	<p>Planetary Science Resources, pp. 71-73 Earth History Resources, pp. 83-85 Populations and Ecosystems Resources, pp. 46-52 Chemical Interactions Resources, pp. 81-85</p>
<p>Develop the ability to clarify questions and direct them toward objects and phenomena that can be described, explained, or predicted by scientific investigations.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning. See for example: Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Solar Energy Investigation 3, Parts 1-2, pp. 8-23</p>
<p>Explain and provide examples that all hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Locate information in reference books, back issues of newspapers, magazines and compact disks, and computer databases.</p>	<p>FOSS provides the opportunity to address this objective in select investigations and through the use of FOSS Resources. See below: Populations and Ecosystems Investigation 7, pp. 210-215 Planetary Science Investigation 2, Part 1, pp. 64-70</p>
<p>Explain that if more than one variable changes at the same time in an investigation, the outcome of the investigation may not be clearly attributable to any one of the variables.</p>	<p>FOSS provides the opportunity to address this objective. See below: Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Diversity of Life Investigation 8, Part 2, pp. 244-252 Weather and Water Investigation 4, Part 1, pp. 121-130</p>
<p>Give examples of when further studies of the question being investigated may be necessary.</p>	<p>FOSS provides the opportunity to address this objective. See below: Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p>

<p>Give reasons for the importance of waiting until an investigation has been repeated many times before accepting the results as correct.</p> <p>Use mathematics to interpret and communicate data.</p> <p>Explain why accurate recordkeeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society.</p>	<p>Diversity of Life Investigation 8, Part 2, pp. 244-252</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>Planetary Science Investigation 8, Part 4, pp. 265-270</p> <p>Weather and Water Investigation 5, Part 1, pp. 152-162</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>Chemical Interactions Investigation 5, Parts 1, 3, pp. 153-158, 165-171</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment.

Objectives	FOSS
<p>Verify the idea that there is no fixed set of steps all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain that what people expect to observe often affects what they actually do observe and that scientists know about this danger to objectivity and take steps to try to avoid it when designing investigations and examining data.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain that even though different explanations are given for the same evidence, it is not always possible to tell which one is correct.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Describe the reasoning that lead to the interpretation of data and conclusions drawn.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Question claims based on vague</p>	

statements or on statements made by people outside their area of expertise.	FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.
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Topic

C. Communicating Scientific Information

Indicator

1. Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.

Objectives	FOSS
Organize and present data in tables and graphs and identify relationships they reveal.	<p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Electronics Investigation 6, Part 3, pp. 195-200</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>Chemical Interactions Investigation 5, Part 3, pp. 165-171</p>
Interpret tables and graphs produced by others and describe in words the relationships they show.	<p>Force and Motion Resources, pp. 28-30, 34-35</p> <p>Planetary Science Resources, pp. 35-38, 43</p> <p>Weather and Water Resources, pp. 19, 29, 30, 45</p>
Give examples of how scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Force and Motion Resources, pp. 50-52</p> <p>Chemical Interactions Resources, pp. 3-6</p>
<p>Criticize the reasoning in arguments in which</p> <ul style="list-style-type: none"> Fact and opinion are intermingled Conclusions do not follow logically from the evidence given. Existence of control groups and the relationship to experimental groups is not made obvious. Samples are too small, biased, or not representative. 	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
Explain how different models can be used to represent the same thing. What kind of a model to use and how complex it should be depend on its purpose. Choosing a useful model is one of the instances in which intuition and creativity come into play in science,	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>

<p>mathematics, and engineering</p> <p>Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.</p> <p>Recognize that important contributions to the advancement of science, mathematics, and technology have been made by different kinds of people, in different cultures, at different times.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>Earth History Resources, pp. 83-86</p> <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Force and Motion Resources, pp. 50-52</p> <p>Planetary Science Resources, pp. 71-73</p> <p>Chemical Interactions Resources, pp. 7-8</p>
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Topic

D. Technology

Indicator

1. Explain that complex systems require control mechanisms.

Introduction

Objectives	FOSS
<p>Explain that the choice of materials for a job depends on their properties and on how they interact with other materials.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p>
<p>Demonstrate that all control systems have inputs, outputs, and feedback.</p>	<p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p>
<p>Realize that design usually requires taking constraints into account. (Some constraints, such as gravity or the properties of the materials to be used, are unavoidable. Other constraints, including economic, political, social, ethical, and aesthetic ones also limit choices.)</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p>
<p>Identify reasons that systems fail-they have faulty or poorly matched parts, are used in ways that exceed what was intended by the design, or were poorly designed to begin with.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p>

Indicator

2. Analyze, design, assemble and troubleshoot complex systems.

Introduction

Objectives	FOSS
<p>Provide evidence that a system can include processes as well as things.</p> <p>Explain that thinking about things as systems means looking for how every part relates to others. (The output from one part of a system (which can include material, energy, or information) can become the input to other parts. Such feedback can serve to control what goes on in the system as a whole.)</p> <p>Analyze any system to determine its connection, both internally and externally to other systems and explain that a system may be thought of as containing subsystems and as being a subsystem of a larger system.</p>	<p>Electronics Investigation 4, Part 1, pp. 143-148</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 1, Part 1, pp. 47-56</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p>

Indicator

3. Analyze the value and the limitations of different types of models in explaining real things and processes.

Introduction

Objectives	FOSS
<p>Explain that the kind of model to use and how complex it should be depends on its purpose and that it is possible to have different models used to represent the same thing.</p> <p>Explain, using examples that models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous.</p> <p>Explain that models may sometimes mislead by suggesting characteristics that are</p>	<p>Chemical Interactions Investigation 8, Part 2, pp. 159-164</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98</p> <p>Human Brain and Senses Investigation 3, Part 3, pp. 106-110</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Chemical Interactions Investigation 9, Part 1, pp. 280-287 CD, Particles in Solid, Liquid and Gas</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98</p> <p>Human Brain and Senses Investigation 3, Part 3, pp. 106-110</p> <p>FOSS provides the opportunity to address this objective. See below:</p>

not really shared with what is being modeled.	Force and Motion Investigation 8, Part 1, pp. 284-293 Weather and Water Investigation 3, Part 2, pp. 97-102 Planetary Science Investigation 3, Part 2, pp. 94-98 Human Brain and Senses Investigation 3, Part 3, pp. 106-110 Chemical Interactions Investigation 9, Part 1, pp. 280-287 CD, Particles in Solid, Liquid and Gas
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Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Objectives	FOSS
none	

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

A. Diversity of Life

Indicator

1. Compile evidence to verify the claim of biologists that the features of organisms connect or differentiate them-these include external and internal structures (features) and processes.

Objectives	FOSS
Provide examples and explain that organisms sorted into groups share similarities in external structures as well as similarities in internal anatomical structures and processes which can be used to infer the degree of relatedness among organisms Vascular - non vascular plants Closed - open circulatory systems Asexual - sexual reproduction Respiration (lungs-gills-skin) Digestion Identify general distinctions among organisms that support classifying some things as plants, some as animals, and some that do not fit neatly into either group. Animals consume food Plants make food Use analogies, models, or drawings to represent that animals and plants have a great	Diversity of Life Investigation 9, Part 1, pp. 273-277 Resources, pp. 51-54, 55-59, 65-68 Diversity of Life Resources, pp. 17, 65-68 Diversity of Life Investigation 2, Part 3, pp. 85-91

variety of body plans and internal structures that define the way they live, grow, survive, and reproduce.	Investigation 3, Parts 2-3, pp. 108-122 Investigation 9, Part 1, pp. 273-277 Resources, pp. 4-7, 51-59
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Topic

B. Cells

Indicator

1. Gather and organize data to defend or argue the proposition that all living things are cellular (composed of cells) and that cells carry out the basic life functions.

Objectives	FOSS
<p>Use microscopes or other magnifying instruments to observe, describe, and compare the cellular composition of different body tissues and organs in a variety of organisms (animals and plants).</p> <p>Based on data from readings and designed investigations, cite evidence to illustrate that the life functions of multicellular organisms (plant and animal) are carried out within complex systems of different tissues, organs and cells.</p> <ul style="list-style-type: none"> Extracting energy from food Getting rid of wastes Making raw materials <p>Based on research and examples from video technology explain that the repeated division of cells enables organisms to grow and make repairs.</p> <p>Collect data from investigations using single celled organisms, such as yeast or algae to explain that a single cell carries out all the basic life functions of a multicellular organism.</p> <ul style="list-style-type: none"> Reproducing Extracting energy from food Getting rid of wastes <p>Based on data compiled from a number of lessons completed, take and defend a position on the statement "The way in which cells function is the same in all organisms."</p>	<p>Diversity of Life Investigation 4, Part 1, pp. 133-136 Investigation 5, Part 3, pp. 165-170 Investigation 6, Part 2, pp. 193-197</p> <p>Diversity of Life Investigation 2, Part 3, pp. 85-91 Investigation 3, Part 2, pp. 108-115 Investigation 5, Parts 2-3, pp. 157-170 Investigation 6, Parts 1-2, pp. 186-197 Investigation 7, Part 1, pp. 218-223 Resources, pp. 31-45</p> <p>Diversity of Life Investigation 5, Part 3, pp. 165-170 Resources, pp. 26, 43</p> <p>Populations and Ecosystems Resources, pp. 53-54</p> <p>Diversity of Life Investigation 3, Parts 1-3, pp. 102-122 Investigation 10, Parts 1-2, pp. 302-316</p> <p>FOSS provides the opportunity to address this objective through the above-cited references.</p>

Indicator

2. Recognize and provide examples that human beings, like other organisms have complex body systems of cells, tissues and organs that interact to support an organism's growth and survival.

Objectives	FOSS
<p>Describe and explain that the complex set of systems found in multicellular organisms are made up of different kinds of tissues and organs which are themselves composed of</p>	<p>Diversity of Life Investigation 5, Parts 2-3, pp. 157-170 Investigation 6, Part 2, pp. 193-197 Resources, pp. 31-39, 55-59</p>

<p>differentiated cells.</p> <p>Select several body systems and explain the role of cells, tissues and organs that effectively carry out a vital function for the organism, such as</p> <ul style="list-style-type: none"> Obtaining food and providing energy (digestive, circulatory, respiratory) Defense (nervous, endocrine, circulatory, muscular, skeletal, immune) Reproduction (reproductive, endocrine, circulatory) Waste removal (excretory, respiratory, circulatory) Breathing (respiratory, circulatory) <p>Develop a response that explains the meaning of the statement, "The specialization of cells serves the operation of the organs, and the organs serve the needs of the cells."</p> <p>Investigate ways in which the various organs and tissues function to serve the needs of cells for food, air, and waste removal.</p>	<p>Diversity of Life Investigation 6, Part 2, pp. 193-197 Investigation 7, Part 1, pp. 218-223 Resources, pp. 31-39, 42-44, 55-59</p> <p>FOSS provides the opportunity for students and teachers to address this objective.</p> <p>Diversity of Life Investigation 6, Parts 1-2, pp. 186-197 Resources, pp. 31-39, 55-59</p>
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Topic

C. Genetics

Indicator

1. Explain the ways that genetic information is passed from parent to offspring in different organisms.

Objectives	FOSS
<p>Investigate and explain that in some kinds of organisms, all the genes come from a single parent, whereas in organisms that have sexes, typically half of the genes come from each parent.</p> <p>Investigate and explain that in sexual reproduction, a single specialized cell from a female (egg) merges with a specialized cell from a male (sperm) and the fertilized egg now has genetic information from each parent, that multiplies to form the complete organism composed of about a trillion cells, each of which contains the same genetic information.</p> <p>Investigate organisms that reproduce asexually to identify what traits they receive from the parent.</p> <p>Use information about how the transfer of traits from parent or parents to offspring</p>	<p>Populations and Ecosystems Investigation 9, Parts 2-4, pp. 267-291 Resources, pp. 46-55</p> <p>Diversity of Life Resources, p. 26</p> <p>Diversity of Life Investigation 7, Part 1, pp. 218-223 Resources, pp. 40-45</p> <p>Populations and Ecosystems Resources, pp. 46-54</p> <p>Diversity of Life Investigation 10, Parts 1-2, pp. 303-316 Resources, pp. 26, 65-68</p> <p>Populations and Ecosystems Investigation 9, Parts 1-4, pp. 262-291 Resources, pp. 46-54, 58-59</p>

<p>occurs, to explain how selective breeding for particular traits has resulted in new varieties of cultivated plants and domestic animals.</p> <p>Identify evidence to support the idea that there is greater variation among offspring of organisms that reproduce sexually than among those that reproduce asexually.</p>	<p>FOSS provides the opportunity to address this objective. See below: Populations and Ecosystems Investigation 9, Parts 1-4, pp. 262-291 Resources, pp. 46-55, 58-59 Diversity of Life Investigation 10, Parts 1-2, pp. 303-316 Resources, p. 26, 65-68</p>
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Topic

E. Flow of Matter and Energy

Indicator

1. Explain that the transfer and transformation of matter and energy links organisms to one another and to their physical setting.

Objectives	FOSS
<p>Cite evidence from research and observations that food provides molecules that serve as fuel and building materials for all organisms.</p>	<p>Populations and Ecosystems Investigation 5, Parts 2-3, pp. 151-160 Resources, pp. 14-16, 17-21 Diversity of Life Resources, p. 36-37</p>
<p>Cite evidence from research and observations that organisms that eat plants or animals break down what they have consumed (food) to produce the materials and energy they need to survive or store for later use.</p>	<p>Populations and Ecosystems Investigation 5, Parts 3-4, pp. 156-169 Resources, pp. 14-16, 17-21 Diversity of Life Resources, p. 36-37</p>
<p>Investigate and describe the processes that enable plants to use the energy from light to make sugars (food) from carbon dioxide and water.</p>	<p>Populations and Ecosystems Investigation 5, Part 2, pp. 151-155 Resources, pp. 14-15 Diversity of Life Resources, p. 36-37</p>
<p>Provide evidence from research to explain how plants can use the food they make immediately for fuel or stored for later use.</p>	<p>Populations and Ecosystems Resources, pp. 14-15 Diversity of Life Resources, p. 36-37</p>
<p>Ask and seek answers to questions about the fact that transfer of matter between organisms continues indefinitely because organisms are decomposed after death to return food materials to the environment.</p>	<p>Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Resources, pp. 17-21</p>
<p>Provide evidence that supports the premise "In the flow of matter system the total amount of matter remains constant even though its form and location change." Carbon cycle Nitrogen (cycle) Food chains and food webs</p>	<p>Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Investigation 5, Part 4, pp. 161-169 Resources, pp. 8-11, 17-21</p>

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

A. Structure of Matter

Indicator

1. Cite evidence to support the fact that all matter is made up of atoms, which are far too small to see directly through a microscope.

Objectives	FOSS
Recognize and describe that the atoms of each element are alike but different from atoms of other elements.	Chemical Interactions Investigation 9, Part 1, pp. 280-287 Resources, pp. 14-15
Recognize and describe that different arrangements of atoms into groups compose all substances.	Chemical Interactions Investigation 9, Parts 2-3, pp. 288-312 Resources, pp. 14-15, 63-67
Provide evidence from the periodic table, investigations and research to demonstrate that elements in the following groups have similar properties. Highly reactive metals, such as magnesium and sodium Less-reactive metals, such as gold and silver Highly reactive non-metals, such as chlorine, flourine, and oxygen Almost non-reactive gases, such as helium and neon	Chemical Interactions Investigation 2, Part 1, pp. 70-74 Resources, pp. 4-6 CD, Periodic Table
Provide examples to illustrate that elements are substances that do not breakdown into smaller parts during normal investigations involving heating, exposure to electric current or reactions with acids.	Chemical Interactions Investigation 2, Part 1, pp. 70-74 Resources, pp. 3-8, 63-67
Cite evidence to explain that all living and non-living things can be broken down to a set of known elements.	Chemical Interactions Investigation 2, Parts 1-2, pp. 2870-80 Resources, pp. 63-67

Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur

Introduction

Objectives	FOSS
none	

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

A. Natural Resources and Human Needs

Indicator

1. Recognize and explain the impact of a changing human population on the use of natural resources and on environmental quality.

Objectives	FOSS
Based on data identify and describe the positive and negative impacts of an increasing human population on the use of natural resources Recognize and describe the decreasing dependence on local resources due to the impact of available transportation	

Topic

B. Environmental Issues

Indicator

1. Recognize and describe that environmental changes can have local, regional, and global consequences.

Objectives	FOSS
Identify and describe a local, regional, or global environmental issue. Identify and describe that different individuals or groups are affected by an issue in different ways.	Populations and Ecosystems Investigation 7, Pp. 210-215 Resources, pp. 31-41 Weather and Water Investigation 9, Part 4, pp. 315-318 Resources, pp. 63-66 Populations and Ecosystems Investigation 7, Pp. 210-215 Resources, pp. 31-41

Grade Eight

Standard 1.0 Skills and Processes

Students will demonstrate the thinking and acting inherent in the practice of science.

Introduction

Topic

A. Constructing Knowledge

Indicator

1. Design, analyze, or carry out simple investigations and formulate appropriate conclusions based on data obtained or provided.

Objectives	FOSS
<p>Explain that scientists differ greatly in what phenomena they study and how they go about their work.</p>	<p>Planetary Science Resources, pp. 71-73 Earth History Resources, pp. 83-85 Populations and Ecosystems Resources, pp. 46-52 Chemical Interactions Resources, pp. 81-85</p>
<p>Develop the ability to clarify questions and direct them toward objects and phenomena that can be described, explained, or predicted by scientific investigations.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning. See for example: Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Solar Energy Investigation 3, Parts 1-2, pp. 8-23</p>
<p>Explain and provide examples that all hypotheses are valuable, even if they turn out not to be true, if they lead to fruitful investigations.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Locate information in reference books, back issues of newspapers, magazines and compact disks, and computer databases.</p>	<p>FOSS provides the opportunity to address this objective in select investigations and through the use of FOSS Resources. See below: Populations and Ecosystems Investigation 7, pp. 210-215 Planetary Science Investigation 2, Part 1, pp. 64-70</p>
<p>Explain that if more than one variable changes at the same time in an investigation, the outcome of the investigation may not be clearly attributable to any one of the variables.</p>	<p>FOSS provides the opportunity to address this objective. See below: Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Diversity of Life Investigation 8, Part 2, pp. 244-252 Weather and Water Investigation 4, Part 1, pp. 121-130</p>
<p>Give examples of when further studies of the question being investigated may be</p>	<p>FOSS provides the opportunity to address this objective. See below: Planetary Science</p>

<p>necessary.</p> <p>Give reasons for the importance of waiting until an investigation has been repeated many times before accepting the results as correct.</p> <p>Use mathematics to communicate data. interpret and</p> <p>Explain why accurate recordkeeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society.</p>	<p>Investigation 5, Parts 2-3, pp. 158-167 Diversity of Life Investigation 8, Part 2, pp. 244-252</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>Planetary Science Investigation 8, Part 4, pp. 265-270 Weather and Water Investigation 5, Part 1, pp. 152-162 Force and Motion Investigation 2, Part 3, pp. 89-99 Chemical Interactions Investigation 5, Parts 1, 3, pp. 153-158, 165-171</p> <p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
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Topic

B. Applying Evidence and Reasoning

Indicator

1. Review data from a simple experiment, summarize the data, and construct a logical argument about the cause-and-effect relationships in the experiment.

Objectives	FOSS
<p>Verify the idea that there is no fixed set of steps all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain that what people expect to observe often affects what they actually do observe and that scientists know about this danger to objectivity and take steps to try to avoid it when designing investigations and examining data.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain that even though different explanations are given for the same evidence, it is not always possible to tell which one is correct.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Describe the reasoning that leads to the interpretation of data and conclusions</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>

<p>drawn.</p> <p>Question claims based on vague statements or on statements made by people outside their area of expertise.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning</p>
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Topic

C. Communicating Scientific Information

Indicator

1. Develop explanations that explicitly link data from investigations conducted, selected readings and, when appropriate, contributions from historical discoveries.

Objectives	FOSS
<p>Organize and present data in tables and graphs and identify relationships they reveal.</p>	<p>Weather and Water Investigation 4, Part 1, pp. 121-130 Electronics Investigation 6, Part 3, pp. 195-200 Chemical Interactions Investigation 5, Part 3, pp. 165-171 Force and Motion Investigation 2, Part 3, pp. 89-99</p>
<p>Interpret tables and graphs produced by others and describe in words the relationships they show.</p>	<p>Force and Motion Resources, pp. 28-30, 34-35 Planetary Science Resources, pp. 35-38, 43 Weather and Water Resources, pp. 19, 29, 30, 45</p>
<p>Give examples of how scientific knowledge is subject to modification as new information challenges prevailing theories and as a new theory leads to looking at old observations in a new way.</p>	<p>FOSS provides the opportunity to address this objective. See below: Populations and Ecosystems Resources, pp. 46-55 Force and Motion Resources, pp. 50-52</p>
<p>Criticize the reasoning in arguments in which</p> <ul style="list-style-type: none"> Fact and opinion are intermingled Conclusions do not follow logically from the evidence given. Existence of control groups and the relationship to experimental groups is not made obvious. Samples are too small, biased, or not representative. 	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>
<p>Explain how different models can be used to represent the same thing. What kind of a model to use and how complex it should be depend on its purpose. Choosing a useful model is one of the instances in which intuition</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p>

<p>and creativity come into play in science, mathematics, and engineering</p> <p>Participate in group discussions on scientific topics by restating or summarizing accurately what others have said, asking for clarification or elaboration, and expressing alternative positions.</p> <p>Recognize that important contributions to the advancement of science, mathematics, and technology have been made by different kinds of people, in different cultures, at different times.</p>	<p>FOSS provides the opportunity to address this objective through its investigations and its inquiry approach to learning.</p> <p>Earth History Resources, pp. 83-86</p> <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Force and Motion Resources, pp. 50-52</p> <p>Planetary Science Resources, pp. 71-73</p> <p>Chemical Interactions Resources, pp. 7-8</p>
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Topic

D. Technology

Indicator

1. Explain that complex systems require control mechanisms.

Introduction

Objectives	FOSS
<p>Explain that the choice of materials for a job depends on their properties and on how they interact with other materials.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p>
<p>Demonstrate that all control systems have inputs, outputs, and feedback.</p>	<p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83</p> <p>Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p>
<p>Realize that design usually requires taking constraints into account. (Some constraints, such as gravity or the properties of the materials to be used, are unavoidable. Other constraints, including economic, political, social, ethical, and aesthetic ones also limit choices.)</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p>
<p>Identify reasons that systems fail—they have faulty or poorly matched parts, are used in ways that exceed what was intended by the design, or were poorly designed to begin with.</p>	<p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Resources, pp. 18-21</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p>

Indicator

2. Analyze, design, assemble and troubleshoot complex systems.

Introduction

Objectives	FOSS
<p>Provide evidence that a system can include processes as well as things.</p> <p>Explain that thinking about things as systems means looking for how every part relates to others. (The output from one part of a system (which can include material, energy, or information) can become the input to other parts. Such feedback can serve to control what goes on in the system as a whole.)</p> <p>Analyze any system to determine its connection, both internally and externally to other systems and explain that a system may be thought of as containing subsystems and as being a subsystem of a larger system.</p>	<p>Electronics Investigation 4, Part 1, pp. 143-148</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 1, Part 1, pp. 47-56</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p> <p>Electronics Investigation 5, Parts 1-3, pp. 161-174</p> <p>Human Brain and Senses Investigation 2, Parts 1-3, pp. 67-83 Resources, pp. 63-74</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201</p>

Indicator

3. Analyze the value and the limitations of different types of models in explaining real things and processes.

Introduction

Objectives	FOSS
<p>Explain that the kind of model to use and how complex it should be depends on its purpose and that it is possible to have different models used to represent the same thing.</p> <p>Explain, using examples that models are often used to think about processes that happen too slowly, too quickly, or on too small a scale to observe directly, or that are too vast to be changed deliberately, or that are potentially dangerous.</p>	<p>Chemical Interactions Investigation 5, Part 2, pp. 159-164 Resources, pp. 18-27</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98</p> <p>Human Brain and Senses Investigation 3, Part 3, pp. 106-110</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Force and Motion Investigation 8, Part 1, pp. 284-293</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98</p> <p>Human Brain and Senses Investigation 3, Part 3, pp. 106-110</p> <p>Chemical Interactions Investigation 9, Part 1, pp. 280-287 CD, Particles in Solids, Liquids and Gases</p>

<p>Explain that models may sometimes mislead by suggesting characteristics that are not really shared with what is being modeled.</p>	<p>FOSS provides the opportunity to address this objective. See below: Force and Motion Investigation 8, Part 1, pp. 284-293 Weather and Water Investigation 3, Part 2, pp. 97-102 Planetary Science Investigation 3, Part 2, pp. 94-98 Human Brain and Senses Investigation 3, Part 3, pp. 106-110 Chemical Interactions Investigation 9, Part 1, pp. 280-287 CD, Particles in Solids, Liquids and Gases</p>
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Standard 2.0 Earth/Space Science

Students will use scientific skills and processes to explain the chemical and physical interactions (i.e., natural forces and cycles, transfer of energy) of the environment, Earth, and the universe that occur over time.

Introduction

Topic

B. Earth History

Indicator

1. Explain how sedimentary rock is formed periodically, embedding plant and animal remains and leaving a record of the sequence in which the plants and animals appeared and disappeared.

Objectives	FOSS
<p>Explain how sedimentary rock buried deep enough may be reformed by pressure and heat and these reformed rock layers may be forced up again to become land surface and even mountains.</p> <p>Cite evidence to confirm that thousands of layers of sedimentary rock reveal the long history of the changing surface of the Earth.</p> <p>Explain why some fossils found in the top layers of sedimentary rock are older than those found beneath in lower layers.</p> <ul style="list-style-type: none"> Folding Breaking Uplift Faulting Tilting 	<p>Earth History Investigation 10, Part 1, pp. 254-258 Resources, pp. 93-97 CD, Metamorphic Processes CD, Formation of Metamorphic, Sedimentary and Igneous Rocks</p> <p>Earth History Investigation 6, Part 3, pp. 215-219 Investigation 7, Parts 1-2, pp. 234-243 Resources, pp. 976-80, 83-86</p>

Indicator

2. Recognize and explain that fossils found in layers of sedimentary rock provide evidence of changing life forms.

Objectives	FOSS
<p>Recognize how different types of fossils are formed, such as petrified remains, imprints,</p>	<p>Earth History Resources, pp. 74-75, 77, 83</p>

<p>molds and casts.</p> <p>Recognize and explain that the fossil record of plants and animals describes changes in life forms over time.</p>	<p>Earth History Investigation 6, Part 3, pp. 215-219 Investigation 7, Parts 1-2, pp. 234-243 Resources, pp. 76-80, 83-86</p>
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Topic

D. Astronomy

Indicator

1. Identify and describe the components of the universe.

Objectives	FOSS
<p>Recognize that a galaxy contains billions of stars that cannot be distinguished by the unaided eye because of their great distance from Earth, and that there are billions of galaxies.</p>	<p>Planetary Science Resources, p. 100</p>
<p>Identify that our solar system is a component of the Milky Way Galaxy.</p>	<p>Planetary Science Resources, p. 100</p>
<p>Identify and describe the various types of galaxies</p>	
<p>Identify and describe the type, size, and scale, of the Milky Way Galaxy.</p>	<p>Planetary Science Resources, p. 100</p>

Indicator

2. Identify and explain celestial phenomena using the regular and predictable motion of objects in the solar system.

Objectives	FOSS
<p>Identify and describe the relationships among the period of revolution of a planet, the length of its solar year, and its distance from the sun.</p>	<p>FOSS provides the opportunity to address this objective. See below: Planetary Science Resources, p. 25</p>
<p>Identify and explain the relationship between the rotation of a planet or moon on its axis and the length of the solar day for that celestial object.</p>	<p>FOSS provides the opportunity to address this objective. See below: Planetary Science Investigation 2, Part 2, pp. 94-98 Resources, p. 25 CD, Day/Night Simulation</p>
<p>Identify and explain the cause of the phases of the moon.</p>	<p>Planetary Science Investigation 4, Part 1, pp. 120-125 Investigation 9, Parts 1-4, pp. 283-301 CD, Phases of the Moon</p>
<p>Describe how lunar and solar eclipses occur.</p>	

Identify and describe how the shape and location of the orbits of asteroids and comets affect their periods of revolution.	
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Indicator

3. Recognize and explain the effects of the tilt of Earth's axis.

Objectives	FOSS
Recognize and describe that Earth's axis is tilted about 23¼° from vertical with respect to the plane of its orbit and points in the same direction during the year.	Weather and Water Investigation 3, Part 2, pp. 97-107 Resources, pp. 17-19 CD, Cycles: Seasons
Recognize and describe that the tilt of Earth's axis causes Changes in the angle of the sun in the sky during the year Seasonal differences in the northern and southern latitudes	Weather and Water Investigation 3, Parts 2-3, pp. 97-110 Resources, pp. 17-19 CD, Cycles: Seasons
Recognize and describe how the tilt of Earth's axis affects the climate in Maryland.	Local Objective See: Weather and Water Investigation 3, Parts 2-3, pp. 97-110 Resources, pp. 17-19 CD, Cycles: Seasons

Indicator

4. Recognize and explain how the force of gravity causes the tides.

Objectives	FOSS
Identify and describe the cause of high and low tides.	

Topic

E. Interactions of Hydrosphere and Atmosphere

Indicator

1. Cite evidence to explain the relationship between the hydrosphere and atmosphere.

Objectives	FOSS
Describe the composition of the atmosphere and hydrosphere.	Weather and Water Investigation 2, Part 2, pp. 76-80 Resources, pp. 6-11, 45-47
Recognize and describe the water cycle as the distribution and circulation of Earth's water through the glaciers, surface water, groundwater, oceans, and atmosphere.	Weather and Water Investigation 7, Parts 1-2, pp. 232-243 CD, Cycles: Water Cycle
Identify and describe how the temperature and precipitation in a geographic area are affected by surface features and changes in atmospheric and ocean content. Relative location of mountains Volcanic eruptions Proximity to large bodies of	Weather and Water Investigation 8, Part 2, pp. 265-270 Resources, pp. 53-55 CD, Climate Factors: Local Winds CD, Climate Factors: Weather and Landforms

<p>water Heat energy of ocean currents</p>	
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Indicator

2. Recognize and describe the various factors that affect climate

Objectives	FOSS
<p>Identify and describe how the temperature and precipitation of an area are affected by surface and ocean features.</p> <p>Relative location of mountains Proximity to large bodies of water Warm and gases, and El Nino ocean currents</p> <p>Recognize and describe the global effects of volcanic eruptions, greenhouse.</p>	<p>Weather and Water Resources, pp. 53-55</p> <p>Weather and Water Investigation 9, Part 4, pp. 315-318 Resources, pp. 63-66</p>

Indicator

3. Identify and describe the atmospheric and hydrospheric conditions related to weather systems.

Objectives	FOSS
<p>Identify and describe weather patterns associated with high and low pressure systems and frontal systems.</p> <p>Identify and describe the atmospheric and hydrospheric conditions associated with the formation and development of hurricanes, tornadoes, and thunderstorms.</p> <p>Identify and describe how various tools are used to collect weather data and forecast weather conditions.</p> <p>Barometer Thermometer Anemometer Psychrometer</p>	<p>Weather and Water Investigation 8, Part 4, pp. 276-279 Investigation 9, Part 2, pp. 303-310</p> <p>Weather and Water Resources, pp. 69-76</p> <p>Weather and Water Investigation 1, Part 2, pp. 48-53 Resources, p. 5</p>

Standard 3.0 Life Science

The students will use scientific skills and processes to explain the dynamic nature of living things, their interactions, and the results from the interactions that occur over time.

Introduction

Topic

D. Evolution

Indicator

1. Recognize and describe that evolutionary change in species over time occurs as a result of natural variation in organisms and environmental changes.

Objectives	FOSS
Recognize and describe that gradual (climatic) and sudden (floods and fires) changes in environmental conditions affect the survival of organisms and populations.	Planetary Science Resources, pp. 67-68
Recognize that adaptations may include variations in structures, behaviors, or physiology, such as spiny leaves on a cactus, birdcalls, and antibiotic resistant bacteria.	Populations and Ecosystems Investigation 8, Parts 1-2, pp. 228-243 Resources, pp. 42-45 Video: Hawaii: Strangers in Paradise CD, Octopus Color Change
Recognize and describe that adaptation and speciation involve the selection of natural variations in a population.	Populations and Ecosystems Investigation 10, Parts 1-3, pp. 302-317 Resources, pp. 58-61
Recognize and describe that extinction occurs when the adaptive traits of a population do not support its survival.	Populations and Ecosystems Resources, p. 61
Recognize that evolution accounts for the diversity of species.	Populations and Ecosystems Investigation 10, Parts 1-3, pp. 302-317 Resources, pp. 58-61

Standard 4.0 Chemistry

Students will use scientific skills and processes to explain the composition, structure, and interactions of matter in order to support the predictability of structure and energy transformations.

Introduction

Topic

A. Structure of Matter

Indicator

1. Provide evidence to explain how compounds are produced. (No electron transfer)

Objectives	FOSS
Describe how elements form compounds and molecules.	Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312 Resources, pp. 14-15, 63-67
Investigate and describe what happens to the properties of elements when they react chemically with other elements.	Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312 Resources, pp. 14-15, 63-67
Based on data from investigations and	Chemical Interactions

research compare the properties of compounds with those of the elements from which they are made.	Investigation 9, Parts 1-4, pp. 280-312 Resources, pp. 14-15, 63-67
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Topic

B. Conservation of Matter

Indicator

1. Provide evidence to support the fact that the idea of atoms explains conservation of matter.

Objectives	FOSS
<p>Use appropriate tools to gather data and provide evidence that equal volumes of different substances usually have different masses.</p> <p>Cite evidence from investigations that the total mass of a system remains the same throughout a chemical reaction because the number of atoms of each element remains the same.</p> <p>Give reasons to justify the statement, "If the number of atoms stays the same no matter how the same atoms are rearranged, then their total mass stays the same."</p>	<p>Weather and Water Investigation 5, Part 1, pp. 152-162</p> <p>Planetary Science Investigation 8, Part 4, pp. 265-270</p> <p>Chemical Interactions Investigation 9, Parts 2-4, pp. 288-312 Resources, pp. 63-71</p> <p>Chemical Interactions Investigation 9, Parts 2-4, pp. 288-312 Resources, pp. 63-71</p>

Topic

C. States of Matter

Indicator

1. Describe how the motion of atoms and molecules in solids, liquids, and gases changes as heat energy is increased or decreased.

Objectives	FOSS
<p>Based on data from investigations and video technology, describe and give reasons for what happens to a sample of matter when heat energy is added to it (most substances expand).</p> <p>Describe what the temperature of a solid, or a liquid, or a gas reveals about the motion of its atoms and molecules.</p> <p>Formulate an explanation for the different characteristics and behaviors of solids, liquids, and gases using an analysis of</p>	<p>Weather and Water Investigation 4, Parts 1-2, pp. 121-139 Resources, pp. 22-26 CD: Matter and Energy: Molecules in Solids, Liquids and Gases CD, Matter and Energy: Heat and Energy</p> <p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 7, Parts 2-3, pp. 210-221 Resources, pp. 23-37 CD, Particles in Solid, Liquid and Gases</p> <p>Weather and Water Resources, pp. 22-26</p> <p>Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171 Investigation 7, Parts 1-4, pp. 204-228 Resources, pp. 24-27 CD, Particles in Solid, Liquid and Gases</p> <p>Weather and Water Resources, pp. 22-26 CD: Matter and Energy: Molecules in Solids,</p>

the data gathered on the motion and arrangement of atoms and molecules.	Liquids and Gases Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171 Investigation 7, Parts 1-4, pp. 204-228 Resources, pp. 24-27 CD, Particles in Solid, Liquid and Gases
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Topic

D. Physical and Chemical Changes

Indicator

1. Compare compounds and mixtures based on data from investigations and research.

Objectives	FOSS
Cite evidence from investigations to explain how the components of mixtures can be separated.	Chemical Interactions Investigation 8, Part 1, pp. 248-255
Use evidence from data gathered to explain why the components of <u>compounds</u> cannot be separated using physical properties.	Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312 Resources , pp. 63-67
Analyze the results of research completed to develop a comparison of compounds and mixtures.	FOSS provides the opportunity to address this objective. See below: Chemical Interactions Investigation 8, Part 1, pp. 248-255 Investigation 9, Parts 1-4, pp. 280-312

Indicator

2. Cite evidence and give examples of chemical properties of substances.

Objectives	FOSS
Based on data from investigations and research, identify and describe chemical properties of common substances.	Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Investigation 9, Parts 1-4, pp. 280-312
Reacts with oxygen (rusting/tarnishing and burning) Reacts with acids Reacts with bases	
Use information gathered from investigations using indicators to classify materials as acidic, basic, or neutral.	Chemical Interactions Investigation 9, Part 4, pp. 308-312

Indicator

3. Provide evidence to support the fact that common substances have the ability to change into new substances.

Objectives	FOSS
Investigate and describe the occurrence of chemical reactions using the following evidence:	Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Investigation 9, Parts 1-4, pp. 280-312 Resources, pp. 63-67
Color change Formation of a precipitate or	

<p>gas Release of heat or <u>light</u></p> <p>Use evidence from observations to identify and describe factors that influence reaction rates.</p> <p>Change in temperature Acidity</p> <p>Identify the reactants and products involved in a chemical reaction given a symbolic equation, a word equation, or a description of the reaction.</p> <p>Provide data from investigations to support the fact that energy is transformed during chemical reactions.</p> <p>Provide examples to explain the difference between a physical change and a chemical change.</p>	<p>Chemical Interactions Resources, p. 78</p> <p>Chemical Interactions Investigation 9, Parts 2-3, pp. 288-307 Investigation 10, Part 1, pp. 323-329 Resources, pp. 63-67</p> <p>Chemical Interactions</p> <p>FOSS provides the opportunity to address this objective. See below: Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Investigation 8, Part 1, pp. 248-255 Investigation 9, Parts 1-4, pp. 280-312</p>
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Standard 5.0 Physics

Students will use scientific skills and processes to explain the interactions of matter and energy and the energy transformations that occur.

Introduction

Topic

A. Mechanics

Indicator

1. Develop an explanation of motion using the relationships among time, distance, velocity, and acceleration.

Objectives	FOSS
<p>Observe, describe, and compare the motions of objects using position, speed, velocity, and the direction.</p> <p>Based on data given or collected, graph and calculate average speed using distance and time.</p> <p>Compare accelerated and constant motions using time, distance, and velocity.</p> <p>Describe and calculate acceleration using change in the speed and time.</p>	<p>Force and Motion Investigation 1, Parts 1-3, pp. 47-66 Investigation 2, Parts 1-2, pp. 78-88</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99 Investigation 3, Parts 1-3, pp. 111-117</p> <p>Force and Motion Investigation 5, Part 1, pp. 169-176 Resources, p. 32</p> <p>Force and Motion Investigation 5, Parts 2-4, pp. 177-201 Resources, pp. 32-35</p>

Indicator

2. Identify and relate formal ideas (Newton's Laws) about the interaction of force and motion to real world experiences.

Objectives	FOSS
<p>Investigate and explain the interaction of force and motion that causes objects that are at rest to move.</p> <p>Demonstrate and explain, through a variety of examples, that moving objects will stay in motion at the same speed and in the same direction unless acted on by an unbalanced force.</p> <p>Investigate and collect data from multiple trials, about the motion that explain the motion that results when the same force acts on objects of different mass; and when different amounts of force act on objects of the same mass.</p> <p>Based on data collected and organized, explain qualitatively the relationship between net force applied to an object and its mass for a given acceleration.</p> <p>Calculate the net force given the mass and acceleration.</p>	<p>Force and Motion Investigation 6, Parts 1-2, pp. 218-235 Resources, p. 25</p> <p>Force and Motion Investigation 6, Parts 3-4, pp. 236-245 Resources, p. 25</p> <p>Force and Motion Investigation 8, Part 1, pp. 284-293 Resources, p. 25</p> <p>Force and Motion Investigation 8, Part 1, pp. 284-293 Resources, pp. 70-74</p>

Indicator

3. Recognize and explain that every object exerts gravitational force on every other object.

Objectives	FOSS
<p>Explain the difference between mass and weight.</p> <p>Mass is a measure of inertia Weight is a measure of the force of gravity</p> <p>Describe the relationship between the gravitational force and the masses of the attracting objects.</p> <p>Describe the relationship between the gravitational force and the distance between the attracting objects.</p> <p>Recognize and cite examples showing that mass remains the same in all locations while weight may vary with a change in location (weight on Earth compared to weight on moon).</p> <p>Recognize that gravity is the force that</p>	<p>Force and Motion Investigation 7, Part 1, pp. 256-261 Resources, pp. 62-63</p> <p>Force and Motion</p>

holds planets, moons, and satellites in their orbits.	Resources, pp. 67-69 Planetary Science Resources, p. 70
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Indicator

4. Recognize and explain that energy can neither be created nor destroyed; rather it changes form or is transferred through the action of forces.

Objectives	FOSS
<p>Observe and describe the relationship between the distance an object is moved by a force and the change in its potential energy or kinetic energy, such as in a slingshot, in mechanical toys, the position of an object and its potential energy.</p> <p>Identify the relationship between the amount of energy transferred (work) to the product of the applied force and the distance moved in the direction of that force.</p> <p>Identify and describe that simple machines (levers and inclined planes) may reduce the amount of effort required to do work.</p> <p>Calculate input and output work using force and distance Demonstrate that input work is always greater than output work</p>	<p>FOSS provides the opportunity to address this objective. See below: Force and Motion Investigation 1, Part 1, pp. 47-56 Investigation 2, Part 3, pp. 89-99</p>

Topic

B. Thermodynamics

Indicator

1. Describe and cite evidence that heat can be transferred by conduction, convection and radiation.

Objectives	FOSS
<p>Based on observable phenomena, identify and describe examples of heat being transferred through conduction and through convection.</p> <p>Based on observable phenomena, identify examples to illustrate that radiation does not require matter to transfer heat energy.</p> <p>c. Research and identify the types of insulators that best reduce heat loss through conduction, convection, or radiation.</p>	<p>Weather and Water Investigation 4, Part 2, pp. 131-139 Investigation 5, Parts 2-3, pp. 163-174</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p>

Indicator

2. Identify and explain that heat energy is a product of the conversion of one form of energy to another.

Objectives	FOSS
<p>Identify and describe the various forms of energy that are transformed in order for systems (living and non-living) to operate.</p> <p>Chemical – Flashlight-Light Mechanical – Pulleys-Motion Solar/Radiant – Solar calculator Chemical – Plant cells</p> <p>Explain that some heat energy is always lost from a system during energy transformations.</p>	<p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Investigation 4, Parts 1-2, pp. 143-151 Resources, pp. 1-2</p> <p>Populations and Ecosystems Resources, pp. 14-15</p> <p>FOSS provides the opportunity to address this objective. See below:</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Investigation 4, Parts 1-2, pp. 143-151 Resources, pp. 1-2</p>

Standard 6.0 Environmental Science

Students will use scientific skills and processes to explain the interactions of environmental factors (living and non-living) and analyze their impact from a local to a global perspective.

Introduction

Topic

B. Environmental Issues

Indicator

1. Recognize and explain how human activities can accelerate or magnify many naturally occurring changes.

Objectives	FOSS
<p>Based on data from research identify and describe how natural processes change the environment.</p> <p>Cyclic climate change Sedimentation in watersheds Population cycles Extinction</p> <p>Identify and describe how human activities produce changes in natural processes:</p> <p>Climate change Loss of habitat Introduction of nonnative species Cycling of matter</p>	<p>Weather and Water Resources, pp. 63-65</p> <p>Populations and Ecosystems Investigation 7, pp. 210-215 Resources, pp. 31-41</p>