



Full Option Science System (FOSS™)

Correlation with

Michigan Grade Level Content Expectations



Correlation of the Michigan Grade Level Content Expectations to the Full Option Science System

The following correlation of the Michigan Grade Level Content Expectations to the Full Option Science System (FOSS) is to show representative examples of investigations and activities that address those standards and their benchmarks. A citation does not reflect all of the investigations or activities from FOSS that might address a particular benchmark.

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KINDERGARTEN

INQUIRY PROCESS

SIP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
S.IP.00.11 Make purposeful observation of the natural world using the appropriate senses.	FOSS is an inquiry based program. Observation is a fundamental skill that is stressed in all investigations. See for example: Animals Two by Two Investigation 1, Parts 1, 3-4, pp. 10-16, 22-29 Fabric Investigation 2, Parts 1-3, pp. 7-21 Wood and Paper Investigation 3, Parts 1-4, pp. 8-25 Trees Investigation 3, Parts 1-9, pp. 10-38
S.IP.00.12 Generate questions based on observations.	FOSS investigations are driven by questions. Investigations encourage student questions. See for example: Animals Two by Two Investigation 2, Parts 1-4, pp. 9-24 Fabric Investigation 1, Parts 1-6, pp. 8-33 Wood and Paper Investigation 1, Parts 1-4, pp. 8-27 Trees Investigation 1, Parts 1-8, pp. 7-37
S.IP.00.13 Plan and conduct simple investigations	Animals Two by Two Investigation 1, Part 3, pp. 22-29 Fabric Investigation 2, Parts 1-3, pp. 7-21 Wood and Paper Investigation 1, Parts 3-4, 20-27 Investigation 3, Part 4, pp. 22-25 Trees Investigation 3, Parts 7, 9, pp. 29-31, 35-38
S.IP.00.14 Manipulate simple tools (for example: hand lens, pencils, balances, non-standard objects for measurement) that aid observation and data collection.	Animals Two by Two Investigation 1, Part 2, pp. 17-21 Investigation 4, Part 1, pp. 8-11 Fabric Investigation 1, Parts 3-6, pp. 16-33 Wood and Paper Investigation 1, Parts 3-4, pp. 20-27 Investigation 4, Parts 1-2, pp. 8-18 Trees Investigation 1, Part 7, pp. 31-35 Investigation 3, Part 7, pp. 29-31
S.IP.00.15 Make accurate measurements with appropriate (non-standard) units for the measurement tool.	Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Trees Investigation 1, Part 7, pp. 31-35 Investigation 3, Part 9, pp. 35-38 Investigation 3, Math Extension, p. 39

<p>S.IP.00.16 Construct simple charts from data and observations.</p>	<p>Animals Two by Two Investigation 3, Math Extension, p.21</p> <p>Animals Two by Two Investigation 3, Language Extension, p. 21</p> <p>Fabric Investigation 2, Part 4, pp. 22-25 Investigation 1, Math Extension, p. 35</p> <p>Trees Investigation 1, Home/School Connection, p. 40 Investigation 2, Math Extension, p. 29</p>
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INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.00.12 Share ideas about science through purposeful conversation.</p>	<p>FOSS requires student dialogue before and after investigations. See for example:</p> <p>Animals Two by Two Investigation 3, Parts 1-3, pp. 8-20</p> <p>Fabric Investigation 2, Parts 1-4, pp. 7-25</p> <p>Wood and Paper Investigation 1, Parts 1-5, pp. 8-32</p> <p>Trees Investigation 3, Parts 1-2, pp. 10-14</p>
<p>S.IA.00.13 Communicate and present findings of observations.</p>	<p>In each FOSS investigation students share observations and data in post-investigation discussions. See for example:</p> <p>Animals Two by Two Investigation 1, 3-4, Parts 1-3, pp. 10-16, 22-29</p> <p>Fabric Investigation 2, Parts 1-4, pp. 7-25</p> <p>Wood and Paper Investigation 3, Parts 2-4, pp. 13-25</p> <p>Trees Investigation 1, Part 7, pp. 31-34 Investigation 3, Part 9, pp. 35-38</p>
<p>S.IA.00.14 Develop strategies for information gathering (ask an expert, use a book, make observations, conduct simple investigations, and watch a video).</p>	<p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also:</p> <p>Animals Two by Two Investigation 4, Parts 1-4, pp. 8-23</p> <p>Fabric Investigation 1, Parts 4-6, pp. 20-33</p> <p>Wood and Paper Investigation 2, Parts 1-4, pp. 8-23</p> <p>Trees Investigation 2, Parts 1-3, pp. 8-23</p>

REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
S.RS.00.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.	Animals Two by Two Investigation 1, Part 1, pp. 8-14 Investigation 2, Part 1, pp. 8-13 Fabric Investigation 2, Part 4, pp. 22-25 Wood and Paper Investigation 1, Part 5, pp. 28-32 Investigation 4, Parts 1-2, pp. 8-18 Trees Investigation 1, Parts 3-6, pp. 20-30 Investigation 2, Parts 3-6, pp. 16-28

FORCE AND MOTION

P.FM.E.1 Position- A position of an object can be described by locating the object relative to other objects or a background. The description of the motion of an object from observer's view may be different from that reported from a different observer's view.

EXPECTATION	FOSS
P.FM.00.11 Compare the position of an object (for example: above, below, in front of, behind, on) in relation to other objects around it.	Wood and Paper Investigation 1, Parts 3-4, pp. 20-32 Investigation 2, Part 4, pp. 20-25 Investigation 3, Part 4, pp. 22-25 Animals Two by Two Investigation 1, Part 1, pp. 10-16 Investigation 3, Part 1, pp. 8-12 Fabric Investigation 1, Parts 4-6, pp. 20-33 Trees Investigation 1, Part 7, pp. 31-34 Investigation 2, Part 4, pp. 20-22 Investigation 3, Part 7, pp. 29-31
P.FM.00.12 Describe the motion of an object (for example: away from or closer to) from different observers' views.	Fabric Investigation 1, Parts 5-6, pp. 23-33 Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Investigation 2, Part 1, pp. 8-11 Animals Two by Two Investigation 1, Part 3, pp. 22-25 Investigation 2, Part 2, pp. 14-17 Investigation 5, Part 4, pp. 25-27

FORCE AND MOTION

P.FM.E.2 Gravity- Earth pulls down on all objects with a force called gravity. With very few exceptions, objects fall to the ground no matter where the object is on the Earth.

EXPECTATION	FOSS
P.FM.00.21 Observe how objects fall toward the earth.	Wood and Paper Investigation 1, Parts 3-5, pp. 20-32 Investigation 3, Part 4, pp. 22-25 Investigation 4, Part 1, pp. 8-13 Trees Investigation 2, Part 1, pp. 6-9 Investigation 3, Part 1, pp. 10-11

FORCE AND MOTION

P.FM.E.3 Force- A Force is either a push or a pull. The motion of objects can be changed by forces. The size of the change is related to the size of the force. The change is also related to the weight (mass) of the object on which the force is being exerted. When an object does not move in response to a force, it is because another force is being applied by the environment.

EXPECTATION	FOSS
P.FM.00.31 Demonstrate pushes and pulls.	Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Investigation 2, Part 1, pp. 8-11 Investigation 5, Part 3, pp. 18-21 Fabric Investigation 1, Parts 4-6, pp. 20-33
P.FM.00.32 Observe that objects initially at rest will move in the direction of the push or pull.	Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Investigation 2, Part 1, pp. 8-11 Investigation 5, Part 3, pp. 18-21 Fabric Investigation 1, Parts 4-6, pp. 20-33
P.FM.00.33 Observe how pushes and pulls can change the speed or direction of moving objects.	Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Investigation 2, Part 1, pp. 8-11 Investigation 5, Part 3, pp. 18-21 Fabric Investigation 1, Parts 4-6, pp. 20-33
P.FM.00.34 Observe how shape (for example: cone, cylinder, sphere), shape, and weight of an object can affect motion.	Wood and Paper Investigation 1, Parts 4-5, pp. 24-32 Fabric Investigation 1, Part 6, pp. 29-33

ORGANIZATION OF LIVING THINGS

L.OLE.1 Life Requirements- Organisms have basic needs. Animals and plants need air, water, and food. Plants also require light. Plants and animals use food as a source of energy and as a source of building material for growth and repair.

EXPECTATION	FOSS
L.OL.00.11 Identify that living things have basic needs.	Animals Two by Two Investigation 1, Part 2, pp 17-21 Investigation 2, Part 1, pp. 9-13 Investigation 3, Part 1, pp. 8-13 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 4, 6, 10, 12, 18 Trees Investigation 1, Parts 2, 8, pp. 15-19, 35-37 Investigation 3, Part 7, pp. 29-31 Science Stories, p. 15
L.OL.00.12 Identify and compare living and nonliving things.	FOSS provides the opportunity to address this expectation. See for example: Animals Two by Two Investigation 1, Parts 1-4, pp. 10-29 Investigation 3, Parts 1-3, pp. 8-20 Science Stories, pp. 3-24 Trees Investigation 1, Parts 1-8, pp. 7-37 Investigation 3, Parts 1-3, pp. 10-18

	Science Stories, pp. 3-24 Fabric Investigation 1, Parts 1-2, pp. 6-15 Science Stories, pp. 3-24 Wood and Paper Investigation 1, Parts 1-2, pp. 8-19 Investigation 3, Part 1, pp. 8-12 Science Stories, pp. 3-23
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SOLID EARTH

E.SE.E.1 Earth Materials- Earth materials that occur in nature include rocks, minerals, soils, water, and the gases of the atmosphere. Some Earth materials have properties which sustain plant and animal life.

EXPECTATION	FOSS
E.SE.00.11 Identify Earth materials (air, water, soil) that are used to grow plants.	Trees Investigation 1, Parts 2, 8, pp. 13-19, 35-37 Investigation 3, Part 7, pp. 29-31 Science Stories, pp. 9, 15

GRADE ONE

INQUIRY PROCESS

SIP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
<p>S.IP.01.11 Make purposeful observation of the natural world using the appropriate senses.</p>	<p>FOSS is an inquiry based program. Observation is a fundamental skill that is stressed in all investigations. See for example:</p> <p>Insects Investigation 2, Parts 1-3, pp. 8-24</p> <p>New Plants Investigation 3, Parts 1-3, pp. 8-25</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38</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>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p>
<p>S.IP.01.12 Generate questions based on observations.</p>	<p>FOSS investigations are driven by questions. Investigations encourage student questions. See for example:</p> <p>Insects Investigation 4, Parts 1-5, pp. 10-31</p> <p>New Plants Investigation 2, Parts 1-3, pp. 8-28</p> <p>Air and Weather Investigation 1, Parts 3-6, pp. 17-38</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25</p> <p>Balance and Motion Investigation 3, Parts 1-3, pp. 6-25</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</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>S.IP.01.13 Plan and conduct simple investigations.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25</p> <p>New Plants Investigation 2, Parts 1-2, pp. 8-19</p> <p>Air and Weather Investigation 1, Parts 4-6, pp. 21-38</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29</p> <p>Balance and Motion Investigation 3, Parts 1-3, pp. 6-25</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p>

<p>S.IP.01.14 Manipulate simple tools (for example: hand lens, pencils, rulers, thermometers, rain gauges, balances, non-standard objects for measurement) that aid observation and data collection.</p> <p>S.IP.01.15 Make accurate measurements with appropriate (non-standard) units for the measurement tool.</p> <p>S.IP.01.16 Construct simple charts from data and observations.</p>	<p>Plants and Animals Investigation 1, Parts 1-3, pp. 52-75</p> <p>Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p> <p>Insects Investigation 3, Parts 1-3, pp. 8-26</p> <p>New Plants Investigation 2, Parts 2-3, pp. 15-28</p> <p>Air and Weather Investigation 1, Parts 3-6, pp. 17-38 Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 6-25</p> <p>Solids and Liquids Investigation 3, Parts 1-4, pp. 8-27</p> <p>Insects and Plants Investigation 5, Parts 1-3, pp. 206-225</p> <p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Solids and Liquids Investigation 3, Math Extension, p. 30</p> <p>New Plants Investigation 2, Part 3, pp. 20-28 Investigation 3, Part 3, pp. 23-30</p> <p>Plants and Animals Investigation 1, Part 3, pp. 63-72</p> <p>Insects and Plants Investigation 2, Part 3, pp. 105-115</p> <p>Air and Weather Investigation 2, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11</p> <p>Solids and Liquids Investigation 1, Part 1, pp. 8-16 Investigation 2, Part 3, pp. 21-27 Investigation 4, Parts 1-2, pp. 7-22</p> <p>Pebbles, Sand and Silt Investigation 1, Part 2, 4, pp. 13-18, 22-25 Investigation 2, Part 2-3, pp. 14-23</p>
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INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.01.12 Share ideas about science through purposeful conversation.</p>	<p>FOSS requires student dialogue before and after investigations. See for example:</p> <p>Insects Investigation 1, Parts 1-3, pp. 8-25</p> <p>New Plants Investigation 3, Parts 1-3, pp. 8-25</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38</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>S.IA.01.13 Communicate and present findings of observations.</p>	<p>Solids and Liquids Investigation 2, Parts 1-3, pp. 10-27 Plants and Animals Investigation 3, Parts 1-2, pp. 120-134 Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p> <p>In each FOSS investigation students share observations and data in post-investigation discussions. See for example:</p> <p>Insects Investigation 3, Parts 1-3, pp. 8-26 New Plants Investigation 2, Parts 1-3, pp. 8-28 Air and Weather Investigation 1, Parts 1-6, pp. 8-38 Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25 Balance and Motion Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75</p>
<p>S.IA.01.14 Develop strategies for information gathering (ask an expert, use a book, make observations, conduct simple investigations, and watch a video).</p>	<p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also:</p> <p>Insects Investigation 5, Parts 1-3, pp. 10-24 New Plants Investigation 4, Parts 1-2, pp. 7-19 Air and Weather Investigation 2, Parts 1-4, pp. 8-27 Pebbles, Sand and Silt Investigation 1, Parts 1-5, pp. 8-29 Balance and Motion Investigation 1, Parts 1-4, pp. 8-28 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-3, pp. 47-72 Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>

REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history.

EXPECTATION	FOSS
<p>S.RS.01.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Insects Investigation 1, Parts 1, 3, pp. 8-16, 22-25 Investigation 2, Parts 1, 3, pp. 8-13, 20-24 New Plants Investigation 2, Parts 2-3, pp. 15-28 Air and Weather</p>

<p>S.RS.01.12 Recognize that science investigations are done more than one time.</p>	<p>Investigation 3, Parts 1-4, pp. 8-27 Pebbles, Sand and Silt Investigation 1, Parts 3-5, pp. 18-29 Investigation 2, Parts 3-4, pp. 18-29 Balance and Motion Investigation 1, Parts 3-4, pp. 19-28 Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 2, Part 3, pp. 21-27 Plants and Animals Investigation 3, Parts 1-2, pp. 120-134 Insects and Plants Investigation 3, Parts 1-3, pp. 91-115</p> <p>FOSS investigations are inquiry based and promote repeated trials as important to the inquiry process. Group results are used in investigations as the repeated trials. See for example: Insects Investigation 1, Parts 1-3, pp. 8-25 New Plants Investigation 2, Parts 1-2, pp. 8-19 Air and Weather Investigation 1, Parts 4-6, pp. 21-38 Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Balance and Motion Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 5, Parts 1-3, pp. 206-225</p>
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PROPERTIES OF MATTER

P.PM.E.1 Physical Properties- All objects and substances have physical properties that can be measured

EXPECTATION	FOSS
<p>P.PM.01.11 Demonstrate the ability to sort objects according to observable attributes such as color, shape, size, sinking or floating.</p>	<p>Pebbles, Sand and Silt Investigation 1, Parts 1-4, pp. 8-25 Investigation 2, Parts 1-4, pp. 8-29 Solids and Liquids Investigation 1, Part 2, pp. 17-21 Investigation 3, Parts 2, 4, pp. 14-18, 24-27 Investigation 2, Science Extension, p. 30 Investigation 3, Science Extension, p. 31</p>

PROPERTIES OF MATTER

P.PM.E.2 States of Matter- Matter exists in several different states: solids, liquids and gases. Each state of matter has unique physical properties. Gases are easily compressed but liquids and solids do not compress easily. Solids have their own particular shapes, but liquids and gases take the shape of the container.

EXPECTATION	FOSS
<p>P.PM.01.21 Demonstrate that water as a solid keeps its own shape (ice).</p>	<p>Solids and Liquids Investigation 4, Science Extension, p. 29 Science Stories, p. 16</p>

P.PM.01.22 Demonstrate that water as a liquid takes on the shape of various containers.	Solids and Liquids Investigation 2, Parts 1-3, pp. 10-27 Science Stories, p. 11
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PROPERTIES OF MATTER

P.PM.E.3 Magnets- Magnets can repel or attract other magnets. Magnets can also attract certain non-magnetic objects at a distance.

EXPECTATION	FOSS
P.PM.01.31 Identify materials that are attracted by magnets.	Balance and Motion Science Stories, pp. 18-19 Solids and Liquids Investigation 3, Science Extension, p. 31
P.PM.01.32 Observe that like poles of a magnet repel and unlike poles of a magnet attract.	Balance and Motion Science Stories, p. 21

ORGANIZATION OF LIVING THINGS

L.OL.E.1 Life Requirements- Organisms have basic needs. Animals and plants need air, water, and food. Plants also require light. Plants and animals use food as a source of energy and as a source of building material for growth and repair.

EXPECTATION	FOSS
L.OL.01.13 Identify the needs of animals.	Insects Investigation 1, Part 1, pp. 8-15 Investigation 2, Part 1, pp. 8-13 Investigation 3, Part 2, pp. 12-20 Investigation 4, Part 2, pp. 14-18 Investigation 5, Part 1, pp. 10-15 Investigation 6, Parts 1-3, pp. 8-22 Plants and Animals Investigation 3, Part 2, pp. 128-134 Science Resources, pp. 21-27 Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 3, Part 2, pp. 134-144 Investigation 4, Part 2, pp. 179-186 Investigation 5, Part 1, pp. 206-211

ORGANIZATION OF LIVING THINGS

L.OL.E.2 Life Cycles- Plants and animals have life cycles. Both plants and animals begin life and develop into adults, reproduce, and eventually die. The details of this life cycle are different for different organisms.

EXPECTATION	FOSS
L.OL.01.21 Describe the life cycle of animals including the following stages: egg, young, adult; egg, larva	Insects Investigation 1, Part 3, pp. 22-25 Investigation 2, Part 3, pp. 20-24 Investigation 3, Part 3, pp. 21-26 Investigation 4, Part 5, pp. 28-31 Investigation 5, Part 3, pp. 20-24 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. 37-55

HEREDITY

L.HE.E.1 Observable Characteristics- Plants and animals share many, but not all, characteristics of their parents.

EXPECTATION	FOSS
<p>L.HE.01.11 Identify characteristics (for example: body coverings, beak shape, number of legs, body parts) that are passed on from parents to young.</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 4, Parts 1-5, pp. 8-31 Investigation 5, Parts 1-3, pp. 10-24 Investigation 6, Parts 1-3, pp. 8-22 Science Stories, pp. 12-33 New Plants Investigation 1, Parts 1-3, pp. 8-30 Science Stories, pp. 16-19 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75 Investigation 2, Part 3, pp. 105-115 Investigation 3, Parts 1-3, pp. 129-151 Investigation 4, Parts 1-5, pp. 166-191 Investigation 5, Parts 1-3, pp. 206-225</p>
<p>L.HE.01.12 Classify young animals based on characteristics that are passed on from parents (for example: dogs/puppies, cats/kittens, cows/calves, chicken/chicks).</p>	<p>Insects Science Stories, pp. 26-33 Insects and Plants Science Resources, pp. 48-55</p>

EARTH SYSTEMS

E.E.S.E.1 Solar Energy- The sun warms the land, air and water and helps plants grow.

EXPECTATION	FOSS
<p>E.E.S.01.11 Identify the sun as the most important source of heat which warms the land, air, and water of the Earth.</p>	<p>Air and Weather Investigation 2, Part 2, pp. 14-19 Science Stories, p. 21</p>
<p>E.E.S.01.12 Demonstrate the importance of sunlight and warmth in plant growth.</p>	<p>New Plants Investigation 1, Parts 2-3, pp. 13-30 Investigation 3, Parts 1-2, pp. 8-18 Science Stories, p. 6</p>

EARTH SYSTEMS

E.E.S.E.2 Weather- Weather changes from day to day and over the seasons.

EXPECTATION	FOSS
<p>E.E.S.01.21 Compare daily changes in the weather related to temperature (cold, hot, warm, cool); cloud cover (cloudy, partly cloudy, foggy) precipitation (rain, snow, hail, freezing rain); wind (breezy, windy, calm).</p>	<p>Air and Weather Investigation 2, Parts 1-4, pp. 8-27 Investigation 4, Part 1, pp. 8-11 Science Stories, pp. 7-13</p>
<p>E.E.S.01.22 Describe and compare weather related to the four seasons in terms of temperature, cloud cover, precipitation, and wind.</p>	<p>Air and Weather Investigation 4, Part 2, pp. 12-18 Science Stories, pp. 18-23</p>
<p>E.E.S.01.23 Describe severe weather events.</p>	<p>Air and Weather Science Stories, pp. 16-17</p>
<p>E.E.S.01.24 Describe precautions that should be taken for human safety during severe</p>	

weather conditions (thunderstorms, lightning, tornadoes, high winds, blizzards, hurricanes).	
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EARTH SYSTEMS

E.ES.E.3 Weather Measurement- Scientists use tools for observing, recording, and predicting weather changes.

EXPECTATION	FOSS
E.ES.01.31 Identify the tools that might be used to measure temperature, precipitation, cloud cover and wind.	Air and Weather Investigation 2, Parts 2-4, pp. 14-27 Investigation 3, Parts 2, 4, pp. 12-16, 22-28 Science Stories, pp. 14-15
E.ES.01.32 Observe and collect data of weather conditions over a period of time.	Air and Weather Investigation 2, Parts 1-4, pp. 8-27 Investigation 4, Parts 1-2, pp. 8-18

SOLID EARTH

E.SE.E.1 Earth Materials- Earth materials that occur in nature include rocks, minerals, soils, water, and the gases of the atmosphere. Some Earth materials have properties which sustain plant and animal life.

EXPECTATION	FOSS
E.SE.01.12 Describe how Earth materials contribute to the growth of plant and animal life.	New Plants Investigation 1, Part 2, pp. 13-22 Investigation 3, Parts 1-2, pp. 8-18 Science Stories, pp. 4-5, 7 Pebbles, Sand and Silt Science Stories, pp. 24-25 Insects Investigation 1, Part 1, pp. 8-15 Investigation 2, Part 1, pp. 8-13 Investigation 3, Part 2, pp. 12-20 Investigation 4, Part 2, pp. 14-18

GRADE TWO

INQUIRY PROCESS

SIP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
<p>S.IP.02.11 Make purposeful observation of the natural world using the appropriate senses.</p>	<p>FOSS is an inquiry based program. Observation is a fundamental skill that is stressed in all investigations. See for example:</p> <p>Insects Investigation 2, Parts 1-3, pp. 8-24</p> <p>New Plants Investigation 3, Parts 1-3, pp. 8-25</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-20</p> <p>Balance and Motion Investigation 2, Parts 1-3, pp. 8-25</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p> <p>Plants and Animals Investigation 3, Parts 1-2, pp. 120-134</p> <p>Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p>
<p>S.IP.02.12 Generate questions based on observations.</p>	<p>FOSS investigations are driven by questions. Investigations encourage student questions. See for example:</p> <p>Insects Investigation 4, Parts 1-5, pp. 10-31</p> <p>New Plants Investigation 2, Parts 1-3, pp. 8-28</p> <p>Air and Weather Investigation 1, Parts 3-6, pp. 17-38</p> <p>Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25</p> <p>Balance and Motion Investigation 3, Parts 1-3, pp. 6-25</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</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>S.IP.02.13 Plan and conduct simple investigations.</p>	<p>Insects Investigation 1, Parts 1-3, pp. 8-25</p> <p>New Plants Investigation 2, Parts 1-2, pp. 8-19</p> <p>Air and Weather Investigation 1, Parts 4-6, pp. 21-38</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29</p> <p>Balance and Motion Investigation 3, Parts 1-3, pp. 6-25</p> <p>Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27</p>

<p>S.IP.02.14 Manipulate simple tools (ruler, meter stick, measuring cups, hand lens, thermometer, balance) that aid observation and data collection.</p>	<p>Plants and Animals Investigation 1, Parts 1-3, pp. 52-75 Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p> <p>Insects Investigation 3, Parts 1-3, pp. 8-26 New Plants Investigation 2, Parts 2-3, pp. 15-28 Air and Weather Investigation 1, Parts 3-6, pp. 17-38 Investigation 2, Parts 2, 4, pp. 14-19, 24-27 Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 3, Parts 1-4, pp. 8-27 Insects and Plants Investigation 5, Parts 1-3, pp. 206-225</p>
<p>S.IP.02.15 Make accurate measurements with appropriate units (meter, centimeter) for the measurement tool.</p>	<p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27 Solids and Liquids Investigation 3, Math Extension, p. 30 New Plants Investigation 2, Part 3, pp. 20-28 Investigation 3, Part 3, pp. 23-30 Plants and Animals Investigation 1, Part 3, pp. 63-72 Insects and Plants Investigation 2, Part 3, pp. 105-115</p>
<p>S.IP.02.16 Construct simple charts and graphs from data and observations.</p>	<p>Air and Weather Investigation 2, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-11 Solids and Liquids Investigation 1, Part 1, pp. 8-16 Investigation 2, Part 3, pp. 21-27 Investigation 4, Parts 1-2, pp. 7-22 Pebbles, Sand and Silt Investigation 1, Part 2, 4, pp. 13-18, 22-25 Investigation 2, Part 2-3, pp. 14-23</p>

INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.02.12 Share ideas about science through purposeful conversation.</p>	<p>FOSS requires student dialogue before and after investigations. See for example: Insects Investigation 1, Parts 1-3, pp. 8-25 New Plants Investigation 3, Parts 1-3, pp. 8-25 Air and Weather Investigation 1, Parts 1-6, pp. 8-38 Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Balance and Motion Investigation 2, Parts 1-3, pp. 8-25</p>

<p>S.IA.02.13 Communicate and present findings of observations.</p>	<p>Solids and Liquids Investigation 2, Parts 1-3, pp. 10-27 Plants and Animals Investigation 3, Parts 1-2, pp. 120-134 Insects and Plants Investigation 4, Parts 1-5, pp. 166-191</p> <p>In each FOSS investigation students share observations and data in post-investigation discussions. See for example:</p> <p>Insects Investigation 3, Parts 1-3, pp. 8-26 New Plants Investigation 2, Parts 1-3, pp. 8-28 Air and Weather Investigation 1, Parts 1-6, pp. 8-38 Pebbles, Sand and Silt Investigation 4, Parts 1-3, pp. 8-25 Balance and Motion Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75</p>
<p>S.IA.02.14 Develop strategies and skills for information gathering and problem solving (books, internet, ask an expert, observation, investigation, technology tools).</p>	<p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also:</p> <p>Insects Investigation 5, Parts 1-3, pp. 10-24 New Plants Investigation 4, Parts 1-2, pp. 7-19 Air and Weather Investigation 2, Parts 1-4, pp. 8-27 Pebbles, Sand and Silt Investigation 1, Parts 1-5, pp. 8-29 Balance and Motion Investigation 1, Parts 1-4, pp. 8-28 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-3, pp. 47-72 Insects and Plants Investigation 2, Parts 1-3, pp. 91-115</p>

REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
<p>S.RS.02.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Insects Investigation 1, Parts 1, 3, pp. 8-16, 22-25 Investigation 2, Parts 1, 3, pp. 8-13, 20-24 New Plants Investigation 2, Parts 2-3, pp. 15-28</p>

<p>S.RS.02.13 Recognize that when a science investigation is done the way it was done before, similar results are expected.</p>	<p>Air and Weather Investigation 3, Parts 1-4, pp. 8-27 Pebbles, Sand and Silt Investigation 1, Parts 3-5, pp. 18-29 Investigation 2, Parts 3-4, pp. 18-29 Balance and Motion Investigation 1, Parts 3-4, pp. 19-28 Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 2, Part 3, pp. 21-27 Plants and Animals Investigation 3, Parts 1-2, pp. 120-134 Insects and Plants Investigation 3, Parts 1-3, pp. 91-115</p> <p>FOSS investigations are inquiry based and promote repeated trials as important to the inquiry process. Group results are used in investigations as the repeated trials. See for example:</p> <p>Insects Investigation 1, Parts 1-3, pp. 8-25 New Plants Investigation 2, Parts 1-2, pp. 8-19 Air and Weather Investigation 1, Parts 4-6, pp. 21-38 Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Balance and Motion Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 5, Parts 1-3, pp. 206-225</p>
<p>S.RS.02.15 Use evidence when communicating scientific ideas.</p>	<p>FOSS investigations discussions rely on student observations and data. See for example:</p> <p>Insects Investigation 1, Parts 1-3, pp. 8-25 New Plants Investigation 2, Parts 1-2, pp. 8-19 Air and Weather Investigation 1, Parts 4-6, pp. 21-38 Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29 Balance and Motion Investigation 3, Parts 1-3, pp. 6-25 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-2, pp. 47-62 Insects and Plants Investigation 3, Parts 1-3, pp. 129-151</p>
<p>S.RS.02.16 Identify technology used in everyday life.</p>	<p>New Plants Science Stories, pp. 18-21</p>

	<p>Air and Weather Science Stories, pp. 5-6, 14-15</p> <p>Balance and Motion Science Stories, pp. 12-17</p> <p>Pebbles, Sand and Silt Science Stories, pp 16-19</p> <p>Plants and Animals Science Resources, pp. 9-14</p>
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PROPERTIES OF MATTER

P.PM.E.1 Physical Properties- All objects and substances have physical properties that can be measured

EXPECTATION	FOSS
P.PM.02.12 Describe objects and substances according to their properties (color, size, shape, texture, hardness, liquid or solid, sinking or floating).	<p>Pebbles, Sand and Silt Investigation 1, Parts 1-4, pp. 8-25 Investigation 2, Parts 1-4, pp. 8-29 Investigation 2, Science Extension, p. 30 Investigation 3, Science Extension, p. 31</p> <p>Solids and Liquids Investigation 1, Part 2, pp. 17-21 Investigation 3, Parts 2, 4, pp. 14-18, 24-27</p>
P.PM.02.13 Measure the length of objects using rulers (centimeters) and meter sticks (meters).	<p>New Plants Investigation 1, Part 3, pp. 23-30</p> <p>Solids and Liquids Investigation 1, Math Extension, p. 27</p> <p>Air and Weather Investigation 2, Part 4, pp. 24-27</p>
P.PM.02.14 Measure the volume of liquids using common measuring tools (measuring cups, measuring spoons).	<p>Solids and Liquids Investigation 4, Part 2, pp. 17-23</p> <p>New Plants Investigation 1, Part 2, pp. 13-22 Investigation 2, Part 1, pp. 8-14</p> <p>Plants and Animals Investigation 1, Part 2, pp. 58-62</p>
P.PM.02.15 Compare the weight of objects using balances.	<p>Solids and Liquids Investigation 3, Math Extension, p. 30</p> <p>Balance and Motion Investigation 1, Math Extension, p. 30</p>

PROPERTIES OF MATTER

P.PM.E.4 Material Composition- Some objects are composed of a single substance, while other objects are composed of more than one substance.

EXPECTATION	FOSS
P.PM.02.41 Classify objects as single substances (ice, silver, sugar, salt) or mixtures (salt and pepper, mixed dry beans).	<p>Solids and Liquids Investigation 1, Part 1, pp. 8-16 Investigation 2, Part 1, pp. 10-14 Investigation 3, Part 2, pp. 14-18 Investigation 4, Parts 1-2, pp. 7-22 Science Stories, pp. 18-21</p> <p>Pebbles, Sand and Silt Investigation 4, Part 1, pp. 8-14 Science Stories, pp. 20-21</p>

ORGANIZATION OF LIVING THINGS

L.OL.E.1 Life Requirements- Organisms have basic needs. Animals and plants need air, water, and food. Plants also require light. Plants and animals use food as a source of energy and as a source of building material for growth and repair.

EXPECTATION	FOSS
L.OL.02.14 Identify the needs of plants.	New Plants Investigation 1, Part 2, pp. 13-22 Investigation 2, Part 1, pp. 8-14 Investigation 3, Parts 1-2, pp. 8-18 Science Stories, pp. 3-7 Plants and Animals Investigation 1, Part 2, pp. 47-57 Investigation 2, Parts 1-2, pp. 87-103 Science Resources, pp. 3-7 Insects and Plants Investigation 2, Part 2, pp. 95-104

ORGANIZATION OF LIVING THINGS

L.OL.E.2 Life Cycles- Plants and animals have life cycles. Both plants and animals begin life and develop into adults, reproduce, and eventually die. The details of this life cycle are different for different organisms.

EXPECTATION	FOSS
L.OL.02.22 Describe the life cycle of familiar flowering plants including the following stages: seed, plant, flower, and fruit.	New Plants Investigation 1, Parts 2-3, pp. 13-30 Science Stories, pp. 12-19 Insects and Plants Investigation 2, Parts 2-3, pp. 95-115 Science Resources, pp. 15-19

HEREDITY

L.HE.E.1 Observable Characteristics- Plants and animals share many, but not all, characteristics of their parents.

EXPECTATION	FOSS
L.HE.02.13 Identify characteristics of plants (for example: leaf shape, flower type, color, size) that are passed on from parents to young.	New Plants Investigation 1, Parts 2-3, pp. 13-30 Science Stories, pp. 2-19 Insects and Plants Investigation 2, Parts 2-3, pp. 95-115 Science Resources, pp. 15-19

SOLID EARTH

E.SE.E.2 Surface Changes- The surface of Earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

EXPECTATION	FOSS
E.SE.02.21 Describe the major landforms of the surface of the Earth (mountains, plains, plateaus, valleys, hills).	

FLUID EARTH

E.FE.E.1 Water- Water is a natural resource and is found under the ground, on the surface of the earth, and in the sky. It exists in three states (liquid, solid, gas) and can go back and forth from one form to another.

EXPECTATION	FOSS
E.FE.02.11 Identify water sources (wells, springs, lakes, rivers, oceans).	See grade 3 module <u>Water</u> .

E.FE.02.12 Identify household uses of water (drinking, cleaning, food preparation).	See grade 3 module <u>Water</u> .
E.FE.02.13 Describe the properties (visible, flowing, melting, dew) of water as a liquid (lakes, rivers, streams, oceans).	See grade 3 module <u>Water</u> .
E.FE.02.14 Describe the properties (hard, visible, freezing, ice) of water as a solid (ice, snow, iceberg, sleet, hail).	See grade 3 module <u>Water</u> .

FLUID EARTH

E.FE.E.2 Water Movement- Water moves in predictable patterns.

EXPECTATION	FOSS
E.FE.02.21 Describe how rain collects on the surface of the Earth and flows downhill into bodies of water (streams, rivers, lakes, oceans) or into the ground.	See grade 3 module <u>Water</u> .
E.FE.02.22 Describe the major bodies of water on the Earth's surface (lakes, ponds, oceans, rivers, streams).	See grade 3 module <u>Water</u> .

GRADE THREE

INQUIRY PROCESS

S.IP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
S.IP.03.11 Make purposeful observation of the natural world using the appropriate senses.	FOSS is an inquiry based program. Observation is a fundamental skill that is stressed in all investigations. See for example: Structures of Life Investigation 4, Parts 1-3, pp. 8-24 Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Water Investigation 2, Parts 1-3, pp. 8-24 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-22 Physics of Sound Investigation 1, Parts 1-3, pp. 8-29 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 2, Parts 1-2, pp. 93-114
S.IP.03.12 Generate questions based on observations.	FOSS investigations are driven by questions. Investigations encourage student questions. See for example: Measurement Investigation 3, Part 3, pp. 18-21 Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Structures of Life Investigation 3, Parts 1-4, pp. 8-30 Magnetism and Electricity Investigation 1, Parts 1-4, pp. 8-34 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Matter and Energy Investigation 4, Part 2, pp. 181-192
S.IP.03.13 Plan and conduct simple and fair investigations.	Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 3, Parts 1-2, pp. 8-19 Measurement Investigation 2, Part 3, pp. 18-24 Human Body Investigation 4, Parts 1-3, pp. 8-24 Earth Materials Investigation 2, Part 2, pp. 14-21 Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26 Matter and Energy Investigation 3, Part 2, pp. 139-150
S.IP.03.14 Manipulate simple tools that aid	Measurement

<p>observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer).</p>	<p>Investigation 1, Parts 2-3, pp. 16-24 Investigation 2, Parts 2-3, pp. 14-24 Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-21 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-21 Water Investigation 1, Part 3, pp. 14-23 Structures of Life Investigation 4, Part 3, pp. 20-24 Magnetism and Electricity Investigation 1, Part 3, pp. 23-30 Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Sun, Moon and Stars Investigation 1, Part 1, pp. 42-55 Matter and Energy Investigation 4, Part 1, pp. 174-180</p>
<p>S.IP.03.15 Make accurate measurements with appropriate units (centimeters, meters, Celsius, grams, seconds, minutes) for the measurement tool.</p>	<p>Measurement Investigation 1, Parts 2-3, pp. 16-24 Investigation 2, Parts 2-3, pp. 14-24 Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-21 Water Investigation 1, Part 3, pp. 14-23 Investigation 4, Part 1, pp. 8-13 Structures of Life Investigation 4, Part 3, pp. 20-24 Magnetism and Electricity Investigation 1, Part 3, pp. 23-30 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160</p>
<p>S.IP.03.16 Construct simple charts and graphs from data and observations.</p>	<p>Human Body Investigation 4, Parts 1-3, pp. 8-24 Magnetism and Electricity Investigation 1, Part 3, pp. 25-29 Investigation 4, Part 2, pp. 14-18 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Measurement Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 3, Parts 2-3, pp. 12-20 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160</p>

INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.03.11 Summarize information from charts and graphs to answer scientific questions.</p>	<p>Human Body Investigation 4, Parts 1-3, pp. 8-24 Magnetism and Electricity Investigation 1, Part 3, pp. 25-29</p>

<p>S.IA.03.12 Share ideas about science through purposeful conversation in collaborative groups.</p>	<p>Investigation 4, Part 2, pp. 14-18 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Measurement Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 3, Parts 2-3, pp. 12-20 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Matter and Energy Investigation 4, Part 2, pp. 181-192</p> <p>FOSS investigations are done in collaborative groups where students share ideas about the science investigation. See for example: Water Investigation 4, Parts 1-2, pp. 8-13 Structures of Life Investigation 4, Parts 2-4, pp. 16-30 Human Body Investigation 3, Parts 1-3, pp. 8-21 Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26 Measurement Investigation 3, Part 3, pp. 18-21 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 89-100</p>
<p>S.IA.03.13 Communicate and present findings of observations and investigations.</p>	<p>In each FOSS investigation students share observations and data in post-investigation discussions. See for example: Ideas and Inventions Investigation 3, Parts 2-3, pp. 14-21 Magnetism and Electricity Investigation 1, Parts 1-3, pp. 8-29 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Structures of Life Investigation 2, Part 1, pp. 8-13 Water Investigation 3, Parts 1-4, pp. 8-26 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Matter and Energy Investigation 1, Part 3, pp. 71-82</p>
<p>S.IA.03.14 Develop research strategies and skills for information gathering and problem solving.</p>	<p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also: Human Body Investigation 2, Parts 1-4, pp. 8-25 Water Investigation 4, Part 2, pp. 14-18 Magnetism and Electricity</p>

<p>S.IA.03.15 Compare and contrast sets of data from multiple trials of a science investigation to explain reasons for differences.</p>	<p>Investigation 4, Part 3, pp. 19-22 Ideas and Inventions Investigation 3, Part 3, pp. 18-21 Physics of Sound Investigation 4, Part 1, pp. 6-15 Measurement Investigation 2, Part 3, pp. 18-24 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100</p> <p>FOSS investigations involve students sharing results of observations and data. The separate group investigations represent repeated trials. Differences in observations would be discussed. See for example:</p> <p>Ideas and Inventions Investigation 3, Parts 2-3, pp. 14-21 Magnetism and Electricity Investigation 1, Parts 1-3, pp. 8-29 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Structures of Life Investigation 2, Part 1, pp. 8-13 Water Investigation 3, Parts 1-4, pp. 8-26 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
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REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
<p>S.RS.03.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Human Body Investigation 2, Parts 1-2, pp. 8-12 Investigation 3, Parts 1-3, pp. 8-21 Water Investigation 2, Part 1, pp. 8-13 Ideas and Inventions Investigation 2, Parts 2-3, pp. 16-22 Investigation 3, Parts 1-3, pp. 8-21 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Measurement Investigation 4, Part 3, pp. 18-21 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 1, Parts 1-3, pp. 50-82</p>
<p>S.RS.03.14 Use data/samples as evidence to separate fact from opinion.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Human Body Investigation 4, Parts 1-3, pp. 8-24 Magnetism and Electricity Investigation 1, Part 3, pp. 25-29</p>

<p>S.RS.03.15 Use evidence when communicating scientific ideas.</p>	<p>Investigation 4, Part 2, pp. 14-18 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Measurement Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 3, Parts 2-3, pp. 12-20 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Matter and Energy Investigation 3, Part 2, pp. 139-150</p> <p>FOSS investigations provide the opportunity to address this expectation. See for example: Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 3, Parts 1-2, pp. 8-19 Measurement Investigation 2, Part 3, pp. 18-24 Human Body Investigation 4, Parts 1-3, pp. 8-24 Earth Materials Investigation 2, Part 2, pp. 14-21 Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
<p>S.RS.03.16 Identify technology used in everyday life.</p>	<p>Measurement Science Stories pp. 22-23 Magnetism and Electricity Science Stories, pp. 28-35 Water Science Stories, pp. 18-20 Human Body Science Stories, pp. 4-7 Physics of Sound Science Stories, pp. 32-35 FOSS Web, Movies: MRI Section Sun, Moon and Stars Science Resources, pp. 40-43, 46 Matter and Energy Science Resources, p. 23</p>
<p>S.RS.03.17 Identify current problems that may be solved through the use of technology.</p>	<p>Water Science Stories, pp. 17-19, 21-23 Physics of Sound Science Stories, pp. 32-35 Measurement Science Stories, p. 17 Sun, Moon and Stars Science Resources, pp. 44-45 Matter and Energy Science Resources, pp. 10-11</p>
<p>S.RS.03.18 Describe the effect humans and</p>	<p>Water</p>

<p>other organisms have on the balance of the natural world.</p> <p>S.RS.03.19 Describe how people have contributed to science throughout history and across cultures.</p>	<p>Science Stories, pp. 20, 22-23</p> <p>Earth Materials Science Stories, pp. 24-29</p> <p>Ideas and Inventions Science Stories, pp. 1-3, 10, 17-22</p> <p>Magnetism and Electricity Science Stories, pp. 12-23, 34-37</p> <p>Structures of Life Science Stories, pp. 6-9</p> <p>Water Science Stories, pp. 24-26</p> <p>Sun, Moon and Stars Science Resources, pp. 40, 44-45</p>
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FORCE AND MOTION

P.FM.E.2 Gravity- Earth pulls down on all objects with a force called gravity. With very few exceptions, objects fall to the ground no matter where the object is on the Earth.

EXPECTATION	FOSS
<p>P.FM.03.22 Identify the force that pulls objects towards the Earth.</p>	<p>FOSS provides the opportunity to address this expectation. See for example:</p> <p>Water Investigation 1, Part 3, pp. 19-23 Investigation 4, Part 1, pp. 8-13</p> <p>Physics of Sound Investigation 1, Parts 1-2, pp. 8-20</p> <p>Human Body Investigation 4, Parts 1-3, pp. 8-24</p>

FORCE AND MOTION

P.FM.E.3 Force- A force is either a push or a pull. The motion of objects can be changed by forces. The size of the change is related to the size of the force. The change is also related to the weight (mass) of the object on which the force is being exerted. When an object does not move in response to a force, it is because another force is being applied by the environment.

EXPECTATION	FOSS
<p>P.FM.03.35 Describe how a push or a pull is a force.</p>	<p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-30</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Matter and Energy Investigation 1, Part 3, pp. 71-82 Science Resources, p. 17</p>
<p>P.FM.03.36 Relate a change in motion of an object to the force that caused the change of motion.</p>	<p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Water Investigation 4, Part 2, pp. 14-18</p>
<p>P.FM.03.37 Demonstrate how the change in motion of an object is related to the strength of the force acting upon the object and to the</p>	<p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-30</p> <p>Water</p>

<p>mass of the object.</p> <p>P.FM.03.38 Demonstrate when an object does not move in response to a force, it is because another force is acting on it.</p>	<p>Investigation 4, Part 2, pp. 14-18</p> <p>FOSS provides the opportunity to address this expectation. See for example: Magnetism and Electricity Investigation 1, Part 3, pp. 23-30 Human Body Investigation 3, Parts 1-3, pp. 8-21 Structures of Life Investigation 4, Part 3, pp. 20-24 Water Investigation 4, Part 2, pp. 14-18</p>
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FORCE AND MOTION

P.FM.E.4 Speed- An object is in motion when its position is changing. The speed of an object is defined by how far it travels divided by the amount of time it took to travel that far.

EXPECTATION	FOSS
<p>P.FM.03.41 Compare and contrast the motion of objects in terms of direction.</p>	<p>Human Body Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-24 Structures of Life Investigation 4, Part 3, pp. 20-24 Water Investigation 1, Part 1, pp. 19-28 Investigation 4, Parts 1-2, pp. 8-18 Matter and Energy Investigation 1, Part 3, pp. 71-82</p>
<p>P.FM.03.42 Identify changes in motion (change direction, speeding up, slowing down).</p>	<p>Human Body Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-24 Structures of Life Investigation 4, Part 3, pp. 20-24 Water Investigation 1, Part 1, pp. 19-28 Investigation 4, Parts 1-2, pp. 8-18 Matter and Energy Investigation 1, Part 3, pp. 71-82</p>
<p>P.FM.03.43 Calculate the speed of an object based on the distance it travels divided by the amount of time it took to travel that distance.</p>	

ENERGY

P.EN.E.1 Forms of Energy- Heat, electricity, light, and sound are forms of energy.

EXPECTATION	FOSS
<p>P.EN.03.11 Identify light and sound as forms of energy.</p>	<p>Physics of Sound Investigation 1, Part 3, pp. 21-29 Science Stories, pp. 6, 14, 17-20, 26 Ideas and Inventions Investigation 4, Part 1-3, pp. 8-21 Science Stories, pp. 28-30 Matter and Energy Investigation 1, Parts 1,3, pp. 50-62, 71-82 Investigation 2, Parts 1-2, pp. 93-114 Science Resources, pp. 1, 15, 24-25</p>

ENERGY

P.EN.E.2 Light Properties- Light travels in straight lines. Shadows result from light not being able to pass through an object. When light travels at an angle from one substance to another (air and water), it changes direction.

EXPECTATION	FOSS
P.EN.03.21 Demonstrate that light travels in a straight line and that shadows are made by placing an object in a path of light.	Ideas and Inventions Investigation 4, Part 1-3, pp. 8-21 Science Stories, pp. 28-30, 33 Matter and Energy Investigation 2, Part 1, pp. 93-102
P.EN.03.22 Demonstrate what happens to light when it travels from water to air. (straw half in water looks bent).	Ideas and Inventions Science Stories, p. 30

ENERGY

P.EN.E.3 Sound- Vibrating objects produce sound. The pitch of sound varies by changing the rate of vibration.

EXPECTATION	FOSS
P.EN.03.31 Relate sounds to their sources of vibrations (for example: a musical note produced by a vibrating guitar string, the sounds of a drum made by the vibrating drum head).	Physics of Sound Investigation 1, Parts 1-3, pp. 8-29 Investigation 2, Parts 1-3, pp. 8-24 Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Part 1, pp. 6-16 Matter and Energy Investigation 1, Parts 1, 3, pp. 50-62, 71-82
P.EN.03.32 Distinguish the effect of fast or slow vibrations as pitch.	Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Science Stories, pp. 11-13 Matter and Energy Investigation 1, Part 3, pp. 71-82

ENERGY

P.PM.E.5 Conductive and Reflective Properties- Objects vary to the extent they absorb and reflect light energy and conduct heat and electricity.

EXPECTATION	FOSS
P.PM.03.51 Demonstrate how some materials are heated more than others by light that shines on them.	See grade module Solar Energy .
P.PM.03.52 Explain how we need light to see objects: light from a source reflects off objects and enters our eyes.	Ideas and Inventions Science Stories, pp. 23-25 Matter and Energy Investigation 2, Part 1, pp. 93-102 Science Resources, pp. 24-25, 29-31

ORGANIZATION OF LIVING THINGS

L.OL.E.3 Structures and Functions- Organisms have different structures that serve different functions in growth, survival, and reproduction.

EXPECTATION	FOSS
L.OL.03.31 Describe the function of the following plant parts: flower, stem, root and leaf.	FOSS provides the opportunity to address this expectation. See for example: Structures of Life Investigation 2, Part 3, pp. 18-22 Science Stories, pp. 10-11, 25

L.OL.03.32 Identify and compare structures in animals used for controlling body temperature, support, movement, food-getting, and protection (for example: fur, wings, teeth, claws).	Structures of Life Investigation 3, Part 1, pp. 8-15 Investigation 4, Parts 1-2, pp. 8-19 Science Stories, pp. 17-18, 22-24, 26-34, 39-40 FOSS Web, Movie: Jellyfish
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ORGANIZATION OF LIVING THINGS

L.OL.E.4 Classification- Organisms can be classified on the basis of observable characteristics.

EXPECTATION	FOSS
L.OL.03.41 Classify plants on the basis of observable physical characteristics (roots, leaves, stems, and flowers).	FOSS provides the opportunity to address this expectation. See for example: Structures of Life Investigation 1, Part 1, pp. 8-16
L.OL.03.42 Classify animals on the basis of observable physical characteristics (backbone, skin, shell, limbs, scales).	FOSS provides the opportunity to address this expectation. See for example: Structures of Life Investigation 4, Part 2, pp. 14-19 Science Stories, pp. 41-42

EVOLUTION

L.EV.E.1 Environmental Adaptation- Different kinds of organisms have characteristics that help them to live in different environments.

EXPECTATION	FOSS
L.EV.03.11 Relate characteristics and functions of observable parts in a variety of plants that allow them to live in their environment (for example: leaf shape, thorns, odor, color).	FOSS provides the opportunity to address this expectation. See for example: Structures of Life Investigation 1, Part 2, pp. 18-27 Investigation 2, Part 3, pp. 18-22 Science Stories, pp. 1-3, 25
L.EV.03.12 Relate characteristics and functions of observable body parts to the ability of animals to live in their environment (for example: sharp teeth, claws, color, body covers).	FOSS provides the opportunity to address this expectation. See for example: Structures of Life Investigation 3, Part 1, pp. 8-16 Investigation 4, Part 1, pp.8-13 Science Stories, pp. 17-18, 22-36, 39-40, 45-49

EARTH SYSTEMS

E.ES.E.4 Natural Resources- The supply of many natural resources is limited. Humans have devised methods for extending their use of natural resources through recycling, reuse, and renewal.

EXPECTATION	FOSS
E.ES.03.41 Identify natural resources (metals, fuels, fresh water, farmland, and forests).	Water Science Stories, pp. 8-11, 17 Earth Materials Science Stories, pp. 12-15, 24-29 Physic of Sound Science Stories, pp. 23-24 Matter and Energy Science Resources, pp. 1-4
E.ES.03.42 Classify renewable (fresh water, farmland, forests) and non-renewable (fuels, metals) resources.	Water FOSS Web, Activity: Match the Resource

<p>E.ES.03.43 Describe ways humans are protecting, extending, and restoring resources (recycle, reuse, reduce, renewal).</p>	<p>Water Activity 3, Language Extension, p. 27 Science Stories, pp. 17-21 Measurement Science Stories, pp. 16-17</p>
<p>E.ES.03.44 Recognize that paper, metal, glass, and some plastics can be recycled.</p>	

EARTH SYSTEMS

E.ES.E.5 Human Impact- Humans depend on their natural and constructed environment. Humans change environments in ways that are helpful or harmful for themselves and other organisms.

EXPECTATION	FOSS
<p>E.ES.03.51 Describe ways humans are dependent on the natural environment (forests, water, clean air, earth materials) and constructed environments (homes, neighborhoods, shopping malls, factories, and industry).</p>	<p>Earth Materials Science Stories, pp. 24-29 Water Science Stories, p. 17 Measurement Science stories, p. 16 Matter and Energy Science Resources, pp. 1-4, 9-10</p>
<p>E.ES.03.52 Describe helpful or harmful effects of humans on the environment (garbage, habitat destruction, land management, renewable and non-renewable resources).</p>	<p>Earth Materials Science Stories, pp. 24-29 Water Activity 3, Language Extension, p. 27 Science Stories, p. 18-21 Measurement Science stories, p. 17</p>

SOLID EARTH

E.SE.E.1 Earth Materials- Earth materials that occur in nature include rocks, minerals, soils, water, and the gases of the atmosphere. Some Earth materials have properties which sustain plant and animal life.

EXPECTATION	FOSS
<p>E.SE.03.13 Recognize and describe different types of earth materials (mineral, rock, clay, boulder, gravel, sand, soil).</p>	<p>Earth Materials Investigation 1, Parts 2-3, pp. 16-29 Investigation 2, Part 1, pp. 8-13 Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Part 1, pp. 8-13 Science Stories, pp. 8-15, 24-31, 34-47 FOSS Web, Activity: Rock Database</p>
<p>E.SE.03.14 Recognize that rocks are made up of minerals.</p>	<p>Earth Materials Investigation 1, Parts 2-3, pp. 16-29 Investigation 2, Part 1, pp. 8-13 Investigation 4, Part 1, pp. 8-13 Science Stories, pp. 30-31, 34-35</p>

SOLID EARTH

E.SE.E.2 Surface Changes- The surface of Earth changes. Some changes are due to slow processes, such as erosion and weathering, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

EXPECTATION	FOSS
<p>E.SE.03.22 Identify and describe natural causes of change in the</p>	<p>Earth Materials Science Stories, pp. 5-7</p>

Earth's surface (erosion, glaciers, volcanoes, landslides, and earthquakes).	
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SOLID EARTH

E.SE.E.3 Using Earth Materials- Some Earth materials have properties that make them useful either in their present form or designed and modified to solve human problems. They can enhance the quality of life as in the case of materials used for building or fuels used for heating and transportation.

EXPECTATION	FOSS
E.SE.03.31 Identify Earth materials used to construct some common objects (for example: bricks, buildings, roads, glass).	Earth Materials Investigation 3, Science Extension, p. 24 Science Stories, pp. 24-29
E.SE.03.32 Describe how materials taken from the Earth can be used as fuels for heating and transportation.	Physics of Sound Science Stories, pp. 23-24 Matter and Energy Science Resources, pp. 2-3, 9-10

GRADE FOUR

INQUIRY PROCESS

S.IP.E.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
S.IP.04.11 Make purposeful observation of the natural world using the appropriate senses.	FOSS is an inquiry based program. Observation is a fundamental skill that is stressed in all investigations. See for example: Structures of Life Investigation 4, Parts 1-3, pp. 8-24 Earth Movements Investigation 1, Parts 1-3, pp. 8-29 Water Investigation 2, Parts 1-3, pp. 8-24 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-22 Physics of Sound Investigation 1, Parts 1-3, pp. 8-29 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 2, Parts 1-2, pp. 93-114
S.IP.04.12 Generate questions based on observations.	FOSS investigations are driven by questions. Investigations encourage student questions. See for example: Measurement Investigation 3, Part 3, pp. 18-21 Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Structures of Life Investigation 3, Parts 1-4, pp. 8-30 Magnetism and Electricity Investigation 1, Parts 1-4, pp. 8-34 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Matter and Energy Investigation 4, Part 2, pp. 181-192
S.IP.04.13 Plan and conduct simple and fair investigations.	Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 3, Parts 1-2, pp. 8-19 Measurement Investigation 2, Part 3, pp. 18-24 Human Body Investigation 4, Parts 1-3, pp. 8-24 Earth Materials Investigation 2, Part 2, pp. 14-21 Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26 Matter and Energy Investigation 3, Part 2, pp. 139-150
S.IP.04.14 Manipulate simple tools that aid	Measurement

<p>observation and data collection (for example: hand lens, balance, ruler, meter stick, measuring cup, thermometer, spring scale, stop watch/timer, graduated cylinder/beaker).</p>	<p>Investigation 1, Parts 2-3, pp. 16-24 Investigation 2, Parts 2-3, pp. 14-24 Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-21 Ideas and Inventions Investigation 2, Parts 1-3, pp. 8-21 Water Investigation 1, Part 3, pp. 14-23 Structures of Life Investigation 4, Part 3, pp. 20-24 Magnetism and Electricity Investigation 1, Part 3, pp. 23-30 Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Sun, Moon and Stars Investigation 1, Part 1, pp. 42-55 Matter and Energy Investigation 4, Part 1, pp. 174-180</p>
<p>S.IP.04.15 Make accurate measurements with appropriate units (millimeters centimeters, meters, milliliters, liters, Celsius, grams, seconds, minutes) for the measurement tool.</p>	<p>Measurement Investigation 1, Parts 2-3, pp. 16-24 Investigation 2, Parts 2-3, pp. 14-24 Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-21 Water Investigation 1, Part 3, pp. 14-23 Investigation 4, part 1, pp. 8-13 Structures of Life Investigation 4, Part 3, pp. 20-24 Magnetism and Electricity Investigation 1, Part 3, pp. 23-30 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160</p>
<p>S.IP.04.16 Construct simple charts and graphs from data and observations.</p>	<p>Human Body Investigation 4, Parts 1-3, pp. 8-24 Magnetism and Electricity Investigation 1, Part 3, pp. 25-29 Investigation 4, Part 2, pp. 14-18 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Measurement Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 3, Parts 2-3, pp. 12-20 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Matter and Energy Investigation 3, Parts 2-3, pp. 139-160</p>

INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.04.11 Summarize information from charts and graphs to answer scientific questions.</p>	<p>Human Body Investigation 4, Parts 1-3, pp. 8-24 Magnetism and Electricity Investigation 1, Part 3, pp. 25-29</p>

<p>S.IA.04.12 Share ideas about science through purposeful conversation in collaborative groups.</p>	<p>Investigation 4, Part 2, pp. 14-18 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Measurement Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 3, Parts 2-3, pp. 12-20 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Matter and Energy Investigation 4, Part 2, pp. 181-192</p> <p>FOSS investigations are done in collaborative groups where students share ideas about the science investigation. See for example: Water Investigation 4, Parts 1-2, pp. 8-13 Structures of Life Investigation 4, Parts 2-4, pp. 16-30 Human Body Investigation 3, Parts 1-3, pp. 8-21 Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26 Measurement Investigation 3, Part 3, pp. 18-21 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p>
<p>S.IA.04.13 Communicate and present findings of observations and investigations.</p>	<p>In each FOSS investigation students share observations and data in post-investigation discussions. See for example: Ideas and Inventions Investigation 3, Parts 2-3, pp. 14-21 Magnetism and Electricity Investigation 1, Parts 1-3, pp. 8-29 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Structures of Life Investigation 2, Part 1, pp. 8-13 Water Investigation 3, Parts 1-4, pp. 8-26 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Matter and Energy Investigation 1, Part 3, pp. 71-82</p>
<p>S.IA.04.14 Develop research strategies and skills for information gathering and problem solving.</p>	<p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also: Human Body Investigation 2, Parts 1-4, pp. 8-25 Water Investigation 4, Part 2, pp. 14-18 Magnetism and Electricity</p>

<p>S.IA.04.15 Compare and contrast sets of data from multiple trials of a science investigation to explain reasons for differences.</p>	<p>Investigation 4, Part 3, pp. 19-22 Ideas and Inventions Investigation 3, Part 3, pp. 18-21 Physics of Sound Investigation 4, Part 1, pp. 6-15 Measurement Investigation 2, Part 3, pp. 18-24 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100</p> <p>FOSS investigations involve students sharing results of observations and data. The separate group investigations represent repeated trials. Differences in observations would be discussed. See for example:</p> <p>Ideas and Inventions Investigation 3, Parts 2-3, pp. 14-21 Magnetism and Electricity Investigation 1, Parts 1-3, pp. 8-29 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Structures of Life Investigation 2, Part 1, pp. 8-13 Water Investigation 3, Parts 1-4, pp. 8-26 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
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REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
<p>S.RS.04.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Human Body Investigation 2, Parts 1-2, pp. 8-12 Investigation 3, Parts 1-3, pp. 8-21 Water Investigation 2, Part 1, pp. 8-13 Ideas and Inventions Investigation 2, Parts 2-3, pp. 16-22 Investigation 3, Parts 1-3, pp. 8-21 Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Measurement Investigation 4, Part 3, pp. 18-21 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 1, Parts 1-3, pp. 50-82</p>
<p>S.RS.04.14 Use data/samples as evidence to separate fact from opinion.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Human Body Investigation 4, Parts 1-3, pp. 8-24 Magnetism and Electricity Investigation 1, Part 3, pp. 25-29</p>

	<p>Investigation 4, Part 2, pp. 14-18 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Measurement Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 3, Parts 2-3, pp. 12-20 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
<p>S.RS.04.15 Use evidence when communicating scientific ideas.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example: Water Investigation 3, Parts 2-4, pp. 12-26 Physics of Sound Investigation 3, Parts 1-2, pp. 8-19 Measurement Investigation 2, Part 3, pp. 18-24 Human Body Investigation 4, Parts 1-3, pp. 8-24 Earth Materials Investigation 2, Part 2, pp. 14-21 Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
<p>S.RS.04.16 Identify technology used in everyday life.</p>	<p>Measurement Science Stories pp. 22-23 Magnetism and Electricity Science Stories, pp. 28-35 Water Science Stories, pp. 18-20 Human Body Science Stories, pp. 4-7 Physics of Sound Science Stories, pp. 32-35 FOSS Web, Movies: MRI Section Sun, Moon and Stars Science Resources, pp. 40-43, 46 Matter and Energy Science Resources, p. 23 Home-School Connection</p>
<p>S.RS.04.17 Identify current problems that may be solved through the use of technology.</p>	<p>Water Science Stories, pp. 17-19, 21-23 Physics of Sound Science Stories, pp. 32-35 Measurement Science Stories, p. 17 Sun, Moon and Stars Science Resources, pp. 44-45</p>
<p>S.RS.04.18 Describe the effect humans and other organisms have on the balance of the</p>	<p>Water Science Stories, pp. 20, 22-23</p>

natural world.	Earth Materials Science Stories, pp. 24-29
S.RS.04.19 Describe how people have contributed to science throughout history and across cultures.	Ideas and Inventions Science Stories, pp. 1-3, 10, 17-22 Magnetism and Electricity Science Stories, pp. 12-23, 34-37 Structures of Life Science Stories, pp. 6-9 Water Science Stories, pp. 24-26 Sun, Moon and Stars Science Resources, pp. 40, 44-45

ENERGY

P.EN.E.1 Forms of Energy- Heat, electricity, light, and sound are forms of energy.

EXPECTATION	FOSS
P.EN.04.12 Identify heat and electricity as forms of energy.	Magnetism and Electricity Investigation 2, Parts 1-2, pp. 8-19 Investigation 3, Parts 1-3, pp.10-26 Investigation 4, Part 1, pp. 8-13 Science Stories, pp. 10-13 FOSS Web, Movie: How a Light Bulb Works Physics of Sound Science Stories, pp. 22-26 Matter and Energy Investigation 1, Parts 1-3, pp. 50-82 Science Resources, pp. 1-3, 6-7, 10-11

ENERGY

P.EN.E.4 Energy and Temperature- Increasing the temperature of any substance requires the addition of energy.

EXPECTATION	FOSS
P.EN.04.41 Demonstrate how temperature can be increased in a substance by adding energy.	Matter and Energy Investigation 4, Parts 1-2, pp. 174-192
P.EN.04.42 Describe heat as the energy produced when substances burn, certain kinds of materials rub against each other, and when electricity flows through wire.	Physics of Sound Science Stories, pp.23-24 Matter and Energy Investigation 1, Part 1, pp. 50-62 Science Resources, pp. 1-4
P.EN.04.43 Describe how heat is produced through electricity, rubbing, and burning.	Physics of Sound Science Stories, pp.23-24 Matter and Energy Investigation 1, Part 1, pp. 50-62

ENERGY

P.EN.E.5 Electrical Circuits- Electrical circuits transfer electrical energy and produce magnetic fields.

EXPECTATION	FOSS
P.EN.04.51 Explain how electrical energy is transferred and changed through the use of a simple circuit.	Magnetism and Electricity Investigation 2, Parts 1-4, pp. 8-29 Investigation 3, Parts 1-3, pp.10-26 Matter and Energy Investigation 1, Parts 1,3, pp. 50-62, 71-82
P.EN.04.52 Create a simple working	Magnetism and Electricity

electromagnet and explain the conditions necessary to make the electromagnet.	Investigation 4, Parts 1-3, pp. 8-22
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PROPERTIES OF MATTER

P.PM.E.1 Physical Properties- All objects and substances have physical properties that can be measured.

EXPECTATION	FOSS
P.PM.04.16 Measure the weight (spring scale) and mass (balances in grams or kilograms) of objects.	Measurement Investigation 2, Parts 2-3, pp. 14-24 Structures of Life Investigation 1, Part 3, pp. 28-33 Investigation 4, Part 3, pp. 20-24 Matter and Energy Investigation 3, Part 2, pp. 139-152
P.PM.04.17 Measure volumes of liquids and capacities of containers in milliliters and liters.	Measurement Investigation 3, Parts 2-3, pp. 14-211 Investigation 4, Part 1, pp. 8-13 Water Investigation 4, Part 1, pp. 8-13 Earth Movements Investigation 3, Parts 8-13 Matter and Energy Investigation 3, Part 3, pp. 151-160
P.PM.04.18 Demonstrate the use of centimeter cubes poured into a container to estimate the container's capacity.	

PROPERTIES OF MATTER

P.PM.E.2 States of Matter- Matter exists in several different states: solids, liquids, and gases. Each state of matter has unique physical properties. Gases are easily compressed, but liquids and solids do not compress easily. Solids have their own particular shapes, but liquids and gases take the shape of the container.

EXPECTATION	FOSS
P.PM.04.23 Compare and contrast the states (solids, liquids, gases) of matter.	FOSS provides the opportunity to address this expectation. See below: Measurement Science Stories, p. 22 Water Investigation 2, Part 3, pp. 19-24 Investigation 3, Parts 1-4, pp. 8-26 Science Stories, pp. 13-16 Matter and Energy Investigation 4, Part 2, pp. 181-192 Science Resources, pp. 39-42, 54-56

PROPERTIES OF MATTER

P.PM.E.3 Magnets- Magnets can repel or attract other magnets. Magnets can also attract certain non-magnetic objects at a distance.

EXPECTATION	FOSS
P.PM.04.33 Demonstrate magnetic field by observing the patterns formed with iron filings using a variety of magnets.	Magnetism and Electricity Investigation 1, Part 4, pp. 30-34
P.PM.04.34 Demonstrate that non-magnetic objects are affected by the strength of the magnet and the distance away from the	Magnetism and Electricity Investigation 1, Part 1, pp. 8-17

magnet.	
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PROPERTIES OF MATTER

P.PM.E.5 Conductive and Reflective Properties- Objects vary to the extent they absorb and reflect light energy and conduct heat and electricity.

EXPECTATION	FOSS
P.PM.04.53 Identify objects that are good conductors or poor conductors of heat and electricity.	Magnetism and Electricity Investigation 2, Part 3, pp. 20-25

CHANGES IN MATTER

P.CM.E.1 Changes in State- Matter can be changed from one state (liquid, solid, gas) to another and then back again. This may be caused by heating and cooling.

EXPECTATION	FOSS
P.CM.04.11 Explain how matter can change from one state (liquid, solid, gas) to another by heating and cooling.	Water Investigation 2, Part 3, pp. 19-24 Investigation 3, Parts 1-4, pp. 8-26 Science Stories, pp. 13-16 FOSS Web, Activity: Evaporation Measurement Science Stories, pp. 32-33 Matter and Energy Investigation 4, Part 2, pp. 181-192 Science Resources, pp. 54-56, 63

ORGANIZATION OF LIVING THINGS

L.OL.E.1 Life Requirements- Organisms have basic needs. Animals and plants need air, water, and food. Plants also require light. Plants and animals use food as a source of energy and as a source of building material for growth and repair.

EXPECTATION	FOSS
L.OL.04.15 Determine that plants require air, water, light, and a source of energy and building material for growth and repair.	Structures of Life Investigation 2, Part 2, pp. 14-17
L.OL.04.16 Determine that animals require air, water, and a source of energy and building material for growth and repair.	Structures of Life Investigation 3, Part 2, pp. 16-19 Science Stories, pp. 18-19

EVOLUTION

L.EV.E.2 Survival- Individuals of the same kind differ in their characteristics, and sometimes the differences give individuals an advantage in surviving and reproducing.

EXPECTATION	FOSS
L.EV.04.21 Identify individual differences (for example: color, leg length, size, wing size) in organisms of the same kind.	FOSS provides the opportunity to address this expectation. See below: Structures of Life Investigation 2, Part 3, pp. 18-22 Investigation 3, Part 1, pp. 8-15 Investigation 4, Part 1, Pp. 8-13
L.EV.04.22 Identify how variations in physical characteristics of individual organisms give them an advantage for survival and reproduction.	

ECOSYSTEMS

L.EC.E.1 Interactions- Organisms interact in various ways including providing food and shelter to one another. Some interactions are helpful: others are harmful to the organism and other organisms.

EXPECTATION	FOSS
L.EC.04.11 Identify organisms as part of a food chain or food web.	Structures of Life Science Stories, p. 43

ECOSYSTEMS

L.EC.E.2 Changed Environment Effects- When the environment changes, some plants and animals survive to reproduce; others die or move to new locations.

EXPECTATION	FOSS
L.EC.04.21 Explain how environmental changes can produce a change in the food web.	Structures of Life Science Stories, pp. 35-36

EARTH IN SPACE AND TIME

E.ST.E.1 Characteristics of Objects in the Sky- Common objects in the sky have observable characteristics.

EXPECTATION	FOSS
E.ST.04.11 Identify common objects in the sky, such as the sun and the moon.	Ideas and Inventions Science Stories, pp. 26-27, 33-38 Sun, Moon and Stars Investigation 1, Part 1, pp. 42-55 Investigation 2, Part 1, pp. 79-88 Investigation 3, Part 1, pp. 114-125 Resources, pp. 1-2, 14-17, 35-36
E.ST.04.12 Compare and contrast the characteristics of the sun, moon and Earth, including relative distances and abilities to support life.	Sun, Moon and Stars Science Resources, pp. 1-2, 9, 19, 30

EARTH IN SPACE AND TIME

E.ST.E.2 Patterns of Objects in the Sky- Common objects in the sky have observable characteristics and predictable patterns of movement.

EXPECTATION	FOSS
E.ST.04.21 Describe the orbit of the Earth around the sun as it defines a year.	Sun, Moon and Stars Science Resources, p. 8
E.ST.04.22 Explain that the spin of the Earth creates day and night.	Sun, Moon and Stars Science Resources, p. 3
E.ST.04.23 Describe the motion of the moon around the Earth.	Ideas and Inventions Science Stories, pp. 34-36 Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Science Resources, pp. 19-24, 30-31
E.ST.04.24 Explain how the visible shape of the moon follows a predictable cycle which takes approximately one month.	Ideas and Inventions Science Stories, pp. 34-36 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Science Resources, pp. 22-28
E.ST.04.25 Describe the apparent movement of the sun and moon across the sky through	Ideas and Inventions Science Stories, p. 33

day/night and the seasons.	Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Science Resources, pp. 4-11, 20-24
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EARTH IN SPACE AND TIME

E.ST.E.3 Fossils- Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.

EXPECTATION	FOSS
E.ST.04.31 Explain how fossils provide evidence of the history of the Earth.	Earth Materials Science Stories, p. 4 Structures of Life Science Stories, pp. 45-48 Human Body Science Stories, pp. 21-24
E.ST.04.32 Compare and contrast life forms found in fossils and organisms that exist today.	Earth Materials Science Stories, p. 4 Structures of Life Science Stories, pp. 45-48

GRADE FIVE

INQUIRY PROCESS

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
<p>S.IP.05.11 Generate scientific questions based on observations, investigations, and research.</p>	<p>FOSS investigations are driven by questions. Investigations encourage student questions. See for example:</p> <p>Food and Nutrition Investigation 2, Parts 1-3, pp. 8-25</p> <p>Environments Investigation 3, Parts 1-3, pp. 8-22</p> <p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24</p> <p>Landforms Investigation 2, Parts 1-2, pp. 8-22</p> <p>Variables Investigation 4, Parts 1-3, pp. 8-23</p> <p>Living Systems Investigation 3, Part 2, pp. 126-135</p>
<p>S.IP.05.12 Design and conduct scientific investigations.</p>	<p>Variables Investigation 3, Parts 2-3, pp. 14-23</p> <p>Landforms Investigation 3, Parts 1-3, pp. 8-24</p> <p>Environments Investigation 2, Parts 2-4, pp. 16-30</p> <p>Mixtures and Solutions Investigation 4, Parts 1-3, pp. 8-24</p> <p>Solar Energy Investigation 4, Parts 2-3, pp. 20-28</p> <p>Food and Nutrition Investigation 3, Parts 1-3, pp. 8-25</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p>
<p>S.IP.05.13 Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens) appropriate to scientific investigations.</p>	<p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28</p> <p>Environments Investigation 3, Parts 2-3, pp. 14-22</p> <p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24</p> <p>Mixtures and Solutions Investigation 1, Parts 2-3, pp. 16-24</p> <p>Variables Investigation 3, Parts 2-3, pp. 14-23</p> <p>Models and Designs Investigation 3, Parts 2-3, pp. 13-23</p> <p>Living Systems Investigation 3, Part 2, pp. 126-135</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p>
<p>S.IP.05.14 Use metric measurement devices in an investigation.</p>	<p>Models and Designs Investigation 3, Parts 2-3, pp. 13-23</p>

<p>S.IP.05.15 Construct charts and graphs from data and observations.</p>	<p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 3, Parts 2-3, pp. 13-23 Variables Investigation 3, Parts 2-3, pp. 14-23 Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Environments Investigation 6, Parts 1-2, pp. 8-17 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Food and Nutrition Investigation 4, Part 1, pp. 8-15 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Part 1, pp. 8-16 Variables Investigation 1, Part 2, pp. 16-24 Water Planet Investigation 3, Part 1, pp. 125-135</p>
<p>S.IP.05.16 Identify patterns in data.</p>	<p>Environments Investigation 5, Part 2, pp. 14-18 Landforms Investigation 2, Parts 1-2, pp. 8-22 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Food and Nutrition Investigation 2, Parts 1-3, pp. 8-25 Levers and Pulleys Investigation 4, Parts 1-2, pp. 8-20 Variables Investigation 1, Parts 2-3, pp. 16-27 Water Planet Investigation 2, Parts 2-3, pp. 86-100 Living Systems Investigation 2, Part 2, pp. 99-106</p>

INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.05.11 Analyze information from data tables and graphs to answer scientific questions.</p>	<p>Environments Investigation 6, Parts 1-2, pp. 8-17 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Food and Nutrition Investigation 4, Part 1, pp. 8-15</p>

<p>S.IA.05.12 Evaluate data, claims, and personal knowledge through collaborative science discourse.</p>	<p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Part 1, pp. 8-16 Variables Investigation 1, Part 2, pp. 16-24 Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example: Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 2, Parts 2-4, pp. 16-30 Mixtures and Solutions Investigation 4, Parts 1-3, pp. 8-24 Solar Energy Investigation 4, Parts 2-3, pp. 20-28 Food and Nutrition Investigation 3, Parts 1-3, pp. 8-25 Living Systems Investigation 3, Part 3, pp. 136-141</p>
<p>S.IA.05.13 Communicate and defend findings of observations and investigations using evidence.</p>	<p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example: Environments Investigation 5, Part 2, pp. 14-18 Landforms Investigation 2, Parts 1-2, pp. 8-22 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Food and Nutrition Investigation 2, Parts 1-3, pp. 8-25 Levers and Pulleys Investigation 4, Parts 1-2, pp. 8-20 Variables Investigation 1, Parts 2-3, pp. 16-27 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 3, Part 2, pp. 126-135</p>
<p>S.IA.05.14 Draw conclusions from sets of data from multiple trials of a scientific investigation.</p>	<p>FOSS investigations involve students sharing results of observations and data and drawing conclusions. The separate group investigations represent repeated trials. See for example: Environments Investigation 6, Parts 1-2, pp. 8-17 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Food and Nutrition Investigation 4, Part 1, pp. 8-15 Levers and Pulleys</p>

<p>S.IA.05.15 Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.</p>	<p>Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Part 1, pp. 8-16 Variables Investigation 1, Part 2, pp. 16-24 Livewater Planet Investigation 2, Parts 2-3, pp. 86-100</p> <p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also:</p> <p>Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 2, Parts 2-4, pp. 16-30 Mixtures and Solutions Investigation 4, Parts 1-3, pp. 8-24 Solar Energy Investigation 4, Parts 2-3, pp. 20-28 Food and Nutrition Investigation 3, Parts 1-3, pp. 8-25 Living Systems Investigation 2, Part 2, pp. 99-106</p>
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REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
<p>S.RS.05.11 Evaluate the strengths and weaknesses of claims, arguments, and data.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Environments Investigation 6, Parts 1-2, pp. 8-17 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Food and Nutrition Investigation 4, Part 1, pp. 8-15 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Part 1, pp. 8-16 Variables Investigation 1, Part 2, pp. 16-24 Living Systems Investigation 3, Part 32, pp. 136-141 Water Planet Investigation 2, Part 3, pp. 93-100</p>
<p>S.RS.05.12 Describe limitations in personal and scientific knowledge.</p>	<p>FOSS investigations provide the opportunity to address this expectation as they arise in the selections in the Science Stories also make reference to this expectation. See for example:</p> <p>Environments Science Stories, pp. 23-26 Solar Energy</p>

<p>S.RS.05.13 Identify the need for evidence in making scientific decisions.</p>	<p>Science Stories, pp. 32-33 Food and Nutrition Science Stories, pp. 34-36 Landforms Science Stories, pp. 43-44</p> <p>FOSS investigations provide the opportunity to address this expectation. See for example: Environments Investigation 6, Parts 1-2, pp. 8-17 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Food and Nutrition Investigation 4, Part 1, pp. 8-15 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Part 1, pp. 8-16 Variables Investigation 1, Part 2, pp. 16-24 Water Planet Investigation 2, Part 2, pp. 86-92 Living Systems Investigation 3, Part 3, pp. 136-141</p>
<p>S.RS.05.15 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Variables Investigation 2, Parts 1-3, pp. 8-23 Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-24 Solar Energy Investigation 4, Parts 1-3, pp. 8-28 Levers and Pulleys Investigation 2, Parts 1-4, pp. 8-25 Mixtures and Solutions Investigation 4, Parts 1-3, pp. 8-24 Water Planet Investigation 1, Part 1, pp. 50-58 Living Systems Investigation 2, Part 1, pp. 85-98</p>
<p>S.RS.05.16 Design solutions to problems using technology.</p>	<p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 8-15 Mixtures and Solutions Investigation 2, Part 2, pp. 16-20 Variables Investigation 3, Parts 1-3, pp. 8-23 Solar Energy Investigation 4, Parts 2-3, pp. 20-28</p>
<p>S.RS.05.17 Describe the effect humans and other organisms have on the balance in the natural world.</p>	<p>Environments Science Stories, pp. 33-37, 43-46 Landforms</p>

<p>S.RS.05.19 Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.</p>	<p>Science Stories, pp. 13-14, 43-44 Water Planet Science Resources, pp. 65-66</p> <p>Mixtures and Solutions Science Stories, pp. 5, 9-10, 33, 35-36 Variables Science Stories, pp. 4-6, 12-14, 21-28 Food and Nutrition Science Stories, pp. 24-26 Models and Designs Science Stories, pp. 6-10, 35 Water Planet Science Resources, pp. 15, 18-19</p>
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FORCES AND MOTION

P.FM.M.2 Force Interactions- Some forces between objects act when the objects are in direct contact (touching), such as friction and air resistance, or when they are not in direct contact (not touching), such as magnetic force, electrical force, and gravitational force.

EXPECTATION	FOSS
<p>P.FM.05.21 Distinguish between contact forces and non-contact forces.</p>	<p>FOSS provides the opportunity to address these expectation. See examples below: Models and Designs Investigation 2, Parts 1-3, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Science Stories, pp. 37-43, 48-55 Variables Investigation 1, Parts 1-3, pp.8-27 Investigation 2, Parts 1-3, pp. 8-23 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 15-17 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Parts 1-2, pp. 8-24 Water Planet Investigation 1, Part 2, pp. 59-66 Science Resources, pp. 16-17</p>
<p>P.FM.05.22 Demonstrate contact and non-contact forces to change the motion of an object.</p>	<p>Models and Designs Investigation 2, Parts 1-3, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Variables Investigation 1, Parts 1-3, pp.8-27 Investigation 2, Parts 1-3, pp. 8-23 Investigation 3, Parts 1-3, pp. 8-23 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Parts 1-2, pp. 8-24 Water Planet Investigation 1, Part 2, pp. 59-66</p>

FORCES AND MOTION

P.FM.M.3 Force- Forces have a magnitude and direction. Forces can be added. The net force on an object is the sum of all of the forces acting on the object. The speed and/or direction of motion of an object changes when a non-zero net force is applied to it. A balanced force on an object does not change the motion of the object (the object either remains at rest or continues to move at a constant speed in a straight line).

EXPECTATION	FOSS
<p>P.FM.05.31 Describe what happens when two forces act on an object in the same or opposing directions.</p>	<p>FOSS provides the opportunity to address this expectation. See examples below: Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Science Stories, pp. 37-41, 48-51 Variables Investigation 1, Parts 1-3, pp.8-27 Investigation 2, Parts 1-3, pp. 8-23 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 15-17 Levers and Pulleys Investigation 3, Parts 1-2, pp. 8-24</p>
<p>P.FM.05.32 Describe how constant motion is the result of balanced (zero net) forces.</p>	
<p>P.FM.05.33 Describe how changes in the motion of objects are caused by a non-zero net (unbalanced) force.</p>	<p>FOSS provides the opportunity to address this expectation. See examples below: Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Science Stories, pp. 37-41, 48-51 Variables Investigation 1, Parts 1-3, pp.8-27 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 15-17</p>
<p>P.FM.05.34 Relate the size of change in motion to the strength of unbalanced forces and the mass of the object.</p>	<p>FOSS provides the opportunity to address this expectation. See examples below: Models and Designs Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Science Stories, pp. 37-41, 48-51 Variables Investigation 1, Parts 1-3, pp.8-27 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 15-17</p>

FORCES AND MOTION

P.FM.M.4 Speed- Motion can be described by a change in position relative to a point of reference. The motion of an object can be described by its speed and the direction it is moving. The position and speed of an object can be measured and graphed as a function of time.

EXPECTATION	FOSS
<p>P.FM.05.41 Explain the motion of an object relative to its point of reference.</p>	<p>FOSS provides the opportunity to address this expectation. See examples below: 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>

<p>P.FM.05.42 Describe the motion of an object in terms of distance, time and direction, as the object moves, and in relationship to other objects.</p> <p>P.FM.05.43 Illustrate how motion can be measured and represented on a graph.</p>	<p>Variables Investigation 1, Parts 1-3, pp.8-27 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-3, pp. 8-23</p> <p>Levers and Pulleys Investigation 3, Parts 1-2, pp. 8-20 Investigation 4, Parts 1-2, pp. 8-20</p> <p>FOSS provides the opportunity to address this expectation. See examples 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 1, Parts 1-3, pp.8-27 Investigation 3, Parts 1-3, pp. 8-23</p> <p>Levers and Pulleys Investigation 3, Parts 1-2, pp. 8-20 Investigation 4, Parts 1-2, pp. 8-20</p> <p>Models and Designs Investigation 3, Math Extension, p. 24</p> <p>Variables Investigation 1, Part 3, pp.23-27 Investigation 3, Part 4, pp. 24-27</p>
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ORGANIZATION OF LIVING THINGS

L.OL.M.4 Animal Systems- Multicellular organisms may have specialized systems that perform functions which serve the needs of the organism.

EXPECTATION	FOSS
<p>L.OL.05.41 Identify the general purpose of selected animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive).</p> <p>L.OL.05.42 Explain how animal systems (digestive, circulatory, respiratory, skeletal, muscular, nervous, excretory, and reproductive) work together to perform selected activities.</p>	<p>Food and Nutrition Science Stories, pp. 6-8, 44-50</p> <p>Living Systems Investigation 1, Parts 1-3, pp. 51-70 Science Resources, pp. 2-13</p> <p>Food and Nutrition Science Stories, pp. 44-50</p> <p>Living Systems Investigation 1, Parts 1-2, pp. 51-65 Science Resources, pp. 2-13</p>

HEREDITY

L.HE.M.1 Inherited and Acquired Traits - The characteristics of organisms are influenced by heredity and environment. For some characteristics, inheritance is more important; for other characteristics, interactions with the environment are more important.

EXPECTATION	FOSS
<p>L.HE.05.11 Explain that the traits of an individual are influenced by both the environment and the genetics of the individual.</p> <p>L.HE.05.12 Distinguish between inherited and acquired traits.</p>	<p>See grade 6 module <u>Populations and Ecosystems</u>.</p> <p>See grade 6 module <u>Populations and Ecosystems</u>.</p>

EVOLUTION

L.EV.M.1 Species Adaptation and Survival- Species with certain traits are more likely than others to survive and have offspring in particular environments. When an environment changes, the advantage or disadvantage of the species' characteristics can change. Extinction of a species occurs when the environment changes and the characteristics of a species are insufficient to allow survival.

EXPECTATION	FOSS
L.EV.05.11 Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment.	Environments Science Stories, pp. 3-4, 6, 11, 15-17, 22
L.EV.05.12 Describe the physical characteristics (traits) of organisms that help them survive in their environment.	Environments Science Stories, pp. 5-6, 11-22, 31, 54
L.EV.05.13 Describe how fossils provide evidence about how living things and environmental conditions have changed.	See grade module Earth History .
L.EV.05.14 Analyze the relationship of environmental change and catastrophic events (for example: volcanic eruption, floods, asteroid impacts, tsunami) to species extinction.	See grade 6 module Planetary Science .

EVOLUTION

L.EV.M.2 Relationships Among Organisms- Similarities among organisms are found in anatomical features, which can be used to infer the degree of relatedness among organisms. In classifying organisms, biologists consider details of internal and external structures to be more important than behavior or general appearance.

EXPECTATION	FOSS
L.EV.05.21 Relate degree of similarity in anatomical features to the classification of contemporary organisms.	

EARTH SYSTEMS

E.ES.M.6 Seasons- Seasons result from annual variations in the intensity of sunlight and length of day due to the tilt of the axis of the Earth relative to the plane of its yearly orbit around the sun.

EXPECTATION	FOSS
E.ES.05.61 Demonstrate using a model, seasons as the result of variations in the intensity of sunlight caused by the tilt of the Earth on its axis, and revolution around the sun.	See grade 6 module Weather and Water .
E.ES.05.62 Explain how the revolution of the Earth around the sun defines a year.	See grade 6 module Planetary Science .

EARTH IN SPACE AND TIME

E.ST.M.1 Solar System- The sun is the central and largest body in our solar system. Earth is the third planet from the sun in a system that includes other planets and their moons, as well as smaller objects, such as asteroids and comets.

EXPECTATION	FOSS
E.ST.05.11 Design a model that describes the position and relationship of the planets and other objects (comets and asteroids) to the	Solar Energy Science Stories, pp. 40-44 Water Planet

sun.	Investigation 1, Part 1, pp. 50-58 See grade 6 module <u>Planetary Science</u> .
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EARTH IN SPACE AND TIME

E.ST.M.2 Solar System Motion- Gravity is the force that keeps most objects in the solar system in regular and predictable motion.

EXPECTATION	FOSS
E.ST.05.21 Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.	Water Planet Investigation 1, Part 2, pp. 59-66 Science Resources, pp. 16-17 See grade 6 module <u>Weather and Water</u> .
E.ST.05.22 Explain moon phases as they relate to the position of the moon in its orbit around the Earth, resulting in the amount of observable reflected light.	See grade 6 module <u>Planetary Science</u> .
E.ST.05.23 Recognize that nighttime objects (stars and constellations) and the sun appear to move because the Earth rotates on its axis and orbits the sun.	
E.ST.05.24 Explain lunar and solar eclipses based on the relative positions of the Earth, moon, and sun, and the orbit of the moon.	
E.ST.05.25 Explain the tides of the oceans as they relate to the gravitational pull and orbit of the moon.	

GRADE SIX

INQUIRY PROCESS

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
<p>S.IP.06.11 Generate scientific questions based on observations, investigations, and research.</p>	<p>FOSS investigations are driven by questions. Investigations encourage student questions. See for example:</p> <p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24</p> <p>Landforms Investigation 2, Parts 1-2, pp. 8-22</p> <p>Variables Investigation 4, Parts 1-3, pp. 8-23</p> <p>Living Systems Investigation 3, Part 2, pp. 126-135</p> <p>Diversity of Life Investigation 6, Parts 1-3, pp. 186-202</p> <p>Populations and Ecosystems Investigation 5, Parts 1-2, pp. 142-155</p> <p>Human Brain and Senses Investigation 3, Parts, 1-2, pp. 92-105</p>
<p>S.IP.06.12 Design and conduct scientific investigations.</p>	<p>Variables Investigation 3, Parts 2-3, pp. 14-23</p> <p>Landforms Investigation 3, Parts 1-3, pp. 8-24</p> <p>Environments Investigation 2, Parts 2-4, pp. 16-30</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p> <p>Planetary Science Investigation 5, Parts 2-3, pp.158-167</p> <p>Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312</p> <p>Force and Motion Investigation 8, Parts 1-2, pp. 284-301</p>
<p>S.IP.06.13 Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, models, sieves, microscopes) appropriate to scientific investigations.</p>	<p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28</p> <p>Environments Investigation 3, Parts 2-3, pp. 14-22</p> <p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 3, Part 2, pp. 126-135</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>Electronics Investigation 3, Parts 1-3, pp. 119-132</p> <p>Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p>

<p>S.IP.06.14 Use metric measurement devices in an investigation.</p>	<p>Models and Designs Investigation 3, Parts 2-3, pp. 13-23 Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 3, Part 1, pp. 125-135 Weather and Water Investigation 5, Part 1, pp. 152-162 Force and Motion Investigation 4, Part 2, pp. 146-151 Chemical Interactions Investigation 7, Parts 2-4, pp. 210-228</p>
<p>S.IP.06.15 Construct charts and graphs from data and observations.</p>	<p>Variables Investigation 1, Part 2, pp. 16-24 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Water Planet Investigation 3, Part 1, pp. 125-135 Force and Motion Investigation 4, Parts 1-3, pp. 130-155 Electronics Investigation 8, Parts 2-3,, pp. 256-264 Weather and Water Investigation 4, Part 1, pp. 121-130</p>
<p>S.IP.06.16 Identify patterns in data.</p>	<p>Variables Investigation 1, Parts 2-3, pp. 16-27 Landforms Investigation 2, Parts 1-2, pp. 8-22 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 2, Parts 2-3, pp. 125-135 Living Systems Investigation 2, Part 2, pp. 99-106 Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Weather and Water Investigation 4, Part 1, pp. 121-130 Human Brain and Senses Investigation 7, Parts 1-3, pp. 210-230</p>

INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.06.11 Analyze information from data tables and graphs to answer scientific questions.</p>	<p>Variables Investigation 1, Part 2, pp. 16-24 Mixtures and Solutions Investigation 1, Part 3, pp. 21-24 Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Water Planet</p>

<p>S.IA.06.12 Evaluate data, claims, and personal knowledge through collaborative science discourse.</p>	<p>Investigation 3, Part 1, pp. 125-135 Force and Motion Investigation 4, Parts 1-3, pp. 130-155 Electronics Investigation 8, Parts 2-3, pp. 256-264 Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example: Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 2, Parts 2-4, pp. 16-30 Living Systems Investigation 3, Part 3, pp. 136-141 Populations and Ecosystems Investigation 6, Parts 1-2, pp. 179-190 Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171 Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p>
<p>S.IA.06.13 Communicate and defend findings of observations and investigations using evidence.</p>	<p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example: Environments Investigation 5, Part 2, pp. 14-18 Landforms Investigation 2, Parts 1-2, pp. 8-22 Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 3, Part 2, pp. 126-135 Weather and Water Investigation 4, Parts 1-2, pp. 121-139 Electronics Investigation 8, Parts 2-3, pp. 256-264 Diversity of Life Investigation 8, Part 2, pp. 244-252</p>
<p>S.IA.06.14 Draw conclusions from sets of data from multiple trials of a scientific investigation.</p>	<p>FOSS investigations involve students sharing results of observations and data and drawing conclusions. The separate group investigations represent repeated trials. See for example: Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 2, Parts 2-4, pp. 16-30 Water Planet Investigation 2, Parts 2-3, pp. 86-100 Planetary Science</p>

<p>S.IA.06.15 Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.</p>	<p>Investigation 5, Parts 2-3, pp. 158-167 Weather and Water Investigation 5, Parts 1-2, pp. 152-168 Force and Motion Investigation 6, Parts 2-4, pp. 224-225</p> <p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also:</p> <p>Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 2, Parts 2-4, pp. 16-30 Living Systems Investigation 2, Part 2, pp. 99-106 Force and Motion Investigation 7, Parts 1-3, pp. 256-272 Diversity of Life Investigation 3, Part 3, pp. 116-122 Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171</p>
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REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
<p>S.RS.06.11 Evaluate the strengths and weaknesses of claims, arguments, and data.</p>	<p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example:</p> <p>Variables Investigation 3, Parts 2-3, pp. 14-23 Landforms Investigation 3, Parts 1-3, pp. 8-24 Environments Investigation 2, Parts 2-4, pp. 16-30 Water Planet Investigation 2, Part 3, pp. 93-100 Living Systems Investigation 3, Part 3, pp. 136-141 Populations and Ecosystems Investigation 6, Parts 1-2, pp. 179-190 Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171 Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p>
<p>S.RS.06.12 Describe limitations in personal and scientific knowledge.</p>	<p>FOSS investigations provide the opportunity to address this expectation as they arise in the selections in the Science Stories also make reference to this expectation. See for example:</p> <p>Environments Science Stories, pp. 23-26 Solar Energy Science Stories, pp. 32-33</p>

<p>S.RS.06.13 Identify the need for evidence in making scientific decisions.</p>	<p>Food and Nutrition Science Stories, pp. 34-36</p> <p>Planetary Science Resources , pp. 59-62</p> <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Force and Motion Resources, pp. 50-52</p> <p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Environments Investigation 6, Parts 1-2, pp. 8-17</p> <p>Mixtures and Solutions Investigation 1, Part 3, pp. 21-24</p> <p>Solar Energy Investigation 3, Parts 1-2, pp. 8-23</p> <p>Water Planet Investigation 2, Part 2, pp. 86-92</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p>
<p>S.RS.06.14 Evaluate scientific explanations based on current evidence and scientific principles.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Levers and Pulleys Investigation 4, Parts 3-4, pp. 18-25</p> <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p> <p>Water Planet Investigation 2, Parts 1-3, pp. 80-100</p> <p>Planetary Science Investigation 5, Parts 6-7, pp. 176-184</p> <p>Populations and Ecosystems Investigation 9, Part 3, pp. 274-286</p> <p>Chemical Interactions Investigation 7, Parts 3-4, pp. 215-228</p>
<p>S.RS.06.15 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Models and Designs Investigation 3, Parts 1-3, pp. 8-23</p> <p>Variables Investigation 2, Parts 1-3, pp. 8-23</p> <p>Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-24</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Earth History Investigation 4, Part 3, pp. 138-146</p> <p>Planetary Science</p>

<p>S.RS.06.16 Design solutions to problems using technology.</p>	<p>Investigation 10, Parts 2-3, pp. 318-324 Populations and Ecosystems Investigation 7, pp. 210-215</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 8-15</p> <p>Variables Investigation 3, Parts 1-3, pp. 8-23</p> <p>Solar Energy Investigation 4, Parts 2-3, pp. 20-28</p> <p>Force and Motion Investigation 6, Parts 2-4, pp. 229-245</p> <p>Chemical Interactions Investigation 7, Parts 2-4, pp. 210-228</p> <p>Electronics Investigation 3, Parts 2-3, pp. 124-127</p>
<p>S.RS.06.17 Describe the effect humans and other organisms have on the balance of the natural world.</p>	<p>Environments Science Stories, pp. 33-37, 43-46</p> <p>Landforms Science Stories, pp. 13-14, 43-44</p> <p>Water Planet Science Resources, pp. 65-66</p> <p>Populations and Ecosystems Investigation 7, pp. 210-215</p>
<p>S.RS.06.18 Describe what science and technology can and cannot reasonably contribute to society.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Models and Designs Science Stories, pp. 35-36, 45-47</p> <p>Solar Energy Science Stories, pp. 29-33, 35-39</p> <p>Food and Nutrition Science Stories, pp. 19, 27-29</p> <p>Planetary Science Resources, pp. 90-97</p> <p>Electronics Resources, pp. 18-21</p> <p>Chemical Interactions Resources, pp. 80-83</p>
<p>S.RS.06.19 Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.</p>	<p>Mixtures and Solutions Science Stories, pp. 5, 9-10, 33, 35-36</p> <p>Variables Science Stories, pp. 4-6, 12-14, 21-28</p> <p>Models and Designs Science Stories, pp. 6-10, 35</p> <p>Water Planet Science Resources, pp. 15, 18-19</p> <p>Force and Motion Resources, pp. 50-52 Video, Galileo: On the Shoulders of Giants</p> <p>Populations and Ecosystems Resources, pp. 46-55, 60-61</p> <p>Chemical Interactions Resources, pp. 5, 7-8, 69-72, 82-82</p>

ENERGY

P.EN.M.1 Kinetic and Potential Energy- Objects and substances in motion have kinetic energy. Objects and substances may have potential energy due to their relative positions in a system. Gravitational, elastic, and chemical energy are all forms of potential energy.

EXPECTATION	FOSS
<p>P.EN.06.11 Identify kinetic or potential energy in everyday situations (for example: stretched rubber band, objects in motion, ball on a hill, food energy).</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15 Science Stories, pp. 37-43</p> <p>Variables Investigation 1, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-3, pp. 8-23</p> <p>Force and Motion Investigation 1, Part 1, pp. 41-56 Investigation 2, Part 3, pp. 89-99</p> <p>Populations and Ecosystems Investigation 5, Part 1, pp. 142-150</p>
<p>P.EN.06.12 Demonstrate the transformation between potential and kinetic energy in simple mechanical systems (for example: roller coasters, pendulums).</p>	<p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-2, pp. 6-15</p> <p>Variables Investigation 1, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-3, pp. 8-23 Investigation 4, Parts 1-3, pp. 8-23</p> <p>Force and Motion Investigation 1, Part 1, pp. 41-56 Investigation 2, Part 3, pp. 89-99</p> <p>Populations and Ecosystems Investigation 5, Part 1, pp. 142-150</p>

ENERGY

P.EN.M.4 Energy Transfer- Energy is transferred from a source to a receiver by radiation, conduction, and convection. When energy is transferred from a source to a receiver, the quantity of energy before the transfer is equal to the quantity of energy after the transfer.

EXPECTATION	FOSS
<p>P.EN.06.41 Explain how different forms of energy can be transferred from one place to another by radiation, conduction, or convection.</p>	<p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Investigation 3, Parts 1-2, pp. 8-23 Science Stories, pp. 16-17, 22-24, 29-32</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 9-21</p> <p>Water Planet Investigation 3, Parts 1-2, pp. 125-144 Science Resources, pp. 46-51, 59</p> <p>Weather and Water Investigation 4, Part 2, pp. 131-139 Investigation 5, Parts 2-3, pp. 163-174 Resources, pp. 32-33, 53-54 Video: Convection Chamber</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Resources, pp. 1-2</p>

<p>P.EN.06.42 Illustrate how energy can be transferred while no energy is lost or gained in the transfer.</p>	<p>Chemical Interactions Investigation 4, Parts 2-3, pp. 130-141 Resources, pp. 28-29, 38-41</p> <p>FOSS investigations provide the opportunity to address this expectation. See below: Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 5, Parts 1-3, pp. 153-171 Resources, pp. 32-33,38-41 CD, Particles in Solid, Liquid and Gas</p>
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CHANGES IN MATTER

P.CM.M.1 Changes in State- Matter changing from state to state can be explained by using models which show that matter is composed of tiny particles in motion. When changes of state occur, the atoms and/or molecules are not changed in structure. When the changes in state occur, mass is conserved because matter is not created or destroyed.

EXPECTATION	FOSS
<p>P.CM.06.11 Describe and illustrate changes in state, in terms of the arrangement and relative motion of the atoms or molecules.</p>	<p>Weather and Water Resources, pp. 22-24 CD, Matter and Energy: Molecules in Solids, Liquids and Gases Chemical Interactions Investigation 7, Parts 1-4, pp. 204-228 Resources, pp. 16-27, 43-48 CD, Particles in Solid, Liquid and Gas</p>
<p>P.CM.06.12 Explain how mass is conserved as it changes from state to state in a closed system.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See below: Mixtures and Solutions Investigation 1, Part 2, pp. 16-20 Chemical Interactions Resources, pp. 16-22, 24-25</p>

ORGANIZATION OF LIVING THINGS

L.OL.M.5 Producers, Consumers, and Decomposers- All animals, including humans, are consumers that meet their energy by eating other organisms or their products. Consumers break down the structures of the organisms they eat to make the materials they need to grow and function. Decomposers, including bacteria and fungi, use dead organisms or their products to meet their energy needs.

EXPECTATION	FOSS
<p>L.OL.06.51 Classify organisms (producers, consumers, and decomposers) based on their source of energy for growth and development.</p>	<p>Environments Science Stories, pp. 38-41 Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Investigation 5, Parts 2, 4, pp. 151-155, 161-169 Resources, pp. 14-21 CD, Mono Lake Food Web</p>
<p>L.OL.06.52 Distinguish between the ways in which consumers and decomposers obtain energy.</p>	<p>Environments Science Stories, pp. 38-41 Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Resources, pp. 17-21 Diversity of Life Resources, pp. 67-68</p>

ECOSYSTEMS

L.EC.M.1 Interactions of Organisms- Organisms of one species form a population. Populations of different organisms interact and form communities. Living communities and nonliving factors that interact with them form ecosystems.

EXPECTATION	FOSS
L.EC.06.11 List examples of populations, communities, and ecosystems including the Great Lakes region.	Environments Science Stories, pp. 27-35, 43-45 Populations and Ecosystems Investigation 2, Part 2, pp. 76-79 Investigation 4, Parts 1-2, pp. 119-129 Investigation 7, pp. 210-215 Resources, pp. 25-41 Video: Among the Wild Chimpanzees

ECOSYSTEMS

L.EC.M.2 Relationships of Organisms- Two types of organisms may interact with one another in several ways: They may be in a producer/consumer, predator/ prey, or parasite/host relationship. Some organisms may scavenge or decompose another. Relationships may be competitive or mutually beneficial. Some species have become so adapted to each other that neither could survive without the other.

EXPECTATION	FOSS
L.EC.06.21 Describe common patterns of relationships between and among populations (competition, parasitism, symbiosis, predator/prey).	Environments Science Stories, pp. 38-41, 53-55 Populations and Ecosystems Investigation 5, Part 4, pp. 161-169 Resources, pp. 19-20, 27-28 Diversity of Life Resources, pp. 42, 48-49
L.EC.06.22 Explain how two populations of organisms can be mutually beneficial and how that can lead to interdependency.	Environments Science Stories, pp. 53-55
L.EC.06.23 Predict how changes in one population might affect other populations based upon their relationships in the food web.	FOSS investigations provide the opportunity to address this expectation. See below: Environments Science Stories, pp. 38-41 Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Investigation 5, Part 4, pp. 161-169 Resources, pp. 19-29 CD, Mono Lake Food Web

ECOSYSTEMS

L.EC.M.3 Biotic and Abiotic Factors- The number of organisms and populations an ecosystem can support depends on the biotic (living) resources available and abiotic (nonliving) factors, such as quality of light and water, range of temperatures and soil composition.

EXPECTATION	FOSS
L.EC.06.31 Identify the living (biotic) and nonliving (abiotic) components of an ecosystem.	Environments Science Stories, pp. 38-41, 43-45 Populations and Ecosystems Investigation 1, Part 2, pp. 47-54 Investigation 6, Parts 2-3, pp. 187-197 Resources, pp. 17-24
L.EC.06.32 Identify the factors in an ecosystem that influence changes in population size.	Environments Investigation 3, Parts 1-3, pp. 8-22

	Investigation 6, Parts 1-2, pp. 8-17 Science Stories, pp. 38, 43-45 Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Investigation 6, Parts 2-3, pp. 187-197 Resources, pp. 22-29
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ECOSYSTEMS

L.EC.M.4 Environmental Impact of Organisms- All organisms (including humans) cause change in the environment where they live. Some of the changes are harmful to the organism or other organisms, whereas others are helpful.

EXPECTATION	FOSS
L.EC.06.41 Describe how human beings are part of the ecosystem of the Earth and that human activity can purposefully, or accidentally, alter the balance in ecosystems.	Environments Science Stories, pp. 38, 43-45 Populations and Ecosystems Investigation 7, pp. 210-215 Resources, pp. 28-29, 31-41
L.EC.06.42 Predict possible consequences of overpopulation of organisms, including humans, (for example: species extinction, resource depletion, climate change, pollution).	

SOLID EARTH

E.SE.M.1 Soil- Soils consist of weathered rocks and decomposed organic materials from dead plants, animals, and bacteria. Soils are often found in layers with each having a different chemical composition and texture.

EXPECTATION	FOSS
E.SE.06.11 Explain how physical and chemical weathering lead to erosion and the formation of soils and sediments.	Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-24 Science Stories, pp. 25-32 Earth History Investigation 4, Parts 3-4, pp. 138-149 CD, Earth Processes Video: Weathering and Erosion Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-24 Science Stories, pp. 25-32 Earth History Resources, p. 103
E.SE.06.12 Explain how waves, wind, water, and glacier movement, shape and reshape the land surface of the Earth by eroding rock in some areas and depositing sediments in other areas.	
E.SE.06.13 Describe how soil is a mixture, made up of weather eroded rock and decomposed organic material.	
E.SE.06.14 Compare different soil samples based on particle size and texture.	

SOLID EARTH

E.SE.M.4 Rock Formation- Rocks and rock formations bear evidence of the minerals, materials, temperature/pressure conditions, and forces that created them.

EXPECTATION	FOSS
E.SE.06.41 Compare and contrast the formation of rock types (igneous, metamorphic,	Earth History Investigation 4, Parts 4-5, pp. 150-162

and sedimentary) and demonstrate the similarities and differences using the rock cycle model.	Investigation 8, Parts 1-2, pp. 254-265 Resources, pp. 93-97 CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks
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SOLID EARTH

E.SE.M.5 Plate Tectonics- The lithospheric plates of the Earth constantly move, resulting in major geological events, such as earthquakes, volcanic eruptions, and mountain building.

EXPECTATION	FOSS
E.SE.06.51 Explain plate tectonic movement and how the lithospheric plates move centimeters each year.	Landforms Science Stories, pp. 22-25 Earth History Resources, pp. 100-102
E.SE.06.52 Demonstrate how major geological events (earthquakes, volcanic eruptions, mountain building) result from these plate motions.	Landforms Science Stories, pp. 22-25 Earth History Resources, pp. 100-102
E.SE.06.53 Describe layers of the Earth as a lithosphere (crust and upper mantle), convecting mantle, and dense metallic core.	Landforms Science Stories, p. 22 Earth History Resources, pp. 100-103

SOLID EARTH

E.SE.M.6 Magnetic Field of Earth- Earth as a whole has a magnetic field that is detectable at the surface with a compass.

EXPECTATION	FOSS
E.SE.06.61 Describe the Earth as a magnet and compare the magnetic properties of the Earth to that of a natural or man-made magnet.	
E.SE.06.62 Explain how a compass works using the magnetic field of the Earth, and how a compass is used for navigation on land and sea.	Landforms Science Stories, p.3

EARTH IN SPACE AND TIME

E.ST.M.3 Fossils- Fossils provide important evidence of how life and environmental conditions have changed in a given location.

EXPECTATION	FOSS
E.ST.06.31 Explain how rocks and fossils are used to understand the age and geological history of the earth (timelines and relative dating, rock layers).	Earth History Investigation 5, Part 4, pp. 88-193 Investigation 6, Part 4, pp. 220-224 Investigation 7, Part 1, pp. 234-242 Resources, pp. 73-79, 81-86, 103-105 CD, Earth Processes

EARTH IN SPACE AND TIME

E.ST.M.4 Geologic Time- Earth processes seen today (erosion, mountain building, and glacier movement) make possible the measurement of geologic time through methods such as observing rock sequences and using fossils to correlate the sequences at various locations.

EXPECTATION	FOSS
E.ST.06.41 Explain how Earth processes (erosion, mountain building, and glacier	Earth History Investigation 4, Part 5, pp. 188-193

<p>movement) are used for the measurement of geologic time through observing rock layers.</p> <p>E.ST.06.42 Describe how fossils provide important evidence of how life and environmental conditions have changed.</p>	<p>Resources, pp. 73-78</p> <p>Earth History Investigation 6, Parts 2, 4, pp. 209-214, 220-224 Investigation 7, Part 1, pp. 234-242 Resources, pp. 81-87 CD, Time Room</p>
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GRADE SEVEN

INQUIRY PROCESS

S.IP.M.1 Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation.

EXPECTATION	FOSS
<p>S.IP.07.11 Generate scientific questions based on observations, investigations, and research.</p>	<p>FOSS investigations are driven by questions. Investigations encourage student questions. See for example:</p> <p>Earth History Investigation 4, Parts 1-3, pp. 127-146</p> <p>Electronics Investigation 1, Parts 1-4, pp. 55-75</p> <p>Chemical Interactions Investigation 8, Parts 1-3, pp. 248-268</p> <p>Diversity of Life Investigation 6, Parts 1-3, pp. 186-202</p> <p>Populations and Ecosystems Investigation 5, Parts 1-2, pp. 142-155</p> <p>Human Brain and Senses Investigation 3, Parts, 1-2, pp. 92-105</p>
<p>S.IP.07.12 Design and conduct scientific investigations.</p>	<p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Human Brain and Senses Investigation 7, Parts 1-2, pp. 210-235</p> <p>Diversity of Life Investigation 8, Part 2, pp. 244-252</p> <p>Planetary Science Investigation 5, Parts 2-3, pp.158-167</p> <p>Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312</p> <p>Force and Motion Investigation 8, Parts 1-2, pp. 284-301</p>
<p>S.IP.07.13 Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens, thermometer, models, sieves, microscopes, hot plates, pH meters) appropriate to scientific investigations.</p>	<p>Diversity of Life Investigation 2, Parts 1-3, pp. 72-91</p> <p>Chemical Interaction Investigation 5, Part 3, pp. 165-171</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>Electronics Investigation 3, Parts 1-3, pp. 119-132</p> <p>Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p>
<p>S.IP.07.14 Use metric measurement devices in an investigation.</p>	<p>Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p> <p>Earth History Investigation 6, Part 2, pp. 215-219</p> <p>Populations and Ecosystems Investigation 5, Part 1, pp. 142-150</p> <p>Weather and Water Investigation 5, Part 1, pp. 152-162</p> <p>Force and Motion Investigation 4, Part 2, pp. 146-151</p>

<p>S.IP.07.15 Construct charts and graphs from data and observations.</p> <p>S.IP.07.16 Identify patterns in data.</p>	<p>Chemical Interactions Investigation 7, Parts 2-4, pp. 210-228</p> <p>Diversity of Life Investigation 10, Part 2, pp. 310-316</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Human Brain and Senses Investigation 7, Part 2, pp. 219-225</p> <p>Force and Motion Investigation 4, Parts 1-3, pp. 130-155</p> <p>Electronics Investigation 8, Parts 2-3,, pp. 256-264</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Earth History Investigation 4, Part 3, pp. 138-146</p> <p>Diversity of Life Investigation 10, Part 2, pp. 310-316</p> <p>Force and Motion Investigation 3, Part 2, pp. 119-123</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Human Brain and Senses Investigation 7, Parts 1-3, pp. 210-230</p>
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INQUIRY ANALYSIS AND COMMUNICATION

SIA.E.1 Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.

EXPECTATION	FOSS
<p>S.IA.07.11 Analyze information from data tables and graphs to answer scientific questions.</p> <p>S.IA.07.12 Evaluate data, claims, and personal knowledge through collaborative science discourse.</p>	<p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Diversity of Life Investigation 10, Part 2, pp. 310-316</p> <p>Human Brian and Senses Investigation 7, Part 2, pp. 219-225</p> <p>Force and Motion Investigation 4, Parts 1-3, pp. 130-155</p> <p>Electronics Investigation 8, Parts 2-3, pp. 256-264</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example:</p> <p>Earth History Investigation 4, Part 3, pp. 138-146</p> <p>Diversity of life Investigation 9, Part 2, pp. 278-285</p> <p>Force and Motion Investigation 8, Part 1, pp. 284-293</p> <p>Populations and Ecosystems Investigation 6, Parts 1-2, pp. 179-190</p> <p>Chemical Interactions</p>

<p>S.IA.17.13 Communicate and defend findings of observations and investigations.</p>	<p>Investigation 5, Parts 1-3, pp. 153-171 Planetary Science Investigation 8, Parts 3-4, pp. 26-270</p> <p>FOSS provides the opportunity to address this expectation through student discussions of investigations. See for example: Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Chemical Interactions Investigation 7, Parts 2-4, pp. 210-228 Force and Motion Investigation 2, Part 3, pp. 89-99 Weather and Water Investigation 4, Parts 1-2, pp. 121-139 Electronics Investigation 8, Parts 2-3, pp. 256-264 Diversity of Life Investigation 8, Part 2, pp. 244-252</p>
<p>S.IA.07.14 Draw conclusions from sets of data from multiple trials of a scientific investigation to draw conclusions.</p>	<p>FOSS investigations involve students sharing results of observations and data and drawing conclusions. The separate group investigations represent repeated trials. See for example: Human Brain and Senses Investigation 7, Part 2, pp. 219-225 Electronics Investigation 8, Parts 2-3, pp. 256-264 Populations and Ecosystems Investigation 5, Part 1, pp. 143-150 Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Weather and Water Investigation 5, Parts 1-2, pp. 152-168 Force and Motion Investigation 6, Parts 2-4, pp. 224-225</p>
<p>S.IA.07.15 Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.</p>	<p>Besides the FOSS investigations, students use FOSS Science Stories and the FOSS Web for information. Additional resources are listed in each module as well. See also: Populations and Ecosystems Investigation 7, pp. 210-215 Resources, pp. 31-41 Force and Motion Investigation 7, Parts 1-3, pp. 256-272 Diversity of Life Investigation 3, Part 3, pp. 116-122 Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171</p>

REFLECTION AND SOCIAL IMPLICATIONS

S.RS.E.1 Reflecting on knowledge is the application of scientific knowledge to new and different situations. Reflecting on knowledge requires careful analysis of evidence that guides decision making and the application of science throughout history and within society.

EXPECTATION	FOSS
S.RS.07.11 Evaluate the strengths and weaknesses of claims, arguments, and data.	FOSS provides the opportunity to address this expectation through student discussions of

<p>S.RS.07.12 Describe limitations in personal and scientific knowledge.</p>	<p>investigations. See for example: Earth History Investigation 4, Part 3, pp. 138-146 Diversity of Life Investigation 9, Part 2, pp. 278-285 Force and Motion Investigation 8, Part 1, pp. 284-293 Populations and Ecosystems Investigation 6, Parts 1-2, pp. 179-190 Chemical Interactions Investigation 5, Parts 1-3, pp. 153-171 Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p>
<p>S.RS.07.13 Identify the need for evidence in making scientific decisions.</p>	<p>FOSS investigations provide the opportunity to address this expectation as they arise in the selections in the Science Stories also make reference to this expectation. See for example: Planetary Science Resources , pp. 59-62 Populations and Ecosystems Resources, pp. 46-55 Force and Motion Resources, pp. 50-52</p>
<p>S.RS.07.14 Evaluate scientific explanations based on current evidence and scientific principles.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example: Diversity of Life Investigation 9, Part 2, pp. 278-285 Human Brain and Senses Investigation 7, Part 2, pp. 219-225 Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Weather and Water Investigation 4, Part 1, pp. 121-130 Force and Motion Investigation 2, Part 3, pp. 89-99</p>
<p>S.RS.07.15 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>FOSS investigations provide the opportunity to address this expectation. See for example: Force and Motion Investigation 7, Parts 1-2, pp. 256-266 Electronics Investigation 1, Parts 3-4, pp. 66-75 Planetary Science Investigation 5, Parts 6-7, pp. 176-184 Populations and Ecosystems Investigation 9, Part 3, pp. 274-286 Chemical Interactions Investigation 7, Parts 3-4, pp. 215-228</p>
<p>S.RS.07.15 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.</p>	<p>Weather and Water Investigation 3, Parts 1-2, p. 93-102 Human Brain and Senses Investigation 9, Parts 1-2, pp. 264-275 Earth History Investigation 4, Part 3, pp. 138-146 Planetary Science Investigation 10, Parts 2-3, pp. 318-324</p>

<p>S.RS.07.16 Design solutions to problems using technology.</p> <p>S.RS.07.17 Describe the effect humans and other organisms have on the balance of the natural world.</p> <p>S.RS.07.18 Describe what science and technology can and cannot reasonably contribute to society.</p> <p>S.RS.07.19 Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.</p>	<p>Populations and Ecosystems Investigation 7, pp. 210-215</p> <p>Force and Motion Investigation 6, Parts 2-4, pp. 229-245</p> <p>Chemical Interactions Investigation 7, Parts 2-4, pp. 210-228</p> <p>Electronics Investigation 3, Parts 2-3, pp. 124-127</p> <p>Populations and Ecosystems Investigation 7, pp. 210-215</p> <p>FOSS investigations provide the opportunity to address this expectation. See for example:</p> <p>Weather and Water Resources, pp. 63-65</p> <p>Planetary Science Resources, pp. 90-97</p> <p>Electronics Resources, pp. 18-21</p> <p>Chemical Interactions Resources, pp. 80-83</p> <p>Earth History Resources, pp. 83-84</p> <p>Planetary Science Resources, 71-73</p> <p>Force and Motion Resources, pp. 50-52 Video, Galileo: On the Shoulders of Giants</p> <p>Populations and Ecosystems Resources, pp. 46-55, 60-61</p> <p>Chemical Interactions Resources, pp. 5, 7-8, 69-72, 82-82</p>
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ENERGY

P.EN.M.3 Waves and Energy-Waves have energy and transfer energy when they interact with matter. Examples of waves include sound waves, seismic waves, waves on water, and light waves.

EXPECTATION	FOSS
<p>P.EN.07.31 Identify examples of waves, including sound waves, seismic waves, and waves on water.</p>	<p>Planetary Science Resources, p. 99</p>
<p>P.EN.07.32 Describe how waves are produced by vibrations in matter.</p>	
<p>P.EN.07.32 Demonstrate how waves transfer energy when they interact with matter (for example: tuning fork in water, waves hitting a beach, earthquake knocking over buildings).</p>	

ENERGY

P.EN.M.4 Energy Transfer- Energy is transferred from a source to a receiver by radiation, conduction, and convection. When energy is transferred from a source to a receiver, the quantity of energy before the transfer is equal to the quantity of energy after the transfer.

EXPECTATION	FOSS
P.EN.07.43 Explain how light energy is transferred to chemical energy through the process of photosynthesis.	Diversity of Life Resources, p. 36 Populations and Ecosystems Investigation 5, Part 2, pp. 151-155 Resources, pp. 141-5

ENERGY

P.EN.M.6 Solar Energy Effects- Nuclear reactions take place in the sun producing heat and light. Only a tiny fraction of the light energy from the sun reaches Earth, providing energy to heat the Earth.

EXPECTATION	FOSS
P.EN.07.61 Identify that nuclear reactions take place in the sun, producing heat and light.	
P.EN.07.62 Explain how only a tiny fraction of light energy from the sun is transformed to heat energy on Earth.	

PROPERTIES OF MATTER

P.PM.M.1 Chemical Properties- Matter has chemical properties. The understanding of chemical properties helps to explain how new substances are formed.

EXPECTATION	FOSS
P.PM.07.11 Classify substances by their chemical properties (flammability, pH, acid-base indicators, reactivity).	Chemical Interactions Investigation 1, Part 2, pp. 46-58 Investigation 9, Part 2, pp. 288-297

PROPERTIES OF MATTER

P.PM.M.2 Elements and Compounds- Elements are composed of a single kind of atom that are grouped into families with similar properties on the periodic table. Compounds are composed of two or more different elements. Each element and compound has a unique set of physical and chemical properties such as boiling point, density, color, conductivity, and reactivity.

EXPECTATION	FOSS
P.PM.07.21 Identify the smallest component that makes up an element.	Chemical Interactions Investigation 9, Part 1, pp. 280-287 Resources, p. 64 Video: Atoms and Molecules
P.PM.07.22 Describe how the elements within the Periodic Table are organized by similar properties into families (highly reactive metals, less reactive metals, highly reactive nonmetals, and some almost completely non-reactive gases).	Chemical Interactions Investigation 2, Part 1, pp. 70-74 Resources, pp. 3-6, 90-91 CD, Periodic Table
P.PM.07.23 Illustrate the structure of molecules using models or drawings (water, carbon dioxide, salt).	Chemical Interactions Investigation 9, Parts 1-2, pp. 280-297 Resources, pp. 63-67, 73-74
P.PM.07.24 List examples of physical and chemical properties of elements and compounds (boiling point, density, color,	FOSS investigations provide the opportunity to address this expectation. See below: Chemical Interactions

conductivity, reactivity).	Investigation 9, Parts 2-4, pp. 288-312 Investigation 10, Parts 1-2, pp. 323-336 Resources, pp. 64-67
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CHANGES IN MATTER

P.CM.M.2 Chemical Changes- Chemical changes occur when two elements and/or compounds react and produce new substances. These new substances have different physical and chemical properties than the original elements and/or compounds. During the chemical change, the number and kind of atoms in the reactants are the same as the number and kind of atoms in the products. Mass is conserved during chemical changes. The mass of the reactants is the same as the mass of the products.

EXPECTATION	FOSS
P.CM.07.21 Identify evidence of chemical change through color, gas formation, solid formation, and temperature change.	Chemical Interactions Investigation 9, Parts 2-4, pp. 288-312 Investigation 10, Parts 1-2, pp. 323-336 Resources, pp. 64-67
P.CM.07.22 Compare and contrast the chemical properties of a new substance with the original after a chemical change.	Chemical Interactions Investigation 9, Part 2, pp. 288-292 Investigation 10, Part 2, pp. 330-336 Resources, p. 67
P.CM.07.23 Describe the physical properties and chemical properties of the products and reactants in a chemical change.	Chemical Interactions Investigation 9, Parts 2-3, pp. 288-307 Investigation 10, Part 2, pp. 330-336 Resources, p. 67

ORGANIZATION OF LIVING THINGS

L.OL.M.2 Cell Functions- All organisms are composed of cells, from one cell to many cells. In multicellular organisms, specialized cells perform specialized functions. Organs and organ systems are composed of cells, and function to serve the needs of cells for food, air, and waste removal. The way in which cells function is similar in all living organisms.

EXPECTATION	FOSS
L.OL.07.21 Recognize that all organisms are composed of cells (single cell organisms, multicellular organisms).	Diversity of Life Investigation 3, Parts 1-3, pp. 102-122 Investigation 4, Parts 1-2, pp. 133-141 Investigation 5, Part 3, pp. 165-170 Resources, pp. 24-30 CD, Database
L.OL.07.22 Explain how cells make up different body tissues, organs, and organ systems.	Diversity of Life Investigation 6, Part 3, pp. 165-170 Investigation 7, Part 1, pp. 218-23 Resources, pp. 32, 37-39, 43 CD, Database
L.OL.07.23 Describe how cells in all multicellular organisms are specialized to take in nutrients, which they use to provide energy for the work that cells do and to make the materials that a cell or organism needs.	Diversity of Life Investigation 6, Part 2, pp. 165-170 Resources, pp. 32-33, 38-39
L.OL.07.24 Recognize that cells function in a similar way in all organisms.	

ORGANIZATION OF LIVING THINGS

L.OL.M.3- Growth and Development- Following fertilization, cell division produces a small cluster of cells that then differentiate by appearance and function to form the basic tissue of an embryo.

EXPECTATION	FOSS
L.OL.07.31 Describe growth and development in terms of increase of cell number and/or cell size.	Diversity of Life Investigation 5, Part 3, pp. 165-170
L.OL.07.32 Examine how through cell division, cells can become specialized for specific functions.	

ORGANIZATION OF LIVING THINGS

L.OL.M.6 Photosynthesis- Plants are producers; they use the energy from light to make sugar molecules from the atoms of carbon dioxide and water. Plants use these sugars along with minerals from the soil to form fats, proteins, and carbohydrates. These products can be used immediately, incorporated into the cells of a plant as the plant grows, or stored for later use.

EXPECTATION	FOSS
L.OL.07.61 Recognize the need for light to provide energy for the production of carbohydrates, proteins and fats.	Diversity of Life Resources, p. 36 Populations and Ecosystems Investigation 5, Part 2, pp. 151-155 Resources, pp. 14-15, 17
L.OL.07.62 Explain that carbon dioxide and water are used to produce carbohydrates, proteins, and fats.	
L.OL.07.63 Describe evidence that plants make, use and store food.	

HEREDITY

L.HE.M.2 Reproduction- Reproduction is a characteristic of all living systems; because no individual organism lives forever, reproduction is essential to the continuation of every species. Some organisms reproduce asexually. Other organisms reproduce sexually.

EXPECTATION	FOSS
L.HE.07.21 Compare how characteristics of living things are passed on through generations, both asexually and sexually.	Populations and Ecosystems Investigation 9, Pars 1-4, pp. 262-291 Resources, pp. 46-55
L.HE.07.22 Compare and contrast the advantages and disadvantages of sexual vs. asexual reproduction.	

EARTH SYSTEMS

E.ES.M.1 Solar Energy- The sun is the major source of energy for phenomena on the surface of the Earth.

EXPECTATION	FOSS
E.ES.07.11 Demonstrate, using a model or drawing, the relationship between the warming	Weather and Water Investigation 7, Parts 1-2, pp. 232-243

<p>by the sun of the Earth and the water cycle as it applies to the atmosphere (evaporation, water vapor, warm air rising, cooling, condensation, clouds).</p> <p>E.ES.07.12 Describe the relationship between the warming of the atmosphere of the Earth by the sun and convection within the atmosphere and oceans.</p> <p>E.ES.07.13 Describe how the warming of the Earth by the sun produces winds and ocean currents.</p>	<p>CD, Water Cycle</p> <p>Weather and Water Resources, pp. 32-33, 53-55</p> <p>Weather and Water Investigation 8, Parts 2, pp. 265-270 Resources, pp. 53-55 CD, Climate Factors: Local Winds</p>
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EARTH SYSTEMS

E.ES.M.4 Human Consequences- Human activities have changed the land, oceans, and atmosphere of the Earth resulting in the reduction of the number and variety of wild plants and animals sometimes causing extinction of species.

EXPECTATION	FOSS
<p>E.ES.07.41 Explain how human activities (surface mining, deforestation, overpopulation, construction and urban development, farming, dams, landfills, and restoring natural areas) change the surface of the Earth and affect the survival of organisms.</p> <p>E.ES.07.42 Describe the origins of pollution in the atmosphere, geosphere, and hydrosphere, (car exhaust, industrial emissions, acid rain, and natural sources), and how pollution impacts habitats, climatic change, threatens or endangers species.</p>	<p>Populations and Ecosystems Investigation 7, pp. 210-215 Resources, pp. 31-41</p> <p>Weather and Water Investigation 9, Part 4, pp. 315-318 Resources, pp. 63-66</p>

EARTH SYSTEMS

E.ES.M.7 Weather and Climate- Global patterns of atmospheric and oceanic movement influence weather and climate.

EXPECTATION	FOSS
<p>E.ES.07.71 Compare and contrast the difference and relationship between climate and weather.</p> <p>E.ES.07.72 Describe how different weather occurs due to the constant motion of the atmosphere from the energy of the sun reaching the surface of the Earth.</p> <p>E.ES.07.73 Explain how the temperature of the oceans affects the different climates on Earth because water in the oceans holds a large amount of heat.</p> <p>E.ES.07.74 Describe weather conditions associated with frontal boundaries (cold, warm, stationary, and occluded) and the movement of major air masses and the jet stream across North America using a weather map.</p>	<p>Weather and Water Investigation 9, Part 3, pp. 311-314 Video: Wonders of Weather</p> <p>Weather and Water Investigation 8, Part 2, pp. 265-270 Investigation 9, Part 2, pp. 303-310 Resources, pp. 53-55</p> <p>Weather and Water Investigation 9, Parts -12, pp. 296-310 Resources, pp. 84-86</p>

EARTH SYSTEMS

E.ES.M.8 Water Cycle- Water circulates through the four spheres of the Earth in what is known as the “water cycle.”

EXPECTATION	FOSS
E.ES.07.81 Explain the water cycle and describe how evaporation, transpiration, condensation, cloud formation, precipitation, infiltration, surface runoff, ground water, and absorption occur within the cycle.	Weather and Water Investigation 7, Parts -12, pp. 232-243 CD, Water Cycle
E.ES.07.82 Analyze the flow of water between the components	Weather and Water Investigation 7, Parts -12, pp. 232-243 CD, Water Cycle

FLUID EARTH

E.FE.M.1 Atmosphere- The atmosphere is a mixture of nitrogen, oxygen and trace gases that include water vapor. The atmosphere has different physical and chemical composition at different elevations.

EXPECTATION	FOSS
E.FE.07.11 Describe the atmosphere as a mixture of gases.	Weather and Water Investigation 2, Part 2, pp. 76-80 Resources, pp. 6-7
E.FE.07.12 Compare and contrast the composition of the atmosphere at different elevations.	Weather and Water Investigation 2, Part 2, pp. 76-80 Resources, pp. 8-11 CD, Atmospheric Data