



FOSS Full Option Science System
(FOSS™)

Grades K-8

Correlation with

**New Mexico
Science Content Standards,
Benchmarks, and Performance Standards**



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(FOSS™)

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*****NOTE:**

The new FOSS alternative modules were not available at the time of the adoption submission – these modules have been just added and are indicated in **Red** (*April 2009*)

New Mexico Science Content Standards, Benchmarks, and Performance Standards Kindergarten

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

Benchmark	Performance Standards	Introduced	Publisher Citation
Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.	<ol style="list-style-type: none"> 1. Use observation and questioning skills in science inquiry (e.g., What happens when something is pushed or pulled?). 2. Ask and answer questions about surroundings and share findings with classmates. 3. Record observations and data with pictures, numbers, and symbols. 	<p>All FOSS units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Fabric Investigation 1, Parts 1 and 2; pp 6-15 Wood and Paper Investigation 3, Part 1; pp 8-12</p>	<p>All FOSS units; e.g.: Trees Investigation 1, Part 1; pp 7-14 Animals Two by Two Investigation 1, Part 3; pp 22-26 Animals Two by Two FOSS Science Stories, p 3</p>
Use scientific thinking and knowledge and communicate findings.	Communicate observations and answer questions about surroundings.	<p>All FOSS units; e.g.: Fabric Investigation 2, Part 4; pp 22-25 Wood and Paper Investigation 1, Part 5; pp 28-32</p>	<p>All FOSS units; e.g.: Animals Two by Two Investigation 1, Part 1; pp 10-16 Trees Investigation 1, Part 6; pp 28-30</p>
Use mathematical skills and vocabulary to analyze data,	Observe and describe the relative sizes and characteristics of objects (e.g., bigger, brighter, louder, smellier).	<p>All FOSS units; e.g.: Fabric Investigation 1, Parts 1 and 2;</p>	<p>All FOSS units; e.g.: Trees Investigation 1, Part 1;</p>

understand patterns and relationships, and communicate findings.	pp 6-15 Wood and Paper Investigation 1, Part 1; pp 8-14	pp 7-14 Investigation 3, Part 8; pp 32-34
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Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation	
		Introduced	Practiced
Recognize that matter has different forms and properties.	<ol style="list-style-type: none"> 1. Observe that objects are made of different types of materials (e.g., metal, plastic, cloth, wood). 2. Observe that different materials have different properties (e.g., color, odor). 	Wood and Paper- All, e.g.: Investigation 1, Part 1; Pp 8-14 Fabric- All, e.g.: Investigation 1, Part 1; Pp 7-11	Wood and Paper- All, e.g.: Investigation 3, Parts 2-4; Pp 13-25 Fabric- All, e.g.: Investigation 2, Part 1; Pp 6-11
Know that energy is needed to get things done and that energy has different forms.	<ol style="list-style-type: none"> 1. Observe how energy does things (e.g., batteries, the sun, wind, electricity). 		
Identify forces and describe the motion of objects.	<ol style="list-style-type: none"> 1. Observe that things move in many different ways (e.g., straight line, vibration, circular). 2. Know that the position and motion of an object (direction or speed) are changed by pushing or pulling it. 		

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation	
		Introduced	Practiced
Know that living things have diverse forms, structures, functions, and habitats.	<ol style="list-style-type: none"> 1. Identify major structures of common living organisms (e.g., stems, leaves, and roots of plants; arms, wings, and legs of animals). 2. Observe that differences exist among individual living organisms (e.g., plants, animals) of the same kind. 	Trees, Investigation 1, Part 1-2; pp 7-22 Animals Two by Two, - ALL, e.g. Investigation 3, Part 1; Pp 8-12	Trees, Investigation 1, Part 3-6; pp 23-30 <u>Trees FOSS Science Stories;</u> <u>Pp 3-14</u> Animals Two by Two-ALL, e.g. Investigation 3, Parts 2-3; Pp 13-20 <u>Animals Two by Two FOSS Science Stories;</u>

<p>Know that living things have similarities and differences and that living things change over time.</p>	<ol style="list-style-type: none"> 1. Observe and describe similarities and differences in the appearance and behavior of living organisms (e.g., plants, animals). 2. Observe that living organisms (e.g., plants, animals) closely resemble their parents. 	<p>Animals Two by Two-ALL, e.g. Investigation 1, Part 1; Pp 10-16 Investigation 5, Part 1; Pp 10-15</p> <p>Trees, Investigation 3, Part 1; Pp 7-14</p>	<p>Pp 3-19</p> <p>Animals Two by Two-ALL, e.g. Investigation 1, Parts 2-4; Pp 11-29 Investigation 5, Parts 2-3; Pp 16-27 <u>Animals Two by Two FOSS Science Stories</u>; Pp 15-24 Trees, Investigation 3, Parts 2-6; Pp 15-25 <u>Trees FOSS Science Stories</u> Pp 16-21</p>
<p>Know the parts of the human body and their functions.</p>	<ol style="list-style-type: none"> 1. Use the senses (e.g., sight, hearing, smell, taste, touch) to observe surroundings, and describe the observations. 2. Identify the parts of the human body (e.g., legs, arms, head, hands) and the functions of these parts. 	<p><i>Note: All FOSS kindergarten modules focus on making careful observations using the senses.</i></p> <p>Fabric Investigation 1, Part 1; Pp 6-11 Trees Investigation 1, Part 1; Pp</p>	<p>Fabric Investigation 1, Part 2; Pp 12-15 Trees Investigation 1, Parts 7-8; Pp 31-37</p>

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of the Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
<p>Know the structure of the solar system and the objects in the universe.</p>	<ol style="list-style-type: none"> 1. Observe that there are many objects in the night sky and that some are brighter than others. 2. Describe the location and movements of objects in the sky (e.g., stars, sun, moon). 	
<p>Know the structure and formation of Earth and its atmosphere and the processes that shape them.</p>	<ol style="list-style-type: none"> 1. Observe that changes in weather occur from day to day and season to season. 2. Observe that the sun warms the land and water and they warm the air. 	<p>Trees, Investigation 3, Parts 1-9; Pp 10-38</p> <p><u>Trees FOSS Science Stories</u>; pp-14-24</p>

Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation	
		Introduced	Practiced
Describe how science influences decisions made by individuals and societies.	<ol style="list-style-type: none"> 1. Recognize that germs exist and may cause disease. 2. Describe how science helps provide products we use every day (e.g., gasoline for cars, electricity for lights, refrigerators, TVs, gas or electricity for heating and cooking). 	Wood and Paper, Investigation 1, Part 1; Pp 8-11 Investigation 4, Part 1; Pp 8-13	Wood and Paper, Investigation 1, Parts 2-5; Pp 12-32 Investigation 4, Part 2; Pp 14-18

First Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		<i>Publisher Citation</i>	
<i>Benchmark</i>	<i>Performance Standards</i>	<i>Introduced</i>	<i>Practiced</i>
Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.	<ol style="list-style-type: none"> 1. Make observations, develop simple questions, and make comparisons of familiar situations (e.g., What does the seed look like when it starts to grow?). 2. Describe relationships between objects (e.g., above, next to, below) and predict the results of changing the relationships (e.g., When that block moves, what will happen to the one next to it?). 	All FOSS units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Air and Weather, Investigation 2, Part 1; Pp 8-13	All FOSS units; e.g.: Air and Weather, Investigation 2, Parts 2-4; Pp 14-32
Use scientific thinking and knowledge and communicate findings.	Know that simple investigations do not always turn out as planned.	All FOSS units; e.g.: Pebbles, Sand and Silt, Investigation 2, Part 1; Pp 8-13 Insects, Investigation 1, Part 1; Pp 8-15 Balance and Motion, Investigation 3, Part 1; Pp 6-15 Plants and Animals, Investigation 4, Parts 1-2, pp, 157-163	All FOSS units; e.g.: Pebbles, Sand and Silt, Investigation 2, Parts 2-4; Pp 14-29 Insects, Investigation 1, Parts 2-3; Pp 16-25 Balance and Motion, Investigation 3, Parts 2-3; Pp 16-25
Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.	Use numbers and mathematical language (e.g., “addition” instead of “add to,” “subtraction” instead of “take away”) to describe phenomena	Solids and Liquids, Investigation 2, Part 1; Pp 10-14 Air and Weather, Investigation 2, Part 1; Pp 8-12	Solids and Liquids, Investigation 2, Parts 2-3; Pp 15-27 Air and Weather, Investigation 2, Parts 2-4; Pp 13-32

Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publsher Citation
Recognize that matter has different forms and properties.	<ol style="list-style-type: none"> 1. Observe that the three states of matter (i.e., solids, liquids, and gases) have different properties (e.g., water can be liquid, ice, or steam). 2. Describe simple properties of matter (e.g., hardness, flexibility, transparency). 	<p>Solids and Liquids, ALL, e.g.: Investigation 1, Parts 2-3; Pp 17-24 Investigation 4, Parts 2-3; Pp 17-27 <u><i>Solids and Liquids FOSS Science Stories;</i></u> Pp 8-26</p>
Know that energy is needed to get things done and that energy has different forms.	<ol style="list-style-type: none"> 1. Observe and describe how energy produces changes (e.g., heat melts ice, gas makes car go uphill, electricity makes TV work). 	<p>Air and Weather Investigation 2, Part 2; Pp 14-19 Investigation 3, Part 1; Pp 8-11</p>
Identify forces and describe the motion of objects.	<ol style="list-style-type: none"> 1. Describe ways to make things move, what causes them to stop, and what causes a change of speed, or change of direction. 2. Observe that gravity makes things fall to the ground unless something holds them up. 	<p>Balance and Motion Investigation 2, Parts 2-3; Pp 14-25 Investigation 3, Parts 2-3; Pp 13-25 <u><i>Balance and Motion FOSS Science Stories;</i></u> Pp 3-24</p>

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publsher Citation
Know that living things have diverse forms, structures, functions and habits.	<ol style="list-style-type: none"> 1. Know that living organisms (e.g., plants, animals) have needs (e.g., water, air, food, sunlight). 2. Know that living organisms (e.g., plants, animals) inhabit various environments and have various external features to help them 	<p>Insects, ALL, such as Investigation 3, Part 1; Pp 3-15 New Plants, Investigation 2, Part 1; Pp 3-14</p>

	satisfy their needs (e.g., leaves, legs, claws).	Plants and Animals , Investigation 1, Part 1, pp. 47-57 Investigation 2, Parts 1-2, p. 87-103 Science Resources, pp. 3-7, 21-24, 28-45 Insects and Plants , ALL, such as Investigation 1, Part 1, pp. 52-61
Know that living things have similarities and differences and that living things change over time.	<ol style="list-style-type: none"> Describe the differences and similarities among living organisms (e.g., plants, animals). Observe that living organisms (e.g., plants, animals) have predictable but varied life cycles. 	Insects , ALL, such as Investigation 3, Part 1; Pp 3-15 New Plants , Investigation 2, Part 1; Pp 3-14 Plants and Animals , Investigation 1, Part 1, pp. 47-57 Insects and Plants , ALL, such as Investigation 5, Parts 1-3, pp. 206-225

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of the Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems

	Performance Standards	Publisher Citation
Benchmark Know the structure of the solar system and the objects in the universe.	<ol style="list-style-type: none"> Observe the changes that occur in the sky as day changes into night and night into day. Describe the basic patterns of objects as they move through the sky: <ul style="list-style-type: none"> sun appears in the day moon appears at night but can sometimes be seen during the day sun and moon appear to move across the sky moon appears to change shape over a month. Recognize that the sun, moon, and stars all appear to move slowly across the sky. 	Air and Weather , Investigation 2, Parts 2-4; Pp 12-32
Know the structure and formation of Earth and its atmosphere and the processes that shape them.	<ol style="list-style-type: none"> Know that simple tools can be used to measure weather conditions (e.g., thermometer, wind sock, hand held anemometer, rain gauge) and that measurements can be recorded from day to day and across seasons. 	Air and Weather , Investigation 2, Parts 2-4; Pp 13-32 Investigation 4, Parts 1-2; Pp 8-18 <i>New Plants FOSS Science Stories</i> ;

	2. Know that there are different climates (e.g., desert, arctic, rainforest).		Pp 18-24 Plants and Animals, Science Resources, pp. 28-45
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Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation
Describe how science influences decisions made by individuals and societies.	<ol style="list-style-type: none"> 1. Know that germs can be transmitted by touching, breathing, and coughing, and that washing hands helps prevent the spread of germs. 2. Describe how science has assisted in creating tools (e.g., plows, knives, telephones, cell phones, computers) to make life easier and more efficient. 3. Describe how tools and machines can be helpful, harmful, or both (e.g., bicycles, cars, scissors, stoves). 4. Know that men and women of all ethnic and social backgrounds practice science and technology. 	<p style="text-align: center;">Pebbles, Sand and Silt Investigation 2, Part 1; pp 8-13 Investigation 3, Part 2; pp12-15</p>

Second Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		<i>Publisher Citation</i>	
<i>Benchmark</i>	<i>Performance Standards</i>	<i>Introduced</i>	<i>Practiced</i>
Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.	<ol style="list-style-type: none"> 1. Conduct simple investigations (e.g., measure the sizes of same kind of plants that are grown in sunlight or shade). 2. Use tools to provide information not directly available through only the senses (e.g., magnifiers, rulers, thermometers). 3. Make predictions based on observed patterns as opposed to random guessing. 4. Follow simple instructions for a scientific investigation. 	All FOSS units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Balance & Motion , Investigation 2, part3; Pp 20-25 Balance & Motion , Investigation 1, parts 1-3; Pp 8-24	All FOSS units; e.g.: Solids & Liquids Investigation 4; Pp 7-27 <u><i>Pebbles, Sand & Silt, FOSS Science Stories</i></u> ; Pp 22-23
Use scientific thinking and knowledge and communicate findings.	<ol style="list-style-type: none"> 1. Understand that in doing science it is often helpful to work with a team and share findings. 2. Make accurate observations and communicate findings about investigations. 	All FOSS units; e.g.: Insects , Investigation 1, parts 1-3; Pp 8-25	All FOSS units; e.g.: Insects , Investigation 2-6, all parts
Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.	<ol style="list-style-type: none"> 1. Record observations on simple charts or diagrams. 2. Measure length, weight, and temperature with appropriate tools and express those measurements in accurate mathematical language. 	All FOSS units; e.g.: New Plants , Investigation 1, parts 1-3; pp 8-30	All FOSS units; e.g.: New Plants , Investigation 2, parts 1-3; pp 8-28

Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation
Recognize that matter has different forms and properties.	<ol style="list-style-type: none"> 1. Observe that properties of substances can change when they are mixed, cooled, or heated (e.g., salt dissolves in water, ice melts). 2. Describe the changes that occur when substances are heated or cooled and change from one state of matter to another (i.e., solid, liquid, and gas). 	<p>Solids and Liquids, ALL, e.g.: Investigation 1, Part 1; Pp 8-16 Investigation 4, Part 1; Pp 7-16</p> <p>Solids and Liquids, ALL, such as Investigation 1, Parts 2-3; Pp 17-24 Investigation 4, Parts 2-3 Pp 17-27 <u><i>Solids and Liquids FOSS Science Stories; Pp 8-26</i></u></p>
Know that energy is needed to get things done and that energy has different forms.	<ol style="list-style-type: none"> 1. Describe how heat can be produced (e.g., burning, rubbing, mixing some substances). 2. Know that heat moves more rapidly in thermal conductors (e.g., metal pan) than in insulators (e.g., plastic handle). 3. Describe the usefulness of some forms of energy (e.g., electricity, sunlight, wind, sound) and how energy (e.g., heat, light,) can affect common objects (e.g., sunlight warms dark objects, heat melts candles). 4. Observe that sound is made by vibrating objects and describe it by its pitch and loudness. 5. Recognize that moving objects carry energy. 	<p>Air & Weather, Investigation 3, Part 1; pp 8-11</p> <p>Air & Weather, Investigation 3, Parts 2-5; pp 12-33 <u><i>Solids and Liquids FOSS Science Stories; Pp 14-17</i></u></p> <p>Balance & Motion, Investigation 2, part 2; pp 17-19 Extension;p27</p> <p>Balance & Motion, Investigation 2, Interdisciplinary</p>
Identify forces and describe the motion of objects.	<ol style="list-style-type: none"> 1. Describe how the strength of a push or pull affects the change in an object's motion (e.g., how a big or small push affects how high a swing rises). 2. Observe that electrically charged materials and magnets attract and repel each other, and observe their effects on other kinds of materials. 	<p>Balance & Motion, Investigation 3, part 2; pp 13-18</p>

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation
Know that living things have diverse forms, structures, functions, and habitats.	<ol style="list-style-type: none"> 1. Observe that diversity exists among individuals within a population. 2. Observe and describe various shapes of fungi. 3. Know that bacteria and viruses are germs. 	<p>Insects, ALL, e.g.: Investigation 3, Part 1; pp 8-11</p> <p>Insects and Plants, ALL, such as Investigation 5, Parts 1-3, pp. 206-225</p>
Know that living things have similarities and differences and that living things change over time.	<ol style="list-style-type: none"> 1. Explain that stages of the life cycle are different for different animals (e.g., mouse, cat, horse, butterfly, frog). 2. Observe that many characteristics of the offspring of living organisms (e.g., plants or animals) are inherited from their parents. 3. Observe how the environment influences some characteristics of living things (e.g., amount of sunlight required for plant growth). 	<p>Insects, All; e.g.: Investigation 1, part 1-3; Pp 8-25</p> <p>Investigation 2, Parts 1-3; Pp 8-24</p> <p>New Plants, Investigation 1, parts 1-3; pp 8-30</p> <p>Insects and Plants, ALL, such as Investigation 1, Parts 1-3, pp. 52-75</p>
Know the parts of the human body and their functions.	<ol style="list-style-type: none"> 1. Identify a variety of human organs (e.g., lungs, heart, stomach, brain). 2. Know that various nutrients are required for specific parts and functions of the body (e.g., milk for bones and teeth, protein for muscles, sugar for energy). 3. Identify the functions of human systems (e.g., respiratory, circulatory, digestive). 	

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of the Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
Know the structure of the solar system and the objects in the universe.	<ol style="list-style-type: none"> 1. Observe that the phase of the moon appears a little different every day but looks the same again after about four weeks. 2. Observe that some objects in the night sky are brighter than others. 3. Know that the sun is a star. 	<p>Air and Weather, Investigation 4, Part 3; Pp 19-24</p>
Know the structure and formation of Earth and its atmosphere and the processes that shape them.	<ol style="list-style-type: none"> 1. Know that rocks have different shapes and sizes (e.g., boulders, pebbles, sand) and that smaller rocks result from the breaking and weathering of larger rocks. 2. Understand that rocks are made of materials with distinct properties. 	<p>Pebbles, Sand and Silt, ALL, e.g.: Investigation 2, Part 1; pp 8-13</p> <p>Pebbles, Sand and Silt, Investigation 4, Part 1; pp 8-14</p>

	<p>3. Know that soil is made up of weathered rock and organic materials, and that soils differ in their capacity to support the growth of plants.</p> <p>4. Recognize the characteristics of the seasons.</p>	<p>Air & Weather, Investigation 4, Part 1; pp 8-15</p>
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Strand III: Science and Society

Standard III: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation
<p>Describe how science influences decisions made by individuals and societies.</p>	<ol style="list-style-type: none"> 1. Describe ways to prevent the spread of germs (e.g., soap, bleach, cooking). 2. Know that science has ways to help living things avoid sickness or recover from sickness (e.g., vaccinations, medicine) and adult supervision is needed to administer them. 3. Know that some materials are better than others for making particular things (e.g., paper, cardboard, plastic, metal, fiberglass, wood). 4. Understand that everybody can do science, invent things, and formulate ideas. 5. Know that science has discovered many things about objects, events, and nature and that there are many more questions to be answered. 	<p>Solids & Liquids, Investigation 1, part 1; Pp 8-16 <i>Pervasive throughout FOSS units</i></p> <p>Solids & Liquids, Investigation 1, parts 2-3; Pp 17-24 <i>Pervasive throughout FOSS units</i></p>

Third Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		<i>Publisher Citation</i>	
<i>Benchmark</i>	<i>Performance Standards</i>	<i>Introduced</i>	<i>Practiced</i>
Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.	<ol style="list-style-type: none"> 1. Make new observations when discrepancies exist between two descriptions of the same object or phenomenon to improve accuracy. 2. Recognize the difference between data and opinion. 3. Use numerical data in describing and comparing objects, events, and measurements. 4. Collect data in an investigation and analyze those data. 5. Know that the same scientific laws govern investigations in different times and places (e.g., gravity, growing plants). 	<p>All FOSS units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.:</p> <p>Human Body Investigation 4, Part 1; Pp 8-16</p> <p>Earth Materials Investigation 3, Part 1; pp 8-13</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p>	<p>All FOSS units; e.g.:</p> <p>Human Body Investigation 4, Parts 2-3; Pp 17-24</p> <p>Investigation 4, Part 4; pp25-29</p> <p>Earth Materials Investigation 3, Part 2; pp 14-119 Investigation 4, Part 2; pp14-18</p>
Use scientific thinking and knowledge and communicate findings.	<ol style="list-style-type: none"> 1. Use a variety of methods to present data and findings. 2. Understand that predictions are based on observations, measurements, and cause-and-effect relationships. 	<p>All FOSS units; e.g.:</p> <p>Physics of Sound Investigation 4, Part 1; Pp 6-15</p> <p>Water Investigation 2, Part 1; Pp 8-13</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p>	<p>All FOSS units; e.g.:</p> <p>Physics of Sound Investigation 4, Part 2; Pp 16-20</p> <p>Water Investigation 2, Parts 2-3; Pp 14-24</p> <p>Sun, Moon and Stars Investigation 1, Part 2, pp. 56-64</p>

Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Covered in depth in FOSS <i>Mixtures & Solutions</i>, 5th – 6th grade unit	Publisher Citation
<p>Recognize that matter has different forms and properties.</p>	<ol style="list-style-type: none"> 1. Identify and compare properties of pure substances and mixtures (e.g., sugar, fruit juice). 2. Separate mixtures based on properties (e.g., by size or by substance; rocks and sand, iron filings and sand, salt and sand). 	<p>Covered in depth in FOSS <i>Mixtures & Solutions</i>, 5th – 6th grade unit</p>	
<p>Know that energy is needed to get things done and that energy has different forms.</p>	<ol style="list-style-type: none"> 1. Understand that light is a form of energy and can travel through a vacuum. 2. Know that light travels in a straight line until it strikes an object and then it is reflected, refracted, or absorbed. 3. Measure energy and energy changes (e.g., temperature changes). 4. Construct charts or diagrams that relate variables associated with energy changes (e.g., melting of ice over time.) 	<p>Ideas and Inventions Investigation 4, Part 2; Pp 14-17 Matter and Energy Investigation 2, Part 1, pp. 93-102 Ideas and Inventions Investigation 4, Part 2; Pp 14-17 Water Investigation 2, Part 3; pp 19-24 Matter and Energy Investigation 4, Part 1, pp. 174-180</p>	<p>Ideas and Inventions Investigation 4, Part 3; Pp 18-21 <i>Ideas and Inventions FOSS Science Stories</i>; Pp 23-25; 26-27, 28-30 Matter and Energy Investigation 2, Part 2, pp. 103-114 Water Investigation 3, Parts 1-4; pp8-26 <i>Water FOSS Science Stories</i>; pp 2-11, 13-16 Water Investigation 2, Parts 1-3; pp 8-24 <i>Water FOSS Science Stories</i>; pp 2-11, 13-16</p>
<p>Identify forces and describe the motion of objects.</p>	<ol style="list-style-type: none"> 1. Recognize that magnets can produce motion by attracting some materials (e.g., steel) and have no effect on others (e.g., plastics). 2. Describe how magnets have poles (N and S) and that like poles repel each other while unlike poles attract. 3. Observe that some forces produce motion without objects touching (e.g., magnetic force on nails). 4. Describe motion on different time scales (e.g., the slow motion of a plant toward light, the fast motion of a tuning fork). 	<p>See above Magnetism and Electricity Investigation 1, Part 1; Pp 8-17 Investigation 1, Part 2; Pp 18-232 Magnetism and Electricity Investigation 1, Part 2; Pp 18-232</p>	<p>Magnetism and Electricity Investigation 1, Parts 3-4; pp 23-34 <i>Magnetism and Electricity FOSS Science Stories</i>; Pp 1-7; 20-23</p>

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structure and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation
Know that living things have diverse forms, structures, functions, and habitats.	<ol style="list-style-type: none"> 1. Know that an adaptation in physical structure or behavior can improve an organism's chance for survival (e.g., horned toads, chameleons, cacti, mushrooms). 2. Observe that plants and animals have structures that serve different functions (e.g., shape of animals' teeth). 3. Classify common animals according to their observable characteristics (e.g., body coverings, structure). 4. Classify plants according to their characteristics (e.g., tree leaves, flowers, seeds). 	<p>Structures of Life, ALL; e;g:: Investigation 3, part 1, pp 8-15</p> <p>Structures of Life, Investigation 1, part 3, Part 3, pp 28-33</p> <p>Structures of Life, Investigation 4, Part 1, pp 8-13, Part 2, pp 14-19 <u>FOSS Structures of Life Science Stories</u> p.17-19</p>
Know that living things have similarities and differences and that living things change over time.	<ol style="list-style-type: none"> 1. Identify how living things cause changes to the environments in which they live, and that some of these changes are detrimental to the organism and some are beneficial. 2. Know that some kinds of organisms that once lived on Earth have become extinct (e.g., dinosaurs) and that others resemble those that are alive today (e.g., alligators, sharks). 	<p>Structures of Life, Part 4, p 31 Science Extensions</p> <p><u>Structures of Life FOSS Science Stories</u>, pp 35-36, 45-48</p>
Know the parts of the human body and their functions.	<ol style="list-style-type: none"> 1. Know that bacteria and viruses are germs that affect the human body. 2. Describe the nutrients needed by the human body. 	

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
Know the structure of the solar system and the objects in the universe.	<ol style="list-style-type: none"> 1. Describe the objects in the solar system (e.g., sun, Earth and other planets, moon) and their features (e.g., size, temperature). 2. Describe the relationships among the objects in the solar system (e.g., relative 	<p>Sun, Moon and Stars Investigation 2, Part 1-2, pp. 79-100 Science Resources, pp. 1-3, 14-17, 19-32</p> <p>Sun, Moon and Stars Science Resources, pp. 16-17</p>

	<p>distances, orbital motions).</p> <ol style="list-style-type: none"> 3. Observe that the pattern of stars stays the same as they appear to move across the sky nightly. 4. Observe that different constellations can be seen in different seasons. 5. Know that telescopes enhance the appearance of some distant objects in the sky (e.g., the moon, planets). 	<p>Sun, Moon and Stars Investigation 3, Part 1, pp. 114-125</p> <p>Sun, Moon and Stars Investigation 3, Part 1, pp. 114-125</p> <p>Sun, Moon and Stars Investigation 3, Part 2, pp. 126-130</p>	<p>Sun, Moon and Stars Investigation 3, Part 2, pp. 126-130</p> <p>Science Resources, pp. 36-39</p> <p>Sun, Moon and Stars Science Resources, pp. 37-39</p> <p>Sun, Moon and Stars Science Resources, pp. 40-43</p>
<p>Know the structure and formation of Earth and its atmosphere and the processes that shape them.</p>	<ol style="list-style-type: none"> 1. Know that Earth's features are constantly changed by a combination of slow and rapid processes that include the action of volcanoes, earthquakes, mountain building, biological changes, erosion, and weathering. 2. Know that fossils are evidence of earlier life and provide data about plants and animals that lived long ago. 3. Know that air takes up space, is colorless, tasteless, and odorless, and exerts a force. 4. Identify how water exists in the air in different forms (e.g., in clouds and fog as tiny droplets; in rain, snow, and hail) and changes from one form to another through various processes (e.g., freezing/condensation, precipitation, evaporation). 	<p>Water, ALL; e.g.: Investigation 2, part 3, pp 19-24</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-139</p>	<p><u>Structures of Life FOSS Science Stories</u>, pp45-48</p> <p>Water, ALL; e.g.: Investigation 3, part 1-4, pp 8-26</p> <p><u>FOSS Water Science Stories</u> p.8-16</p> <p>Matter and Energy Science Resources, pp. 39-42</p>

Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation
<p>Describe how science influences decisions made by individuals and societies.</p>	<ol style="list-style-type: none"> 1. Describe how food packaging (e.g., airtight containers, date) and preparation (heating, cooling, salting, smoking, drying) extend food life and the safety of foods (e.g., elimination of bacteria). 2. Know that science produces information for the manufacture and recycling of materials (e.g., materials that can be recycled 	

	<p>[aluminum, paper, plastic] and others that cannot [gasoline]).</p> <ol style="list-style-type: none">3. Know that naturally occurring materials (e.g., wood, clay, cotton, animal skins) may be processed or combined with other materials to change their properties.4. Know that using poisons can reduce the damage to crops caused by rodents, weeds, and insects, but their use may harm other plants, animals, or the environment.		
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Fourth Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		<i>Publisher Citation</i>	
<i>Benchmark</i>	<i>Performance Standards</i>	<i>Introduced</i>	<i>Practiced</i>
Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of data.	<ol style="list-style-type: none"> 1. Use instruments to perform investigations (e.g., timers, balances) and communicate findings. 2. Differentiate observation from interpretation and understand that a scientific explanation comes in part from what is observed and in part from how the observation is interpreted. 3. Conduct multiple trials to test a prediction, draw logical conclusions, and construct and interpret graphs from measurements. 4. Collect data in an investigation using multiple techniques, including control groups, and analyze those data to determine what other investigations could be conducted to validate findings. 	<p>All FOSS Units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Earth Materials, Investigation 1, part 1; Structures of Life, Investigation 1, part 3; Pp 28-33 Investigation 4, part 3; Pp 20-24 Magnetism & Electricity, Investigation 4, ALL; Pp 8-22</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p>	<p>All FOSS Units; e.g.: Earth Materials, Investigation 1, part 2; Pp 16-23 1, part 1; Structures of Life, Investigation 1, part 3; Pp 28-33 Investigation 4, part 3; Pp 20-24 Magnetism & Electricity, Investigation 4, ALL; Pp 8-22</p>
Use scientific thinking and knowledge and communicate findings.	<ol style="list-style-type: none"> 1. Communicate ideas and present findings about scientific investigations that are open to critique from others. 2. Describe how scientific investigations may differ from one another (e.g., observations of nature, measurements of things changing over time). 3. Understand how data are used to explain how a simple system functions (e.g., a thermometer to measure heat loss as water cools). 	<p>Most FOSS Units; e.g.: Earth Materials, Investigation 1, part 1; Pp 8-15 Sun, Moon and Stars Investigation 1, Part 2, pp. 56-64</p>	<p>Most FOSS Units; e.g.: Earth Materials, Investigation 1, part 3; Pp 24-29 Investigation 2-4 ALL Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100</p>
Use mathematical skills and vocabulary to analyze data, understand patterns and relationships, and communicate findings.	<ol style="list-style-type: none"> 1. Conduct multiple trials using simple mathematical techniques to make and test predictions. 2. Use mathematical equations to formulate and justify predictions based on cause-and-effect relationships. 3. Identify simple mathematical relationships 	<p>Many FOSS Units; e.g.: Magnetism & Electricity, Investigation 1, part 3; Pp 23-30 Matter and Energy Investigation 3, Part 2, pp. 139-150</p>	<p>Many FOSS Units; e.g.: Magnetism & Electricity, Investigation 4, ALL; Pp 8-22 Matter and Energy Investigation 3, Part 3, pp. 151-160</p>

	<p>in a scientific investigation (e.g., the relationship of the density of materials that will or will not float in water to the density of water.)</p>		
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Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation
<p>Recognize that matter has different forms and properties.</p>	<ol style="list-style-type: none"> 1. Know that changes to matter may be chemical or physical and when two or more substances are combined, a new substance may be formed with properties that are different from those of the original substances (e.g., white glue and borax, cornstarch and water, vinegar and baking soda). 2. Know that materials are made up of small particles (atoms and molecules) that are too small to see with the naked eye. 3. Know that the mass of the same amount of material remains constant whether it is together, in parts, or in a different state. 	<p>Matter and Energy Investigation 4, Part 3, pp. 193-203</p> <p><u>FOSS Measurement Science Stories:</u> <u>pp 30-33</u></p> <p>Matter and Energy Investigation 4, Part 2, pp. 181-192</p> <p>Matter and Energy Science Resources, p. 70</p> <p>Matter and Energy Science Resources, pp. 57-59</p>
<p>Know that energy is needed to get things done and that energy has different forms.</p>	<ol style="list-style-type: none"> 1. Identify the characteristics of several different forms of energy and describe how energy can be converted from one form to another (e.g., light to heat, motion to heat, electricity to heat, light, or motion). 2. Recognize that energy can be stored in many ways (e.g., potential energy in gravity or springs, chemical energy in batteries). 3. Describe how some waves move through materials (e.g., water, sound) and how others can move through a vacuum (e.g., x-ray, television, radio). 4. Demonstrate how electricity flows through a simple circuit (e.g., by constructing one). 	<p>Magnetism & Electricity, Investigation 2, part 1; Pp 8-13</p> <p>Matter and Energy Investigation 1, Part 1, pp. 50-62</p> <p>Magnetism & Electricity, Investigation 2, part 1; Pp 8-13</p> <p>Matter and Energy Investigation 1, Part 1, pp. 50-62</p> <p>Magnetism & Electricity, Investigation 2, part 1; Pp 14-19</p> <p>Matter and Energy Investigation 1, Parts 2-3, pp. 63-82</p> <p>Matter and Energy Investigation 1, Parts 2-3, pp. 63-82 Science Resources, pp. 4-7, 11</p> <p>Magnetism & Electricity, Investigation 2, part 4; Pp 26-29</p>

Identify forces and describe the motion of objects.	<ol style="list-style-type: none"> 1. Know that energy can be carried from one place to another by waves (e.g., water waves, sound waves), by electric currents, and by moving objects. 2. Describe the motion of an object by measuring its change of position over a period of time. 3. Describe that gravity exerts more force on objects with greater mass (e.g., it takes more force to hold up a heavy object than a lighter one). 4. Describe how some forces act on contact and other forces act at a distance (e.g., a person pushing a rock versus gravity acting on a rock). 	<p>Matter and Energy Investigation 1, Part 1, pp. 50-62</p> <p>Sun, Moon and Stars Investigation 1, Part 2, pp. 56-64</p> <p>Magnetism & Electricity, Investigation 1, part 1; Pp 8-17</p>	<p>Matter and Energy Investigation 1, Parts 2-3, pp. 63-82</p> <p>Sun, Moon and Stars Investigation 2, Part 2, pp. 89-100 Science Resources, pp. 4-8, 20-24</p> <p>Magnetism & Electricity, Investigation 1, part 2-4; Pp 18-34</p>
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Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

		<i>Publisher Citation</i>	
<i>Benchmark</i>	<i>Performance Standards</i>	<i>Introduced</i>	<i>Practiced</i>
Know that living things have diverse forms, structures, functions, and habitats.	<ol style="list-style-type: none"> 1. Explain that different living organisms have distinctive structures and body systems that serve specific functions (e.g., walking, flying, swimming). 2. Know that humans and other living things have senses to help them detect stimuli, and those sensations (e.g., hunger) and stimuli (e.g., changes in the environment) influence the behavior of organisms. 3. Describe how roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight (photosynthesis). 4. Describe the components of and relationships among organisms in a food chain (e.g., plants are the primary source of energy for living systems). 5. Describe how all living things are made up of smaller units that are called cells. 	<p>Structures of Life, ALL; e;g.: Investigation 3, part 1, pp 8-15</p> <p>Human Body, Investigation 1, part 1, pp 8-15</p> <p>Human Body, Investigation 4, part 1</p> <p><u>Structures of Life FOSS Science Stories</u>, p 43</p>	<p>Structures of Life, ALL; e;g.: <u>FOSS Structures of Life Science Stories:</u> <u>pp 1-3</u> Human Body, ALL</p> <p>Human Body, Investigation 4 ALL</p>
Know that living	<ol style="list-style-type: none"> 1. Know that in any particular environment 	<p><u>Structures of Life FOSS</u></p>	

<p>things have similarities and differences and that living things change over time.</p>	<p>some kinds of plants and animals survive well, some survive less well, and others cannot survive at all.</p> <ol style="list-style-type: none"> 2. Know that a change in physical structure or behavior can improve an organism's chance of survival (e.g., a chameleon changes color, a turtle pulls its head into its shell, a plant grows toward the light). 3. Describe how some living organisms have developed characteristics from generation to generation to improve chances of survival (e.g., spines on cacti, long beaks on hummingbirds, good eyesight on hawks). 	<p><u>Science Stories</u>, p 35-36</p>	
<p>Know the parts of the human body and their functions.</p>	<ol style="list-style-type: none"> 1. Know that the human body has many parts that interact to function as systems (e.g., skeletal, muscular) and describe the parts and their specific functions in selected systems (e.g., the nose, lungs, and diaphragm in the respiratory system). 2. Recognize that the human body is organized from cells, to tissues, to organs, to systems, to the organism. 	<p>Human Body, Investigation 1, part 1, pp 8-15</p>	<p>Human Body, ALL <u>Human Body FOSS Science Stories</u>, p 1-3; 8; 10-16; 28-29</p>

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
<p>Know the structure of the solar system and the objects in the universe.</p>	<ol style="list-style-type: none"> 1. Understand that the number of stars visible through a telescope is much greater than the number visible to the naked eye. 2. Know that there are various types of telescopes that use different forms of light to observe distant objects in the sky. 3. Know that the pattern of stars (e.g., constellations) stays the same although they appear to move across the sky nightly due to Earth's rotation. 	<p>Sun, Moon and Stars Investigation 3, Part 2, pp. 126-130</p> <p>Sun, Moon and Stars Investigation 3, Part 2, pp. 126-130</p> <p>Sun, Moon and Stars Investigation 3, Part 1, pp. 114-125</p>
<p>Know the structure and formation of</p>	<ol style="list-style-type: none"> 1. Know that the properties of rocks and minerals reflect the processes that shaped 	<p>Sun, Moon and Stars Science Resources, p. 43</p> <p>Sun, Moon and Stars Science Resources, pp. 40-43</p> <p>Sun, Moon and Stars Science Resources, pp. 35-38</p>

<p>Earth and its atmosphere and the processes that shape them.</p>	<p>them (i.e., igneous, metamorphic, and sedimentary rocks).</p> <ol style="list-style-type: none"> Describe how weather patterns generally move from west to east in the United States. Know that local weather information describes patterns of change over a period of time (e.g., temperature, precipitation symbols, cloud conditions, wind speed/direction). 	<p>pp 8-13</p>	
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Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

		Publisher Citation	
		Introduced	Practiced
<p>Benchmark</p> <p>Describe how science influences decisions made by individuals and societies.</p>	<p>Performance Standards</p> <ol style="list-style-type: none"> Know that science has identified substances called pollutants that get into the environment and can be harmful to living things. Know that, through science and technology, a wide variety of materials not appearing in nature have become available (e.g., steel, plastic, nylon, fiber optics). Know that science has created ways to store and retrieve information (e.g., paper and ink, printing press, computers, CD ROMs) but that these are not perfect (e.g., faulty programming, defective hardware). Know that both men and women of all races and social backgrounds choose science as a career. 	<p><u>Water FOSS Science Stories</u>: pp 18-20</p> <p>Most FOSS Science Stories; e.g.: <u>Earth Materials FOSS Science Stories</u>: pp 6-9 <u>Magnetism & Electricity FOSS Science Stories</u>: pp 12-13 Sun, Moon and Stars Science Resources, pp. 44-46</p>	<p><u>Water FOSS Science Stories</u>: pp 24-26</p> <p>Most FOSS Science Stories; e.g.: <u>Magnetism & Electricity FOSS Science Stories</u>: pp 16-23; 34-37 <u>Human Body FOSS Science Stories</u>: pp 5-8</p>

Fifth Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		<i>Publisher Citation</i>	
<i>Benchmark</i>	<i>Performance Standards</i>	<i>Introduced</i>	<i>Practiced</i>
Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.	<ol style="list-style-type: none"> Plan and conduct investigations, including formulating testable questions, making systematic observations, developing logical conclusions, and communicating findings. Use appropriate technologies (e.g., calculators, computers, balances, spring scales, microscopes) to perform scientific tests and to collect and display data. Use graphic representations (e.g., charts, graphs, tables, labeled diagrams) to present data and produce explanations for investigations. Describe how credible scientific investigations use reproducible elements including single variables, controls, and appropriate sample sizes to produce valid scientific results. Communicate the steps and results of a scientific investigation. 	<p>All FOSS units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Variables, Investigation 1, part 1, Pp 8-15 Levers & Pulleys, Investigation 1, part 2, pp 18-23 Water Planet Investigation 2, Part 2, pp. 86-92 SEE ABOVE SEE ABOVE</p>	<p>All FOSS units; e.g.: Variables, Investigation 1, parts 2-3, Pp 16-27; Investigations 2-4; ALL Levers & Pulleys, Investigation 1, part 3, pp 24-28 Water Planet Investigation 2, Part 3, pp. 93-100</p>
Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.	<ol style="list-style-type: none"> Understand that different kinds of investigations are used to answer different kinds of questions (e.g., observations, data collection, controlled experiments). Understand that scientific conclusions are subject to peer and public review. 	<p>All FOSS units; e.g.: Variables, Investigation 1, part 1, Pp 8-15 Models & Designs, Investigation 1, part 1, Pp 8-17 Living Systems Investigation 2, Part 1, pp. 85-98</p>	<p>All FOSS units; e.g.: Variables, Investigation 1, parts 2-3, Pp 16-27; Investigations 2-4; ALL Models & Designs, Investigation 1, part 2, Pp 18-21 Investigation 2, part 2, Pp 8-21 Living Systems Investigation 3, Part 3, pp. 136-141</p>

Use mathematical ideas, tools, and techniques to understand scientific knowledge.	<ol style="list-style-type: none"> 1. Use appropriate units to make precise and varied measurements. 2. Use mathematical skills to analyze data. 3. Make predictions based on analyses of data, observations, and explanations. 4. Understand the attributes to be measured in a scientific investigation and describe the units, systems, and processes for making the measurement. 	<p>Most FOSS units; e.g.: Variables, Investigation 1, part 1, Pp 8-15 SEE ABOVE Living Systems Investigation 2, Part 1, pp. 85-98 Water Planet Investigation 3, Part 1, pp. 125-135</p>	<p>Most FOSS units; e.g.: Variables, Investigation 1, parts 2-3, Pp 16-27; Investigations 2-4; ALL Living Systems Investigation 3, Part 3, pp. 136-141</p>
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Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation	
Know the forms and properties of matter and how matter interacts.	<ol style="list-style-type: none"> 1. Describe properties (e.g., relative volume, ability to flow) of the three states of matter. 2. Describe how matter changes from one phase to another (e.g., condensation, evaporation). 3. Know that matter is made up of particles (atoms) that can combine to form molecules and that these particles are too small to see with the naked eye. 4. Know that the periodic table is a chart of the pure elements that make up all matter. 5. Describe the relative location and motion of the particles (atoms and molecules) in each state of matter. 6. Explain the relationship between temperature and the motion of particles in each state of matter. 	<p>Mixtures & Solutions – ALL; e.g.: Investigation 4, part 1, Pp 8-15 Water Planet Investigation 2, Part 1, pp. 125-135</p>	<p>Mixtures & Solutions – ALL; e.g.: Investigation 4, part 2-4, Pp 16-28 <u>Mixtures & Solutions; FOSS Science Stories</u>, pp25-42 Water Planet Investigation 2, Parts 2-4, pp. 86-110 Science Resources, pp. 26-30, 33-40, 67-70</p>
Explain the physical processes involved in the transfer, change, and conservation of energy.	<ol style="list-style-type: none"> 1. Know that heat is transferred from hotter to cooler materials or regions until both reach the same temperature. 2. Know that heat is often produced as a by-product when one form of energy is converted to another form (e.g., when machines or organisms convert stored energy into motion). 	<p>Solar Energy ALL; e.g.: Investigation 2, part 1; Pp 8-14 Water Planet Investigation 3, Part 1, pp. 125-135</p>	<p>Solar Energy ALL; e.g.: Investigation 2, part 2; Pp 16-24 Investigation 3- All <u>Solar Energy FOSS Science Stories</u>, Pp 22-26, 29-44 Water Planet Investigation 3, Part 2, pp. 136-144</p>

	<p>3. Know that there are different forms of energy.</p> <p>4. Describe how energy can be stored and converted to a different form of energy (e.g., springs, gravity) and know that machines and living things convert stored energy to motion and heat.</p>	<p>Levers & Pulleys– ALL; e.g.: Investigation 1, part 1, Pp 8-15 Water Planet Investigation 3, Part 1, pp. 125-135 Living Systems Investigation 3, Part 2, pp. 126-135</p>	<p>Levers & Pulleys– ALL; e.g.: Investigation 1, parts 2-3, Pp 18-28 Investigations 2-4- ALL Water Planet Investigation 3, Part 2, pp. 136-144 Living Systems Science Resources, pp. 31-36, 47-48</p>
<p>Describe and explain forces that produce motion in objects.</p>	<ol style="list-style-type: none"> Understand how the rate of change of position is the velocity of an object in motion. Recognize that acceleration is the change in velocity with time. Identify forces in nature (e.g., gravity, magnetism, electricity, friction). Understand that when a force (e.g., gravity, friction) acts on an object, the object speeds up, slows down, or goes in a different direction. Identify simple machines and describe how they give advantage to users (e.g., levers, pulleys, wheels and axles, inclined planes, screws, wedges.) 	<p>Magnetism & Electricity, ALL Investigations Levers & Pulleys– ALL; e.g.: Investigation 1, part 1, Pp 8-15 Water Planet Investigation 1, Part 2, pp. 59-66</p>	<p>Magnetism & Electricity, ALL Investigations Levers & Pulleys– ALL; e.g.: Investigation 1, parts 2-3, Pp 18-28 Investigations 2-4- ALL <u>Levers & Pulleys FOSS Science Stories,</u> Pp 1-32 Water Planet Science Resources, pp 16-17</p>

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation
<p>Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.</p>	<ol style="list-style-type: none"> Identify the components of habitats and ecosystems (producers, consumers, decomposers, predators). Understand how food webs depict relationships between different organisms. Know that changes in the environment can have different effects on different organisms (e.g., some organisms move, some survive, some reproduce, some die). 	<p>Environments All; e.g.: Investigation 1, parts 1-2, Pp 8-19 SEE ABOVE SEE ABOVE</p> <p>Environments All; e.g.: Investigations 2-6, ALL <u>Environments FOSS Science Stories,</u> Pp 36-38, 43-45, 53-55</p>

	4. Describe how human activity impacts the environment.	Water Planet Science Resources, pp. 64-66	
Understand how traits are passed from one generation to the next and how species evolve.	<ol style="list-style-type: none"> 1. Know that plants and animals have life cycles that include birth, growth and development, reproduction, and death and that these cycles differ for different organisms. 2. Identify characteristics of an organism that are inherited from its parents (e.g., eye color in humans, flower color in plants) and other characteristics that are learned or result from interactions with the environment. 3. Understand that heredity is the process by which traits are passed from one generation to another. 	Environments , Investigation 1, Parts 1-2, Pp 8-19	Environments , Investigation 4, Parts 1-3, Pp 8-22 <u><i>Environments FOSS Science Stories</i></u> , Pp 21-22
Understand the structure of organisms and the function of cells in living systems.	<ol style="list-style-type: none"> 1. Understand that all living organisms are composed of cells from one to many trillions, and that cells are usually only visible through a microscope. 2. Know that some organisms are made of a collection of similar cells that cooperate (e.g., algae) while other organisms are made of cells that are different in appearance and function (e.g., corn, birds). 3. Describe the relationships among cells, tissues, organs, organ systems, whole organisms, and ecosystems. 	Living Systems Investigation 1, Part 1, pp. 51-59 Living Systems Science Resources, pp. 1-13 Living Systems Science Resources, pp. 1-13	Living Systems Science Resources, pp. 1-3

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their	<ol style="list-style-type: none"> 1. Know that many objects in the universe are huge and are separated from one another by vast distances (e.g., many stars are larger than the sun but so distant that they look like points of light). 2. Understand that Earth is part of a larger solar system, which is part of an even larger galaxy (Milky Way), which is one of many 	Water Planet Science Resources, pp. 3, 20 Water Planet Investigation 1, Part 1, pp. 50-58 Water Planet Science Resources, pp. 1-13

structures.	galaxies. 3. Know that there have been manned and unmanned journeys to space and to the moon.	Water Planet Science Resources, p. 96	
Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth's systems.	<ol style="list-style-type: none"> Understand that water and air relate to Earth's processes, including: <ul style="list-style-type: none"> how the water cycle relates to weather how clouds are made of tiny droplets of water, like fog or steam. Know that air is a substance that surrounds Earth (atmosphere), takes up space, and moves, and those temperature fluctuations and other factors produce wind currents. Know that most of Earth's surface is covered by water, that most of that water is salt water in oceans, and that fresh water is found in rivers, lakes, underground sources, and glaciers. Recognize that the seasons are caused by Earth's motion around the sun and the tilt of Earth's axis of rotation. 	<p>Water, Investigation 3, part 4, Pp 22-25</p> <p>Water Planet Investigation 4, Part 1, pp. 184-197</p> <p>Water Planet Investigation 3, Part 2, pp. 136-144</p> <p>Water Planet Science Resources, pp. 64-66</p>	<p><u>Water FOSS Science Stories</u>, p 14</p> <p><u>Water FOSS Science Stories</u>, pp 15-16, 17-21, 27-29</p> <p>Water Planet Science Resources, pp. 33-40, 67-70</p> <p>Water Planet Science Resources, pp. 46-52</p>

Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

	Performance Standards	Introduced	Publisher Citation
Explain how scientific discoveries and inventions have changed individuals and societies.	<ol style="list-style-type: none"> Describe the contributions of science to understanding local or current issues (e.g., watershed and community decisions regarding water use). Describe how various technologies have affected the lives of individuals (e.g., transportation, entertainment, health). 	<p>Many FOSS Units; e.g.: Levers & Pulleys, Investigation 2, parts 1-4, pp 8-25</p> <p>Environments, Investigation 5, parts 1-3, Pp 8-22</p> <p>Water Planet Science Resources, pp. 64-66</p>	<p>Practiced <u>Levers & Pulleys FOSS Science Stories</u>, pp 28-32</p> <p><u>Environments FOSS Science Stories</u>, pp 36, 43-45</p> <p><u>Variables FOSS Science Stories</u>, pp 21-28</p> <p><u>Solar Energy FOSS Science Stories</u>, pp 29-31</p>

Sixth Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		Publisher Citation	
Benchmark	Performance Standards	Introduced	Practiced
Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.	<ol style="list-style-type: none"> Construct appropriate graphs from data and develop qualitative and quantitative statements about the relationships between variables being investigated. Examine the reasonableness of data supporting a proposed scientific explanation. Justify predictions and conclusions based on data. 	<p>All FOSS Units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Force & Motion, Investigation 1, part 1, pp 47-56</p> <p>Weather & Water, Investigation 4, part 1</p> <p>Water Planet Investigation 3, Part 1, pp. 125-135</p>	<p>All FOSS Units; e.g.: Force & Motion, Investigation 1, part 2-3, pp 57-66,</p> <p>Investigation 2-5 all FOSS Force & Motion. Student Resource Book, pp 17-19, 27-31, 36-40</p> <p>Weather & Water, Investigation 6, part 3, pp 200-206; part 5, pp 214-220,</p> <p>FOSS Weather & Water Student Resource Book, pp 12-16, 79-81</p>
Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.	<ol style="list-style-type: none"> Understand that scientific knowledge is continually reviewed, critiqued, and revised as new data become available. Understand that scientific investigations use common processes that include the collection of relevant data and observations, accurate measurements, the identification and control of variables, and logical reasoning to formulate hypotheses and explanations. Understand that not all investigations result in defensible scientific explanations. 	<p>Most FOSS Units; e.g.: Weather and Water Investigation 4, Part 1, pp121-130</p> <p>Living Systems Investigation 2, Part 1, pp. 85-98</p>	<p>Most FOSS Units; e.g.: Weather and Water Investigation 4, Part 2, pp 131-140</p> <p>Weather & Water Student Resource Book, pp27-31, 34-36</p> <p>Living Systems Investigation 3, Part 3, pp. 136-141</p>
Use mathematical ideas, tools, and techniques to understand scientific knowledge.	<ol style="list-style-type: none"> Evaluate the usefulness and relevance of data to an investigation. Use probabilities, patterns, and relationships to explain data and observations. 	<p>Most FOSS Units; e.g.: Earth History, Investigation, 3, part 1, pp 88-95</p> <p>Water Planet Investigation 2, Part 2, pp. 86-92</p>	<p>Most FOSS Units; e.g.: Earth History, Investigation, 3, parts 2-4, pp 96-112</p> <p>Water Planet Investigation 2, Part 3, pp. 93-100</p>

Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation
<p>Know the forms and properties of matter and how matter interacts.</p>	<ol style="list-style-type: none"> Understand that substances have characteristic properties and identify the properties of various substances (e.g., density, boiling point, solubility, chemical reactivity). Use properties to identify substances (e.g., for minerals: the hardness, streak, color, reactivity to acid, cleavage, fracture). Know that there are about 100 known elements that combine to produce compounds in living organisms and nonliving substances. Know the differences between chemical and physical properties and how these properties can influence the interactions of matter. 	<p>Mixtures & Solutions, Investigation 1, Part 2, pp 16-20 Part 3, Folio pages 21-24 Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Resources, pp. 97-101 Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Chemical Interactions Investigation 2, Parts 1-2, pp. 70-80 Resources, pp. 2-13 Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58 Investigation 8, Part 1, pp. 248-255 Investigation 9, Parts 2-4, pp. 288-312 Investigation 10, Parts 1-2, pp. 323-336 Resources, pp. 63-67</p>
<p>Explain the physical processes involved in the transfer, change, and conservation of energy.</p>	<ol style="list-style-type: none"> Identify various types of energy (e.g., heat, light, mechanical, electrical, chemical, nuclear). Understand that heat energy can be transferred through conduction, radiation and convection. Know that there are many forms of energy transfer but that the total amount of energy is conserved (i.e., that energy is neither created nor destroyed) Understand that some energy travels as waves (e.g., seismic, light, sound), including: <ul style="list-style-type: none"> the sun as source of energy for many processes on Earth different wavelengths of sunlight (e.g., visible, ultraviolet, infrared) vibrations of matter (e.g., sound, earthquakes) different speeds through different materials. 	<p>Weather and Water Investigation 4, Part 1, pp 121-130 Water Planet Investigation 3, Part 1, pp. 125-135 Resources, pp. 42-45 Living Systems Investigation 3, Part 1, pp. 118-125 Resources, pp. 31-36, 47-48 Chemical Interactions Investigation 5, Part 3, pp. 165-171 Resources, pp. 24-27, 32-37</p>

Describe and explain forces that produce motion in objects.	<ol style="list-style-type: none"> 1. Know that every object exerts gravitational force on every other object dependent on the masses and distance of separation (e.g., motions of celestial objects, tides). 2. Know that gravitational force is hard to detect unless one of the objects (e.g., Earth) has a lot of mass. 	Force & Motion , Investigation 7, part 1, pp 256-261
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Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation
Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.	<ol style="list-style-type: none"> 1. Understand how organisms interact with their physical environments to meet their needs (i.e., food, water, air) and how the water cycle is essential to living systems. 2. Describe how weather and geologic events (e.g., volcanoes, earthquakes) affect the function of living systems. 3. Describe how organisms have adapted to various environmental conditions. 	Populations & Ecosystems , Investigation 3, pp 90-108; Investigation 4, pp 119-130, Investigation 7, pp 210-218 <u>Populations & Ecosystems Student Resource Book</u> , pp 6-45
Understand how traits are passed from one generation to the next and how species evolve.	<ol style="list-style-type: none"> 1. Understand that the fossil record provides data for how living organisms have evolved. 2. Describe how species have responded to changing environmental conditions over time (e.g., extinction, adaptation). 	Earth History , Investigation 7, pp 234-244; <u>Earth History Student Resource Book</u> , pp 41-48, 76-88
Understand the structure of organisms and the function of cells in living systems.	<ol style="list-style-type: none"> 1. Explain how fossil fuels were formed from animal and plant cells. 2. Describe the differences between substances that were produced by living organisms (e.g., fossil fuels) and substances that result from nonliving processes (e.g., igneous rocks). 	

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
Describe how the concepts of energy, matter, and force	Universe <ol style="list-style-type: none"> 1. Describe the objects in the universe, including: 	

<p>can be used to explain the observed behavior of the solar system, the universe, and their structures.</p>	<ul style="list-style-type: none"> billions of galaxies, each containing billions of stars different sizes, temperatures, and colors of stars in the Milky Way galaxy. <p>Solar System</p> <ol style="list-style-type: none"> Locate the solar system in the Milky Way galaxy. Identify the components of the solar system, and describe their defining characteristics and motions in space, including: <ul style="list-style-type: none"> sun as a medium sized star sun's composition (i.e., hydrogen, helium) and energy production nine planets, their moons, asteroids. Know that the regular and predictable motions of the Earth-moon-sun system explain phenomena on Earth, including: <ul style="list-style-type: none"> Earth's motion in relation to a year, a day, the seasons, the phases of the moon, eclipses, tides, and shadows moon's orbit around Earth once in 28 days in relation to the phases of the moon. 	<p>Planetary Science, Investigation 10, part 1, pp 312-317</p> <p>Planetary Science, Investigation 3, pp 89-110</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58</p> <p>Science Resources, pp. 1-13</p>	<p>Planetary Science, Investigation 10, parts 2-3, pp 318-325; <u>Planetary Science Student Resource Book</u>, pp 80-103</p> <p>Planetary Science, Investigation 4, pp 120-142; Investigation 9, pp 283-302, <u>Planetary Science Student Resource Book</u>, pp 32, 38</p>
<p>Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth's systems.</p>	<p>Structure of Earth</p> <ol style="list-style-type: none"> Know that Earth is composed of layers that include a crust, mantle, and core. Know that Earth's crust is divided into plates that move very slowly, in response to movements in the mantle. Know that sedimentary, igneous, and metamorphic rocks contain evidence of the materials, temperatures, and forces that created them. <p>Weather and Climate</p> <ol style="list-style-type: none"> Describe the composition (i.e., nitrogen, oxygen, water vapor) and strata of Earth's atmosphere, and differences between the 	<p>Earth History, Investigation 4, pp 127-163</p> <p>Weather & Water ALL, see Investigation 2, pp 69-79</p>	<p><u>Earth History Student Resource Book</u>, pp 100-105</p> <p>Earth History, Investigation 5, pp 175-193; Investigation 5, pp 254-275</p> <p><u>Earth History Student Resource Book</u>, pp 22-24, 34-3589-97</p> <p>Weather & Water ALL, see Investigation 1, pp 79-82</p> <p>Weather & Water ALL, see Investigation 5, pp 141-176; Investigation 6, pp 177-222, Investigation 7, pp 223-244,</p>

	<p>atmosphere of Earth and those of other planets.</p> <p>5. Understand factors that create and influence weather and climate, including:</p> <ul style="list-style-type: none"> • heat, air movement, pressure, humidity, oceans • how clouds form by condensation of water vapor • how weather patterns are related to atmospheric pressure • global patterns of atmospheric movement (e.g., El Niño) • factors that can impact Earth's climate (e.g., volcanic eruptions, impacts of asteroids, glaciers). <p>6. Understand how to use weather maps and data (e.g., barometric pressure, wind speeds, humidity) to predict weather.</p> <p>Changes to Earth</p> <p>7. Know that landforms are created and change through a combination of constructive and destructive forces, including:</p> <ul style="list-style-type: none"> • weathering of rock and soil, transportation, deposition of sediment, and tectonic activity • similarities and differences between current and past processes on Earth's surface (e.g., erosion, plate tectonics, changes in atmospheric composition) • impact of volcanoes and faults on New Mexico geology. <p>8. Understand the history of Earth and how information about it comes from layers of sedimentary rock, including:</p> <ul style="list-style-type: none"> • sediments and fossils as a record of a very slowly changing world • evidence of asteroid impact, volcanic and glacial activity. 	<p>Weather & Water ALL, see Investigation 4, pp 121-140</p> <p>Water Planet</p> <p>Investigation 4, Parts 1-3, pp. 184-211</p> <p>Science Resources, pp. 42-61, 67-79</p> <p>SEE ABOVE</p> <p>Water Planet</p> <p>Investigation 4, Part 3, pp. 204-211</p> <p>Science Resources, pp. 83-89</p> <p>Earth History, Investigation, 4, part 1, pp 127-134</p> <p>Earth History, Investigation 7, part 1, pp 234-239</p>	<p>Investigation 8, pp 245-280, Investigation 9. pp 281-319</p> <p>Earth History, Investigation, 4, parts 2-4, pp 135-149</p> <p><u>Earth History Student Resource Book</u>, pp 18-26, 34-36, 100-105</p> <p>Earth History, Investigation 7, part 2, pp 240-244;</p> <p><u>Earth History Student Resource Book</u>, pp 41-48, 76-88-112</p>
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Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation
<p>Explain how scientific discoveries and inventions have changed individuals and societies.</p>	<ol style="list-style-type: none"> 1. Examine the role of scientific knowledge in decisions (e.g., space exploration, what to eat, preventive medicine and medical treatment). 2. Describe the technologies responsible for revolutionizing information processing and communications (e.g., computers, cellular phones, Internet). 	<p>Planetary Science, Investigation 8, pp 250-271 <u>Planetary Science Student Resource Book,</u> pp 78-79</p>

Seventh Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

		Publisher Citation	
Benchmark	Performance Standards	Introduced	Practiced
Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.	<ol style="list-style-type: none"> Use a variety of print and web resources to collect information, inform investigations, and answer a scientific question or hypothesis. Use models to explain the relationships between variables being investigated. 	<p>All FOSS Units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Populations & Ecosystems, Investigation 7, pp 210-218 Planetary Science, Investigation 3, pp 89-110</p>	<p><u>Populations & Ecosystems Student Resource Book</u>, pp 42-45 Planetary Science, Investigation 5, pp 154-173</p>
Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.	<ol style="list-style-type: none"> Describe how bias can affect scientific investigation and conclusions. Critique procedures used to investigate a hypothesis. Analyze and evaluate scientific explanations. 	<p>Most FOSS Units; e.g.: Populations & Ecosystems, Investigation 5, part 1, pp 142-150 Planetary Science, Investigation 5, part 1 pp 154-157</p>	<p>Most FOSS Units; e.g.: Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170 <u>Populations & Ecosystems Student Resource Book</u>, pp 14-21 Planetary Science, Investigation 5, parts 2-7 pp 158-184</p>
Use mathematical ideas, tools, and techniques to understand scientific knowledge.	<ol style="list-style-type: none"> Understand that the number of data (sample size) influences the reliability of a prediction. Use mathematical expressions to represent data and observations collected in scientific investigations. Select and use an appropriate model to examine a phenomenon. 	<p>Many FOSS Units; e.g.: Populations & Ecosystems, Investigation 5, part 1, pp 142-150 Planetary Science, Investigation 5, part 1 pp 154-157</p>	<p>Many FOSS Units; e.g.: Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170 <u>Populations & Ecosystems Student Resource Book</u>, pp 14-21 Planetary Science, Investigation 5, parts 2-7 pp 158-184</p>

Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation
<p>Know the forms and properties of matter and how matter interacts.</p>	<ol style="list-style-type: none"> 1. Explain how matter is transferred from one organism to another and between organisms and their environment (e.g., consumption, the water cycle, the carbon cycle, the nitrogen cycle). 2. Know that the total amount of matter remains constant although its form, location, and properties may change. 3. Identify characteristics of radioactivity, including: <ul style="list-style-type: none"> • decay in time of some elements to others • release of energy • damage to cells. 4. Describe how substances react chemically in characteristic ways to form new substances (compounds) with different properties (e.g., carbon and oxygen combine to form carbon dioxide in respiration). 5. Know that chemical reactions are essential to life processes. 	<p>Populations & Ecosystems, Investigation 5, part 1, pp 142-150 <u>Populations & Ecosystems Student Resource Book</u>, pp 14-21</p> <p>Populations & Ecosystems, Investigation 5, part 1, pp 142-150 Chemical Interactions Investigation 9, Parts 2-4, pp. 288-312 Investigation 10, Parts 1-2, pp. 323-336 Science Resources, pp. 63-67 Chemical Interactions Resources, pp. 76-77</p> <p>Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170 <u>Populations & Ecosystems Student Resource Book</u>, pp 14-21</p>
<p>Explain the physical processes involved in the transfer, change, and conservation of energy.</p>	<ol style="list-style-type: none"> 1. Know how various forms of energy are transformed through organisms and ecosystems, including: <ul style="list-style-type: none"> • sunlight and photosynthesis • energy transformation in living systems (e.g., cellular processes changing chemical energy to heat and motion) • effect of mankind's use of energy and other activities on living systems (e.g., global warming, water quality). 	<p>Populations & Ecosystems, Investigation 5, part 1, pp 142-150 , <u>Populations & Ecosystems Student Resource Book</u>, pp 14-21</p>
<p>Describe and explain forces that produce motion in</p>	<ol style="list-style-type: none"> 1. Know that forces cause motion in living systems, including: <ul style="list-style-type: none"> • the principle of a lever and how it gives 	<p>This is covered in Human Body, a 3rd-4th grade unit</p>

objects.	<ul style="list-style-type: none"> mechanical advantage to a muscular/skeletal system to lift objects forces in specific systems in the human body (e.g., how the heart generates blood pressure, how muscles contract and expand to produce motion). 		
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Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation
<p>Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.</p>	<p>Populations and Ecosystems</p> <ol style="list-style-type: none"> Identify the living and nonliving parts of an ecosystem and describe the relationships among these components. Explain biomes (i.e., aquatic, desert, rainforest, grasslands, tundra) and describe the New Mexico biome. Explain how individuals of species that exist together interact with their environment to create an ecosystem (e.g., populations, communities, niches, habitats, food webs). Explain the conditions and resources needed to sustain life in specific ecosystems. Describe how the availability of resources and physical factors limit growth (e.g., quantity of light and water, range of temperature, composition of soil) and how the water, carbon, and nitrogen cycles contribute to the availability of those resources to support living systems. <p>Biodiversity</p> <ol style="list-style-type: none"> Understand how diverse species fill all niches in an ecosystem. Know how to classify organisms: domain, kingdom, phylum, class, order, family, genus, 	<p>Populations & Ecosystems, Investigation 4, pp 119-124 <u>Populations & Ecosystems Student Resource Book</u>, pp 25-30 Investigation 2, part 2, pp 76-78</p> <p>Populations & Ecosystems, Investigation 6, parts 2-3, pp 187-198 <u>Populations & Ecosystems Student Resource Book</u>, pp 22-24</p> <p>Populations & Ecosystems, Investigation 3., pp 90-108</p> <p>Populations & Ecosystems, Investigation 7, part 1, pp 210-218 Investigation 2, part 1, pp 70-75</p> <p>Populations & Ecosystems, Investigation 6, part 1, pp 179-186</p> <p>Diversity of Life, ALL; e.g.: Investigation 10, part 1, pp 302-309</p> <p>Diversity of Life, ALL; e.g.: Investigation 10, parts 2-3, pp 310-320 <u>Populations & Ecosystems Student Resource Book</u>, pp 16-17, 65-70</p>

<p>Understand how traits are passed from one generation to the next and how species evolve.</p>	<p>and species.</p> <p>Reproduction</p> <ol style="list-style-type: none"> 1. Know that reproduction is a characteristic of all living things and is essential to the continuation of a species. 2. Identify the differences between sexual and asexual reproduction. 3. Know that, in sexual reproduction, an egg and sperm unite to begin the development of a new individual. 4. Know that organisms that sexually reproduce fertile offspring are members of the same species. <p>Heredity</p> <ol style="list-style-type: none"> 5. Understand that some characteristics are passed from parent to offspring as inherited traits and others are acquired from interactions with the environment. 6. Know that hereditary information is contained in genes that are located in chromosomes, including: <ul style="list-style-type: none"> • determination of traits by genes • traits determined by one or many genes • more than one trait sometimes influenced by a single gene. <p>Biological Evolution</p> <ol style="list-style-type: none"> 7. Describe how typical traits may change from generation to generation due to environmental influences (e.g., color of skin, shape of eyes, camouflage, shape of beak). 8. Explain that diversity within a species is developed by gradual changes over many generations. 9. Know that organisms can acquire unique characteristics through naturally occurring genetic variations. 10. Identify adaptations that favor the survival of organisms in their environments (e.g., camouflage, shape of beak). 11. Understand the process of natural selection. 12. Explain how species adapt to changes in the environment or become extinct and that 	<p>Diversity of Life, Investigation 7, part 1, pp 218-223 Populations & Ecosystems, Investigation 1, pp 41-60</p> <p>Populations & Ecosystems, Investigation 8, pp 228-244</p> <p>Populations & Ecosystems, Investigation 10, part 1 pp 302-310</p> <p>See Above Earth History, Investigation 6, pp 205-226</p>	<p>Diversity of Life, Investigation 7, part 2, pp 224-226 Populations & Ecosystems, Investigation 6, part 1, pp 179-186</p> <p>Populations & Ecosystems, Investigation 9, pp 262-292 <u><i>Populations & Ecosystems Student Resource Book</i></u>, pp 42-55</p> <p>Populations & Ecosystems, Investigation 10, part 2-3 pp 311-318 <u><i>Populations & Ecosystems Student Resource Book</i></u>, pp 58-63</p> <p>See Above Earth History, Investigation 7, pp 234-244</p>
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Understand the structure of organisms and the function of cells in living systems.	<p>extinction of species is common in the history of living things.</p> <p>13. Know that the fossil record documents the appearance, diversification, and extinction of many life forms.</p> <p>Structure of Organisms</p> <ol style="list-style-type: none"> Understand that organisms are composed of cells and identify unicellular and multicellular organisms. Explain how organs are composed of tissues of different types of cells (e.g., skin, bone, muscle, heart, intestines). <p>Function of Cells</p> <ol style="list-style-type: none"> Understand that many basic functions of organisms are carried out in cells, including: <ul style="list-style-type: none"> growth and division to produce more cells (mitosis) specialized functions of cells (e.g., reproduction, nerve-signal transmission, digestion, excretion, movement, transport of oxygen). Compare the structure and processes of plant cells and animal cells. Describe how some cells respond to stimuli (e.g., light, heat, pressure, gravity). Describe how factors (radiation, UV light, drugs) can damage cellular structure or function. 		<u>Earth History Student Resource Book</u> , pp 41-48, 76-88
		<p>Diversity of Life, Investigation 3, pp 102-124</p> <p>See Above</p>	<p>Diversity of Life, Investigation 4, pp 133-142</p> <p><u>Diversity of Life Student Resource Book</u>, pp 9, 24-29</p>

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their	<ol style="list-style-type: none"> Explain why Earth is unique in our solar system in its ability to support life. Explain how energy from the sun supports life on Earth. 	<p>Populations & Ecosystems, Investigation 5, part 1, pp 142-150</p>
		<p>Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170</p> <p><u>Populations & Ecosystems Student Resource Book</u>, pp 14-21</p>

<p>structures.</p> <p>Describe the structure of Earth and its atmosphere and explain how energy, matter, and forces shape Earth's systems.</p>	<ol style="list-style-type: none"> 1. Understand how the remains of living things give us information about the history of Earth, including: <ul style="list-style-type: none"> • layers of sedimentary rock, the fossil record, and radioactive dating showing that life has been present on Earth for more than 3.5 billion years. 2. Understand how living organisms have played many roles in changes of Earth's systems through time (e.g., atmospheric composition, creation of soil, impact on Earth's surface). 3. Know that changes to ecosystems sometimes decrease the capacity of the environment to support some life forms and are difficult and/or costly to remediate. 	<p>Earth History, Investigation 6, pp 205-226</p> <p>Populations & Ecosystems, Investigation 4, part 1, pp 119-121</p>	<p>Earth History, Investigation 7, pp 234-244 <u><i>Earth History Student Resource Book</i></u>, pp 41-48, 76-88</p> <p>Populations & Ecosystems, Investigation 4, part 2, pp 120-129 <u><i>Populations & Ecosystems Student Resource Book</i></u>, pp 25-30</p>
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Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation
<p>Explain how scientific discoveries and inventions have changed individuals and societies.</p>	<ol style="list-style-type: none"> 1. Analyze the contributions of science to health as they relate to personal decisions about smoking, drugs, alcohol, and sexual activity. 2. Analyze how technologies have been responsible for advances in medicine (e.g., vaccines, antibiotics, microscopes, DNA technologies). 3. Describe how scientific information can help individuals and communities respond to health emergencies (e.g., CPR, epidemics, HIV, bio-terrorism). 	<p>Human Brain & Senses, Investigation 3, pp 92-112</p> <p>Human Brain & Senses, Investigation 5, pp 148-176; <u><i>Human Brain & Senses Student Resource Book</i></u>, pp 34-35, 47-49</p>

Eighth Grade

Strand I: Scientific Thinking and Practice

Standard I: Understand the processes of scientific investigations and use inquiry and scientific ways of observing, experimenting, predicting, and validating to think critically.

Performance Standards		Publisher Citation	
Benchmark		Introduced	Practiced
Use scientific methods to develop questions, design and conduct experiments using appropriate technologies, analyze and evaluate results, make predictions, and communicate findings.	<ol style="list-style-type: none"> Evaluate the accuracy and reproducibility of data and observations. Use a variety of technologies to gather, analyze and interpret scientific data. Know how to recognize and explain anomalous data. 	<p>Most FOSS Units; (NOTE that this means you will find these standards imbedded throughout all or most FOSS investigations, because of the nature of the program. The citation refers to only one or two specific examples.) e.g.: Force & Motion, Investigation 2, pp 78-100; Populations & Ecosystems, Investigation 5, part 1, pp 142-150</p>	<p>Most FOSS Units; Force & Motion, Investigation 3, pp 111-128; Investigation 4, pp 138-156; Investigation 5, pp 169-202 Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170 <u><i>Populations & Ecosystems Student Resource Book</i></u>, pp 14-21</p>
Understand the processes of scientific investigation and how scientific inquiry results in scientific knowledge.	<ol style="list-style-type: none"> Examine alternative explanations for observations. Describe ways in which science differs from other ways of knowing and from other bodies of knowledge (e.g., experimentation, logical arguments, skepticism). Know that scientific knowledge is built on questions posed as testable hypotheses, which are tested until the results are accepted by peers. 	<p>Most FOSS Units; e.g.: Electronics, Investigation 1, part 1, pp 55-60</p> <p>Force & Motion Investigation 4, part 1, pp 138-145</p>	<p>Most FOSS Units; e.g.: Electronics, Investigation 1, parts 2-5, pp 61-80 Investigation 2-3, pp 89-110, 119-136, <u><i>Electronics Student Resource Book</i></u>, pp 1-12 Force & Motion Investigation 4, parts 2-3 pp 146-156; <u><i>Force & Motion Student Resource Book</i></u>, pp 50-61</p>
Use mathematical ideas, tools, and techniques to understand scientific knowledge.	<ol style="list-style-type: none"> Use mathematical expressions and techniques to explain data and observations and to communicate findings (e.g., formulas and equations, significant figures, graphing, sampling, estimation, mean). Create models to describe phenomena. 	<p>Many FOSS Units; e.g.: Electronics, Investigation 2, pp 89-110; Investigation 3, pp 119-136</p> <p>Populations & Ecosystems, Investigation</p>	<p>Many FOSS Units; e.g.: Electronics, Investigation 3, pp 119-136 <u><i>Electronics Student Resource Book</i></u>, pp 911, 15-17, 30-33 Populations & Ecosystems, Investigation 9, pp 262-292</p>

	8, pp 228-244	<u>Populations & Ecosystems Student Resource Book</u> , pp 42-55
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Strand II: Content of Science

Standard I (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Benchmark	Performance Standards	Publisher Citation
<p>Know the forms and properties of matter and how matter interacts.</p>	<p>Properties of Matter</p> <ol style="list-style-type: none"> 1. Know how to use density, boiling point, freezing point, conductivity, and color to identify various substances. 2. Distinguish between metals and non-metals. 3. Understand the differences among elements, compounds, and mixtures by: <ul style="list-style-type: none"> • classification of materials as elements, compounds, or mixtures • interpretation of chemical formulas • separation of mixtures into compounds by methods including evaporation, filtration, screening, magnetism. <p>Structure of Matter</p> <ol style="list-style-type: none"> 4. Identify the protons, neutrons, and electrons within an atom and describe their locations (i.e., in the nucleus or in motion outside the nucleus). 5. Explain that elements are organized in the periodic table according to their properties. 6. Know that compounds are made of two or more elements, but not all sets of elements can combine to form compounds. <p>Changes in Matter</p> <ol style="list-style-type: none"> 7. Know that phase changes are physical changes that can be reversed (e.g., evaporation, condensation, melting). 8. Describe various familiar physical and chemical changes that occur naturally (e.g., snow melting, photosynthesis, rusting, burning). 9. Identify factors that influence the rate at which chemical reactions occur (e.g., temperature, concentration). 	<p>Chemical Interactions Investigation 1, Part 2, pp. 46-58 Resources, pp. 97-101</p> <p>Chemical Interactions Investigation 8, Part 1, pp. 248-255 Investigation 9, Parts 1-2, pp. 280-297 Resources, pp. 63-67</p> <p>Chemical Interactions Resources, pp. 4-6, 90-91</p> <p>Chemical Interactions Investigation 10, Parts 1-2, pp. 323-336 Resources, pp. 6, 63-67</p> <p>Chemical Interactions Resources, pp. 42-48</p> <p>Chemical Interactions Investigation 10, Part 2, pp. 330-336 Resources, pp. 28-31, 76-77</p>

<p>Explain the physical processes involved in the transfer, change, and conservation of energy.</p>	<p>10. Know that chemical reactions can absorb energy (endothermic reactions) or release energy (exothermic reactions).</p> <p>Energy Transformation</p> <ol style="list-style-type: none"> 1. Know that energy exists in many forms and that when energy is transformed some energy is usually converted to heat. 2. Know that kinetic energy is a measure of the energy of an object in motion and potential energy is a measure of an object's position or composition, including: <ul style="list-style-type: none"> • transformation of gravitational potential energy of position into kinetic energy of motion by a falling object. 3. Distinguish between renewable and nonrenewable sources of energy. 4. Know that electrical energy is the flow of electrons through electrical conductors that connect sources of electrical energy to points of use, including: <ul style="list-style-type: none"> • electrical current paths through parallel and series circuits • production of electricity by fossil-fueled and nuclear power plants, wind generators, geothermal plants, and solar cells • use of electricity by appliances and equipment (e.g., calculators, hair dryers, light bulbs, motors). <p>Waves</p> <ol style="list-style-type: none"> 5. Understand how light and radio waves carry energy through vacuum or matter by: <ul style="list-style-type: none"> • straight-line travel unless an object is encountered • reflection by a mirror, refraction by a lens, absorption by a dark object • separation of white light into different wavelengths by prisms • visibility of objects due to light emission or scattering. 6. Understand that vibrations of matter (e.g., 		
		<p>Electronics, Investigation 1, part 1, pp 55-60</p> <p>Electronics, Investigation 4, part 1, pp 143-148</p>	<p>Electronics, Investigation 1, parts 2-5, pp 61-80</p> <p>Investigation 2-3, pp 89-110, 119-136, <u><i>Electronics Student Resource Book</i></u>, pp 1-12</p> <p>Electronics, Investigation 4, part 2, pp 149-152</p>

<p>Describe and explain forces that produce motion in objects.</p>	<p>sound, earthquakes, water waves) carry wave energy, including:</p> <ul style="list-style-type: none"> • sound transmission through solids, liquids, and gases • relationship of pitch and loudness of sound to rate and distance (amplitude) of vibration • ripples made by objects dropped in water. 		
<p>Forces</p> <ol style="list-style-type: none"> 1. Know that there are fundamental forces in nature (e.g., gravity, electromagnetic forces, nuclear forces). 2. Know that a force has both magnitude and direction. 3. Analyze the separate forces acting on an object at rest or in motion (e.g., gravity, elastic forces, friction), including how multiple forces reinforce or cancel one another to result in a net force that acts on an object. 4. Know that electric charge produces electrical fields and magnets produce magnetic fields. 5. Know how a moving magnetic field can produce an electric current (generator) and how an electric current can produce a magnetic field (electromagnet). <p>Motion</p> <ol style="list-style-type: none"> 7. Know that an object's motion is always described relative to some other object or point (i.e., frame of reference). 8. Understand and apply Newton's Laws of Motion: <ol style="list-style-type: none"> 2. Objects in motion will continue in motion and objects at rest will remain at rest unless acted upon by an unbalanced force (inertia). 3. If a greater force is applied to an object a proportionally greater acceleration will occur. 4. If an object has more mass the 	<p>Force & Motion – ALL; e.g. Investigation 1, pp 47-66</p> <p>Covered in Magnetism & Electricity, a 3rd-4th grade unit</p> <p>Force & Motion – ALL; e.g. Investigation 1, pp 47-66 Investigation 4, part 1, pp 138-145</p>	<p>Force & Motion – ALL; Investigation 2, pp 78-100; Investigation 3, pp 111-128; Investigation 4, pp 138-156; Investigation 5, pp 169-202</p> <p>Force & Motion – ALL; e.g. Investigation 2, pp 78-100; Investigation 3, pp 111-128; Investigation 4, parts 2-3 pp 146-156; <u>Force & Motion Student Resource Book</u>, pp 50-61</p>	

	effect of an applied force is proportionally less.	
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Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

Benchmark	Performance Standards	Publisher Citation
Explain the diverse structures and functions of living things and the complex relationships between living things and their environments.	<ol style="list-style-type: none"> Describe how matter moves through ecosystems (e.g., water cycle, carbon cycle). Describe how energy flows through ecosystems (e.g., sunlight, green plants, food for animals). Explain how a change in the flow of energy can impact an ecosystem (e.g., the amount of sunlight available for plant growth, global climate change). 	<p>Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170 <u><i>Populations & Ecosystems Student Resource Book</i></u>, pp 14-21</p>
Understand how traits are passed from one generation to the next and how species evolve.	<ol style="list-style-type: none"> Understand that living organisms are made mostly of molecules consisting of a limited number of elements (e.g., carbon, hydrogen, nitrogen, oxygen). Identify DNA as the chemical compound involved in heredity in living organisms. Describe the widespread role of carbon in the chemistry of living systems. 	<p>Populations & Ecosystems Student Resource Book, pp 46-55</p>
Understand the structure of organisms and the function of cells in living systems.	<ol style="list-style-type: none"> Describe how cells use chemical energy obtained from food to conduct cellular functions (i.e., respiration). Explain that photosynthesis in green plants captures the energy from the sun and stores it chemically. Describe how chemical substances can influence cellular activity (e.g., pH). 	<p>Populations & Ecosystems, Investigation 5, parts 2-4, pp 143-170 <u><i>Populations & Ecosystems Student Resource Book</i></u>, pp 14-21</p>

Strand II: Content of Science

Standard III (Earth and Space Science): Understand the structure of Earth, the solar system, and the universe, the interconnections among them, and the processes and interactions of Earth's systems.

Benchmark	Performance Standards	Publisher Citation
Describe how the concepts of energy, matter, and force can be used to explain the observed behavior of the solar system, the universe, and their structures.	<ol style="list-style-type: none"> Understand how energy from the sun and other stars, in the form of light, travels long distances to reach Earth. Explain how the properties of light (e.g., emission, reflection, refraction) emitted from the sun and stars are used to learn about the universe, including: <ul style="list-style-type: none"> distances in the solar system and the universe temperatures of different stars. Understand how gravitational force acts on objects in the solar system and the universe, including: <ul style="list-style-type: none"> similar action on masses on Earth and on other objects in the solar system explanation of the orbits of the planets around the sun. 	<p>Weather & Water, Investigation 4, pp 121-140; Investigation 5, pp 152-175; <u>Weather & Water Student Resource Book</u>, pp 22-26</p> <p>Force & Motion, Investigation 7, parts 2-3, pp 262-272 <u>Force & Motion Student Resource Book</u>, pp 62-69</p>

Strand III: Science and Society

Standard I: Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by, individuals and societies.

Benchmark	Performance Standards	Publisher Citation
Explain how scientific discoveries and inventions have changed individuals and societies.	<ol style="list-style-type: none"> Analyze the interrelationship between science and technology (e.g., germ theory, vaccines). Describe how scientific information can help to explain environmental phenomena (e.g., floods, earthquakes, volcanoes, fire, extreme weather). Describe how technological revolutions have significantly influenced societies (e.g., energy production, warfare, space exploration). 	<p>Electronics, Investigation 7, pp 220-239; Investigation 9, pp 284-298 <u>Electronics Student Resource Book</u>, pp23-36</p>

	4. Critically analyze risks and benefits associated with technologies related to energy production.	Weather & Water, Investigation 9, pp 296-320	<u>Weather & Water Student Resource Book, pp 63-76</u> <u>Earth History Student Resource Book, pp64-67</u>
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