

**K-8**  
**Science Curriculum**  
**Framework**

**Revised 2005**

Strands	Content Standards
Nature of Science	
1. Characteristics and Processes of Science	Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology.
Life Science	
2. Living Systems: Characteristics, Structure, and Function	Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology.
3. Life Cycles, Reproduction, and Heredity	Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology.
4. Populations and Ecosystems	Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.
Physical Science	
5. Matter: Properties and Changes	Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology.
6. Motion and Forces	Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology.
7. Energy and Transfer of Energy	Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology.
Earth and Space Science	
8. Earth Systems	Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology.
9. Earth's History: Changes in Earth and Sky	Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology.
10. Objects in the Universe	Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology.

\*Each grade level continues to address earlier Student Learning Expectations.

A minimum of 20% of instructional time in science must be spent in inquiry and conducting hands-on investigations. Equipment, training, and grant information are available through the Arkansas Centers for Mathematics and Science Education.

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Inquiry and Process Skills	NS.1.K.1 Record observations pictorially, orally, and in writing	NS.1.1.1 Communicate observations orally, in writing, and in graphic organizers: <ul style="list-style-type: none"> <li>• T-charts</li> <li>• pictographs</li> </ul>	NS.1.2.1 Communicate observations orally, in writing, and in graphic organizers: <ul style="list-style-type: none"> <li>• T-charts</li> <li>• pictographs</li> <li>• Venn diagrams</li> <li>• bar graphs</li> </ul>	NS.1.3.1 Communicate observations orally, in writing, and in graphic organizers: <ul style="list-style-type: none"> <li>• T-charts</li> <li>• pictographs</li> <li>• Venn diagrams</li> <li>• bar graphs</li> <li>• frequency tables</li> </ul>	NS.1.4.1 Communicate observations orally, in writing, and in graphic organizers: <ul style="list-style-type: none"> <li>• T-charts</li> <li>• pictographs</li> <li>• Venn diagrams</li> <li>• bar graphs</li> <li>• frequency tables</li> <li>• line graphs</li> </ul>
	NS.1.K.2 Ask questions based on observations	NS.1.1.2 Ask questions based on observations	NS.1.2.2 Develop questions that guide scientific inquiry	NS.1.3.2 Develop questions that guide scientific inquiry	NS.1.4.2 Refine questions that guide scientific inquiry
	NS.1.K.3 Conduct <i>scientific investigations</i> as a class and in teams: <ul style="list-style-type: none"> <li>• <i>lab activities</i></li> <li>• <i>field studies</i></li> </ul>	NS.1.1.3 Conduct <i>scientific investigations</i> as a class and in teams: <ul style="list-style-type: none"> <li>• <i>lab activities</i></li> <li>• <i>field studies</i></li> </ul>	NS.1.2.3 Conduct <i>scientific investigations</i> individually and in teams: <ul style="list-style-type: none"> <li>• <i>lab activities</i></li> <li>• <i>field studies</i></li> </ul>	NS.1.3.3 Conduct <i>scientific investigations</i> individually and in teams: <ul style="list-style-type: none"> <li>• <i>lab activities</i></li> <li>• <i>field studies</i></li> </ul>	NS.1.4.3 Conduct <i>scientific investigations</i> individually and in teams: <ul style="list-style-type: none"> <li>• <i>lab activities</i></li> <li>• <i>field studies</i></li> </ul>

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Inquiry and Process Skills	<p>NS.1.K.4 Estimate and measure length, <i>mass</i>, and capacity/volume of familiar objects using non-standard units</p> <p>NS.1.K.5 Estimate relative <i>temperature of matter</i> (e.g., objects, <i>living</i> things, and earth materials)</p> <p>NS.1.K.6 Collect <i>empirical evidence</i> as a class</p>	<p>NS.1.1.4 Estimate and measure length and <i>temperature</i> using International System of Units (SI) as a class</p> <p>NS.1.1.5 Collect measurable <i>empirical evidence</i> as a class and in teams</p> <p>NS.1.1.6 Make predictions as a class and in teams based upon <i>empirical evidence</i> (e.g., predict which object is heavier)</p>	<p>NS.1.2.4 Estimate and measure length and <i>temperature</i> using International System of Units (SI)</p> <p>NS.1.2.5 Collect measurable <i>empirical evidence</i> in teams and as individuals</p> <p>NS.1.2.6 Make predictions in teams and as individuals based upon <i>empirical evidence</i></p>	<p>NS.1.3.4 Communicate the results of <i>scientific investigations</i> (e.g., age-appropriate graphs, charts, and writings)</p> <p>NS.1.3.5 Estimate and measure length, <i>mass</i>, <i>temperature</i>, and elapsed time using International System of Units (SI)</p> <p>NS.1.3.6 Collect and analyze measurable <i>empirical evidence</i> as a team and/or as individuals</p> <p>NS.1.3.7 Make and explain predictions based on prior knowledge</p>	<p>NS.1.4.5 Communicate the designs, procedures, and results of <i>scientific investigations</i> (e.g., age-appropriate graphs, charts, and writings)</p> <p>NS.1.4.6 Estimate and measure length, <i>mass</i>, <i>temperature</i>, capacity/volume, and elapsed time using International System of Units (SI)</p> <p>NS.1.4.7 Collect and interpret measurable <i>empirical evidence</i> in teams and as individuals</p> <p>NS.1.4.8 Develop a <i>hypothesis</i> based on prior knowledge and observations</p>

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Inquiry and Process Skills					NS.1.4.9 Identify <i>variables</i> that affect investigations  NS.1.4.10 Identify patterns and trends in data  NS.1.4.11 Generate conclusions based on evidence  NS.1.4.12 Evaluate the quality and feasibility of an idea or project

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

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	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Scientific Equipment and Technology	<p>NS.1.K.7 Use age-appropriate equipment and tools in <i>scientific investigations</i> (e.g., balances and hand lenses)</p> <p>NS.1.K.8 Apply appropriate rules of safety related to daily activities</p> <p>NS.1.K.9 Apply lab safety rules as they relate to specific science <i>lab activities</i> (see Arkansas Lab Safety Guide)</p>	<p>NS.1.1.7 Use age appropriate equipment and tools in <i>scientific investigations</i> (e.g., balances, hand lenses, rulers, and <i>thermometers</i>)</p> <p>NS.1.1.8 Apply appropriate rules of safety related to daily activities</p> <p>NS.1.1.9 Apply lab safety rules as they relate to specific science <i>lab activities</i> (see Arkansas Lab Safety Guide)</p>	<p>NS.1.2.7 Use age appropriate equipment and tools in <i>scientific investigations</i> (e.g., balances, hand lenses, rulers, and <i>thermometers</i>)</p> <p>NS.1.2.8 Apply lab safety rules as they relate to specific science <i>lab activities</i> (see Arkansas Lab Safety Guide)</p>	<p>NS.1.3.8 Use simple equipment, age appropriate tools, technology, and mathematics in <i>scientific investigations</i> (e.g., balances, hand lenses, microscopes, rulers, <i>thermometers</i>, calculators, computers)</p> <p>NS.1.3.9 Apply lab safety rules as they relate to specific science <i>lab activities</i> (see Arkansas Lab Safety Guide)</p>	<p>NS.1.4.13 Use simple equipment, age appropriate tools, technology, and mathematics in <i>scientific investigations</i> (e.g., balances, hand lenses, microscopes, rulers, <i>thermometers</i>, calculators, computers)</p> <p>NS.1.4.14 Apply lab safety rules as they relate to specific science <i>lab activities</i> (see Arkansas Lab Safety Guide)</p>

Strand 2: Life Science

Standard 2: Living Systems: Characteristics, Structure, and Function

Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Characteristics	<p>LS.2.K.1 Classify <i>living</i> and non-<i>living</i> things</p> <p>LS.2.K.2 Differentiate between plants and animals</p> <p>LS.2.K.3 Match parents and offspring</p> <p>LS.2.K.4 Identify basic needs of plants and animals:</p> <ul style="list-style-type: none"> <li>• food</li> <li>• water</li> <li>• light</li> <li>• air</li> <li>• space</li> </ul>	<p>LS.2.1.1 Classify animals according to common characteristics (e.g., movement, body coverings, diet)</p> <p>LS.2.1.2 Differentiate between <i>herbivores</i> and <i>carnivores</i></p>	<p>LS.2.2.1 Classify animals into major groups according to their structure:</p> <ul style="list-style-type: none"> <li>• mammals</li> <li>• birds</li> <li>• fish</li> </ul> <p>LS.2.2.2 Differentiate among <i>herbivores</i>, <i>carnivores</i>, and omnivores</p> <p>LS.2.2.3 Identify basic needs of most plants:</p> <ul style="list-style-type: none"> <li>• <i>nutrients</i></li> <li>• water</li> <li>• light</li> <li>• air</li> <li>• <i>temperature</i></li> <li>• space</li> </ul> <p>LS.2.2.4 Compare different types of flowering plants and <i>conifers</i></p>	<p>LS.2.3.1 Classify animals as vertebrates and <i>invertebrates</i> according to their structure</p>	<p>LS.2.4.1 Classify <i>vertebrates</i> into major subgroups:</p> <ul style="list-style-type: none"> <li>• mammals</li> <li>• birds</li> <li>• fish</li> <li>• amphibians</li> <li>• reptiles</li> </ul> <p>LS.2.4.2 Classify some <i>invertebrates</i> according to their structure:</p> <ul style="list-style-type: none"> <li>• mollusks</li> <li>• segmented worms</li> <li>• arthropods</li> </ul>

Strand 2: Life Science

Standard 2: Living Systems: Characteristics, Structure, and Function

Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Structure and Function	<p>LS.2.K.5 Name and describe the five senses</p> <p>LS.2.K.6 Discuss the functions of the five senses</p> <p>LS.2.K.7 Identify the basic materials for oral hygiene</p> <p>LS.2.K.8 Demonstrate the proper technique for cleaning teeth</p>	<p>LS.2.1.3 Locate the following human body parts:</p> <ul style="list-style-type: none"> <li>• heart</li> <li>• lungs</li> <li>• brain</li> <li>• stomach</li> <li>• muscles</li> <li>• bones</li> </ul> <p>LS.2.1.4 Locate plant parts:</p> <ul style="list-style-type: none"> <li>• leaves</li> <li>• stems</li> <li>• flowers</li> <li>• roots</li> </ul>	<p>LS.2.2.5 Identify the major parts and functions of the skeletal system</p> <p>LS.2.2.6 Describe the function of the following plant parts:</p> <ul style="list-style-type: none"> <li>• leaves</li> <li>• stems</li> <li>• flowers</li> <li>• roots</li> </ul>	<p>LS.2.3.2 Identify major parts and functions of the following systems:</p> <ul style="list-style-type: none"> <li>• respiratory</li> <li>• muscular</li> </ul>	<p>LS.2.4.3 Identify major parts and functions of the following systems:</p> <ul style="list-style-type: none"> <li>• digestive</li> <li>• circulatory</li> <li>• nervous</li> </ul>



Strand 2: Life Science

Standard 3: Life Cycles, Reproduction, and Heredity

Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Life Cycles	<p>LS.3.K.1 Describe plant development and growth</p> <p>LS.3.K.2 Illustrate <i>complete metamorphosis</i> (e.g., butterfly, frog)</p>	<p>LS.3.1.1 Illustrate <i>incomplete metamorphosis</i> (e.g., grasshopper)</p> <p>LS.3.1.2 Compare and contrast <i>complete metamorphosis</i> and <i>incomplete metamorphosis</i></p>	<p>LS.3.2.1 Illustrate embryonic development (e.g., chicken)</p> <p>LS.3.2.2 Compare and contrast embryonic development and <i>incomplete metamorphosis</i></p>	<p>LS.3.3.3 Differentiate among <i>complete metamorphosis</i>, <i>incomplete metamorphosis</i>, and <i>embryonic development</i></p>	

Strand 2: Life Science

Standard 4: Populations and Ecosystems

Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
	LS.4.K.1 Recognize what it means for a <i>species</i> to be <i>extinct</i>	LS.4.1.1 Identify some endangered <i>species</i> in Arkansas	LS.4.2.1 Compare and contrast living and <i>extinct species</i>  LS.4.2.2 Describe characteristics of various <i>habitats</i>		LS.4.4.1 Recognize <i>environmental adaptations</i> of plants and animals  LS.4.4.2 Illustrate the interdependence of organisms in an <i>ecosystem</i>

Strand 3: Physical Science

Standard 5: Matter: Properties and Changes

Students shall demonstrate and apply knowledge of *matter*, including properties and changes, using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Physical Properties	PS.5.K.1 List and classify objects according to the single properties of <ul style="list-style-type: none"> <li>• size</li> <li>• color</li> <li>• shape</li> </ul>	PS.5.1.1 Compare and contrast objects according to the single properties of <ul style="list-style-type: none"> <li>• size</li> <li>• color</li> <li>• shape</li> <li>• texture</li> <li>• <i>magnetism</i></li> </ul>	PS.5.2.1 Classify objects based on two or more properties  PS.5.2.2 Investigate the effect of physical phenomena on various materials (e.g., heat absorption by different colored materials)	PS.5.3.1 Compare and contrast objects based on two or more properties  PS.5.3.2 Demonstrate physical changes in <i>matter</i>  PS.5.3.3 Determine the <i>mass</i> of solids	PS.5.4.1 Demonstrate multiple ways to classify objects  PS.5.4.2 Demonstrate <i>chemical changes</i> in <i>matter</i>
States of Matter		PS.5.1.2 Identify characteristics of solids and liquids		PS.5.3.4 Compare and contrast solids and liquids	PS.5.4.3 Compare and contrast gases to solids and liquids

Strand 3: Physical Science

Standard 6: Motion and Forces

Students shall demonstrate and apply knowledge of motion and forces using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Motion and Forces	<p>PS.6.K.1 Demonstrate spatial relationships, including but not limited to</p> <ul style="list-style-type: none"> <li>• over</li> <li>• under</li> <li>• left</li> <li>• right</li> </ul> <p>PS.6.K.2 Demonstrate various ways that objects can move, including but not limited to</p> <ul style="list-style-type: none"> <li>• straight</li> <li>• zig-zag</li> <li>• back and forth</li> <li>• round and round</li> <li>• fast and slow</li> </ul> <p>PS.6.K.3 Demonstrate the effects of the <i>force of gravity</i> on objects</p>	<p>PS.6.1.1 List orally the various ways that objects can move, including but not limited to</p> <ul style="list-style-type: none"> <li>• straight</li> <li>• zig-zag</li> <li>• back and forth</li> <li>• round and round</li> <li>• fast and slow</li> </ul> <p>PS.6.1.2 Investigate the relationship between <i>mass</i> and <i>weight</i> (e.g., identical filled and empty containers)</p>	<p>PS.6.2.1 Investigate the relationship between <i>force</i> and motion</p>	<p>PS.6.3.1 Identify characteristics of wave motion:</p> <ul style="list-style-type: none"> <li>• <i>amplitude</i></li> <li>• <i>frequency</i></li> </ul> <p>PS.6.3.2 Investigate the relationship between sound and wave motion</p> <p>PS.6.3.3 Determine the impact of the following <i>variables</i> on pitch:</p> <ul style="list-style-type: none"> <li>• length</li> <li>• <i>mass</i></li> <li>• tension</li> <li>• state of <i>matter</i></li> </ul>	<p>PS.6.4.1 Investigate the relationship between force and direction</p> <p>PS.6.4.2 Investigate the relationship between <i>force</i> and <i>mass</i></p>

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Light		<p>PS.7.1.1 Compare natural sources of light (e.g., sun, fireflies, deep sea creatures, fire, lightning) to artificial sources of light (e.g., light bulbs, matches, candles)</p> <p>PS.7.1.2 Investigate the properties of <i>transparent</i> and <i>opaque</i> objects (e.g., plastic wrap and aluminum foil)</p>	<p>PS.7.2.1 Classify materials as <i>transparent</i>, <i>translucent</i>, or <i>opaque</i> (e.g., plastic wrap, wax paper, and aluminum foil)</p>	<p>PS.7.3.1 Classify materials as those which can <i>reflect</i>, <i>refract</i>, or absorb light</p>	
Heat	<p>PS.7.K.1 Classify objects in terms of their relative <i>temperature</i> (e.g., hotter and colder)</p>	<p>PS.7.1.3 Compare natural sources of <i>heat</i> (e.g., sun, fire, lightning) to artificial sources of <i>heat</i> (e.g., stove, toaster)</p> <p>PS.7.1.4 Chart <i>temperature</i> over time using the Celsius scale</p>	<p>PS.7.2.2 Compare <i>temperatures</i> using the Celsius scale</p>	<p>PS.7.3.2 Calculate a change in <i>temperature</i> using the Celsius scale</p>	<p>PS.7.4.1 Interpret trends in <i>temperature</i> over time using the Celsius scale</p>

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Electricity	<p>PS.7.K.2 Identify uses of <i>electricity</i></p> <p>PS.7.K.3 Identify ways to conserve <i>electricity</i> in the classroom and at home</p>	<p>PS.7.1.5 Demonstrate methods of producing static <i>electricity</i> (e.g., balloons, shuffling across carpet)</p>	<p>PS.7.2.3 Demonstrate methods of using <i>electricity</i> to produce light, <i>heat</i>, and sound</p>	<p>PS.7.3.3 Identify methods of producing <i>electricity</i> relative to Arkansas:</p> <ul style="list-style-type: none"> <li>• <i>hydroelectric</i></li> <li>• coal</li> <li>• oil</li> <li>• natural gas</li> <li>• nuclear</li> <li>• solar</li> <li>• wind</li> </ul>	<p>PS.7.4.2 Classify electrical <i>conductors</i> and electrical <i>insulators</i></p> <p>PS.7.4.3 Construct simple circuits from circuit diagrams</p>
Magnetism	<p>PS.7.K.4 Demonstrate effects of magnets on each other and other objects</p> <p>PS.7.K.5 List some uses of magnets in everyday objects</p> <p>PS.7.K.6 Investigate magnets of various shapes</p>	<p>PS.7.1.6 Classify materials as magnetic or nonmagnetic</p> <p>PS.7.1.7 Investigate the properties of magnets:</p> <ul style="list-style-type: none"> <li>• attraction</li> <li>• repulsion</li> </ul>		<p>PS.7.3.4 Differentiate between magnets and non-magnets</p> <p>PS.7.3.5 Describe the effect of distance on attraction and repulsion</p> <p>PS.7.3.6 Construct a magnet by the "Touch/Stroke" method</p>	

Strand 4: Earth and Space Science

Standard 8: Earth Systems: Structure and Properties

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Properties of the Earth	<p>ESS.8.K.1 Identify various characteristics of Earth's surface</p>	<p>ESS.8.1.1 Identify the features of major landforms</p>	<p>ESS.8.2.1 Conduct investigations to distinguish among the following components of soil:</p> <ul style="list-style-type: none"> <li>• <i>clay</i></li> <li>• <i>sand</i></li> <li>• <i>silt</i></li> <li>• <i>humus</i></li> </ul> <p>ESS.8.2.2 Recognize and discuss the different properties of soil:</p> <ul style="list-style-type: none"> <li>• color</li> <li>• texture</li> <li>• ability to retain water</li> <li>• ability to support plant growth</li> </ul> <p>ESS.8.2.3 Conduct investigations to determine which soil best supports bean plant growth</p>	<p>ESS.8.3.1 Distinguish among Earth's materials:</p> <ul style="list-style-type: none"> <li>• rocks</li> <li>• minerals</li> <li>• <i>fossils</i></li> <li>• soils</li> </ul> <p>ESS.8.3.2 Classify rocks by their properties, including but not limited to</p> <ul style="list-style-type: none"> <li>• size</li> <li>• shape</li> <li>• color</li> <li>• texture</li> <li>• patterns</li> </ul> <p>ESS.8.3.3 Identify the three categories of rocks:</p> <ul style="list-style-type: none"> <li>• <i>metamorphic</i></li> <li>• <i>igneous</i></li> <li>• <i>sedimentary</i></li> </ul>	

Strand 4: Earth and Space Science

Standard 8: Earth Systems: Structure and Properties

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Properties of the Earth				<p>ESS.8.3.4 Identify the <i>physical properties</i> of minerals:</p> <ul style="list-style-type: none"> <li>• hardness</li> <li>• color</li> <li>• luster</li> <li>• streak</li> </ul> <p>ESS.8.3.5 Identify areas in Arkansas that are the main sources of the following minerals:</p> <ul style="list-style-type: none"> <li>• bauxite</li> <li>• novaculite</li> <li>• quartz crystal</li> <li>• diamond</li> <li>• bromine</li> </ul> <p>ESS.8.3.6 Describe the layers of Earth:</p> <ul style="list-style-type: none"> <li>• crust</li> <li>• mantle</li> <li>• inner core</li> <li>• outer core</li> </ul>	<p>ESS.8.4.1 Locate natural divisions of Arkansas:</p> <ul style="list-style-type: none"> <li>• Ozark Plateau</li> <li>• Ouachita Mountains</li> <li>• Crowley's Ridge</li> <li>• Mississippi Alluvial Plain (Delta)</li> <li>• Coastal Plain</li> <li>• Arkansas River Valley</li> </ul>



Strand 4: Earth and Space Science

Standard 8: Earth Systems: Structure and Properties

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Natural Resources	<p>ESS.8.K.2 Identify the uses of land and water</p> <p>ESS.8.K.3 Classify resources as natural or man-made</p> <p>ESS.8.K.4 Identify ways natural and man-made materials can be reused or recycled</p>	<p>ESS.8.1.2 Identify common uses of Earth's resources</p>	<p>ESS.8.2.4 Identify products derived from <i>natural resources</i></p>	<p>ESS.8.3.7 Identify common uses of rocks and minerals</p>	<p>ESS.8.4.2 Analyze the impact of using <i>natural resources</i></p> <p>ESS.8.4.3 Differentiate between renewable and non-renewable resources</p> <p>ESS.8.4.4 Evaluate the impact of water pollution</p> <p>ESS.8.4.5 Evaluate the impact of Arkansas' <i>natural resources</i> on the economy, including but not limited to</p> <ul style="list-style-type: none"> <li>• farming</li> <li>• timber</li> <li>• tourism</li> <li>• hunting</li> <li>• fishing</li> </ul> <p>ESS.8.4.6 Evaluate human use of Arkansas' <i>natural resources</i> on the <i>environment</i>, including but not limited to</p> <ul style="list-style-type: none"> <li>• mining</li> <li>• clear cutting</li> <li>• dredging</li> </ul>

Strand 4: Earth and Space Science

Standard 8: Earth Systems: Structure and Properties

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Weather	<p>ESS.8.K.5 Chart weather conditions every day</p> <p>ESS.8.K.6 Describe the four seasons</p> <p>ESS.8.K.7 Demonstrate safety procedures related to severe weather</p>	<p>ESS.8.1.3 Chart weather conditions every day</p> <p>ESS.8.1.4 Identify the sequence of seasons</p> <p>ESS.8.1.5 Demonstrate safety procedures related to severe weather</p> <p>ESS.8.1.6 Read a Celsius <i>thermometer</i> as a class</p>	<p>ESS.8.2.5 Chart weather conditions every day</p> <p>ESS.8.2.6 Demonstrate safety procedures related to severe weather</p> <p>ESS.8.2.7 Describe characteristics of <i>cumulus</i>, <i>stratus</i>, and <i>cirrus</i> clouds</p> <p>ESS.8.2.8 Predict weather based on cloud type</p> <p>ESS.8.2.9 Read a Celsius <i>thermometer</i></p>	<p>ESS.8.3.8 Chart <i>precipitation</i> levels over time</p> <p>ESS.8.3.9 Demonstrate safety procedures related to severe weather</p> <p>ESS.8.3.10 Construct and read a rain gauge</p>	<p>ESS.8.4.7 Describe the processes of the <i>water cycle</i>:</p> <ul style="list-style-type: none"> <li>• <i>precipitation</i></li> <li>• <i>evaporation</i></li> <li>• <i>condensation</i></li> </ul> <p>ESS.8.4.8 Organize weather data into tables or charts to identify trends and patterns</p> <p>ESS.8.4.9 Demonstrate safety procedures related to severe weather</p> <p>ESS.8.4.10 Describe weather-related natural disasters</p> <p>ESS.8.4.11 Construct and read instruments to collect weather data:</p> <ul style="list-style-type: none"> <li>• <i>barometer</i></li> <li>• <i>weather vane</i></li> <li>• <i>anemometer</i></li> </ul>

Strand 4: Earth and Space Science

Standard 9: Earth's History: Changes in Earth and Sky

Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Weather				ESS.9.3.1 Analyze the effect of wind and water on Earth's surface	ESS.9.4.1 Analyze changes to Earth's surface: <ul style="list-style-type: none"> <li>• erosion</li> <li>• glaciation</li> <li>• weathering</li> <li>• earthquakes</li> <li>• volcanic activity</li> </ul>

Strand 4: Earth and Space Science

Standard 10: Objects in the Universe

Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.					
	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4
Solar System	<p>ESS.10.K.1 Distinguish between celestial bodies and other objects in the sky:</p> <ul style="list-style-type: none"> <li>• sun</li> <li>• moon</li> <li>• other stars</li> <li>• clouds</li> <li>• birds</li> <li>• planes</li> </ul>	<p>ESS.10.1.1 Illustrate the sequence of planets in the <i>solar system</i></p>	<p>ESS.10.2.1 Illustrate four <i>moon phases</i>:</p> <ul style="list-style-type: none"> <li>• full</li> <li>• half</li> <li>• crescent</li> <li>• new</li> </ul> <p>ESS.10.2.2 Model the movement of Earth and its moon</p> <p>ESS.10.2.3 Contrast the visibility of the sun and moon</p>	<p>ESS.10.3.1 Demonstrate how the planets <i>orbit</i> the sun</p> <p>ESS.10.3.2 Demonstrate the <i>orbit</i> of Earth and its moon around the sun</p> <p>ESS.10.3.3 Relate Earth's rotation to the day/night cycle</p>	

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Processes of Science	NS.1.5.1 Make accurate observations	NS.1.6.1 Verify accuracy of observations	NS.1.7.1 Interpret <i>evidence</i> based on observations	NS.1.8.1 Justify conclusions based on appropriate and unbiased observations
	NS.1.5.2 Identify and define components of <i>experimental design</i> used to produce <i>empirical evidence</i> : <ul style="list-style-type: none"> <li>• <i>hypothesis</i></li> <li>• replication</li> <li>• sample size</li> <li>• appropriate use of <i>control</i></li> <li>• use of standardized <i>variables</i></li> </ul>	NS.1.6.2 Apply components of <i>experimental design</i> used to produce <i>empirical evidence</i> : <ul style="list-style-type: none"> <li>• <i>hypothesis</i></li> <li>• replication</li> <li>• sample size</li> <li>• appropriate use of <i>control</i></li> <li>• use of standardized <i>variables</i></li> </ul>	NS.1.7.2 Analyze components of <i>experimental design</i> used to produce <i>empirical evidence</i> : <ul style="list-style-type: none"> <li>• <i>hypothesis</i></li> <li>• replication</li> <li>• sample size</li> <li>• appropriate use of <i>control</i></li> <li>• use of standardized <i>variables</i></li> </ul>	NS.1.8.2 Evaluate the merits of <i>empirical evidence</i> based on <i>experimental design</i> : <ul style="list-style-type: none"> <li>• <i>hypothesis</i></li> <li>• replication</li> <li>• sample size</li> <li>• appropriate use of <i>control</i></li> <li>• use of standardized <i>independent</i> and <i>dependent variables</i></li> </ul>
	NS.1.5.3 Calculate mean, median, mode, and range from scientific data using <i>SI units</i>	NS.1.6.3 Compare scientific data using mean, median, mode, and range using <i>SI units</i>	NS.1.7.3 Interpret scientific data using mean, median, mode, and range using <i>SI units</i>	NS.1.8.3 Formulate a testable problem using <i>experimental design</i>

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Processes of Science	<p>NS.1.5.4 Interpret scientific data using</p> <ul style="list-style-type: none"> <li>• data tables/charts</li> <li>• bar graphs</li> <li>• circle graphs</li> <li>• line graphs</li> <li>• <i>stem and leaf plots</i></li> <li>• Venn diagrams</li> </ul> <p>NS.1.5.5 Communicate results and conclusions from scientific inquiry</p> <p>NS.1.5.6 Develop and implement strategies for long-term, accurate data collection</p>	<p>NS.1.6.4 Construct and interpret scientific data using</p> <ul style="list-style-type: none"> <li>• data tables/charts</li> <li>• bar and double bar graphs</li> <li>• line graphs</li> <li>• <i>stem and leaf plots</i></li> <li>• line graphs</li> </ul> <p>NS.1.6.5 Communicate results and conclusions from scientific inquiry</p> <p>NS.1.6.6 Develop and implement strategies for long-term, accurate data collection</p>	<p>NS.1.7.4 Construct and interpret scientific data using</p> <ul style="list-style-type: none"> <li>• histograms</li> <li>• circle graphs</li> <li>• <i>scatter plots</i></li> <li>• double line graphs</li> <li>• line graphs by approximating line of best fit</li> </ul> <p>NS.1.7.5 Communicate results and conclusions from scientific inquiry</p>	<p>NS.1.8.4 Analyze a set of scientific data using mean, median, mode, and range using <i>SI units</i></p> <p>NS.1.8.5 Suggest <i>solutions</i> to real world problems by analyzing scientific data in</p> <ul style="list-style-type: none"> <li>• data tables/charts</li> <li>• histograms</li> <li>• circle graphs</li> <li>• <i>scatter plots</i></li> <li>• <i>stem and leaf plots</i></li> <li>• line and double line graphs by approximating line of best fit</li> </ul>

Strand 1: Nature of Science

Standard 1: Characteristics and Processes of Science

Students shall demonstrate and apply knowledge of the characteristics and processes of science using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Processes of Science			NS.1.7.6 Develop and implement strategies for long-term, accurate data collection	NS.1.8.6 Formulate inferences based on scientific data  NS.1.8.7 Communicate results and conclusions from scientific inquiry following peer review  NS.1.8.8 Develop and implement strategies for long-term, accurate data collection
Characteristics of Science	NS.1.5.7 Summarize the characteristics of science  NS.1.5.8 Explain the role of observation in the development of a theory  NS.1.5.9 Define and give examples of hypotheses	NS.1.6.7 Distinguish between scientific fact and opinion  NS.1.6.8 Explain the role of prediction in the development of a theory  NS.1.6.9 Define and give examples of <i>laws</i> and <i>theories</i>	NS.1.7.7 Distinguish between questions that can and cannot be answered by science  NS.1.7.8 Explain the role of testability and modification in the development of a theory  NS.1.7.9 Compare and contrast hypotheses, <i>laws</i> , and <i>theories</i>	NS.1.8.9 Generate questions that can and cannot be answered by science  NS.1.8.10 Explain the role of peer review, evidence, and modification in the development of a theory  NS.1.8.11 Evaluate the merit of hypotheses, <i>laws</i> , and <i>theories</i>

Strand 2: Life Science

Standard 2: Living Systems: Characteristics, Structure, and Function

Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Structure and Function	<p>LS.2.5.1 Compare the <i>cell theory</i> to the characteristics of a scientific <i>theory</i></p> <p>LS.2.5.2 Examine cells on a microscopic level</p> <p>LS.2.5.3 Describe the similarities of basic <i>cell</i> functions in all <i>organisms</i></p> <p>LS.2.5.4 Model and identify the parts of animal <i>cells</i> and plant <i>cells</i>:</p> <ul style="list-style-type: none"> <li>• <i>cell</i> wall</li> <li>• <i>cell</i> membrane</li> <li>• <i>nucleus</i></li> <li>• cytoplasm</li> <li>• chloroplast</li> </ul> <p>LS.2.5.5 Compare and contrast plant and animal <i>cells</i></p> <p>LS.2.5.6 Conduct investigations to separate plant pigments from the <i>cell</i></p>	<p>LS.2.6.1 Observe, describe, and illustrate plant and animal <i>tissues</i>:</p> <ul style="list-style-type: none"> <li>• muscle</li> <li>• blood</li> <li>• skin</li> <li>• <i>xylem</i></li> <li>• <i>phloem</i></li> </ul> <p>LS.2.6.2 Illustrate the hierarchical relationships of <i>cells</i>, <i>tissues</i>, and <i>organs</i></p> <p>LS.2.6.3 Investigate the functions of <i>tissues</i></p> <p>LS.2.6.4 Model and explain the functions of animal <i>organs</i>:</p> <ul style="list-style-type: none"> <li>• heart</li> <li>• lung</li> <li>• kidneys</li> <li>• eyes</li> <li>• ears</li> <li>• skin</li> <li>• teeth</li> </ul>	<p>LS.2.7.1 Illustrate the hierarchical relationships of <i>cells</i>, <i>tissues</i>, <i>organs</i>, and <i>organ systems</i></p> <p>LS.2.7.2 Analyze how two or more <i>organs</i> work together to perform a function (e.g., mouth and stomach to digest food)</p> <p>LS.2.7.3 Identify <i>organ systems</i> in <i>vertebrates</i> and plants</p> <p>LS.2.7.4 Analyze the structure and function of <i>tissues</i>, <i>organs</i>, and <i>organ systems</i> of a <i>vertebrate</i> and an <i>angiosperm</i> using various models or methods of dissection</p> <p>LS.2.7.5 Compare and contrast <i>vertebrate</i> systems and plant <i>organ systems</i></p>	<p>LS.2.8.1 Illustrate the hierarchical relationships of <i>cells</i>, <i>tissues</i>, <i>organs</i>, <i>organ systems</i>, and <i>organisms</i></p> <p>LS.2.8.2 Identify different types of single-celled <i>organisms</i>:</p> <ul style="list-style-type: none"> <li>• protists</li> <li>• bacteria</li> </ul> <p>LS.2.8.3 Relate the effect of bacteria on oral health</p> <p>LS.2.8.4 Describe and illustrate single-celled <i>organisms</i> found in pond water</p> <p>LS.2.8.5 Use a <i>dichotomous key</i> to classify <i>organisms</i> found in pond water</p> <p>LS.2.8.6 Compare and contrast characteristics of unicellular <i>organisms</i> and multi-cellular <i>organisms</i></p>



Strand 2: Life Science

Standard 2: Living Systems: Characteristics, Structure, and Function

Students shall demonstrate and apply knowledge of living systems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Structure and Function	<p>LS.2.5.7 Identify the role of chlorophyll in the process of photosynthesis</p> <p>LS.2.5.8 Explain and illustrate photosynthesis</p> <p>LS.2.5.9 Explain <i>cellular respiration</i></p> <p>LS.2.5.10 Conduct investigations demonstrating the process of <i>cellular respiration</i></p> <p>LS.2.5.11 Investigate careers, scientists, and historical breakthroughs related to <i>cells</i></p>	<p>LS.2.6.5 Model and explain the function of plant <i>organs</i>:</p> <ul style="list-style-type: none"> <li>• leaves</li> <li>• roots</li> <li>• stems</li> <li>• flowers</li> </ul> <p>LS.2.6.6 Dissect <i>organs</i>, including but not limited to</p> <ul style="list-style-type: none"> <li>• heart</li> <li>• eye</li> <li>• lung</li> <li>• stem</li> <li>• root</li> </ul> <p>LS.2.6.7 Describe the relationship between organ function and the following needs of cells:</p> <ul style="list-style-type: none"> <li>• oxygen</li> <li>• food</li> <li>• water</li> <li>• waste removal</li> </ul> <p>LS.2.6.8 Investigate careers, scientists, and historical breakthroughs related to <i>tissues</i> and <i>organs</i></p>	<p>LS.2.7.6 Identify human body systems:</p> <ul style="list-style-type: none"> <li>• nervous</li> <li>• digestive</li> <li>• circulatory</li> <li>• respiratory</li> <li>• excretory</li> <li>• integumentary</li> <li>• skeletal/muscular</li> <li>• endocrine</li> <li>• reproductive</li> </ul> <p>LS.2.7.7 Relate the structure of <i>vertebrate</i> and plant body systems to their functions</p> <p>LS.2.7.8 Investigate functions of human body systems</p> <p>LS.2.7.9 Describe interactions between major <i>organ systems</i></p> <p>LS.2.7.10 Investigate careers, scientists, and historical breakthroughs related to life systems</p>	<p>LS.2.8.7 Classify <i>cells</i> as <i>eukaryotic</i> or <i>prokaryotic</i></p> <p>LS.2.8.8 Identify and describe similarities and differences among <i>organisms</i> of different, but closely related taxa (e.g., pine trees, big cats, rodents, ungulates)</p> <p>LS.2.8.9 Investigate careers, scientists, and historical breakthroughs related to <i>organisms</i></p>

Strand 2: Life Science

Standard 3: Life Cycles, Reproduction, and Heredity

Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Heredity and Reproduction		<p>LS.3.6.1 Describe characteristics of plants and animals manipulated through <i>selective breeding</i></p> <p>LS.3.6.2 Predict the outcome of <i>selective breeding</i> practices over several generations</p> <p>LS.3.6.3 Relate the development of Earth's present-day complex <i>species</i> from earlier, distinctly different simpler <i>species</i></p> <p>LS.3.6.4 Investigate careers, scientists, and historical breakthroughs related to <i>adaptations</i> and <i>selective breeding</i></p>	<p>LS.3.7.1 Explain that the fertilized <i>egg cell</i> carries <i>genetic</i> information from each parent and multiplies to form a complete <i>organism</i></p> <p>LS.3.7.2 Distinguish between <i>sperm cells</i> and <i>egg cells</i></p> <p>LS.3.7.3 Compare and contrast the structure and function of the <i>sperm cell</i> and the <i>egg cell</i> in <i>vertebrates</i> and plants and their role in <i>sexual reproduction</i></p> <p>LS.3.7.4 Investigate and analyze the development of <i>embryos</i></p> <p>LS.3.7.5 Dissect a poultry <i>egg</i> to analyze its structure (e.g., paper, plastic, or <i>clay</i> models, virtual dissection, or specimen dissection)</p>	<p>LS.3.8.1 Identify and explain why inherited characteristics of <i>living</i> things depend on <i>genes</i></p> <p>LS.3.8.2 Differentiate between dominant and <i>recessive</i> traits</p> <p>LS.3.8.3 Observe and classify traits as dominant or <i>recessive</i>:</p> <ul style="list-style-type: none"> <li>• tongue rolling</li> <li>• detached earlobes</li> <li>• widow's peak</li> <li>• hitchhiker's thumb</li> <li>• dimples</li> <li>• unibrow</li> </ul> <p>LS.3.8.4 Differentiate among observed inherited traits and acquired traits of plants and animals</p> <p>LS.3.8.5 Interpret simple <i>genetic</i> crosses using <i>Punnett Squares</i></p>

Strand 2: Life Science

Standard 3: Life Cycles, Reproduction, and Heredity

Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Heredity and Reproduction			<p>LS.3.7.6 Dissect a flower to analyze the reproductive system of <i>angiosperms</i> (e.g., paper, plastic, or <i>clay</i> models; virtual dissection; or specimen dissection)</p> <p>LS.3.7.7 Differentiate between sexual and <i>asexual reproduction</i> in</p> <ul style="list-style-type: none"> <li>• <i>vertebrates</i></li> <li>• plants</li> </ul> <p>LS.3.7.8 Identify the number and source of chromosomes in human body <i>cells</i></p> <p>LS.3.7.9 Identify the number and source of chromosomes in human sex <i>cells</i></p> <p>LS.3.7.10 Explain the role of <i>cell</i> division</p> <p>LS.3.7.11 Investigate careers, scientists, and historical breakthroughs related to <i>reproduction</i></p>	<p>LS.3.8.6 Predict patterns that emerge from simple <i>genetic</i> crosses</p> <p>LS.3.8.7 Conduct investigations demonstrating that the phenotype of a <i>genetic</i> trait is the result of genotype</p> <p>LS.3.8.8 Explain how genetic variation within a <i>species</i> is a result of dominant traits and <i>recessive traits</i></p> <p>LS.3.8.9 Compare and contrast patterns of <i>embryological</i> development for all <i>vertebrates</i>, including humans</p> <p>LS.3.8.10 Distinguish between characteristics of plants and animals through <i>selective breeding</i></p> <p>LS.3.8.11 Investigate careers, scientists, and historical breakthroughs related to <i>genetics</i></p>

Strand 2: Life Science

Standard 3: Life Cycles, Reproduction, and Heredity

Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Regulation and Behavior		<p>LS.3.6.5 Describe behavioral <i>adaptations</i> of <i>organisms</i> to the <i>environment</i>:</p> <ul style="list-style-type: none"> <li>• <i>hibernation</i></li> <li>• <i>estivation</i></li> <li>• <i>tropism</i></li> <li>• <i>territorial behavior</i></li> <li>• <i>migration</i></li> </ul> <p>LS.3.6.6 Differentiate between <i>innate behaviors</i>:</p> <ul style="list-style-type: none"> <li>• <i>migration</i></li> <li>• web spinning</li> <li>• defensive posture</li> <li>• <i>communication</i></li> <li>• <i>imprinting</i></li> </ul> <p>and <i>learned behaviors</i>:</p> <ul style="list-style-type: none"> <li>• speaking a language</li> <li>• using tools</li> <li>• hunting skills</li> </ul>	<p>LS.3.7.12 Summarize the interactions between <i>organ systems</i> in the maintenance of <i>homeostasis</i></p>	<p>LS.3.8.12 Compare the theory of evolution to the characteristics of a scientific <i>theory</i></p> <p>LS.3.8.13 Identify basic ideas related to biological evolution:</p> <ul style="list-style-type: none"> <li>• diversity of <i>species</i></li> <li>• variations within <i>species</i></li> <li>• <i>adaptations</i></li> <li>• <i>natural selection</i></li> <li>• <i>extinction</i> of a <i>species</i></li> </ul> <p>LS.3.8.14 Explain that the <i>fossil</i> record provides <i>evidence</i> of life forms' appearance, diversification, and <i>extinction</i></p> <p>LS.3.8.15 Explain the process of <i>natural selection</i></p>

Strand 2: Life Science

Standard 3: Life Cycles, Reproduction, and Heredity

Students shall demonstrate and apply knowledge of life cycles, reproduction, and heredity using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Regulation and Behavior		<p>LS.3.6.7 Describe the following <i>structural adaptations</i> for survival in the <i>environment</i>:</p> <ul style="list-style-type: none"> <li>• coloration</li> <li>• <i>mimicry</i></li> <li>• odor glands</li> <li>• beaks</li> <li>• feet</li> <li>• wings</li> <li>• fur</li> <li>• ears</li> <li>• spines</li> <li>• teeth</li> <li>• thorns</li> <li>• characteristics of seeds</li> </ul> <p>LS.3.6.8 Investigate careers, scientists, and historical breakthroughs related to learned and <i>innate behaviors</i></p>		<p>LS.3.8.16 Identify <i>genetic</i> traits that make <i>organisms</i> more likely to survive and reproduce in a particular environment</p> <p>LS.3.8.17 Investigate careers, scientists, and historical breakthroughs related to <i>natural selection</i> and the <i>fossil</i> record</p>

Strand 2: Life Science

Standard 4: Populations and Ecosystems

Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology.

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Populations and Ecosystems	<p>LS.4.5.1 Distinguish among and model</p> <ul style="list-style-type: none"> <li>• <i>organisms</i></li> <li>• <i>populations</i></li> <li>• <i>communities</i></li> <li>• <i>ecosystems</i></li> <li>• <i>biosphere</i></li> </ul> <p>LS.4.5.2 Identify the transfer of <i>energy</i> using <i>energy</i> pyramids:</p> <ul style="list-style-type: none"> <li>• terrestrial</li> <li>• aquatic</li> </ul> <p>LS.4.5.3 Design food webs in specific <i>habitats</i> to show the flow of <i>energy</i> within <i>communities</i>:</p> <ul style="list-style-type: none"> <li>• terrestrial</li> <li>• aquatic</li> </ul> <p>LS.4.5.4 Evaluate food webs under conditions of stress:</p> <ul style="list-style-type: none"> <li>• overgrazing</li> <li>• overpopulation</li> <li>• natural disaster</li> <li>• introduction of non-native <i>species</i></li> <li>• human impact/urban development</li> </ul>	<p>LS.4.6.1 Identify <i>environmental</i> conditions that can affect the survival of individual <i>organisms</i> and entire <i>species</i></p> <p>LS.4.6.2 Conduct simulations demonstrating competition for resources within an <i>ecosystem</i></p> <p>LS.4.6.3 Conduct simulations demonstrating <i>natural selection</i></p> <p>LS.4.6.4 Analyze <i>natural selection</i></p>	<p>LS.4.7.1 Explain the role of <i>reproduction</i> in the continuation of a <i>species</i></p>	<p>LS.4.8.1 Analyze the effect of changes in environmental conditions on the survival of individual <i>organisms</i> and entire <i>species</i></p>

Strand 2: Life Science

Standard 4: Populations and Ecosystems

Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Populations and Ecosystems	<p>LS.4.5.5 Examine the role of <i>limiting factors</i> on the <i>carrying capacity</i> of an <i>ecosystem</i>:</p> <ul style="list-style-type: none"> <li>• food</li> <li>• space</li> <li>• water</li> <li>• shelter</li> </ul> <p>LS.4.5.6 Describe and diagram the nitrogen cycle in <i>ecosystems</i></p> <p>LS.4.5.7 Describe and diagram the <i>carbon cycle</i> in <i>ecosystems</i></p> <p>LS.4.5.8 Describe and diagram the <i>carbon dioxide-oxygen cycle</i> in <i>ecosystems</i></p> <p>LS.4.5.9 Conduct investigations demonstrating the role of the <i>carbon dioxide-oxygen cycle</i> in <i>ecosystems</i></p> <p>LS.4.5.10 Analyze the concept of conservation of <i>mass</i> as related to the amount of <i>matter</i> in an <i>ecosystem</i></p>			

Strand 2: Life Science

Standard 4: Populations and Ecosystems

Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Populations and Ecosystems	<p>LS.4.5.11 Create <i>ecosystems</i> in which plants can exist without animals</p> <p>LS.4.5.12 Conduct investigations in which plants are encouraged to thrive</p> <p>LS.4.5.13 Construct, compare, and contrast <i>environments</i> in <i>open</i> and <i>closed</i> aquaria</p> <p>LS.4.5.14 Categorize <i>organisms</i> by the function they serve in <i>ecosystems</i> and food webs:</p> <ul style="list-style-type: none"> <li>• <i>predator/prey</i></li> <li>• <i>parasitism</i></li> <li>• <i>producer/consumer/ decomposer</i></li> <li>• <i>scavenger</i></li> <li>• <i>herbivore/carnivore/ omnivore</i></li> </ul> <p>LS.4.5.15 Conduct <i>field studies</i> identifying and categorizing <i>organisms</i> in a given area of an ecosystem</p>			



Strand 2: Life Science

Standard 4: Populations and Ecosystems

Students shall demonstrate and apply knowledge of populations and ecosystems using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Populations and Ecosystems	<p>LS.4.5.16 Evaluate positive and negative human effects on <i>ecosystems</i></p> <p>LS.4.5.17 Describe and illustrate various symbiotic relationships:</p> <ul style="list-style-type: none"> <li>• <i>parasitism</i></li> <li>• <i>mutualism</i></li> <li>• <i>commensalism</i></li> </ul> <p>LS.4.5.18 Investigate careers, scientists, and historical breakthroughs related to <i>populations</i> and <i>ecosystems</i></p>			

Strand 3: Physical Science

Standard 5: Matter: Properties and Changes

Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Properties of <i>Matter</i>	<p>PS.5.5.1 Identify the relationship of <i>atoms</i> to all <i>matter</i></p> <p>PS.5.5.2 Conduct <i>scientific investigations</i> on <i>physical properties</i> of objects</p> <p>PS.5.5.3 Identify common examples of <i>physical properties</i>:</p> <ul style="list-style-type: none"> <li>• length</li> <li>• <i>mass</i></li> <li>• area</li> <li>• perimeter</li> <li>• texture</li> <li>• taste</li> <li>• odor</li> <li>• color</li> <li>• elasticity</li> </ul> <p>PS.5.5.4 State characteristics of physical changes</p> <p>PS.5.5.5 Identify characteristics and common examples of physical changes</p>	<p>PS.5.6.1 Identify common examples of <i>chemical properties</i>:</p> <ul style="list-style-type: none"> <li>• ability to burn</li> <li>• ability to produce light</li> <li>• ability to react with other substances</li> </ul> <p>PS.5.6.2 Compare and contrast characteristics of physical and <i>chemical properties</i></p> <p>PS.5.6.3 Conduct investigations using acid/base indicators</p> <p>PS.5.6.4 Apply skills of scientific investigation to determine <i>density</i> using <i>SI units</i></p> <p>PS.5.6.5 Construct a <i>density</i> column using a minimum of four different liquids (e.g., alcohol, colored water, syrup, oil)</p> <p>PS.5.6.6 Use a <i>density</i> column to test the <i>density</i> of various solid objects (e.g., piece of candy, cork, candle, paper clip, egg)</p>	<p>PS.5.7.1 Explain how a small number of naturally-occurring <i>elements</i> can result in the large variety of substances found in the world</p> <p>PS.5.7.2 Create models of common <i>compounds</i>:</p> <ul style="list-style-type: none"> <li>• water</li> <li>• carbon dioxide</li> <li>• salt</li> <li>• iron oxide</li> <li>• ammonia</li> </ul> <p>PS.5.7.3 Identify <i>compounds</i> as substances consisting of two or more <i>elements</i> chemically combined</p> <p>PS.5.7.4 Compare and contrast properties of <i>compounds</i> to those of the <i>elements</i> that compose them:</p> <ul style="list-style-type: none"> <li>• salt: sodium, chlorine</li> <li>• water: hydrogen, oxygen</li> <li>• carbon dioxide: carbon, oxygen</li> </ul>	<p>PS.5.8.1 Compare the atomic theory to the characteristics of a scientific <i>theory</i></p> <p>PS.5.8.2 Explain the structure of <i>atoms</i></p> <p>PS.5.8.3 Determine the number of <i>protons</i>, <i>neutrons</i>, and <i>electrons</i> in an <i>atom</i></p> <p>PS.5.8.4 Create <i>atomic</i> models of common <i>elements</i></p> <p>PS.5.8.5 Investigate scientists, careers, and historical breakthroughs related to the <i>atomic theory</i></p>

Strand 3: Physical Science

Standard 5: Matter: Properties and Changes

Students shall demonstrate and apply knowledge of matter, including properties and changes, using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Properties of Matter	<p>PS.5.5.6 Explain how heat influences the states of matter of a substance:</p> <ul style="list-style-type: none"> <li>• solid</li> <li>• liquid</li> <li>• gas</li> <li>• plasma</li> </ul> <p>PS.5.5.7 Demonstrate the effect of changes in the <i>physical properties of matter</i></p> <p>PS.5.5.8 Model the motion and position of <i>molecules</i> in solids, liquids, and gases in terms of <i>kinetic energy</i></p> <p>PS.5.5.9 Conduct investigations demonstrating expansion and contraction</p> <p>PS.5.5.10 Investigate scientists, careers, and historical breakthroughs related to <i>physical properties</i>, physical changes, and states of <i>matter</i></p>	<p>PS.5.6.7 Identify characteristics of <i>chemical changes</i>:</p> <ul style="list-style-type: none"> <li>• burning</li> <li>• production of a new substance</li> <li>• production of light</li> <li>• color change</li> <li>• <i>endothermic</i> and <i>exothermic</i> reactions</li> <li>• <i>reactivity</i></li> </ul> <p>PS.5.6.8 Conduct investigations comparing and contrasting physical and <i>chemical changes</i></p> <p>PS.5.6.9 Demonstrate the <i>law of the conservation of matter</i></p> <p>PS.5.6.10 Investigate scientists, careers, and historical breakthroughs related to <i>chemical properties</i> and <i>chemical changes</i></p>	<p>PS.5.7.5 Demonstrate techniques for forming and separating <i>mixtures</i>:</p> <ul style="list-style-type: none"> <li>• mixing</li> <li>• magnetic attraction</li> <li>• evaporation</li> <li>• filtration</li> <li>• chromatography</li> <li>• settling</li> </ul> <p>PS.5.7.6 Classify substances as</p> <ul style="list-style-type: none"> <li>• <i>elements</i></li> <li>• <i>compounds</i></li> <li>• <i>mixtures</i></li> </ul> <p>PS.5.7.7 Distinguish among <i>solvent</i>, <i>solute</i>, and <i>solution</i></p> <p>PS.5.7.8 Investigate the effect of <i>variables</i> on <i>solubility rates</i></p> <p>PS.5.7.9 Interpret solubility graphs</p> <p>PS.5.7.10 Investigate scientists, careers, and historical breakthroughs related to <i>elements</i>, <i>mixtures</i>, and <i>compounds</i></p>	

Strand 3: Physical Science

Standard 6: Motion and Forces

Students shall demonstrate and apply knowledge of motion and *forces* using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Motion and Forces	<p>PS.6.5.1 Classify <i>simple machines</i></p> <p>PS.6.5.2 Conduct investigations using</p> <ul style="list-style-type: none"> <li>• levers (e.g., toothbrush)</li> <li>• pulleys</li> <li>• inclined planes-ramps, wedges, and screws</li> <li>• wheels and axles</li> </ul> <p>PS.6.5.3 Relate <i>simple machines</i> to inventions and discoveries</p> <p>PS.6.5.4 Compare and contrast <i>potential energy</i> and <i>kinetic energy</i> as applied to motion</p> <p>PS.6.5.5 Classify real world examples as <i>potential energy</i> or <i>kinetic energy</i> as applied to motion</p> <p>PS.6.5.6 Conduct investigations using <i>potential energy</i> and <i>kinetic energy</i></p>	<p>PS.6.6.1 Compare and contrast <i>simple machines</i> and <i>compound machines</i></p> <p>PS.6.6.2 Identify and analyze the simple machines that make up a compound machine</p> <p>PS.6.6.3 Conduct investigations of various forces using SI units (newton)</p> <p>PS.6.6.4 Recognize and give examples of different types of <i>forces</i>:</p> <ul style="list-style-type: none"> <li>• gravitational <i>forces</i></li> <li>• magnetic <i>forces</i></li> <li>• <i>friction</i></li> </ul> <p>PS.6.6.5 Understand why objects have <i>weight</i></p> <p>PS.6.6.6 Compare and contrast <i>weight</i> and <i>mass</i></p>	<p>PS.6.7.1 Compare and contrast Newton's three laws of motion</p> <p>PS.6.7.2 Conduct investigations demonstrating Newton's first law of motion</p> <p>PS.6.7.3 Demonstrate Newton's second law of motion</p> <p>PS.6.7.4 Conduct investigations of Newton's third law of motion</p> <p>PS.6.7.5 Explain how Newton's three laws of motion apply to real world situations (e.g., sports, transportation)</p> <p>PS.6.7.6 Investigate careers, scientists, and historical breakthroughs related to laws of motion</p>	<p>PS.6.8.1 Model how motion and <i>forces</i> change Earth's surface:</p> <ul style="list-style-type: none"> <li>• <i>compression</i></li> <li>• <i>tension</i></li> <li>• <i>weathering</i></li> <li>• <i>erosion</i></li> </ul> <p>PS.6.8.2 Conduct investigations demonstrating the field <i>force</i> (lines of <i>force</i>) in magnetic fields</p> <p>PS.6.8.3 Design and conduct investigations applying <i>variables</i> affecting the strength of an <i>electromagnet</i></p> <p>PS.6.8.4 Analyze and compare the relationship between <i>electricity</i> and <i>magnetism</i></p> <p>PS.6.8.5 Investigate careers, scientists, and historical breakthroughs related to motion and <i>forces</i> that change Earth's surface</p>

Strand 3: Physical Science

Standard 6: Motion and Forces

Students shall demonstrate and apply knowledge of motion and *forces* using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Motion and Forces	<p>PS.6.5.7 Investigate careers, scientists, and historical breakthroughs related to <i>simple machines</i> and <i>potential</i> and <i>kinetic energy</i></p>	<p>PS.6.6.7 Describe the effects of <i>force</i>:</p> <ul style="list-style-type: none"> <li>• move a stationary object</li> <li>• <i>speed</i> up, slow down or change the direction of motion</li> <li>• change the shape of objects</li> </ul> <p>PS.6.6.8 Conduct investigations to demonstrate change in direction caused by <i>force</i></p> <p>PS.6.6.9 Conduct investigations to calculate the change in <i>speed</i> caused by applying <i>forces</i> to an object</p> <p>PS.6.6.10 Investigate careers, scientists, and historical breakthroughs related to <i>compound machines</i> and <i>forces</i></p>		

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Energy	<p>PS.7.5.1 Summarize how light can interact with <i>matter</i> through <i>absorption</i>, <i>refraction</i>, and <i>reflection</i></p> <p>PS.7.5.2 Investigate how light travels and interacts with an object or material</p> <p>PS.7.5.3 Conduct investigations demonstrating how an object can be seen</p> <p>PS.7.5.4 Design and conduct investigations of transparent, <i>translucent</i>, and <i>opaque</i> as applied to light</p> <p>PS.7.5.5 Investigate physical interactions of light and <i>matter</i> and the effect on color perception:</p> <ul style="list-style-type: none"> <li>• <i>refraction</i></li> <li>• <i>absorption</i></li> <li>• <i>transmission</i></li> <li>• <i>scattering</i></li> </ul>	<p>PS.7.6.1 Classify examples of <i>energy</i> forms:</p> <ul style="list-style-type: none"> <li>• <i>chemical</i></li> <li>• <i>electromagnetic</i></li> <li>• <i>mechanical</i></li> <li>• <i>thermal</i></li> <li>• <i>nuclear</i></li> </ul> <p>PS.7.6.2 Summarize the application of the law of conservation of energy in real world situations:</p> <ul style="list-style-type: none"> <li>• <i>electrical energy</i> into <i>mechanical energy</i></li> <li>• <i>electrical energy</i> into <i>heat</i></li> <li>• <i>chemical energy</i> into <i>mechanical energy</i></li> <li>• <i>chemical energy</i> into light</li> </ul> <p>PS.7.6.3 Conduct investigations demonstrating how <i>energy</i> can be converted from one form to another</p>	<p>PS.7.7.1 Identify <i>natural resources</i> used to supply energy needs</p> <p>PS.7.7.2 Describe alternatives to the use of <i>fossil fuels</i>:</p> <ul style="list-style-type: none"> <li>• <i>solar energy</i></li> <li>• <i>geothermal energy</i></li> <li>• <i>wind</i></li> <li>• <i>hydroelectric power</i></li> <li>• <i>nuclear energy</i></li> <li>• <i>biomass</i></li> </ul> <p>PS.7.7.3 Conduct investigations to identify types of <i>potential energy</i> and <i>kinetic energy</i></p> <p>PS.7.7.4 Investigate alternative <i>energy</i> sources</p> <p>PS.7.7.5 Investigate careers, scientists, and historical breakthroughs related to <i>natural resources</i>, alternative resources, <i>electricity</i>, and <i>magnetism</i></p>	<p>PS.7.8.1 Construct <i>open</i> and <i>closed electrical circuits</i>:</p> <ul style="list-style-type: none"> <li>• <i>series circuits</i></li> <li>• <i>parallel circuits</i></li> </ul> <p>PS.7.8.2 Describe and diagram <i>open</i> and <i>closed series</i> and <i>parallel circuits</i></p> <p>PS.7.8.3 Compare and contrast <i>open</i> and <i>closed series circuits</i> and <i>parallel circuits</i></p> <p>PS.7.8.4 Conduct investigations demonstrating the characteristics of a wave:</p> <ul style="list-style-type: none"> <li>• <i>wavelength</i></li> <li>• <i>frequency</i></li> <li>• <i>speed</i></li> <li>• <i>amplitude</i></li> </ul> <p>PS.7.8.5 Conduct investigations of <i>longitudinal</i> and <i>transverse waves</i> to determine how they are different</p>

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Energy	<p>PS.7.5.6 Investigate careers, scientists, and historical breakthroughs related to light <i>energy</i></p>	<p>PS.7.6.4 Investigate the transfer of <i>energy</i> in real world situations:</p> <ul style="list-style-type: none"> <li>• <i>conduction</i></li> <li>• <i>convection</i></li> <li>• <i>radiation</i></li> </ul> <p>PS.7.6.5 Investigate careers, scientists, and historical breakthroughs related to <i>energy</i> forms and conversions</p>		<p>PS.7.8.6 Explain how <i>energy</i> is transferred through waves:</p> <ul style="list-style-type: none"> <li>• <i>seismic waves</i></li> <li>• <i>sound waves</i></li> <li>• <i>water waves</i></li> <li>• <i>electromagnetic waves</i></li> </ul> <p>PS.7.8.7 Describe how waves travel through different kinds of media</p> <p>PS.7.8.8 Differentiate among <i>reflection</i>, <i>refraction</i>, and <i>absorption</i> of various types of waves</p> <p>PS.7.8.9 Describe and diagram the <i>electromagnetic spectrum</i></p> <p>PS.7.8.10 Analyze the <i>electromagnetic spectrum</i></p> <p>PS.7.8.11 Investigate examples of real world uses of the <i>electromagnetic spectrum</i></p>

Strand 3: Physical Science

Standard 7: Energy and Transfer of Energy

Students shall demonstrate and apply knowledge of energy and transfer of energy using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Energy				<p>PS.7.8.12 Conduct investigations demonstrating the separation of <i>white light</i> into its spectrum using <i>refraction</i></p> <p>PS.7.8.13 Compare ways to transfer information:</p> <ul style="list-style-type: none"> <li>• sound</li> <li>• light</li> <li>• radio</li> <li>• <i>microwave energy</i></li> </ul> <p>PS.7.8.14 Investigate careers, scientists, and historical breakthroughs related to waves and the <i>electromagnetic</i> spectrum</p>



Strand 4: Earth and Space Science  
 Standard 8: Earth Systems

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Structure and Properties	<p>ESS.8.5.1 Identify some basic <i>elements</i> composing minerals:</p> <ul style="list-style-type: none"> <li>• silicon</li> <li>• oxygen</li> <li>• iron</li> <li>• sodium</li> <li>• chlorine</li> <li>• calcium</li> <li>• carbon</li> <li>• hydrogen</li> <li>• aluminum</li> </ul> <p>ESS.8.5.2 Investigate the growth of crystals</p> <p>ESS.8.5.3 Identify characteristics of minerals</p> <p>ESS.8.5.4 Conduct investigations on mineral properties:</p> <ul style="list-style-type: none"> <li>• luster</li> <li>• hardness</li> <li>• streak</li> <li>• acid test for calcite</li> <li>• fluorescence</li> </ul>	<p>ESS.8.6.1 Identify and diagram the layers of the Earth:</p> <ul style="list-style-type: none"> <li>• crust</li> <li>• mantle</li> <li>• inner and outer core</li> </ul> <p>ESS.8.6.2 Model the layers of the Earth</p> <p>ESS.8.6.3 Model how <i>convection</i> currents in the mantle affect lithosphere movement</p> <p>ESS.8.6.4 Conduct investigations to identify the <i>variables</i> within volcanoes that cause different types of eruptions</p> <p>ESS.8.6.5 Diagram and explain how volcanoes work</p> <p>ESS.8.6.6 Explain how volcanic activity relates to mountain formation</p> <p>ESS.8.6.7 Connect short-term changes in <i>climate</i> with volcanic activity</p>	<p>ESS.8.7.1 Describe the composition and physical characteristics of the <i>atmosphere</i></p> <p>ESS.8.7.2 Investigate the influence of global patterns on local weather:</p> <ul style="list-style-type: none"> <li>• movement of air masses</li> <li>• <i>Coriolis effect</i></li> <li>• <i>jet stream</i></li> <li>• global wind belts</li> </ul> <p>ESS.8.7.3 Conduct investigations demonstrating the effects of <i>solar energy</i> on the <i>atmosphere</i></p> <p>ESS.8.7.4 Investigate the effect that oceans have on <i>climate</i></p> <p>ESS.8.7.5 Identify <i>elements</i> of weather:</p> <ul style="list-style-type: none"> <li>• <i>temperature</i></li> <li>• air pressure</li> <li>• <i>wind speed</i></li> <li>• wind direction</li> <li>• <i>humidity</i></li> </ul>	<p>ESS.8.8.1 Analyze the causes and predict the consequences of <i>global warming</i> on the following:</p> <ul style="list-style-type: none"> <li>• weather</li> <li>• <i>temperature</i></li> <li>• ocean water levels</li> </ul> <p>ESS.8.8.2 Investigate how global patterns of water currents influence local weather:</p> <ul style="list-style-type: none"> <li>• Gulf Stream</li> <li>• Atlantic Currents</li> <li>• California Current</li> </ul> <p>ESS.8.8.3 Conduct investigations to compare and contrast different landforms found on Earth:</p> <ul style="list-style-type: none"> <li>• mountains</li> <li>• plateaus</li> <li>• plains</li> </ul> <p>ESS.8.8.4 Synthesize and model the result of both constructive and destructive <i>forces</i> on land forms:</p> <ul style="list-style-type: none"> <li>• <i>deposition</i></li> <li>• <i>erosion</i></li> <li>• <i>weathering</i></li> <li>• <i>crustal deformation</i></li> </ul>

Strand 4: Earth and Space Science  
 Standard 8: Earth Systems

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Structure and Properties	<p>ESS.8.5.5            Identify the following minerals:</p> <ul style="list-style-type: none"> <li>• halite (salt)</li> <li>• feldspar</li> <li>• sulfur</li> <li>• quartz</li> <li>• diamonds</li> <li>• gypsum</li> <li>• calcite</li> <li>• talc</li> <li>• hematite (iron)</li> <li>• precious <i>metals</i> (gold, silver)</li> </ul> <p>ESS.8.5.6            Identify minerals found in Arkansas:</p> <ul style="list-style-type: none"> <li>• bauxite</li> <li>• diamonds</li> <li>• quartz</li> <li>• galena</li> </ul>	<p>ESS.8.6.8            Compare and contrast the different land forms caused by Earth's internal <i>forces</i>:</p> <ul style="list-style-type: none"> <li>• mountains</li> <li>• plateaus</li> <li>• trenches</li> <li>• islands</li> </ul> <p>ESS.8.6.9            Research local, regional, and state landforms created by internal <i>forces</i> in the earth:</p> <ul style="list-style-type: none"> <li>• Ozark Plateau</li> <li>• Crater of Diamonds</li> <li>• Ouachita Mountains</li> <li>• New Madrid Fault</li> </ul>	<p>ESS.8.7.6            Conduct investigations using weather measurement devices:</p> <ul style="list-style-type: none"> <li>• <i>anemometers</i></li> <li>• <i>barometers</i></li> <li>• <i>sling psychrometers</i></li> <li>• <i>thermometers</i></li> <li>• weather charts</li> </ul> <p>ESS.8.7.7            Predict weather conditions using data on the following:</p> <ul style="list-style-type: none"> <li>• <i>temperature</i></li> <li>• air pressure: highs, lows, fronts</li> <li>• clouds</li> <li>• <i>wind speed</i></li> <li>• <i>wind direction</i></li> <li>• <i>humidity</i></li> </ul>	<p>ESS.8.8.5            Compare and contrast the different landforms caused by Earth's external <i>forces</i>:</p> <ul style="list-style-type: none"> <li>• plains</li> <li>• canyons</li> <li>• deltas</li> <li>• valleys</li> <li>• swamps</li> </ul> <p>ESS.8.8.6            Research local, regional, and state landforms created by external <i>forces</i> on Earth:</p> <ul style="list-style-type: none"> <li>• Gulf Coastal Plain</li> <li>• Arkansas River Valley</li> <li>• Mississippi Alluvial Plain, including the delta region</li> <li>• Crowley's Ridge</li> </ul>

Strand 4: Earth and Space Science  
 Standard 8: Earth Systems

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
	<p>ESS.8.5.7            Identify characteristics of <i>sedimentary, igneous, and metamorphic</i> rocks</p> <p>ESS.8.5.8            Compare and contrast by investigation characteristics of the three basic types of rocks:</p> <ul style="list-style-type: none"> <li>• <i>sedimentary</i></li> <li>• <i>igneous</i></li> <li>• <i>metamorphic</i></li> </ul>	<p>ESS.8.6.10            Identify the effects of <i>earthquakes</i> on Earth's surface:</p> <ul style="list-style-type: none"> <li>• tsunamis</li> <li>• floods</li> <li>• changes in natural and man-made structures</li> </ul> <p>ESS.8.6.11            Investigate and map patterns of <i>earthquake</i> and volcanic activity</p>	<p>ESS.8.7.8            Identify the causes and effects of weather-related phenomena:</p> <ul style="list-style-type: none"> <li>• thunderstorms</li> <li>• tornadoes/ hurricanes/cyclones/ typhoons</li> <li>• drought</li> <li>• <i>acid precipitation</i></li> </ul> <p>ESS.8.7.9            Explain tornado belt weather patterns using a map of the United States</p>	<p>ESS.8.8.7            Use topographic maps to identify surface features of Earth</p>

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 Standard 8: Earth Systems

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THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Structure and Properties	<p>ESS.8.5.9 Classify the three basic types of rocks</p> <p>ESS.8.5.10 Investigate careers, scientists, and historical breakthroughs related to minerals and rocks</p>	<p>ESS.8.6.12 Locate <i>earthquake</i> belts on Earth:</p> <ul style="list-style-type: none"> <li>• Mediterranean-Trans-Asiatic</li> <li>• Circum-Pacific (Ring of Fire)</li> </ul> <p>ESS.8.6.13 Analyze how <i>earthquake</i> occurrences are recorded (<i>seismograph</i>) and measured (<i>Richter scale</i>)</p> <p>ESS.8.6.14 Model the effect of major geological events on land and ocean features:</p> <ul style="list-style-type: none"> <li>• mountain building</li> <li>• ocean trenches</li> <li>• island formation</li> <li>• mid-ocean ridges</li> </ul> <p>ESS.8.6.15 Investigate careers, scientists, and historical breakthroughs related to internal <i>forces</i> that change the Earth</p>	<p>ESS.8.7.10 Describe ways human beings protect themselves, others, and their property from adverse weather conditions</p> <p>ESS.8.7.11 Describe and map <i>climates</i> of major Earth regions</p> <p>ESS.8.7.12 Analyze the effect of the shape of Earth and the tilt of Earth's <i>axis</i> on <i>climate</i></p> <p>ESS.8.7.13 Identify and explain the effects that human activities have on weather and <i>atmosphere</i></p> <p>ESS.8.7.14 Describe causes and effects of <i>acid precipitation</i></p> <p>ESS.8.7.15 Investigate careers, scientists, and historical breakthroughs related to <i>atmosphere</i> and weather</p>	<p>ESS.8.8.8 Demonstrate an understanding of the agents of <i>erosion</i>:</p> <ul style="list-style-type: none"> <li>• <i>gravity</i></li> <li>• water</li> <li>• ice</li> <li>• wind</li> <li>• animals, including humans</li> </ul> <p>ESS.8.8.9 Using models of rivers, predict changes when <i>variables</i>, such as load, slope, amount of water, or the composition of a stream bed, are changed through <i>erosion</i> or <i>deposition</i></p> <p>ESS.8.8.10 Explain how <i>weathering</i> and <i>erosion</i> affect the oceans' salinity</p> <p>ESS.8.8.11 Investigate careers, scientists, and historical breakthroughs related to external <i>forces</i> that change the Earth</p>

Strand 4: Earth and Space Science  
 Standard 8: Earth Systems

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.

	Grade 5	Grade 6	Grade 7	Grade 8
Cycles	ESS.8.5.11 Investigate the formation of soil  ESS.8.5.12 Conduct investigations on sedimentation  ESS.8.5.13 Describe and illustrate the rock cycle		ESS.8.7.16 Conduct investigations demonstrating the <i>water cycle</i>  ESS.8.7.17 Explain the relationship between the <i>water cycle</i> and ground water  ESS.8.7.18 Investigate cloud formation  ESS.8.7.19 Conduct investigations demonstrating the <i>greenhouse effect</i>  ESS.8.7.20 Research how human activities may contribute to <i>global warming</i>  ESS.8.7.21 Explain examples of actual events that cause temporary <i>climate</i> changes: <ul style="list-style-type: none"> <li>• volcanic dust</li> <li>• drought</li> <li>• <i>meteor</i> impact</li> </ul>	ESS.8.8.12 Investigate the types of <i>weathering</i> involved in the breakdown of <i>organic</i> and <i>inorganic</i> components of Earth's surface  ESS.8.8.13 Illustrate <i>soil profiles</i>  ESS.8.8.14 Apply knowledge of <i>soil profiles</i> to local soil samples  ESS.8.8.15 Investigate the formation of soil types  ESS.8.8.16 Identify components of soil as <i>inorganic</i> or <i>organic</i> through investigations  ESS.8.8.17 Identify the basic <i>nutrients</i> needed by plants that are present in soils: <ul style="list-style-type: none"> <li>• nitrogen</li> <li>• phosphorous</li> <li>• potassium</li> </ul>

Strand 4: Earth and Space Science  
 Standard 8: Earth Systems

Students shall demonstrate and apply knowledge of Earth's structure and properties using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES.				
	Grade 5	Grade 6	Grade 7	Grade 8
Cycles				ESS.8.8.18 Identify ways plants use <i>organic</i> and <i>inorganic</i> components in the soil  ESS.8.8.19 Investigate and analyze the composition of a variety of soils  ESS.8.8.20 Conduct investigations on soil permeability

Strand 4: Earth and Space Science  
 Standard 9: Earth's History

Students shall demonstrate and apply knowledge of Earth's history using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Earth's History	<p>ESS.9.5.1 Explain and give examples of how physical <i>evidence</i> from <i>fossils</i> supports the <i>theory</i> that Earth has changed over time</p> <p>ESS.9.5.2 Analyze <i>fossil record evidence</i> about plants and animals that lived long ago</p> <p>ESS.9.5.3 Infer the nature of ancient <i>environments</i> based on <i>fossil record evidence</i></p>	<p>ESS.9.6.1 Research methods of determining geologic time:</p> <ul style="list-style-type: none"> <li>• <i>fossil</i> records</li> <li>• mountain building</li> <li>• rock sequencing</li> </ul> <p>ESS.9.6.2 Model rock layer sequencing based on characteristics of <i>fossils</i></p> <p>ESS.9.6.3 Analyze evidence that supports the theory of plate tectonics:</p> <ul style="list-style-type: none"> <li>• matching coastlines</li> <li>• similar rock types</li> <li>• fossil record</li> </ul>	<p>ESS.9.7.1 Analyze charts to infer past atmospheric conditions based on the <i>organisms</i> found in the <i>fossil</i> record</p> <p>ESS.9.7.2 Demonstrate that Earth has a magnetic field that is detectible at the surface with a compass</p> <p>ESS.9.7.3 Compare and contrast Earth's magnetic field to those of natural or human-made magnets with</p> <ul style="list-style-type: none"> <li>• North and South poles</li> <li>• lines of force</li> </ul> <p>ESS.9.7.4 Analyze evidence of sea floor spreading:</p> <ul style="list-style-type: none"> <li>• magnetic reversal</li> <li>• molten material</li> <li>• drilling samples</li> </ul> <p>ESS.9.7.5 Research ways in which people have used compasses</p>	<p>ESS.9.8.1 Explain processes that have changed Earth's surface that have resulted from sudden events (e.g., <i>earthquakes</i> and volcanoes) and gradual changes (e.g., uplift, <i>erosion</i>, and <i>weathering</i>)</p> <p>ESS.9.8.2 Analyze how rock sequences may be disturbed by the following:</p> <ul style="list-style-type: none"> <li>• <i>erosion</i></li> <li>• <i>deposition</i></li> <li>• <i>igneous intrusion</i></li> <li>• folding</li> <li>• faulting</li> <li>• uplifting</li> </ul> <p>ESS.9.8.3 Explain how scientists determine the relative ages of <i>fossils</i> found in layers of <i>sedimentary rock</i>:</p> <ul style="list-style-type: none"> <li>• <i>law</i> of superposition</li> <li>• <i>law</i> of cross-cutting</li> </ul> <p>ESS.9.8.4 Apply geologic <i>laws</i> of superposition and cross-cutting to determine the relative age of rock in a cross section</p>

Strand 4: Earth and Space Science

Standard 10: Objects in the Universe

Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Solar system: Sun, Earth, Moons, Planets, Galaxies	<p>ESS.10.5.1 Compare the physical characteristics of the sun to other stars:</p> <ul style="list-style-type: none"> <li>• size</li> <li>• color</li> <li>• brightness</li> </ul> <p>ESS.10.5.2 Demonstrate the order of planets and other space objects in our <i>solar system</i></p> <p>ESS.10.5.3 Compare the properties of planets in our <i>solar system</i>:</p> <ul style="list-style-type: none"> <li>• size</li> <li>• shape</li> <li>• <i>density</i></li> <li>• <i>atmosphere</i></li> <li>• distance from the sun</li> <li>• orbital path</li> <li>• moons</li> <li>• surface</li> <li>• composition</li> </ul> <p>ESS 10.5.4 Distinguish between <i>mass</i> and <i>weight</i></p>	<p>ESS.10.6.1 Explain how planets seem to wander against the background of the stars</p> <p>ESS.10.6.2 Compare the distance of the following:</p> <ul style="list-style-type: none"> <li>• from the sun to Earth (<i>light minutes</i>)</li> <li>• from the next nearest star to Earth (<i>light years</i>)</li> </ul> <p>ESS.10.6.3 Describe how astronomers measure distance to stars</p> <p>ESS.10.6.4 Calculate the rate at which we would have to travel to other stars and planets in our <i>solar system</i> using current technology</p> <p>ESS.10.6.5 Explain the effect of the sun on <i>comets</i></p>	<p>ESS.10.7.1 Identify and model the causes of night and day</p> <p>ESS.10.7.2 Compare and contrast Earth's day to those of other planets in our <i>solar system</i></p> <p>ESS.10.7.3 Identify and model the cause of <i>planetary years</i></p> <p>ESS.10.7.4 Compare and contrast Earth's year to those of other planets in our <i>solar system</i></p> <p>ESS.10.7.5 Identify and model the causes of seasons</p> <p>ESS.10.7.6 Investigate careers, scientists, and historical breakthroughs related to rotations and revolutions of bodies in space</p>	<p>ESS.10.8.1 Summarize the effects of <i>gravity</i> on bodies in space</p> <p>ESS.10.8.2 Identify <i>variables</i> that affect the amount of gravitational <i>force</i> between two objects:</p> <ul style="list-style-type: none"> <li>• <i>mass</i> of the objects</li> <li>• distance between the objects</li> </ul> <p>ESS.10.8.3 Relate the effects of the moon's gravitational <i>force</i> on Earth's ocean tides</p> <p>ESS.10.8.4 Identify the causes of the following:</p> <ul style="list-style-type: none"> <li>• high tides</li> <li>• low tides</li> <li>• <i>spring tides</i></li> <li>• <i>neap tides</i></li> </ul> <p>ESS.10.8.5 Define the terms <i>galaxy</i> and universe</p>



Strand 4: Earth and Space Science

Standard 10: Objects in the Universe

Students shall demonstrate and apply knowledge of objects in the universe using appropriate safety procedures, equipment, and technology

THE GOAL FOR EACH STUDENT IS PROFICIENCY IN ALL REQUIREMENTS AT CURRENT AND PREVIOUS GRADES				
	Grade 5	Grade 6	Grade 7	Grade 8
Solar system: Sun, Earth, Moons, Planets, Galaxies	<p>ESS.10.5.5 Compare the human body's <i>mass</i> to <i>weight</i> on Earth, the moon, and other planets in our <i>solar system</i></p> <p>ESS.10.5.6 Investigate careers, scientists, and historical breakthroughs related to planets</p>	<p>ESS.10.6.6 Compare and contrast <i>comets</i>, <i>meteors</i>, and asteroids by</p> <ul style="list-style-type: none"> <li>• size</li> <li>• <i>orbits</i></li> <li>• <i>nucleus</i></li> <li>• <i>mass</i></li> </ul> <p>ESS.10.6.7 Model moon phases demonstrating the position of Earth, moon, and sun</p> <p>ESS.10.6.8 Compare and contrast <i>solar eclipse</i> and <i>lunar eclipse</i></p> <p>ESS.10.6.9 Investigate careers, scientists, and historical breakthroughs related to the sun and space travel</p>		<p>ESS.10.8.6 Illustrate the appearance of galaxies as seen through a telescope:</p> <ul style="list-style-type: none"> <li>• clarity</li> <li>• shape</li> </ul> <p>ESS.10.8.7 Compare and contrast the Milky Way <i>Galaxy</i> to other galaxies</p> <p>ESS.10.8.8 Illustrate the position of our <i>solar system</i> within the Milky Way <i>Galaxy</i></p> <p>ESS.10.8.9 Investigate careers, scientists, and historical breakthroughs related to <i>gravity</i>, <i>galaxies</i>, and the universe</p>

## Science Glossary

Absorption	When white light wave passes through a substance the energy of certain colors may be taken in by the substance and converted to a different form of energy
Acid precipitation	Rain or snow produced when gases, released by burning fossil fuels, mix with water in the air
Adaptation	Any structure or behavior that helps an organism survive in its environment; develops in a population over a long period of time
Amplitude	The distance between a wave's midpoint and its crest or trough
Anemometer	A device used to measure wind speed
Angiosperm	A flowering plant with seeds enclosed in a fruit such as an apple
Asexual reproduction	A type of reproduction in which a new organism is produced from one parent
Atmosphere	The mixture of gases, solids, and liquids that surrounds a celestial body
Atom	Smallest unit of matter that cannot be broken down by chemical means
Axis	The imaginary line through Earth's center from the North Pole to the South Pole
Barometer	An instrument for measuring air pressure
Biomass	Organic material from plants or animals that is used to produce energy
Biosphere	All parts of Earth where life exists
Carbon cycle	The flow of carbon through Earth's ecosystems
Carbon dioxide-oxygen cycle	The flow of carbon dioxide and oxygen through Earth's ecosystems
Carnivore	An animal that feeds on other animals
Carrying capacity	The largest number of individuals that an environment can support over time
Cell	The smallest unit of an organism that can perform life functions
Cellular respiration	
Cell theory	The major theory that the cell is the basic unit of life; organisms are made up of one or more cells; and all cells come from other living cells
Chemical change	Any change where one or more of the original materials changes into other materials
Chemical property	Characteristic of a substance that allows it to change to a new substance
Cirrus	A cloud that is thin, feathery, and high in the sky, usually associated with sunny weather
Clay	A sedimentary material with grains smaller than 0.002 mm in diameter
Climate	Average of weather conditions in a given area over a period of years
Closed Circuit	Circuit having a complete path for current flow
Comet	A ball of ice, rock, and frozen gases that orbits the sun
Commensalism	A symbiotic relationship that benefits one partner but not the other
Communication	An exchange of information from one organism to another

Community	All of the populations of different species that live in the same place at the same time and interact with each other
Compound machines	Combination of two or more simple machines
Compound	Pure substance produced when two or more elements combine and whose properties are different from the elements from which it is formed
Compression	Process of being pressed together
Cumulus	A cloud that looks like puffy white cotton, usually associated with fair weather
Conductors	Materials that transfer energy from one particle to another
Conifer	A tree that produces seeds in cones and has needle-like leaves
Conservation of matter (mass)	Law that states that matter is neither created nor destroyed, only changed in form
Consumer	Organism that cannot make its own food
Control	In an experiment, the standard for comparison
Convection	Transfer of thermal energy through liquid and gases
Complete metamorphosis	Complete reorganization of the tissues of an animal during its life cycle from egg to larva to pupa to adult, usually involving the addition of legs and wings
Coriolis effect	Force that changes the direction of solids, liquids, and gases to the right in the northern hemisphere and to the left in the southern hemisphere as a result of earth's rotation
Crustal deformation	Alteration of Earth's crust by forces applied by the movement of the tectonic plates
Decomposer	Organisms that break down and absorb nutrients from dead organisms
Density	The amount of mass in a given volume ( $D=m/v$ )
Dependent variable	Factor being measured in an experiment, found on the vertical or Y-axis on a graph
Deposition	The dropping of sediment from wind or water
Dichotomous key	System used for identifying plants, animals, rocks, or minerals that is made up of a series of paired descriptions to choose between
Dominant trait	Form of a trait that masks another form of the same trait
Earthquake	A sudden movement of Earth's crust caused by the release of stress accumulated along geologic fault lines or by volcanic activity
Ecosystem	Populations interacting with the living and non-living parts of the environment
Egg	The female sex cell
Electricity	The interaction of electric charges
Electromagnet	A temporary magnet made by passing electric current through a wire coiled around an iron bar
Elements	A pure substance that is made of only one kind of atom
Embryo	Fertilized egg that has begun to divide
Embryonic development	The growth of a fertilized egg from a single cell to multi-cells
Empirical evidence	Data that can be detected, observed, or measured

Endothermic	A chemical reaction in which more energy is taken in than given off
Energy	The capacity to cause change and do work
Environment	The surroundings and conditions in which an organism lives
Erosion	Transportation of soil and rock by wind, water, gravity, and ice
Estivation	An adaptation for survival in hot, dry weather during which an animal becomes inactive and all body processes slow down
Eukaryote	Cell with a nucleus
Evaporation	To change from a liquid into a gas
Exothermic	A chemical reaction in which more energy is given off than is taken in
Experimental design	The design of a suitable experiment to test a hypothesis
Extinction	The dying out of an entire species
Fault	A crack in Earth's crust along which rock moves
Field force	A force applied without physical contact
Field study	Planned small or large group activities that provide opportunities for students to practice skills in a variety of settings other than an actual classroom; conducting <i>scientific investigations</i> in a natural setting
Force	Any push or pull that tends to produce a change in the speed or direction of motion of an object
Fossil	The preserved remains or traces of an organism that lived in the past
Fossil fuels	Fuel such as coal, natural gas, or oil that formed underground millions of years ago from decaying organic matter
Frequency	The number of complete waves that pass a given point in a given amount of time
Friction	A force that opposes motion whenever two surfaces rub against each other
Galaxy	A large system of stars moving together through space
Gene	A section of DNA that controls specific cell activities and characteristics of every organism
Geothermal energy	Heat energy below Earth's surface
Glaciation	Any change in the landscape caused by glacial movement
Global warming	An increase in Earth's temperature caused by gases in the atmosphere that trap heat
Gravity	The force of attraction that exists between any two objects
Greenhouse effect	The natural heating process caused when gases trap heat in the atmosphere
Habitat	The place in an ecosystem where an organism lives
Heat	The transfer of thermal energy
Herbivore	An animal that eats only plants
Hibernation	An adaptation for winter survival during which an animal becomes inactive and all body processes slow down
Homeostasis	The process by which an organism's internal environment is kept stable in spite of changes in the external environment
Humidity	Water vapor in the air
Humus	Material in the soil that formed from decayed plant and animal matter

Hydroelectric	Production of electricity by flowing water
Hypothesis	Explanation for a question or a problem that can be formally tested
Igneous	Rock formed by the solidification of magma or lava
Igneous intrusion	A body of solidified magma intruded into rock layers
Imprinting	A process in which newly hatched birds or newborn mammals learn to follow the first object they see
Incomplete metamorphosis	The life cycle of an animal, such as the grasshopper, whose form does not change substantially through its life stages from egg to nymph to adult
Independent variable	The one factor changed in an experiment; represented on the horizontal or X-axis of a graph
Innate behavior	Behavior that an organism is born with and does not have to learn
Inorganic	Not alive and none of its components have ever been alive
Insulators	Materials that prevent the transfer of energy
Invertebrate	An animal without a backbone
Jet stream	Narrow belt of strong winds near the top of the troposphere
Kinetic energy	Energy of motion
Lab activities	Inquiry-based <i>scientific investigations</i>
Law	A descriptive generalization about how some aspect of the natural world behaves under stated circumstances, often stated in the form of a mathematical equation
Law of conservation of momentum	The rule that, in the absence of outside forces, the total momentum of objects in an interaction does not change
Learned behavior	Behavior that an organism is not born with and must acquire
Light minute	The distance that light travels in one minute
Light year	The distance that light travels in one year
Limiting factor	Any living or non-living factor that restricts the number of individuals in a population
Lithosphere	The crust and the rigid upper mantle that is broken into plates
Living	Anything that is or has ever been alive
Longitudinal wave	A wave in which the particles vibrate parallel to the direction of wave motion
Lunar eclipse	A darkening of the moon when passed through Earth's shadow
Magnetic reversal	Earth's magnetic field reverses and the poles switch places
Magnetism	The force associated with some motion of electrical charges or by the field of force produced by a magnet
Mass	A measure of the amount of matter in an object (K-4 uses weight interchangeably)
Matter	Anything that has mass and occupies space
Metal	An element that conducts heat and electricity
Metamorphic	Rock formed by the effect of heat, pressure, and chemical action on other rocks

Meteor	A rock from space that is burning up in the atmosphere (commonly referred to as a falling star)
Microwave energy	A wavelength of energy in the electromagnetic spectrum
Migration	The instinctive seasonal movement of animals
Mimicry	The structural adaptation involved in some species where one species resembles another
Mixture	The combination of two or more substances that have not chemically combined
Molecule	The combination of atoms chemically bonded together
Moon phase	A change in appearance of the moon as it revolves around Earth
Mutualism	A symbiotic relationship that benefits both partners
Natural resources	Minerals, fossil fuels, trees, and other valuable materials that occur naturally
Natural selection	The idea that those organisms best adapted to their environment will be the ones most likely to survive and reproduce
Neap tide	During the first and last quarter moon phases, the tides are not as high or not as low as a normal tide
Newton	The metric unit for forces (Newton)
Non-living	Anything that is not now or never has been alive
Nuclear energy	The potential energy stored in the nucleus of an atom
Nucleus	The control center of the cell
Nutrients	The substance in food that produces energy and materials for life activities
Omnivore	An animal that eats both plants and animals
Opaque	Does not allow light to pass through
Open circuit	A break in the conductive path so that no current flows
Orbit	The path an object follows as it revolves around another object
Organ	Structures made up of different types of tissues that work together to do a certain job
Organ system	System made up of different types of organs to do a certain job
Organic	Anything that is or has ever been alive
Organism	A living thing
Parallel circuit	A circuit that provides more than one path for the electrical current to follow
Parasitism	A symbiotic relationship in which one organism benefits and the other is harmed
Periodic table	Organizational chart of the elements
Phloem	Tubes that move food in plants
Physical property	Characteristic that can be observed or measured
Pitch	How high or low a sound is
Planetary year	The length of time it takes a planet to orbit the sun
Plate tectonics	Theory which states that pieces of Earth's crust are moving around on the mantle
Population	All the members of one species in a particular area
Potential energy	Stored energy
Precipitation	Any form of water that falls to the earth

Predator	Any animal that hunts and kills other animals for food
Prey	An animal that a predator feeds upon
Producer	An organism that makes its own food
Prokaryote	Organism without a nucleus
Proton	Positively charged particle in an atom's nucleus
Punnett Square	A tool that can show how genes combine
Radiation	Transfer of thermal energy as waves
Reactivity	The ability of a substance to go through a chemical change
Recessive trait	Physical characteristic resulting when no dominant gene is present
Reflect/reflection	Change in the direction of a light ray as it bounces off an object
Refract/refraction	A bending of a light ray when it passes at an angle from one transparent substance into another transparent substance in which its speed is different (such as when it passes through air into water)
Reproduction	The production of offspring by an organism
Richter scale	A scale that measures the amount of energy released by an earthquake
Sand	A sedimentary material finer than a granule and coarser than silt, with grains between 0.06 mm and 2.0 mm in diameter
Scatter plot	A graph with one point for each item being measured
Scavenger	An animal that feeds on the bodies of dead organisms
Sedimentary rocks	Rock formed in layers from sediment
Seismograph	Instrument which detects and records earthquakes
Selective breeding	The process of selecting a few organisms with desired traits to serve as parents of the next generation
Series circuit	Having only one path for electrons to flow
Sexual reproduction	The joining of a male sperm cell and a female egg cell
SI units	International System of Units metric system
Silt	A sedimentary material consisting of very fine particles intermediate in size between sand and clay with grains between 0.002 mm and 0.05 mm in diameter
Simple machine	Machine that works with only one motion
Sling psychrometer	Instrument used to measure relative humidity
Soil profile	Layers of soil in an area
Solar eclipse	An alignment of the sun, moon, and Earth where the moon blocks the sun from Earth's view
Solar energy	Radiant energy that comes from the sun
Solar system	A star that is orbited by a group of planets, comets, and other objects
Solubility rate	Speed at which a substance dissolves
Solute	A substance that is dissolved

Solution	A mixture in which the particles of each substance are mixed evenly
Solvent	A substance that dissolves other materials
Species	A group of similar organisms whose members successfully reproduce among themselves
Speed	The distance that an object moves in a certain period of time $s = \frac{d}{t}$
Sperm	The male sex cell
Spring tide	During the full moon and new moon phases, high tides are higher and lower than normal
Stability	The condition where a substance does not go through chemical changes easily
Stratus	A long, layered cloud
Structural adaptation	Adaptation that involves body parts or color
Temperature	Measure of the average motion of the particles in a substance (heat)
Tension	A stress created by pulling
Territorial behavior	Activities associated with the defense of an area
Theory	A unifying explanation that has the ability to explain what has been observed; predict what has not yet been observed; be tested further by experimentation; be modified as required by the acquisition of new data; be modified only with compelling empirical evidence, verification, and peer review; be supported by sufficient empirical evidence to make abandonment unlikely
Thermometer	Instrument used to measure temperature
Tissues	Group of similar cells that work together
Translucent	Describes matter that allows, some, but not all, of the light that hits it to pass through, and that scatters some light
Transparent	The ability of light to pass through without refraction
Transverse wave	A wave in which the particles vibrate at right angles to the direction of the wave
Tropism	The response of a plant to something in its environment
Variable	Measurable factor, characteristic, or attribute of an individual or a system
Vertebrate	Animals with a backbone
Water cycle	The movement of water through Earth's ecosystems
Wavelength	Distance between any point on one wave to a corresponding point on the next wave, such as crest to crest or trough to trough
Weathering	The breakdown of a material into smaller and smaller pieces by mechanical or chemical means
Weight	The downward pull of gravity on an object (K-4 uses mass interchangeably)
White light	Contains all the colors of the visible spectrum (colors of the rainbow)
Xylem	Vessels in a plant that carry water and nutrients from the roots to the leaves



# Appendix

Suggested Science Labs-Grades 5-8

Grade	Strand	Suggested Laboratory or Activity
5 <sup>th</sup>	Nature of Science	Accurate observations lab Use mean, median, and mode Interpret scientific data using charts, graphs, stem and leaf plots
	Life Science	Use microscopes to identify cells Model parts of animal and plant cells Separate plant pigments for cell Demonstrate cellular respiration Energy pyramids Design food webs Investigate the carbon dioxide and oxygen cycle Create ecosystems Create system for plant growth Field study to categorize organisms
	Physical Science	Identify physical properties of objects Model the motion and position of molecules in the states of matter Model expansion and contraction Classify simple machines Investigate various simple machines Investigate potential/kinetic energy Investigate how light is absorbed, refracted, or reflected by matter Investigate matter that is translucent, transparent, or opaque Interactions of light, matter, and color perception
	Earth and Space Science	Grow crystals Investigate mineral properties Identify minerals Identify rocks Investigate the formation of soil Show how sedimentation occurs Model the rock cycle Analyze fossil record

Grade	Strand	Suggested Laboratory or Activity
6 <sup>th</sup>	Nature of Science	Accurate observations lab Use mean, median, and mode Interpret scientific data using charts, graphs, stem and leaf plots
	Life Science	Model and explain the functions of animal and plant organs Dissect animal and plant organs Simulate how organisms compete for resources Simulate natural selection
	Physical Science	Determine density of various materials Construct a density column and test various objects Investigate acid/base indicators Physical and chemical changes lab Conservation of mass lab Investigate forces using SI units Calculate direction based on changes of force Calculate the speed of an object based on force Investigate the transfer of energy
	Earth and Space Science	Model the layers of the earth Demonstrate convection currents and how they cause plate movements Demonstrate <i>variables</i> within volcanoes that cause different types of eruption Investigate Arkansas landforms created by internal forces: plateau, mountains, earthquake faults Map patterns of earthquake and volcanic activity Model major geological events on land and in the ocean Model rock layer sequencing based on fossils Model phases of the moon

Grade	Strand	Suggested Laboratory or Activity
7 <sup>th</sup>	Nature of Science	Accurate observations lab Use mean, median, and mode Interpret scientific data using charts, graphs, stem and leaf plots
	Life Science	Dissect tissues, organs, and organ systems of a vertebrate and angiosperm Dissect poultry egg Dissect a flower
	Physical Science	Model common compounds Investigate solubility rates (temperature, surface area, agitation, solutes, and solvents) Demonstrate Newton's three laws of motion Identify examples of potential and kinetic energy Model and describe alternative energy sources
	Earth and Space Science	Demonstrate the effects of solar energy on the atmosphere Demonstrate how the ocean affects climate Use weather measurement methods Predict weather conditions using data Demonstrate the water cycle Demonstrate cloud formation Demonstrate the "Greenhouse Effect" Use a compass to determine Earth's magnetic field Model day and night on Earth Model planetary years for our solar system Model the tilt of Earth to determine the seasons

Grade	Strand	Suggested Laboratory or Activity
8 <sup>th</sup>	Nature of Science	Accurate observations lab Use mean, median, and mode Interpret scientific data using charts, graphs, stem and leaf plots
	Life Science	Use dichotomous key to classify pond organisms Observe and classify traits as dominant or recessive Use Punnett square Predict patterns from simple genetic crosses Demonstrate how genotype affects phenotype
	Physical Science	Create atomic models of common elements Model how motion and forces change the surface of Earth Investigate field force in magnetic fields Investigate variables affecting electromagnetic strength Construct open and closed electrical circuits Investigate wave characteristics Investigate transverse and longitudinal waves Investigate the refraction of white light into the spectrum
	Earth and Space Science	Demonstrate Earth's landforms Model the constructive and destructive forces on Earth Investigate types of weathering Use topographic maps to identify surface features Create map of the six natural divisions of Arkansas to explain their formation Model rivers and predict changes Compare local soil types with standard soil profiles Demonstrate soil formation Investigate organic and inorganic components Investigate soil permeability Demonstrate how rock sequences can be disturbed Demonstrate how the moon's gravity affects Earth's ocean tides

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