



**FOSS Full Option Science System
(FOSS™)
K-12**

Correlation

to

**Kansas
Science Education
Standards**



Kansas

Science Education Standards

Correlation

to

Full Option Science System (FOSS™)

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

September 2007
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GRADES K-2

STANDARD 1: SCIENCE AS INQUIRY

SCIENCE AS INQUIRY – The student will experience science as *full inquiry*. In the elementary grades, students begin to develop the physical and intellectual abilities of scientific inquiry.

Benchmark 1: The student will be involved in activities that develop skills necessary to conduct scientific inquiries.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. identifies <i>properties</i> of objects. 2. <i>classifies</i> and arranges groups of objects by a variety of properties, one property at a time. 3. uses appropriate materials, <i>tools</i>, and safety procedures to collect information. 	<p>Wood and Paper Investigation 1, Parts 1-4, pp. 8-27 Investigation 3, Parts 1-4, pp. 8-25</p> <p>Fabric Investigation 1, Parts 1-3, pp. 6-19</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38</p> <p>Solids and Liquids Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 1-3, pp. 10-27 Investigation 3, Parts 1-4, pp. 8-27 Investigation 4, Parts 1-2, pp. 7-23</p> <p>Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-21 Investigation 2, Part 2, pp. 14-17 Investigation 4, Part 1, pp. 8-14</p> <p>Wood and Paper Investigation 1, Part 3, pp.20-23 Investigation 3, Part 4, pp. 22-25</p> <p>Fabric Investigation 1, Part 1, pp. 6-11</p> <p>Solids and Liquids Investigation 1, Part 2, pp. 17-20 Investigation 3, Parts 2, 4, pp. 14-18, 24-27</p> <p>Pebbles, Sand, and Silt Investigation 1, Parts 3-4, pp. 18-25 Investigation 2, Parts 1-4, pp. 8-29</p> <p>FOSS investigations have students use materials and tools in a safe manner to collect information. See for example:</p> <p>Trees Investigation 1, Part 7, pp. 31-34</p> <p>Fabric Investigation 1, Parts 4-6, pp. 20-33</p> <p>Wood and Paper Investigation 1, Parts 1-4, pp. 8-27</p> <p>Air and Weather Investigation 1, Parts 1-6, pp. 8-38 Investigation 2, Parts 1-4, pp. 8-27</p> <p>Pebbles, Sand and Silt Investigation 2, Parts 1-4, pp. 8-29</p> <p>Insects Investigation 1, Parts 1-3, pp. 8-25</p>

<p>4. asks and answers questions about objects, organisms, and events in his/her environment.</p>	<p>Plants and Animals Investigation 1, Part 3, pp. 71-75 FOSS provides opportunity for students to ask and answer questions throughout the program. See for example: Fabric Investigation 2, Part 1, pp. 7-11 Wood and Paper Investigation 3, Part 3, pp. 20-23 New Plants Investigation 2, Parts 1-2, pp. 8-19 Pebbles, Sand and Silt Investigation 4, Part 1, pp. 8-14 Solids and Liquids Investigation 4, Parts 1-3, pp. 7-27 Plants and Animals Investigation 1, Parts 1-2, pp. 52-70 Insects and Plants Investigation 5, Parts 1-3, pp. 203-225</p>
<p>5. describes an observation orally or pictorially.</p>	<p>FOSS provides ample opportunity for students to make reports and record observations. See for example: Animals Two by Two Investigation 2, Part 1, pp. 10-16 New Plants Investigation 3, Part 1, pp. 8-13 Insects Investigation 1, Part 1, pp. 8-15 Pebbles, Sand and Silt Investigation 1, Part 2, pp. 13-17 Solids and Liquids Investigation 2, Part 2, pp. 17-20 Air and Weather Investigation 4, Part 3, pp. 19-21 Plants and Animals Investigation 4, Parts 1-2, pp. 151-163 Insects and Plants Investigation 1, Parts 1-3, pp. 52-75</p>

STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE - The student will explore the world by observing and manipulating common objects and materials in their environment.

Benchmark 1: The student will develop skills to describe objects.

INDICATOR	FOSS
<p>The student...</p> <p>1. observes properties of objects and measures or describes those properties using age-appropriate tools and materials.</p>	<p>Wood and Paper Investigation 1, Parts 1-4, pp. 8-27 Investigation 3, Parts 1-4, pp. 8-25 Fabric Investigation 1, Parts 1-3, pp. 6-19 Air and Weather Investigation 1, Parts 1-6, pp. 8-38 Investigation 2, Part 2, pp. 14-19 Investigation 3, Parts 2, 4, pp. 12-16, 22-27 Solids and Liquids Investigation 1, Parts 1-2, pp. 8-20</p>

<p>2. separates or sorts a group of objects or materials by <i>properties</i>.</p> <p>3. compares solids and liquids.</p> <p>4. describes the position of an object in relation to other objects</p>	<p>Investigation 2, Parts 1-3, pp. 10-27 Investigation 3, Parts 1-4, pp. 8-27 Investigation 4, Parts 1-2, pp. 7-23 Pebbles, Sand and Silt Investigation 1, Parts 1-2, pp. 8-21 Investigation 2, Part 2, pp. 14-17 Investigation 3, Parts 1-5, pp. 8-29 Investigation 4, Part 1, pp. 8-14</p> <p>Fabric Investigation 1, Part 1, pp.6-11 Investigation 2, Part 1, pp. 7-11</p> <p>Wood and Paper Investigation 1, Part 3, pp. 20-23 Investigation 3, Part 4, pp. 22-25</p> <p>Animals Two by Two Investigation 2, Part 4, pp. 22-24</p> <p>Solids and Liquids Investigation 1, Part 2, pp. 17-20 Investigation 3, Parts 2, 4, pp. 14-18, 24-27 Investigation 4, Parts 1-2, pp. 7-22</p> <p>Pebbles, Sand and Silt Investigation 1, Parts 3-4, pp. 18-25 Investigation 2, Parts 1-4, pp. 8-29 Investigation 3, Parts 1, 3, pp. 8-14, 19-25</p> <p>Solids and Liquids Investigation 1, Parts 1-3, pp. 8-24 Investigation 2, Parts 1-3, pp. 10-27 Investigation 4, Parts 1-2, pp. 7-22 Science Stories, pp. 4-13</p> <p>Wood and Paper Investigation 1, Part 4, pp. 24-27 Investigation 2, Part 4, pp. 20-23</p> <p>Fabric Investigation 1, Part 5, pp. 23-28</p> <p>Solids and Liquids Investigation 1, Part 3, pp. 21-24</p> <p>Air and Weather Investigation 1, Part 2, 4, 6, pp. 13-16, 21-26, 34-38 Investigation 2, Parts 2, 4, pp. 14-19, 24-27</p> <p>Balance and Motion Investigation 1, Parts 1-4, pp. 8-28</p>
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STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will begin to develop an understanding of biological concepts.

Benchmark 1: The student will develop an understanding of the characteristics of living things.

INDICATOR	FOSS
<p>The student...</p> <p>1. discusses that <i>organisms</i> live only in <i>environments</i> in which their needs can be met.</p>	<p>Trees Investigation 1, Part 2, pp. 15-19</p> <p>Animals Two by Two Investigation 1, Part 2, pp. 17-21 Investigation 3, Part 1, pp. 8-12</p>

<p>4. examines the <i>structures/parts</i> of living things.</p>	<p>Investigation 3, Parts 5, 7, pp. 22-25, 29-31 Science Stories, pp. 14-22</p> <p>Animals Two by Two Investigation 1, Part 1, pp. 10-16 Investigation 2, Parts 1, 3, pp. 9-13, 18-21 Investigation 3, Part 1, pp. 8-12 Science Stories, pp. 5-6, 9-10, 13-14, 17-18, 21-22</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 Science Stories, pp. 12-15</p> <p>New Plants Investigation 1, Part 3, pp. 23-30 Investigation 2, Part 3, pp. 20-25 Investigation 4, Parts 1-2, pp. 7-19 Science Stories, pp. 3-15, 40-43</p> <p>Plants and Animals Investigation 1, Part 3, pp. 63-72 Investigation 2, Parts 1-3, pp. 87-108 Investigation 3, Parts 1-3, pp. 120-140 Investigation 4, Parts 1-2, pp. 151-165 Resources, pp. 4-7, 16-19, 47-50</p> <p>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 Resources, pp. 15-19, 30-33</p>
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STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will observe closely the objects and materials in their *environment*.

Benchmark 1: The student will describe *properties of earth materials*.

INDICATOR	FOSS
<p>The student...</p> <p>1. observes, compares, and sorts <i>earth materials</i>.</p>	<p>Pebbles, Sand and Silt Investigation 1, Parts 1-5, pp. 8-29 Investigation 2, Parts 1-4, pp. 8-29 Investigation 4, Parts 1-3, pp. 8-25 Science Stories, pp. 2-13, 20-23, 26-31 FOSS Web, Activity: Find Earth Materials</p>

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will observe closely the objects and materials in their environment.

Benchmark 2: The student will observe and compare objects in the sky.

INDICATOR	FOSS
<p>The student...</p> <p>1. observes and recognizes the sun, moon, stars, clouds, birds, airplanes,</p>	<p>Air and Weather Investigation 4, Part 3, pp. 19-24</p>

and other objects in the sky.	
2. describes that the sun provides light and warmth	Air and Weather Investigation 2, Part 2, pp. 14-19 Science Stories, pp. 7, 10, 21 FOSS Web, Activity: What's the Weather

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will observe closely the objects and materials in their environment.

Benchmark 3: The student will describe changes in weather.

INDICATOR	FOSS
The student...	
1. observes changes in the weather from day to day.	Trees Tools for Observing Weather, pp. 6-9 Air and Weather Investigation 2, Parts 1-4, pp. 8-27
2. records weather changes daily.	Trees Tools for Observing Weather, pp. 6-9 Air and Weather Investigation 2, Parts 1- 2, pp. 8-19
3. discusses weather safety procedures	Air and Weather Science Stories, p. 17

STANDARD 5: SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY – The student will have a variety of educational experiences that involve science and *technology*.

Benchmark 1: The student will use *technology* to learn about the world around them.

INDICATOR	FOSS
The student...	
1. explores the way things work.	Wood and Paper Investigation 4, Parts 1-2, pp. 8-18 Science Stories, pp. 3-8, 13-18 Fabric Investigation 1, Parts 4-6, pp. 20-33 Air and Weather Investigation 1, Parts 5-6, pp. 27-38 Investigation 2, Parts 2, 4, pp. 14-19, 24-27 Balance and Motion Investigation 2, Parts 1-3, pp. 8-25 Science Stories, pp. 32-35 Solids and Liquids Investigation 3, Part 4, pp. 24-27
2. experiences science through <i>technology</i> .	FOSS Web provides science activities for students. See also: Wood and Paper Investigation 4, Parts 1-2, pp. 8-18 Investigation 5, Parts 1-3, pp. 8-21 Trees Tools for Observing Weather, pp. 6-21

	Air and Weather Investigation 2, Parts 2, 4, pp. 12-16, 22-27 Pebbles, Sand and Silt Investigation 3, Part 2, pp. 12-15
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STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will have a variety of experiences that provide understanding for various science-related personal and environmental challenges.

Benchmark 1: The student will demonstrate responsibility for their own health.

INDICATOR	FOSS
The student...	
1. engages in personal care.	Students are encouraged to have good personal care. See for example: Animals Two by Two Investigation 3, p. 20 Trees Investigation 1, p. 37
2. discusses healthy foods	
3. discusses that humans need to practice being safe	FOSS modules provide a “Safety in the Classroom” section and identify safety concerns throughout the modules. See for example: Fabric Investigation 1, p. 32 Balance and Motion Investigation 2, p 15 Solids and Liquids Investigation 1, p. 23 Plants and Animals Investigation 1, Part 1, pp. 50-51

STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will experience scientific inquiry and learn about people from history.

Benchmark 1: The student will know they practice science.

INDICATOR	FOSS
The student...	
1. is involved in explorations that make his/her mind wonder and know that he/she is practicing science.	FOSS is an inquiry-based program that engages students in the scientific process. See for example: Wood and Paper Investigation 1, Parts 3-5, pp. 20-32 Science Stories, pp. 9-12 Animals Two by Two Investigation 1, Parts 3-4, pp. 22-29 Balance and Motion Investigation 3, Parts 1-3, pp. 6-25 Pebbles, Sand, and Silt

<p>2. uses <i>technology</i> to learn about people in science.</p>	<p>Investigation 4, Parts 1-3, pp. 8-25 Air and Weather Investigation 1, Parts 1-6, pp. 8-38 Plants and Animals Investigation 1, Parts 1-3, pp. 47-72 Insects and Plants Investigation 4, Parts 1-5, pp. 166-19</p> <p>FOSS Web: Ask a Scientist</p>
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GRADES 3-4

STANDARD 1: SCIENCE AS INQUIRY

SCIENCE AS INQUIRY – The student will experience science as inquiry.

Benchmark 1: The student will develop the skills necessary to do full inquiry. *Full inquiry* involves asking a simple question, completing an *investigation*, answering the question, and sharing the results with others.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. asks questions that he/she can answer by investigating. 2. plans and conducts a simple investigation. 3. employs appropriate equipment, <i>tools</i>, and safety procedures to gather data. 	<p>FOSS investigations and inquiry approach encourage investigative questions. See for example:</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Human Body Investigation 4, Part 2, pp. 17-19</p> <p>Water Investigation 3, Parts 2-3, pp. 12-20</p> <p>Ideas and Inventions Investigation 3, Part 2, pp. 14-17</p> <p>Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p> <p>Matter and Energy Investigation 2, Parts 1-2, pp. 93-114</p> <p>Human Body Investigation 4, Part 3, pp. 20-24</p> <p>Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22</p> <p>Ideas and Inventions Investigation 4, Part 3, pp. 18-21</p> <p>Water Investigation 3, Parts 2-3, pp. 12-20</p> <p>Measurement Investigation 2, Part 3, pp. 18-24</p> <p>Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p> <p>Measurement Investigation 2, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-3, pp. 8-21</p> <p>Earth Materials Investigation 3, Parts 1-2, pp. 8-19</p> <p>Magnetism and Electricity Investigation 3, Parts 1-3, pp. 10-26</p> <p>Physics of Sound Investigation 2, Parts 1-3, pp. 8-24</p> <p>Water Investigation 4, Part 1, pp. 8-13</p> <p>Sun, Moon and Stars Investigation 1, Part 1, pp. 42-55</p> <p>Matter and Energy Investigation 3, Parts 2-3, pp. 139-160</p>

<p>4. begins developing the abilities to communicate, critique, analyze his/her own investigations, and interprets the work of other students.</p>	<p>Investigation 4, Part 1, pp. 174-180</p> <p>FOSS investigations encourage these inquiry skills. See for example:</p> <p>Measurement Investigation 4, Part 2, pp. 14-17</p> <p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-30 Investigation 4, Part 3, pp. 14-18</p> <p>Human Body Investigation 4, Parts 1-3, pp. 8-24</p> <p>Water Investigation 3, Parts 2-3, pp. 12-20</p> <p>Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p>
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STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE - The student will increase their understanding of the *properties* of objects and materials that they encounter on a daily basis. The student will compare, describe, and sort and *classify* these materials by observable properties.

Benchmark 1: The student will develop skills to describe objects.

INDICATOR	FOSS
<p>The student...</p> <p>1. observes <i>properties</i> of objects and measures those <i>properties</i> using appropriate <i>tools</i>.</p> <p>2. describes and <i>classifies</i> objects by more than one property.</p> <p>3. observes and records how one object <i>interacts</i> with another object.</p>	<p>Measurement Investigation 2, Parts 2-3, pp. 14-24 Investigation 3, Parts 2-3, pp. 14-21 Investigation 4, Parts 1-2, pp. 8-17</p> <p>Water Investigation 2, Part 3, pp. 19-25 Investigation 4, Part 1, pp. 8-13</p> <p>Earth Materials Investigation 2, Part 2, pp. 14-21</p> <p>Earth Materials Investigation 2, Part 2, pp. 14-21</p> <p>Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19</p> <p>Water Investigation 4, Part 1, pp. 8-13</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Earth Materials Investigation 3, Parts 1-2, pp. 8-19</p> <p>Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17</p> <p>Magnetism and Electricity Investigation 1, Parts 1-2, pp. 8-22</p> <p>Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100</p> <p>Matter and Energy Investigation 3, Part 2, pp. 1139-150 Investigation 4, Part 3, pp. 193-203</p>

4. recognizes and describes the differences between solids, liquids, and gases.	Water Investigation 1, Parts 1-3, pp. 8-23 Investigation 2, Part 3, pp. 19-24 Investigation 3, Part 4, pp. 21-26 Science Stories, pp. 1-2, 8-9, 13-16 Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 39-42
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STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will increase their understanding of the properties of objects and materials that they encounter on a daily basis. The student will compare, describe, and sort and classify these materials by observable properties.

Benchmark 2: The student will describe the motion of objects.

INDICATOR	FOSS
The student... 1. moves objects by pushing, pulling, throwing, spinning, dropping, and rolling and describes the motion. 2. describes the change in position of objects when moved.	Human Body Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-24 Physics of Sound Investigation 3, Part 1, pp. 8-14 Structures of Life Investigation 4, Part 3, pp. 20-24 Water Investigation 1, Part 3, pp. 19-23 Investigation 4, Part 2, pp. 14-18 Water Investigation 1, Part 3, pp. 19-23 Investigation 2, Part 2, pp. 14-18 Human Body Investigation 1, Part 2, pp. 16-20 Investigation 3, Parts 1-3, pp. 8-21 Investigation 4, Part 3, pp. 20-24 Ideas and Inventions Investigation 3, Parts 1-2, pp. 8-17 Investigation 4, Part 2, pp. 14-17

STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will increase their understanding of the properties of objects and materials that they encounter on a daily basis. The student will compare, describe, and sort and classify these materials by observable properties.

Benchmark 3: The student will recognize and demonstrate what makes sounds.

INDICATOR	FOSS
The student... 1. identifies that the source of sound is vibrations..	Physics of Sound Investigation 1, Part 3, pp. 21-29 Investigation 3, Parts 1-2, pp. 8-19 Science Stories, pp. 6, 9

2. discriminates between sounds made by different objects	Physics of Sound Investigation 1, Parts 1-2, pp. 8-20 Investigation 4, Part 1, pp. 6-15 Science Stories, pp. 5-8
3. discriminates between various pitches.	Physics of Sound Investigation 2, Parts 1-3, pp. 8-24 Science Stories, 11-13

STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will increase their understanding of the properties of objects and materials that they encounter on a daily basis. The student will compare, describe, and sort and classify these materials by observable properties.

Benchmark 4: The student will experiment with electricity and magnetism:

INDICATOR	FOSS
The student...	
1. demonstrates that magnets attract and repel.	Magnetism and Electricity Investigation 1, Parts 1-4, pp. 8-34 Investigation 4, Part 1, pp. 8-15 Science Stories, pp. 5-9 FOSS Web, Activity: Electromagnets; Kitchen
2. designs a simple experiment to determine whether various objects will be attracted to magnets.	Magnetism and Electricity Investigation 1, Parts 1-2, pp. 8-22
3. constructs a <i>simple circuit</i> .	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

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of biological concepts through direct experience with living things, their life cycles, and their habitats.

Benchmark 1: The student will develop knowledge of organisms in their environment.

INDICATOR	FOSS
The student...	
1. observes different organisms and compares and contrasts how similar functions are served by different structural characteristics.	Structures of Life Investigation 1, Parts 1-2, pp. 8-27 Investigation 2, Part 3, pp. 18-22 Investigation 3, Part 1, pp. 8-15 Investigation 4, Parts 1-2, pp. 8-19 Science Stories, pp. 1-3, 17-18, 22-21, 23, 25-35, 37, 40-43 Human Body Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 1-4, pp. 8-25 Investigation 3, Parts 1-3, pp. 8-21 Science Stories, pp. 1-4, 10-13
2. compares basic needs of different	Structures of Life

organisms in their environment.	Investigation 2, Part 2, pp. 14-17 Investigation 3, Part 2, pp. 16-19 Investigation 4, Part 1, pp. 8-13 Science Stories, pp. 17-18
3. discusses ways organisms use their senses to survive in their environments.	Structures of Life Investigation 3, Part 1, pp. 8-15 Investigation 4, Part 1, pp. 8-13 Science Stories, pp. 18, 39

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of biological concepts through direct experience with living things, their life cycles, and their habitats.

Benchmark 2: The student will observe and illustrate the life cycles of various organisms.

INDICATOR	FOSS
The student...	
1. compares, contrasts, and asks questions about life cycles of various organisms.	Structures of Life Investigation 2, Part 3, pp. 18-22 Science Stories, pp. 20-21 FOSS Web, Activity: Life Cycles

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will observe objects, materials, and changes in their *environment*, note their *properties*, distinguish one from another, and develop their own explanations making sense of their observations.

Benchmark 1: The student will develop an understanding of the properties of *earth materials*.

INDICATOR	FOSS
The student...	
1. collects, observes <i>properties</i> , and <i>classifies</i> a variety of <i>earth materials</i> in his/her <i>environment</i> .	Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-2, pp. 8-19 Investigation 4, Part 1, pp. 8-13 Science Stories, pp. 1-15, 30-37 FOSS Web, Activity: Rock Database Water Investigation 1, Parts 1-3, pp. 8-23 Investigation 2, Part 3, pp. 19-24 Science Stories, pp. 1-9, 17
2. experiments with a variety of soil types (clay, silt, sand, and loam).	This topic is addressed in the grade two module <u>Pebbles, Sand and Silt</u> .
3. describes <i>properties</i> of water and process of the water cycle.	Water Investigation 1, Parts 1-3, pp. 8-23 Science Stories, pp. 14-16 Foss Web, Pictures, Water Cycle
4. observes and records the properties of <i>fossils</i> and discusses what <i>fossils</i> are.	Earth Materials Science Stories, p. 4

	FOSS Web, Pictures Structures of Life Science Stories, pp. 45-48 Human Body Science Stories, pp. 21-24
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STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will observe objects, materials, and changes in their environment, note their *properties*, distinguish one from another, and develop their own explanations making sense of their observations.

Benchmark 2: The student will observe and describe objects in the sky.

INDICATOR	FOSS
The student...	
1. observes the moon and stars.	Ideas and Inventions Science Stories, pp. 34-37 Sun, Moon and Stars Investigation 2, Parts 1-2, pp. 79-100 Investigation 3, Parts 1-2, pp. 114-130 Resources, pp. 25-32, 35-39
2. observes and compares the length of shadows.	Ideas and Inventions Science Stories, p. 33 Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64 Resources, pp. 4-11
3. discusses that the sun provides light and heat (electro-magnetic radiation) to maintain the temperature of the earth.	Ideas and Inventions Science Stories, p. 33 Water Science Stories, pp. 14-15 Matter and Energy Investigation 1, Part 1, pp. 50-62 Science Resources, pp. 1-5 Sun, Moon and Stars Resources, pp. 1-3

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will observe objects, materials, and changes in their environment, note their properties, distinguish one from another, and develop their own explanations making sense of their observations.

Benchmark 3: The student will develop skills necessary to describe changes in the earth and weather.

INDICATOR	FOSS
The student...	
1. describes changes in the surface of the earth.	Earth Materials Science Stories, pp. 5-7 This indicator is further addressed in the grade five module <u>Landforms</u> .
2. observes, describes, and records daily and seasonal weather changes.	This indicator is addressed in the grade Two module <u>Air and Weather</u> .

STANDARD 5: SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY – The student will have a variety of educational experiences which involve science and technology. The student will begin to understand the design process.

Benchmark 1: The student will work with a technology design.

INDICATOR	FOSS
The student... 1. identifies a simple <i>design problem</i> (designs a plan, implements the plan, evaluates the results, makes changes to improve the product, and communicates the results).	Water Investigation 4, Part 2, pp. 14-18 Magnetism and Electricity Investigation 4, Part 3, pp. 19-22 Physics of Sound Investigation 4, Part 1, pp. 6-15

STANDARD 5: SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY – The student will have a variety of educational experiences which involve science and technology. They will begin to understand the design process.

Benchmark 2: The student will apply their understanding about science and technology.

INDICATOR	FOSS
The student... 1. will understand that the design process produces knowledge that can be used to solve a problem and improve our world.	FOSS provides the opportunity to address this indicator. See examples below: Ideas and Inventions Science Stories, pp. 1-3, 9-10, 17-22 Magnetism and Electricity Science Stories, pp. 16-20, 28-33 Physics of Sound Science Stories, pp. 32-35 Water Science Stories, pp. 18-19, 22-23
2. invents a product to solve problems.	Magnetism and Electricity Investigation 4, Part 3, pp. 19-22 Water Investigation 4, Part 2, pp. 17-19 Physics of Sound Investigation 4, Part 1, pp. 6-15
3. works with others to solve problems.	FOSS investigations involve students working in cooperative groups. See for example: Earth Materials Investigation 3, Parts 1-2, pp. 8-19 Structures of Life Investigation 3, Part 3, pp. 20-23 Measurement Investigation 3, Part 3, pp. 18-21 Physics of Sound Investigation 4, Part 1, pp. 6-15 Matter and Energy Investigation 3, Part 2, pp. 139-150
4. develops an awareness that women	Magnetism and Electricity

<p>and men of all ages, backgrounds, and ethnic groups engage in a variety of scientific and technological work.</p> <p>5. investigates how scientists use <i>tools</i> to observe.</p>	<p>Science Stories, pp. 12-23 Water Science Stories, pp. 24-26 Ideas and Inventions Science Stories, pp. 1-3, 9-22 Structures of Life Science Stories, pp. 6-9 Sun, Moon and Stars Resources, pp. 44-46</p> <p>Measurement Investigation 1, Parts 2-3, pp. 16-24 Investigation 2, Parts 2-3, pp. 14-24 Investigation 3, Parts 2-3, pp. 14-21 Investigation 4, Parts 1-2, pp. 8-17 Water Investigation 4, Part 1, pp. 8-13 Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19 Magnetism and Electricity Investigation 1, Part 3, pp. 23-29 Sun, Moon and Stars Investigation 3, Part 2, pp. 126-130 Resources, pp. 40-43</p>
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STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will demonstrate personal health and environmental practices.

Benchmark 1: The student will develop an understanding of personal health.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. discusses the nutritional value of various foods and their contribution to health. 2. discusses that safety involves preventing injury by avoiding inappropriate risks and dangers. 3. assumes some responsibility for his/her own health , and the health and well being of others.. 	<p>Human Body Science Stories, p. 25</p> <p>FOSS modules contain a “Safety in the Classroom” section and designate safety concerns in investigations. See for example: Magnetism and Electricity Investigation 1, p. 14 Investigation 2, p. 9 Earth Materials Investigation 1, pp. 18 and 19 Human Body Investigation 1, pp. 22 and 23 Sun, Moon and Stars Investigation 1, Part 1, pp. 50-51 Matter and Energy Investigation 1, p. 58.</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will demonstrate personal health and environmental practices.

Benchmark 2: The student will demonstrate an awareness of changes in the environment.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. defines pollution . 2. develops personal actions to solve pollution problems in and around the neighborhood. 3. practices reducing, reusing, and recycling. 	<p>Water Science Stories, pp. 20-21</p> <p>Measurement Science Stories, pp. 16-17</p> <p>Water Science Stories, p. 21</p> <p>Measurement Science Stories, pp. 16-17</p>

STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will experience some things about scientific inquiry and learn about people from history.

Benchmark 1: The student will develop an awareness that people practice science.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. recognizes that students participate in science inquiry by asking questions. 2. studies the lives of people who have made scientific contributions. 	<p>FOSS investigations encourage student questions and seeking answers to questions. See for example:</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Human Body Investigation 4, Part 2, pp. 17-19</p> <p>Magnetism and Electricity Investigation 4, Parts 2-3, pp. 14-22</p> <p>Water Investigation 3, Parts 2-3, pp. 12-20</p> <p>Sun, Moon and Stars Investigation 1, Parts 1-2, pp. 42-64</p> <p>Matter and Energy Investigation 2, Parts 1-2, pp. 93-114 Investigation 3, Part 2, pp. 139-150</p> <p>Structures of Life Science Stories, pp. 6-9</p> <p>Magnetism and Electricity Science Stories, pp. 12-23, 34-37</p> <p>Ideas and Inventions Science Stories, pp. 17-22</p> <p>Measurement Science Stories, p. 21</p> <p>Sun, Moon and Stars Resources, pp. 40, 44-46</p>

GRADES 5-7

SCIENCE AS INQUIRY

SCIENCE AS INQUIRY – The student will develop the abilities to do *scientific inquiry*, be able to demonstrate how *scientific inquiry* is applied, and develop understandings about *scientific inquiry*.

Benchmark 1: The student will demonstrate abilities necessary to do the processes of *scientific inquiry*.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> <li>1. identifies questions that can be answered through scientific investigations. <li>2. designs and conducts <i>scientific investigations</i> safely using appropriate tools, mathematics, <i>technology</i>, and techniques to gather, analyze, and interpret data. <li>3. identifies the relationship between evidence and logical conclusions. 	<p>FOSS investigations are inquiry-based and students identify questions to be investigated. See for example:</p> <p>Variables Investigation 3, Part 3, pp. 20-23</p> <p>Environments Investigation 2, Part 4, pp. 26-30</p> <p>Mixtures and Solutions Investigation 3, Part 3, pp. 15-20</p> <p>Water Planet Investigation 2, Parts 1-3, pp. 80-100</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Diversity of Life Investigation 8, Part 2, pp. 244-252</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21</p> <p>Landforms Investigation 3, Part 3, pp. 20-24</p> <p>Mixtures and Solutions Investigation 3, Part 2, pp. 15-20</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p> <p>Diversity of Life Investigation 6, Part 1, pp. 186-192</p> <p>Human Brain and Senses Investigation 3, Parts 1-3, pp. 92-110</p> <p>Chemical Interactions Investigation 7, Parts 2-3, pp. 210-221</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Students discuss investigation results and conclusions. See for example:</p> <p>Solar Energy Investigation 3, Parts 1-2, pp. 8-23</p> <p>Levers and Pulleys Investigation 4, Parts 1-2, pp. 8-20</p>

<p>4. communicates scientific procedures, results and explanations.</p>	<p>Landforms Investigation 3, Parts 1-3, pp. 8-24</p> <p>Water Planet Investigation 2, Parts 1-3, pp. 80-100</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Human Brain and Senses Investigation 7, Part 2, pp. 219-225</p> <p>Weather and Water Investigation 5, Part 2, pp. 163-168</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>Students communicate both written and orally in their investigations. See for example:</p> <p>Variables Investigation 1, Parts 1-3, pp. 8-27</p> <p>Environments Investigation 2, Part 4, pp. 26-30</p> <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p> <p>Diversity of Life Investigation 8, Part 2, pp. 244-252</p> <p>Chemical Interactions Investigation 1, Part 2, pp. 46-58</p> <p>Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p> <p>Populations and Ecosystems Investigation 5, Part 1, pp. 142-150</p>
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STANDARD 1: SCIENCE AS INQUIRY

SCIENCE AS INQUIRY – The student will develop the abilities to do scientific inquiry, be able to demonstrate how scientific inquiry is applied, and develop understandings about scientific inquiry.

Benchmark 2: The student will apply different kinds of investigations to different kinds of questions.

INDICATOR	FOSS
<p>The student....</p> <p>1. develops questions and adapts (frames) the inquiry process to guide the appropriate type of investigation.</p>	<p>FOSS investigations provide the opportunity to teach this indicator. See for example:</p> <p>Variables Investigation 3, Part 3, pp. 20-23</p> <p>Landforms Investigation 3, Part 3, pp. 20-24</p> <p>Environments Investigation 2, Part 4, pp. 26-30</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158-167</p> <p>Diversity of Life</p>

<p>2. differentiates between qualitative and quantitative data in an investigation.</p>	<p>Investigation 9, Part 2, pp. 278-285</p> <p>FOSS investigations provide the opportunity to teach this indicator. See for example:</p> <p>Food and Nutrition Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Part 2, pp. 18-21</p> <p>Landforms Investigation 3, Parts 1-3, pp. 8-24</p> <p>Water Planet Investigation 2, Parts 1-3, pp. 80-100</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p> <p>Variables Investigation 1, Parts 1-3, pp. 8-27</p> <p>Force and Motion Investigation 1, Part 2, pp. 57-62</p> <p>Chemical Interaction Investigation 7, Part 2, pp. 210-214 Investigation 8, Parts 1-3, pp. 248-268</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Planetary Science Investigation 8, Parts 2-3, pp. 260-270</p>
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STANDARD 1: SCIENCE AS INQUIRY

SCIENCE AS INQUIRY – The student will develop the abilities to do scientific inquiry, be able to demonstrate how scientific inquiry is applied, and develop understandings about scientific inquiry.

Benchmark 3: The student will analyze how science advances through the interaction of new ideas, scientific investigations, skepticism, and examinations of evidence of varied explanations.

INDICATOR	FOSS
<p>The student...</p> <p>1. after completing an investigation, generates alternative methods of investigation and/or further questions for inquiry.</p> <p>2. evaluates the work of others to determine evidence which scientifically supports or contradicts the results, identifying faulty reasoning or conclusions that go beyond</p>	<p>FOSS investigations provide the opportunity to teach this indicator. See for example:</p> <p>Variables Investigation 4, Part 3, pp. 18-23</p> <p>Environments Investigation 2, Part 4, pp. 26-30</p> <p>Landforms Investigation 3, Part 3, pp. 20-24</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p> <p>Diversity of Life Investigation 9, Part 2, pp. 278-285</p> <p>Planetary Science Investigation 5, Part 3, pp. 164-167</p> <p>Earth History Investigation 4, Part 3, pp. 138-146</p> <p>FOSS investigations provide the opportunity to teach this indicator. See for example:</p> <p>Solar Energy Investigation 3, Parts 1-2, pp. 8-23</p>

evidence and/or are not supported by data.	Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Water Planet Investigation 2, Parts 1-3, pp. 80-100 Living Systems Investigation 2, Part 1, pp. 85-98 Food and Nutrition Investigation 2, Parts 2-3, pp. 18-25 Populations and Ecosystems Investigation 5, Part 1, pp. 142-150 Diversity of Life Investigation 6, Part 1, pp. 186-192 Chemical Interactions Investigation 1, Part 2, pp. 46-58 Human Brain and Senses Investigation 7, Part 2, pp. 219-225
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STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will apply process skills to develop an understanding of physical science including: properties, changes of properties of matter, motion and forces, and transfer of energy.

Benchmark 1: The student will observe, compare, and classify properties of matter.

INDICATOR	FOSS
The student... 1. compares and classifies the states of matter; solids, liquids, gases, and plasma 2. compares and contrasts the classes of matter, elements, compounds, and mixtures. 3. identifies and communicates properties of matter (including but not limited to: phases of matter, boiling point, solubility, and density).	Mixtures and Solutions Investigation Chemical Interactions Investigation 4, Part, 1-3, pp. 122-141 Resources, pp. 23-27,, 42-48 Mixtures and Solutions Investigation 1, Parts1-2, pp. 8-21 Investigation 4, Parts 1-3, pp. 8-24 Science Stories, pp. 1-8, 25-28, 37-42 Chemical Interactions Investigation 2, Parts 1-2, pp. 70-80 Investigation 8, Part 1, pp. 248-255 Investigation 9, Parts 1-4, p. 280-312 Resources, pp. 3-6, 9-13, 49-53, 63-68, 73-77, 96 Mixtures and Solutions Investigation 1, Part 1, pp. 8-15 Investigation 2, Parts 1-2, pp. 8-20 Water Planet Investigation 3, Part 1, pp. 125-135 Earth History Investigation 5, Part 2, pp.179-182 Weather and Water Investigation 5, Part 1, pp.152-162 Planetary Science Investigation 8, Parts 2-3, pp. 260-270 Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Investigation 4, Part 1-3, pp. 122-141 Investigation 7, Parts 1-5, pp. 204-234 Resources, pp. 16-17, 28-31, 42-48

STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will apply process skills to develop an understanding of physical science including: properties, changes of properties of matter, motion and forces, and transfer of energy.

Benchmark 2: The student will observe, measure, infer, and classify changes in properties of matter.

INDICATOR	FOSS
The student...	
1. understands the relationship of atoms to elements and elements to compounds.	<p>Mixtures and Solutions Science Stories, pp. 3-6, 25-28</p> <p>Chemical Interactions Investigation 2, Parts 1-2, pp. 70-80 Investigation 9, Parts 1-4, pp. 280-312 Resources, pp. 4-6, 63-68, 96</p>
2. measures and graphs the effects of temperature on matter.	<p>Solar Energy Investigation 2, Part 2, pp. 16-24</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Chemical Interactions Investigation 5, Part 1-3, pp. 153-171 Investigation 6, pp. 178-187 Investigation 7, Parts 2-4, pp. 210-228</p>

STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will apply process skills to develop an understanding of physical science including: properties, changes of properties of matter, motion and forces, and transfer of energy.

Benchmark 3: The student will investigate motion and forces.

INDICATOR	FOSS
The student...	
1. identifies the forces that act on an object (e.g. gravity and friction).	<p>Variables Investigation 1, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 5, 32-33</p> <p>Water Planet Investigation 1, Part 2, pp. 59-66 Science Resources, pp. 16-17</p> <p>Models and Designs Investigation 3, Parts 1-2, pp. 8-19 Science Stories, pp. 37-43, 48-55</p> <p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 3, Parts 1-2, pp. 8-20 Science Stories, pp. 5-6, 10-17</p> <p>Force and Motion Investigation 6, Parts 1-3, pp. 223-241 Investigation 7, Parts 1-3, pp. 256-272 Resources, pp. 62-65, 67-69</p>

<p>2. describes, measures, and represents data on a graph showing the motion of an object (position, direction of motion, speed).</p> <p>3. recognizes and describes examples of Newton’s Laws of Motion.</p> <p>4. investigates and explains how simple machines multiply force at the expense of distance.</p>	<p>Planetary Science Resources, pp. 70, 84-85</p> <p>Variables Investigation 1, Part 2, pp. 16-22 Investigation 3, Part 3, pp. 20-23 Investigation 4, Part 4, pp. 24-27</p> <p>Force and Motion Investigation 1, Part 2, pp. 57-62 Investigation 2, Part 3, pp. 89-99 Investigation 3, Part 2, pp. 119-123 Investigation 4, Part 2, pp. 146-151</p> <p>Models and Designs Science Stories, pp. 48-49</p> <p>Force and Motion Investigation 6, Parts 1-3, pp. 223-241 Investigation 8, Parts 1-2, pp. 284-301 Resources, pp. 50-52</p> <p>Levers and Pulleys Investigation 1, Parts 2-3, pp. 18-28 Investigation 2, Parts 1-3, pp. 8-22 Investigation 3, Parts 1-2, pp. 8-20 Investigation 4, Parts 1-2, pp. 8-20 Science Stories, pp. 1-17, 21-27</p>
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STANDARD 2: PHYSICAL SCIENCE

PHYSICAL SCIENCE – The student will apply process skills to develop an understanding of physical science including: properties, changes of properties of matter, motion and forces, and transfer of energy.

Benchmark 4: The student will understand and demonstrate the transfer of energy.

INDICATOR	FOSS
<p>The student...</p> <p>1. understands the difference between potential and kinetic energy.</p> <p>2. understands that when work is done, energy may transform from one form to another, including mechanical, heat, light, sound, electrical, chemical, and nuclear energy, yet is conserved</p>	<p>FOSS provides the opportunity to address this indicator. See examples below:</p> <p>Variables Investigation 1, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-2, pp. 8-19</p> <p>Force and Motion Investigation 1, Part 1, pp. 47-56 Investigation 2, Part 3, pp. 89-99</p> <p>Solar Energy Investigation 3, Parts 1-2, pp. 8-23 Science Stories, pp. 29-39 FOSS Web, Activity: Solar Road Race</p> <p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Science Stories, pp. 25-28</p> <p>Weather and Water Investigation 5, Parts 2-3, pp. 163-174 Resources, pp. 22-26, 65</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Investigation 4, Part 2, pp. 149-151 Resources, pp. 1-2, 12-13</p>

<p>3. observes and communicates how light (electromagnetic) energy interacts with matter: transmitted, reflected, refracted, and absorbed.</p> <p>4. understands that heat energy can be transferred from hot to cold by radiation, convection, and conduction.</p>	<p>Human Brain and Senses Investigation 3, Parts 1-3, pp. 92-110 Resources, pp. 31-35 CD, Optics Bench</p> <p>Water Planet Investigation 3, Parts 1-2, pp. 125-144 Science Resources, pp. 42-51</p> <p>Weather and Water Investigation 4, Parts 1-2, pp. 121-139 Investigation 5, Parts 2-3, pp. 162-174 Resources, pp. 22-26, 32-33 CD, Matter and Energy: Heat and Energy; Molecules in Solids, Liquids, and Gases Video: Convection Chamber; Conduction through Metals</p> <p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 6, pp. 178-187 Investigation 7, Parts 2-5, pp. 222-234 Resources, pp. 23-31, 32-48</p>
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STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

Benchmark 1: The student will model structures of organisms and relate functions to the structures.

INDICATOR	FOSS
<p>The student...</p> <p>1. will understand the cell theory; that all organisms are composed of one or more cells, cells are the basic unit of life, and that cells come from other cells.</p> <p>2. relates the structure of cells, organs, tissues, organ systems, and whole organisms to their functions.</p> <p>3. compares organisms composed of single cells with organisms that are multi-cellular.</p>	<p>Food and Nutrition Science Stories, p. 41</p> <p>Living Systems Investigation 1, Part 1, pp. 51-59 Science Resources, pp. 1-3</p> <p>Diversity of Life Investigation 3, Parts 1-3, pp. 102-122 Investigation 4, Parts 1-2, pp. 133-141 Investigation 10, Part 1, pp. 302-309 Resources, pp. 9, 27-30, 31-44, 65-67 CD, Database</p> <p>Food and Nutrition Science Stories, pp. 6-9, 41-50</p> <p>Diversity of Life Investigation 4, Parts 1-2, pp. 133-141 Resources, pp. 24-30, 31-44 CD, Cells and the Ribbon of Life</p> <p>Living Systems Investigation 1, Parts 1-3, pp. 51-70 Science Resources, pp. 1-13</p> <p>Food and Nutrition Science Stories, pp. 42-43</p> <p>Diversity of Life</p>

<p>4. concludes that breakdowns in structure or function may be caused by disease, damage, heredity, or aging.</p>	<p>Investigation 3, Parts 1-3, pp. 102-122 Investigation 4, Part 1, pp. 133-136 Investigation 5, Parts 1-3, pp. 151-170 Investigation 7, Part 1, pp. 218-223 Investigation 8, Part 1, pp. 239-243 Investigation 9, Parts 1-2, pp. 273-285 Investigation 10, Part 1, pp. 302-309 Resources, pp. 4-14, 24-26, 31-44, 51-70 CD, Database</p> <p>Diversity of Life Resources, pp. 66-68</p>
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STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

Benchmark 2: The student will understand the role of reproduction and heredity for all living things.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> differentiates between asexual and sexual reproduction of organisms. understands how hereditary information of each cell is passed from one generation to the next. infers that the characteristics of an organism result from heredity and interactions with the environment. 	<p>Diversity of Life Investigation 7, Part 1, pp. 218-223 Resources, pp. 26, 40-45, 53-54, 58-59, 61-62</p> <p>Populations and Ecosystems Investigation 9, Parts 1-4, pp. 262-291 Resources, pp. 46-55 CD, Larkeys: Genotypes and Phenotypes; Punnett Square</p> <p>FOSS investigations and resources provide the opportunity to teach this indicator. See number 2 above.</p>

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

Benchmark 3: The student will describe homeostasis, the regulation and balance of internal conditions in response to a changing external environment.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> understands that internal and/or environmental conditions affect an organism’s behavior and/or response in order to maintain and regulate stable internal conditions to survive in a continually changing environment. 	<p>Food and Nutrition Science Stories, pp. 16-19</p> <p>Environments Investigation 2, Parts 2-3, pp. 16-25 Investigation 6, Parts 1-2, pp. 8-17 Science Stories, pp. 15-16</p> <p>Diversity of Life Investigation 6, Part 2, pp. 193-197</p>

<p>2. recognizes that the survival of all organisms requires the ingestion of materials the intake and release of energy, growth, release of wastes and response to environmental change.</p>	<p>Investigation 8, Part 2, pp. 244-252 Resources, pp. 33-39</p> <p>Food and Nutrition Science Stories, pp. 6-9, 41-43, 44-50</p> <p>Living Systems Investigation 1, Part 2, pp. 60-65 Science Resources, pp. 7-10, 13</p> <p>Environments Investigation 5, Parts 1-3, pp. 8-22 Science Stories, pp. 9-16, 23-25, 38-41, 43-45</p> <p>Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Investigation 5, Parts 1-4, pp. 142-169 Resources, pp. 8-21 CD, Mono Lake, Food Web</p> <p>Diversity of Life Investigation 6, Parts 1-3, pp. 186-202 Resources, pp. 21-26, 31-39</p>
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STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

Benchmark 4: The student will identify and relate interactions of populations of organisms within an ecosystem.

INDICATOR	FOSS
<p>The student...</p> <p>1. recognizes that all populations living together (biotic resources) and the physical factors (abiotic resources) with which they interact compose an ecosystem.</p> <p>2. understands how limiting factors determine the carrying capacity of an ecosystem.</p> <p>3. traces the energy flow from the sun (source of radiant energy) to producers (via photosynthesis – chemical energy) to consumers and decomposers in food webs.</p>	<p>Environments Investigation 3, Parts 1-3, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-22 Investigation 6, Parts 1-2, pp. 8-17 FOSS Web, Activity: Virtual Aquarium</p> <p>Populations and Ecosystems Investigation 1, Parts 1-3, pp. 41-59 Investigation 2, Parts 1-2, pp. 70-79 Investigation 3, Parts 1-3, pp. 90-107 Resources, pp. 6-18</p> <p>Environments Investigation 3, Parts 1-3, pp. 8-22 Investigation 5, Parts 1-3, pp. 8-22 Investigation 6, Parts 1-2, pp. 8-17 FOSS Web, Activity: Virtual Aquarium</p> <p>Populations and Ecosystems Investigation 6, Parts 1-3, pp. 179-197 Resources, pp. 22-29</p> <p>Environments Science Stories, pp. 38-41</p> <p>Living Systems Investigation 3, Part 1, pp. 118-125 Science Resources, pp. 31-34, 47</p> <p>Populations and Ecosystems Investigation 5, Parts 2, 4, pp. 151-155, 161-169 Resources, pp. 14-21</p>

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will apply process skills to explore and understand structure and function in living systems, reproduction and heredity, regulation and behavior, populations and ecosystems, and diversity and adaptations of organisms.

Benchmark 5: The student will observe the diversity of living things and relate their adaptations to their survival or extinction.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. concludes that species of animals, plants, and microorganisms may look dissimilar on the outside but have similarities in internal structures, developmental characteristics, chemical processes, and genomes. 2. understands that adaptations of organisms (changes in structure, function, or behavior that accumulate over successive generations) contribute to biological diversity. 3. associates extinction of a species with environmental changes and insufficient adaptive characteristics. 	<p>Diversity of Life Investigation 3, Parts 1-3, pp. 102-122 Investigation 5, Parts 1-3, pp. 151-170 Investigation 7, Parts 1-2, pp. 218-229 Investigation 9, Part 1, pp. 273-277 Resources, pp. 31-50, 51-63</p> <p>Populations and Ecosystems Resources, pp. 58-63</p> <p>Populations and Ecosystems Investigation 10, Parts 1-3, pp. 302-317 Resources, pp. 58-61</p> <p>Populations and Ecosystems Resources, p. 61</p>

STANDARD 4: EARTH and SPACE SCIENCE

EARTH and SPACE SCIENCE – The student will apply process skills to explore and develop an understanding of the structure of the earth system, earth's history, and earth in the solar system.

Benchmark 1: The student will understand that the structure of the earth system is continuously changing due to earth's physical and chemical processes.

INDICATOR	FOSS
<p>The student...</p> <ol style="list-style-type: none"> 1. identifies properties of the solid earth, the oceans and fresh water, and the atmosphere. 	<p>Landforms Investigation 2, Parts 8-22 Investigation 3, Parts 1-3, pp. 8-24 Science Stories, pp. 15-29</p> <p>Solar Energy Science Stories, pp. 18-20</p> <p>Water Planet Investigation 4, Part 4, pp. 212-216 Science Resources, pp. 52-57, 63-66</p> <p>Earth History Investigation 4, Parts 1-2, 5-6, pp. 127-137, 150-162 Investigation 8, Parts 1-4, pp. 254-274 Resources, pp. 93-97 CD, Geology Lab, Rock Database</p> <p>Weather and Water Investigation 2, Parts 1-2, pp. 69-80</p>

<p>2. models Earth's cycles, constructive and destructive processes, and weather systems.</p>	<p>Resources, pp. 6-11, 45-47 CD, Atmospheric Data, Elevator to Space</p> <p>Environments FOSS Web, Pictures: Water Cycle</p> <p>Landforms Investigation 2, Parts 1-2, pp. 8-22 Investigation 3, Parts 1-3, pp. 8-24</p> <p>Solar Energy Science Stories, pp. 22-25 FOSS Web, Movies</p> <p>Water Planet Investigation 4, Parts 1-3, pp. 184-211 Science Resources, pp. 67-88</p> <p>Weather and Water Investigation 7, Parts 1-2, pp. 232-239 CD, Cycles: Water Cycle</p> <p>Earth History Investigation 4, Parts 3-4, pp. 138-149 Resources, pp. 100-105 CD, Geology Lab; Earth Processes</p>
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STANDARD 4: EARTH and SPACE SCIENCE

EARTH and SPACE SCIENCE – The student will apply process skills to explore and develop an understanding of the structure of the earth system, earth's history, and earth in the solar system.

Benchmark 2: The student will understand past and present earth processes and their similarity.

INDICATOR	FOSS
<p>The student...</p> <p>1. understands that earth processes observed today (including movement of lithospheric plates, constructive and destructive forces, and changes in atmospheric conditions) are similar to those that occurred in the past; Earth history is also influenced by occasional catastrophes, such as the impact of a comet or asteroid.</p>	<p>Landforms Science Stories, pp. 22-29</p> <p>Earth History Investigation 4, Parts 5-6, pp. 150-162 Investigation 8, Part 1, pp. 254-258 Resources, pp. 73-75, 93-97, 100-102 CD, Geology Lab; Earth Processes</p>

STANDARD 4: EARTH and SPACE SCIENCE

EARTH and SPACE SCIENCE – The student will apply process skills to explore and develop an understanding of the structure of the earth system, earth's history, and earth in the solar system.

Benchmark 3: The student will identify and classify stars, planets, and other solar system components.

INDICATOR	FOSS
<p>The student...</p> <p>1. compares and contrasts the characteristics of stars, planets, moons, comets, and asteroids.</p>	<p>Solar Energy Science Stories, pp. 40-43</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58 Science Resources, pp. 1-13, 20-22</p> <p>Planetary Science</p>

<p>2. models spatial relationships of the earth/moon/planets/sun system to scale.</p> <p>3. identifies past and present methods used to explore space</p>	<p>Investigation 10, Parts 2-3, pp. 318-324 Resources, pp. 83-89 CD, Planet Images; Notebooks</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58 Planetary Science Investigation 6, Part 2-3, pp. 197-205 Investigation 7, Part 2, pp. 222-229</p> <p>Planetary Science Resources, pp. 74-77, 90-99 CD, Notebooks: Space Exploration</p>
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STANDARD 4: EARTH and SPACE SCIENCE

EARTH and SPACE SCIENCE – The student will apply process skills to explore and develop an understanding of the structure of the earth system, earth’s history, and earth in the solar system.

Benchmark 4: The student will model motions and identify forces that explain earth phenomena.

INDICATOR	FOSS
<p>The student...</p> <p>1. demonstrates and models object/space/time relationships that explain phenomena such as the day, the month, the year, seasons, phases of the moon, eclipses and tides.</p> <p>2. describes how the angle of incidence of solar energy striking earth’s surface affects the amount of heat energy absorbed at earth’s surface.</p>	<p>Weather and Water Investigation 3, Parts 1-2, pp. 93-102 Resources, pp. 12-19 CD, Cycles, Seasons Planetary Science Investigation 3, Parts 1-2, pp. 89-98 Investigation 9, Parts 2-4, pp. 288-301 CD, Day/Night Simulation; Phases of the Moon</p> <p>Water Planet Science Resources, p. 45 Weather and Water Investigation 3, Part 3, pp. 103-110 Resources, pp. 17-19</p>

STANDARD 5: SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY – The student will demonstrate abilities of technological design and understanding about science and technology.

Benchmark 1: The student will demonstrate abilities of technological design.

INDICATOR	FOSS
<p>The student...</p> <p>1. identifies appropriate problems for technological design, designs a solution or product, implements the proposed design, evaluates the product, and communicates the process of technological design.</p>	<p>Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Investigation 3, Science Extension, pp. 26-27 Force and Motion Investigation 8, Part 2, pp. 294-301</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will apply process skills to explore and develop an understanding of issues of personal health, population, resources and environment, and natural hazards.

Benchmark 1: The student will understand scientific knowledge relative to personal health.

INDICATOR	FOSS
The student... 1. identifies individual nutrition, exercise, and rest needs based on science and uses a scientific approach to thinking critically about personal health, lifestyle choices, risks and benefits.	Food and Nutrition Investigation 4, Part 1, pp. 8-15 Science Stories, pp. 1-4, 21-23, 27-29, 37-40

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will apply process skills to explore and develop an understanding of issues of personal health, population, resources and environment, and natural hazards.

Benchmark 2: The student will understand the impact of human activity on resources and environment.

INDICATOR	FOSS
The student... 1. investigates the effects of human activities on the environment and bases decisions on knowledge of benefits and risks.	Landforms Science Stories, pp. 13-14, 43-44 Environments Science Stories, pp. 36-37, 43-45 Water Planet Science Resources, pp. 64-66 Earth History Resources, pp. 64-67 Weather and Water Resources, pp. 65-66 Populations and Ecosystems Resources, pp. 31-41

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will apply process skills to explore and develop an understanding of issues of personal health, population, resources and environment, and natural hazards.

Benchmark 3: The student will understand that natural hazards are dynamic examples of earth processes which cause us to evaluate risks.

INDICATOR	FOSS
The student...	

<p>1. recognizes patterns of natural processes and/or human activities that may cause and/or contribute to natural hazards.</p>	<p>Landforms Science Stories, pp. 13-14 Water Planet Investigation 4, Part 2, pp. 198-203 Science Resources, pp. 64-66 Environments Science Stories, pp. 36-37, 43-45 Weather and Water Resources, pp. 63-66, 67-76</p>
<p>2. evaluates risks and defines appropriate actions associated with the natural hazard.</p>	<p>Weather and Water Resources, pp. 63-66</p>

STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will examine and develop an understanding of science as a historical human endeavor.

Benchmark 1: The student will develop scientific habits of mind.

INDICATOR	FOSS
<p>The student...</p> <p>1. practices intellectual honesty, demonstrates skepticism appropriately, displays open-mindedness to new ideas, and bases decisions on evidence.</p>	<p>FOSS investigations are inquiry-based and provide the opportunity to teach this indicator.</p>

STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will examine and develop an understanding of science as a historical human endeavor.

Benchmark 2: The student will research contributions to science throughout history.

INDICATOR	FOSS
<p>The student...</p> <p>1. recognizes that new knowledge leads to new questions and new discoveries, replicates historic experiments to understand principles of science, and relates contributions of men and women to the fields of science.</p>	<p>Mixtures and Solutions Science Stories, pp. 5, 9-10, 33, 35-36 Variables Science Stories, pp. 4-6, 18-28 Models and Designs Science Stories, pp. 4-10, 29-32 Force and Motion Investigation 7, Part 3, pp. 267-272 Resources, pp. 50-52, 62-63 Populations and Ecosystems Resources, pp. 46-61 Planetary Science Resources, pp. 71-73</p>

GRADES 8-12

STANDARD 1: SCIENCE AS INQUIRY

SCIENCE AS INQUIRY – The student will develop the abilities necessary to do scientific inquiry and develop an understanding of scientific inquiry.

Benchmark 1: The student will demonstrate the abilities necessary to do scientific inquiry.

FOSS Middle School Modules are designated for grades 6-8. The indicators in this correlation are for grade 12 and represent the high school assessed indicators at grade 12. Correlations from FOSS would represent the grade eight curriculum that would contribute to the 8-12 indicators.

▲ = High School Assessed Indicator

INDICATOR	FOSS
<p>The student...</p> <p>1. actively engages in asking and evaluating research questions.</p> <p>2. ▲ actively engages in investigations, including developing questions, gathering and analyzing data, and designing and conducting research</p> <p>3. ▲ actively engages in using technological tools and mathematics in their own scientific investigations.</p> <p>4. actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that potential alternative explanations and models should be considered.</p>	<p>FOSS incorporates an inquiry approach to learning and provides opportunity for students to ask and evaluate questions. See for example:</p> <p>Earth History Investigation 4, Part 3, pp. 138-146</p> <p>Weather and Water Investigation 4, Part 1, pp. 121-130</p> <p>Diversity of Life Investigation 9, Part 2, pp. 278-285</p> <p>Force and Motion Investigation 1, Part 1, pp. 47-56</p> <p>Human Brain and Senses Investigation 7, Part 2, pp. 219-225</p> <p>Planetary Science Investigation 5, Parts 2-3, pp. 158- 167</p> <p>Diversity of Life Investigation 6, Part 1, pp. 186-192</p> <p>Force and Motion Investigation 6, Part 2, pp. 229-235</p> <p>Chemical Interactions Investigation 5, Part 3, pp. 165-171</p> <p>Weather and Water Investigation 5, Part 1, pp. 152-166</p> <p>Electronics Investigation 5, Parts 1-2, pp. 161-170</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p> <p>FOSS provides the opportunity to address this indicator. See for example:</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>Diversity of Life Investigation 9, Part 2, pp. 278-285</p> <p>Electronics</p>

<p>5. actively engages in communicating and defending the design, results, and conclusion of his/her investigation.</p>	<p>Investigation 3, Part 4, pp. 133-135</p> <p>FOSS investigations include discussions of experimental results. See for example:</p> <p>Earth History Investigation 4, Part 3, pp. 138-146</p> <p>Chemical Interactions Investigation 5, Part 1, pp. 153-158</p> <p>Human Brain and Senses Investigation 7, Part 2, pp. 219-225</p> <p>Force and Motion Investigation 2, Part 3, pp. 89-99</p>
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STANDARD 2A: CHEMISTRY

CHEMISTRY - The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

Benchmark 1: The student will understand the structure of the atom.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands atoms, the fundamental organizational unit of matter, are composed of subatomic particles. Chemists are primarily interested in the protons, electrons, and neutrons found in the atom.</p> <p>2. understands isotopes are atoms with the same atomic number (same number of protons) but different numbers of neutrons. The nuclei of some atoms are radioactive isotopes that spontaneously decay, releasing radioactive energy.</p>	<p>Chemical Interactions Investigation 7, Part 2, pp. 210-214 Investigation 9, Parts 1-2, pp. 280-297 Resources, pp. 14-15, 63-67, 73-74, 77</p> <p>Electronics Resources, p. 26 CD, Tech Manual: Atoms and Charge</p>

STANDARD 2A: CHEMISTRY

CHEMISTRY - The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

Benchmark 2: The student will understand the states and properties of matter.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands chemists use kinetic and potential energy to explain the physical and chemical properties of matter on earth that may exist in any of these three states: solids, liquids, and gases.</p> <p>2. ▲ understands the periodic table lists elements according to increasing atomic number. This table organizes physical and chemical trends by groups, periods, and sub-categories</p>	<p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 5, Parts 1-3, pp. 153-171 Investigation 7, Parts 1-4, pp. 204-234 Resources, pp. 16-48 Video: Particles in Solid, Liquid and Gas</p> <p>Chemical Interactions Investigation 2, Part 1, pp. 70-74 Resources, pp. 4-6, 90-91 CD, Periodic Table</p>

<p>3. ▲ understands chemical bonds result when valence electrons are transferred or shared between atoms. Breaking a chemical bond requires energy. Formation of a chemical bond releases energy. Ionic compounds result from atoms transferring electrons. Molecular compounds result from atoms sharing electrons.</p> <p>For example, carbon atoms can bond to each other in chains, rings, and branching networks. Branched network and metallic solids also result from bonding.</p>	
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STANDARD 2A: CHEMISTRY

CHEMISTRY - The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

Benchmark 3: The student will gain a basic concept of chemical reactions.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands a chemical reaction occurs when one or more substances (reactants) react to form a different chemical substance(s) (products). There are different types of chemical reactions all of which demonstrate the Law of Conservation of Matter and Energy.</p> <p>2. understands how to perform mathematical calculations regarding the Law of Conservation of Matter, i.e., through stoichiometric relationships.</p> <p>3. understands the differences and reactions between acids, bases, and salts. Perform calculations to determine the concentration of ions in solutions.</p>	<p>Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312 Investigation 10, Parts 1-2, pp. 323-336 Resources, pp. 63-67</p>

STANDARD 2B: PHYSICS

PHYSICS - The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

Benchmark 1: The student will understand the relationships between force and motion.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands Newton's Laws and the variables of time, position, velocity, and acceleration can be used to describe the position and motion of particles.</p> <p>2. understands physicists use conservation laws to analyze the motion of objects.</p>	<p>Force and Motion Investigations 1-7 Resources, pp. 17-19, 32-35, 50-52</p> <p>Force and Motion Investigation 8, Parts 1-2, pp. 284-301 Resources, pp. 70-74</p>

STANDARD 2B: PHYSICS

PHYSICS - The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

Benchmark 2: The student will understand the conservation of mass and energy, and the First and Second Laws of Thermodynamics.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands matter has energy. Mass and energy can be interchanged. The total energy in the universe is constant, but the type of energy may vary.</p> <p>2. ▲ understands the first law of thermodynamics states the total internal energy of a substance (the sum of all the kinetic and potential energies of its constituent molecules) will change only if heat is exchanged with the environment or work is done on or by the substance. In any physical interaction, the total energy in the universe is conserved.</p> <p>3. understands the second law of thermodynamics that states the entropy of the universe is increasing.</p>	

STANDARD 2B: PHYSICS

PHYSICS - The student will develop an understanding of the structure of atoms, compounds, chemical reactions, and the interactions of energy and matter.

Benchmark 3: The student will understand the nature of the fundamental interactions of matter and energy.

INDICATOR	FOSS
<p>The student ...</p> <p>1. There are four fundamental forces in nature: strong nuclear force, weak nuclear force, electromagnetic force, and gravitational force.</p> <p>2. ▲ understands waves have energy and can transfer energy when they interact with matter.</p> <p>3. The student understand interference – how waves interact with other waves</p> <p>4. The student will understand the principles of reflection and refraction.</p> <p>5. ▲ understands electromagnetic waves result when a charged particle is accelerated or decelerated</p> <p>6. The student understands basic electrostatics and circuits.</p>	<p>Electronics Investigations 1-3, 5-9 Resources, pp. 30-33</p>

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 1: The student will demonstrate an understanding of the structure and function of the cell.

INDICATOR	FOSS
<p>The student ...</p> <ol style="list-style-type: none"> 1. understands cells are composed of a variety of specialized structures that carry out specific functions. 2. ▲ understands cell functions involve specific chemical reactions. 3. understands cells function and replicate as a result of information stored in DNA and RNA molecules. 4. understands some plant cells contain chloroplasts, which are the sites of photosynthesis. 5. understands cells can differentiate, thereby enabling complex multicellular organisms to form. 	<p>Diversity of Life Investigation 4, Parts 1-2, pp. 133-141 Resources, pp. 22-30 CD, Cells and the Ribbon of Life</p> <p>Diversity of Life Resources, p. 36 Populations and Ecosystems Resources, pp. 14-15</p> <p>Diversity of Life Resources, p. 36</p>

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 2: The student will demonstrate an understanding of chromosomes, genes, and the molecular basis of heredity.

INDICATOR	FOSS
<p>The student ...</p> <ol style="list-style-type: none"> 1. ▲ understands living organisms contain DNA or RNA as their genetic material, which provides the instructions that specify the characteristics of organisms. 2. understands organisms usually have a characteristic number of chromosomes; one pair of these may determine the sex of individuals. 3. ▲ understands hereditary information is contained in genes, located in the chromosomes of each cell. 	<p>Populations and Ecosystems Resources, pp. 50-55</p> <p>Populations and Ecosystems Investigation 9, Part 2, pp. 267-272 Resources, pp. 50-55</p>

4. understands gametes carry the genetic information to the next generation.	Populations and Ecosystems Resources, pp. 53-54
5. understands expressed mutations occur in DNA at very low rates.	

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 3: The student will understand biological evolution.

INDICATOR	FOSS
The student ...	
1 ▲ understands biological evolution, descent with modification, is a scientific explanation for the history of the diversification of organisms from common ancestors	Populations and Ecosystems Investigation 10, Part 1, pp. 302-310 Resources, pp. 58-61
2. understands populations of organisms adapt to environmental challenges and changes as a result of natural selection, genetic drift, and various mechanisms of genetic change.	Populations and Ecosystems Investigation 10, Parts 2-3, pp. 311-317 Resources, pp. 58-61 CD, Larkeys, Natural Selection Video: Voyage to the Galapagos
3. ▲ understands biological evolution is used to explain the earth's present day biodiversity: the number, variety and variability of organisms.	Populations and Ecosystems Resources, pp. 58-61
4. ▲ understands organisms vary widely within and between populations. Variation allows for natural selection to occur.	Populations and Ecosystems Investigation 10, Parts 1-3, pp. 302-317 Resources, pp. 58-61
5. understands the primary mechanism acting on variation is natural selection	Populations and Ecosystems Investigation 10, Parts 2-3, pp. 311-317 Resources, pp. 58-61 Video: Voyage to the Galapagos
6. understands biological evolution is used as a broad, unifying theoretical framework for biology.	FOSS provides the opportunity to address this indicator. See citations above.

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 4: The student will understand the interdependence of organisms and their interaction with the physical environment.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands atoms and molecules on the earth cycle among the living and nonliving components of the biosphere.</p> <p>2. understands energy is received, transformed and expended in ecosystems.</p> <p>3. ▲ understands the distribution and abundance of organisms and populations in ecosystems are limited by the carrying capacity.</p> <p>4. understands organisms cooperate and compete in complex, interdependent relationships</p> <p>5. understands human beings live within and impact ecosystems</p>	<p>Populations and Ecosystems Investigation 5, Parts 1-4, pp. 142-169 Resources, pp. 14-21</p> <p>Populations and Ecosystems Investigation 6, Parts 2-3, pp. 187-197 Resources, pp. 22-24</p> <p>Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Investigation 5, Part 4, pp. 161-169 Resources, pp. 17-21, 25-27 CD, Mon Lake Food Web</p> <p>Populations and Ecosystems Investigation 7, pp. 210-215 Resources, pp. 28-29, 31-41</p>

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 5: The student will develop an understanding of matter, energy, and the organization in living things.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands living systems require a continuous input of energy to maintain their chemical and physical organization.</p> <p>2. ▲ understands the sun is the primary source of energy for life through the process of photosynthesis.</p> <p>3. ▲ understands food molecules contain biochemical energy, which is then available for cellular respiration.</p> <p>4. understands the structure and function of an</p>	<p>Populations and Ecosystems Investigation 5, Parts 1-4, pp. 142-169 Resources, pp. 17-21</p> <p>Populations and Ecosystems Investigation 5, Part 2, pp. 151-155 Resources, pp. 14-15 Diversity of Life Resources, p. 36</p> <p>Populations and Ecosystems Investigation 5, Part 1, pp. 142-150 Resources, pp. 14-18</p> <p>Diversity of Life</p>

organism serve to acquire, transform, transport, release, and eliminate the matter and energy used to sustain the organism.	Investigation 2, Part 3, pp. 85-91 Investigation 3, Part 2, pp. 108-115 Investigation 5, Parts 2-3, pp. 157-170 Investigation 6, Parts 1-2, pp. 186-197 Investigation 9, Part 1, pp.273-277 Resources, pp. 24-26, 31-39, 51-54
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STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 6: The student will understand the behavior of animals.

INDICATOR	FOSS
<p>The student ...</p> <ol style="list-style-type: none"> ▲ understands animals have behavioral responses to internal changes and to external stimuli. understands most multicellular animals have nervous systems that underlie behavior. understands behaviors are often adaptive when viewed in terms of survival and reproductive success. 	<p>Diversity of Life Investigation 8, Part 2, pp. 244-252 Investigation 9, Part 2, pp. 278-285 Resources, pp. 60-64</p>

STANDARD 3: LIFE SCIENCE

LIFE SCIENCE – The student will develop an understanding of the cell, molecular basis of heredity, biological evolution, interdependence of organisms, matter, energy, and organization in living systems, and the behavior of organisms.

Benchmark 7: The student will demonstrate an understanding of the diversity of structure and function in organisms.

INDICATOR	FOSS
<p>The student ...</p> <ol style="list-style-type: none"> understands differences in structure and function among organisms and can identify the characteristics of relevant life forms. ▲ understands that homeostasis is the dynamic regulation and balance of an organisms internal environment to maintain conditions suitable for survival. ▲ understands that living things change following a specific pattern of developmental stages called life cycles. understands that in complex organisms there is a division of labor into specific body systems i.e., respiration, digestion, nervous, endocrine, excretion, circulatory, reproductive, immune, skeletal and muscle. 	<p>Diversity of Life Investigation 3, Parts 1-3, pp. 102-122 Investigation 8, Part 1, pp. 239-243 Investigation 9, Part 1, pp. 273-277 Resources, pp. 55-58, 110-114</p> <p>Diversity of Life Resources, pp. 26, 53-54, 58-59</p>

5. understands taxonomy is the systematic way in which organism are placed into a hierarchical classification system, according to their physical and genetic characteristics and their evolutionary history.	Diversity of Life Resources, pp. 16-17, 65-68
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STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, the dynamics of the earth/moon/sun system, and the organization and development of the universe.

Benchmark 1: The student will develop an understanding of the sources of energy that power the subsystems and cycles of the dynamic earth; the geosphere, hydrosphere, atmosphere and biosphere.

INDICATOR	FOSS
The student ... 1. understands constructive and destructive processes, including weathering, erosion and deposition, dynamically reshape the surface of the earth.	Earth History Investigation 3, Part 4, pp. 108-111 Investigation 4, Parts 3-4, pp. 138-149 Resources, pp. 102-105 CD, Geology Lab: Earth Processes Video: Weathering and Erosion
2. ▲ understands the theory of Plate Tectonics explains that internal energy drives the earth's ever changing structure.	Earth History Resources, pp. 10-102
3. The ultimate source of atmospheric and oceanic energy comes from the sun. Energy flow drives global climate and weather. Climate and weather are influenced by geographic features, cloud cover, and the earth's rotation.	Weather and Water Investigation 3, Part 3, pp. 103-110 Investigation 8, Part 2, pp. 265-270 Investigation 9, Parts 1-3, pp. 296-318 Resources, pp. 22-26, 32-33, 53-55
4. Understands the processes of water cycling through surface water (oceans, lakes, streams, glaciers), ground water (aquifers), and the atmosphere. (hydrological cycle)	Weather and Water Investigation 7, Part 1-2, pp. 232-243 Resources, pp. 37-41

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, the dynamics of the earth/moon/sun system, and the organization and development of the universe.

Benchmark 2: The student will develop an understanding of the origin and development of the dynamic earth system.

INDICATOR	FOSS
The student ... 1. ▲ understands geological time is used to understand the earth's past.	Earth History Investigation 6, Parts 2-4, pp. 209-224 Investigation 7, Parts 1-2, pp. 234-243 Resources, pp. 76-88 CD, Time Room

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, the dynamics of the earth/moon/sun system, and the organization and development of the universe.

Benchmark 3: The student will develop an understanding of our solar system.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands gravitational attraction of objects in the solar system keeps solar system objects in orbit.</p>	<p>Planetary Science Resources, pp. 70, 84-85</p> <p>Force and Motion Resources, pp. 67-69</p>
<p>2. ▲ understands the relationship between the earth, moon, and sun explains the seasons, tides and moon phases.</p>	<p>Planetary Science Investigation 9, Parts 1-4, pp. 283-301 CD, Phases of the Moon</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-109 Resources, pp. 17-19</p>
<p>3. understands the relative sizes and distances of objects in the solar system.</p>	<p>Planetary Science Resources, pp. 84-89</p>
<p>4. understands the sun, earth, and other objects in the solar system formed from a nebular cloud of dust and gas.</p>	<p>Planetary Science Resources, pp. 84-85</p>

STANDARD 4: EARTH AND SPACE SCIENCE

EARTH AND SPACE SCIENCE – The student will develop an understanding of energy in the earth system, geochemical cycles, the formation and organization of the earth system, the dynamics of the earth/moon/sun system, and the organization and development of the universe.

Benchmark 4: The student will develop an understanding of the organization of the universe, and its development.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands stellar evolution.</p> <p>2. understands the current scientific explanation of the origin and structure of the universe.</p> <p>3. understand how the tools of astronomy have revolutionized the study of the universe.</p>	<p>Planetary Science Resources, pp. 74-77, 90-95, 97-103</p>

STANDARD 5: SCIENCE AND TECHNOLOGY

SCIENCE AND TECHNOLOGY – The student will develop understandings about the relationship between science and technology.

Benchmark 1: The student will develop an understanding that technology is applied science.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands technology is the application of scientific knowledge for functional purposes.</p> <p>2. understands creativity, imagination, and a broad scientific knowledge base are required to produce useful results.</p> <p>3. understands science advances new technologies. New technologies open new areas for scientific inquiry.</p>	<p>Planetary Science Resources, pp. 74-77, 90-95</p> <p>Chemical Interactions Resources, pp. 80-83</p> <p>Force and Motion Investigation 8, Part 2, pp. 294-301</p> <p>Electronics Investigation 4, Parts 1-2, pp. 143-151 Resources, p. 34-36</p> <p>FOSS investigations and resources provide the opportunity for teachers to address this indicator.</p> <p>Planetary Science Resources, pp. 74-77, 90-95</p> <p>Chemical Interactions Resources, pp. 80-83</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.

Benchmark 1: The student will develop an understanding of the overall functioning of human systems and their interaction with the environment in order to understand specific mechanisms and processes related to health issues.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands some chemical and physical hazards and accidents can be avoided through safety education</p> <p>2. understands the severity of disease symptoms is dependent on many factors,</p> <p>3. understands informed personal choices concerning fitness and health involve an understanding of chemistry and biology.</p> <p>4. understands selection of foods and eating patterns determine nutritional balance which affects emotional and physical well-being.</p>	<p>FOSS provides safety instruction guidelines in the Teacher Manual and safety precautions with each investigation where appropriate to share with students.</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.

Benchmark 2: The student will demonstrate an understanding of population growth.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands the rate of change in populations is determined by the combined effects of birth, death, emigration, and immigration.</p> <p>2. understands a variety of factors influence birth rates and fertility rates.</p> <p>3. understands populations have limits to growth.</p>	<p>Populations and Ecosystems Investigation 6, Parts 1-2, pp. 187-197 Resources, pp. 22-24</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.

Benchmark 3: The student will understand that human populations use natural resources an influence environmental quality.

INDICATOR	FOSS
<p>The student ...</p> <p>1. ▲ understands natural resources from the lithosphere and ecosystems are required to sustain human populations.</p> <p>2. understands earth does not have infinite resources.</p>	<p>Weather and Water Resources, pp. 45-47 Electronics Resources, p. 13 Populations and Ecosystems Resources, pp. 14-16</p> <p>Weather and Water Resources, pp. 45-47 Electronics Resources, p. 13</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.

Benchmark 4: The student will understand the effect of natural and human-induced hazards.

INDICATOR	FOSS
<p>The student ...</p> <p>1 understands natural processes of earth may be hazardous for humans.</p> <p>2. understands there is a need to assess potential risk and danger from natural and human-induced hazards</p>	<p>Weather and Water Resources, pp. 67-76</p> <p>Populations and Ecosystems Resources, pp. 28-29, 32-41</p> <p>Earth History Resources, p. 64-67</p>

STANDARD 6: SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES

SCIENCE IN PERSONAL AND ENVIRONMENTAL PERSPECTIVES – The student will develop an understanding of personal and community health, population growth, natural resources, environmental quality, natural and human-induced hazards, and science and technology in local, national, and global settings.

Benchmark 5: The student will develop an understanding of the relationship between science, technology, and society.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands progress in science and technology can be affected by social issues and challenges. Science and technology indicate what can happen, not what should happen.</p>	<p>FOSS provides the opportunity to address this indicator. See below:</p> <p>Planetary Science Resources, pp. 74-77, 90-95</p> <p>Electronics Resources, pp. 12-13, 18-21</p>

STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will develop an understanding of science as a human endeavor, the nature of scientific knowledge, and historical perspectives.

Benchmark 1: The student will develop an understanding that science is a human endeavor that uses models to describe and explain the physical universe.

INDICATOR	FOSS
<p>The student...</p> <p>1. demonstrates an understanding of science as both vocation and avocation.</p> <p>2. explains how science uses peer review, replication of methods, and norms of honesty.</p> <p>3. recognizes the universality of basic science concepts and the influence of personal and cultural beliefs that embed science in society.</p> <p>4. recognizes that society helps create the ways of thinking (mindsets) required for scientific advances, both toward training</p>	<p>Earth History Resources, pp. 98-99</p> <p>Chemical Interactions Resources, pp. 78-79</p> <p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p> <p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p> <p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p>

<p>scientists and educating a populace to utilize benefits of science (e.g., standards of hygiene, attitudes toward forces of nature, etc.).</p> <p>5. understands there are many issues which involve morals, ethics, values or spiritual beliefs that go beyond what science can explain, but for which solid scientific literacy is useful.</p> <p>6. recognizes society's role in supporting topics of research and determining institutions where research is conducted.</p>	<p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p>
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STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will develop an understanding of science as a human endeavor, the nature of scientific knowledge, and historical perspectives.

Benchmark 2: The student will develop an understanding of the nature of scientific knowledge.

INDICATOR	FOSS
<p>The student ...</p> <p>1. understands scientific knowledge describes and explains the physical world in terms of matter, energy, and forces. Scientific knowledge is provisional and is subject to change as new evidence becomes available.</p>	<p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p>
<p>2. understands scientific knowledge begins with empirical observations, which are the data (also called facts or evidence) upon which further scientific knowledge is built.</p>	<p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p>
<p>3. understands scientific knowledge consists of hypotheses, inferences, laws, and theories.</p>	<p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p>
<p>4. understands a testable hypothesis or inference must be subject to confirmation by empirical evidence</p>	<p>FOSS is an inquiry based program and provides the teacher opportunity to address this indicator.</p>

STANDARD 7: HISTORY AND NATURE OF SCIENCE

HISTORY AND NATURE OF SCIENCE – The student will develop an understanding of science as a human endeavor, the nature of scientific knowledge, and historical perspectives.

Benchmark 3: The student will understand science from historical perspectives.

INDICATOR	FOSS
<p>The student...</p> <p>1. demonstrates an understanding of the history of science.</p>	<p>Force and Motion Resources, pp. 50-52 Video: Galileo: On the Shoulders of Giants Populations and Ecosystems Resources, pp. 46-55,60-61 Chemical Interactions</p>

<p>2. demonstrates a knowledge that scientific method historically proceeded from an inductive approach rather than a deductive approach</p> <p>3. actively engages in conducting an inquiry, formulating and revising his or her scientific explanations and models (physical, conceptual, or mathematical) using logic and evidence, and recognizing that potential alternative explanations and models should be considered</p> <p>4. actively engages in communicating and defending the design, results, and conclusion of his/her investigation.</p>	<p>Resources, pp. 4-8, 69-72, 80-83 Earth History Resources, pp. 83-86</p> <p>Force and Motion Resources, pp. 50-52 Video: Galileo: On the Shoulders of Giants Populations and Ecosystems Resources, pp. 46-55 Chemical Interactions Resources, pp. 69-72 Earth History Resources, pp. 83-86</p> <p>FOSS investigations provide the opportunity to address this indicator. See examples below: Planetary Science Investigation 5, Parts 2-3, pp. 158-167 Diversity of Life Investigation 9, Part 2, p. 278-285 Weather and Water Investigation 4, Part 1, pp. 121-30 Electronics Investigation 3, Part 4, pp. 133-135</p> <p>FOSS investigations provide the opportunity to address this indicator. See examples below: Force and Motion Investigation 2, Part 3, pp. 89-99 Human Brain and Senses Investigation 7, Part 2, p. 219-225 Earth History Investigation 4, Part 3, pp. 138-146 Chemical Interactions Investigation 5, Part 1, pp. 153-158</p>
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