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Grades 4-5

correlated to

**Arkansas
Science Curriculum
Framework**

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Arkansas Science Curriculum Framework

Grade 4

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.

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
<p>Inquiry and Process Skills NS.1.4.1 Communicate observations orally, in writing, and in graphic organizers:</p> <ul style="list-style-type: none"> • T-charts • pictographs • Venn diagrams • bar graphs • frequency tables • line graphs 	<p>Teacher’s Guide: 11b, 13, 15, 17, 18, 19, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 39, 41, 42, 43, 46, 47, 48, 49, 49b, 54, 56, 60, 62, 63, 67, 68, 69, 71, 73, 74, 75, 78, 79, 80, 81, 84, 85, 87, 89, 91, 93, 94, 95, 98, 99, 100, 101, 103, 104, 105, 106, 107, 109, 111, 112, 113, 115, 117, 118, 119, 121, 122, 123, 124, 125, 125b, 127, 130, 131, 132, 133, 135, 136, 137, 138, 139, 142, 143, 144, 145, 145a, 147, 149, 150, 151, 152, 153, 155, 157, 158, 159, 162, 163, 164, 165</p>
<p>NS.1.4.2 Refine questions that guide scientific inquiry</p>	<p>Teacher’s Guide: 112</p>
<p>NS.1.4.3 Conduct scientific investigations individually and in teams:</p> <ul style="list-style-type: none"> • lab activities • field studies 	<p>Teacher’s Guide: 6, 11b, 15, 21, 23, 28, 31, 35, 40, 41, 47, 49b, 54-55, 63, 66-67, 71, 73, 79, 84, 87b, 89, 91, 92, 98, 101, 104, 106, 107, 109, 111, 117, 119, 122, 124, 125a-125b, 129, 137, 142, 145a, 150, 155, 157, 162</p>
<p>NS.1.4.5 Communicate the designs, procedures, and results of scientific investigations (e.g., age-appropriate graphs, charts, and writings)</p>	<p>Teacher’s Guide: 11b, 13, 15, 17, 18, 19, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 33, 34, 35, 36, 37, 39, 41, 42, 43, 45, 46, 47, 48, 49, 49b, 51, 54, 56, 60, 62, 63, 67, 68, 69, 71, 73, 74, 75, 78, 79, 80, 81, 84, 85, 87, 89, 91, 93, 94, 95, 98, 99, 100, 101, 103, 104, 105, 106, 107, 109, 111, 112, 113, 115, 117, 118, 119, 121, 122, 123, 124, 125, 125b, 127, 130, 131, 132, 133, 135, 136, 137, 138, 139, 142, 143, 144, 145, 145a, 147, 149, 150, 151, 152, 153, 155, 157, 158, 159, 162, 163, 164, 165</p>

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
NS.1.4.6 Estimate and measure length, mass, temperature, capacity/volume, and elapsed time using International System of Units (SI)	Teacher's Guide: 11b, 15, 21, 45, 54, 55, 57, 63, 66, 81, 83, 86, 89-93, 169
NS.1.4.7 Collect and interpret measurable empirical evidence in teams and as individuals	Teacher's Guide: 11b, 15, 21, 45, 54, 55, 63, 66, 81, 83, 86
NS.1.4.8 Develop a hypothesis based on prior knowledge and observations	Teacher's Guide: 28
NS.1.4.9 Identify variables that affect investigations	Teacher's Guide: 62, 91, 94
NS.1.4.10 Identify patterns and trends in data	Teacher's Guide: 52, 53, 68, 74, 91, 94
NS.1.4.11 Generate conclusions based on evidence	Teacher's Guide: 68, 74, 91, 94, 124, 125b, 132
NS.1.4.12 Evaluate the quality and feasibility of an idea or project	Teacher's Guide: 91
Scientific Equipment and Technology NS.1.4.13 Use simple equipment, age appropriate tools, technology, and mathematics in scientific investigations (e.g., balances, hand lenses, microscopes, rulers, thermometers, calculators, computers)	Teacher's Guide: 11b, 15, 21, 45, 46, 49b, 54, 55, 66, 73, 83, 86, 87b, 98, 153, 156
NS.1.4.14 Apply lab safety rules as they relate to specific science lab activities (see Arkansas Lab Safety Guide)	Teacher's Guide: 49b, 54, 55, 61, 87b, 125a, 132

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.

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
Characteristics LS.2.4.1 Classify vertebrates into major subgroups: <ul style="list-style-type: none">• mammals• birds• fish• amphibians• reptiles	Teacher's Guide: 43
Structure and Function LS.2.4.3 Identify major parts and functions of the following systems: <ul style="list-style-type: none">• digestive• circulatory• nervous	Teacher's Guide: 19-24, 166, 169

Standard 4: Populations and Ecosystems

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

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
LS.4.4.1 Recognize environmental adaptations of plants and animals	Teacher's Guide: 13-18
LS.4.4.2 Illustrate the interdependence of organisms in an ecosystem	Teacher's Guide: 37-42

Strand 3: Physical Science

Standard 5: Matter and Changes

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

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
States of Matter PS.5.4.3 Compare and contrast gases to solids and liquids	Teacher's Guide: 98-99

Standard 6: Motion and Forces

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

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
Motions and Forces PS.6.4.1 Investigate the relationship between force and direction	Teacher's Guide: 54, 105, 168
PS.6.4.2 Investigate the relationship between force and mass	Teacher's Guide: 93

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.

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
Electricity PS.7.4.2 Classify electrical conductors and electrical insulators	Teacher's Guide: 113-118
PS.7.4.3 Construct simple circuits from circuit diagrams	Teacher's Guide: 117

Strand 4: Earth and Space Systems

Standard 8: Earth Systems

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

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
Natural Resources ESS.8.4.2 Analyze the impact of using natural resources	Teacher's Guide: 133-138
ESS.8.4.3 Differentiate between renewable and non-renewable resources	Teacher's Guide: 133-138
Weather ESS.8.4.8 Organize weather data into tables or charts to identify trends and patterns	Teacher's Guide: 67, 68
ESS.8.4.11 Construct and read instruments to collect weather data: <ul style="list-style-type: none"> • barometer • weather vane • anemometer 	Teacher's Guide: 66-67

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.

Student Learning Expectations, Grade 4	Science Daybook, Grade 4
Weather ESS.9.4.1 Analyze changes to Earth's surface: <ul style="list-style-type: none"> • erosion • glaciation • weathering • earthquakes • volcanic activity 	Teacher's Guide: 51-56, 58, 87, 167, 172

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Grade 5

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.

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Processes of Science NS.1.5.1 Make accurate observations	Teacher's Guide: 35, 60-61, 69-74, 119, 170
NS.1.5.2 Identify and define components of experimental design used to produce empirical evidence: <ul style="list-style-type: none"> • hypothesis • replication • sample size • appropriate use of control • use of standardized variables 	Teacher's Guide: 90, 118, 127, 167
NS.1.5.4 Interpret scientific data using <ul style="list-style-type: none"> • data tables/charts • bar graphs • circle graphs • line graphs • stem and leaf plots • Venn diagrams 	Teacher's Guide: 17, 29, 33, 35, 40, 45, 47, 61, 62, 71, 74, 92, 111, 116, 117, 141
NS.1.5.5 Communicate results and conclusions from scientific inquiry	Teacher's Guide: 13, 15, 18, 19, 24, 25, 30, 31, 33, 35, 36, 37, 39, 41, 42, 43, 48, 89, 94, 95, 97, 100, 101, 103, 107, 109, 112, 113, 118, 119, 120, 121, 124, 133, 138, 139, 144, 147, 149, 153, 155, 159, 161
NS.1.5.6 Develop and implement strategies for long-term, accurate data collection	Teacher's Guide: 35, 60-61, 93-94, 117, 118, 125a-125b

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Characteristics of Science NS.1.5.7 Summarize the characteristics of science	Teacher's Guide: 18, 20, 40, 58, 71, 74, 76-77, 90, 118, 127, 167
NS.1.5.8 Explain the role of observation in the development of a theory	Teacher's Guide: 40, 71, 73, 127
NS.1.5.9 Define and give examples of hypotheses	Teacher's Guide: 90, 118, 127, 167

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.

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Structure and Function LS.2.5.1 Compare the cell theory to the characteristics of a scientific theory	Teacher's Guide: 20, 169
LS.2.5.3 Describe the similarities of basic cell functions in all organisms	Teacher's Guide: 20, 28, 169
LS.2.5.5 Compare and contrast plant and animal cells	Teacher's Guide: 20, 28
Structure and Function LS.2.5.8 Explain and illustrate photosynthesis	Teacher's Guide: 27, 28, 170
LS.2.5.11 Investigate careers, scientists, and historical breakthroughs related to cells	Teacher's Guide: 20

Standard 4: Populations and Ecosystems

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

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
<p>Populations and Ecosystems LS.4.5.1 Distinguish among and model</p> <ul style="list-style-type: none"> • organisms • populations • communities • ecosystems • biosphere 	<p>Teacher’s Guide: 13, 43-48, 49, 63-68, 89, 127-132, 133-138, 139-144, 145, 166, 167, 170</p>
<p>LS.4.5.2 Identify the transfer of energy using energy pyramids:</p> <ul style="list-style-type: none"> • terrestrial • aquatic 	<p>Teacher’s Guide: 26, 27, 30, 40, 47, 127-128, 130</p>
<p>LS.4.5.3 Design food webs in specific habitats to show the flow of energy within communities:</p> <ul style="list-style-type: none"> • terrestrial • aquatic 	<p>Teacher’s Guide: 25, 26, 27, 30, 89, 127</p>
<p>LS.4.5.4 Evaluate food webs under conditions of stress:</p> <ul style="list-style-type: none"> • overgrazing • overpopulation • natural disaster • introduction of non-native species • human impact/urban development 	<p>Teacher’s Guide: 25, 27, 43-48, 132, 133-138, 170</p>
<p>LS.4.5.5 Examine the role of limiting factors on the carrying capacity of an ecosystem:</p> <ul style="list-style-type: none"> • food • space • water • shelter 	<p>Teacher’s Guide: 43-48, 133-138</p>
<p>LS.4.5.6 Describe and diagram the nitrogen cycle in ecosystems</p>	<p>Teacher’s Guide: 26, 27, 28, 30</p>
<p>LS.4.5.8 Describe and diagram the carbon dioxide-oxygen cycle in ecosystems</p>	<p>Teacher’s Guide: 27</p>

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
LS.4.5.9 Conduct investigations demonstrating the role of the carbon dioxide-oxygen cycle in ecosystems	Teacher's Guide: 27
LS.4.5.10 Analyze the concept of conservation of mass as related to the amount of matter in an ecosystem	Teacher's Guide: 127-128
LS.4.5.13 Construct, compare, and contrast environments in open and closed aquaria	Teacher's Guide: 43, 48, 125a-125b
LS.4.5.14 Categorize organisms by the function they serve in ecosystems and food webs: <ul style="list-style-type: none"> • predator/prey • parasitism • producer/consumer/decomposer • scavenger • herbivore/carnivore/omnivore 	Teacher's Guide: 26, 47, 89, 166, 170
LS.4.5.15 Conduct field studies identifying and categorizing organisms in a given area of an ecosystem	Teacher's Guide: 26, 43-48
LS.4.5.16 Evaluate positive and negative human effects on ecosystems	Teacher's Guide: 25, 27, 43-48, 125a-125b, 132, 133-138, 170
LS.4.5.17 Describe and illustrate various symbiotic relationships: <ul style="list-style-type: none"> • parasitism • mutualism • commensalism 	Teacher's Guide: 135
LS.4.5.18 Investigate careers, scientists, and historical breakthroughs related to populations and ecosystems	Teacher's Guide: 13, 43, 45, 47, 127, 128, 134-135, 140, 142, 143, 144

Strand 3: Physical Science

Standard 5: Matter and Changes

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

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
<p>Properties of Matter PS.5.5.2 Conduct scientific investigations on physical properties of objects</p>	<p>Teacher's Guide: 87b, 121, 123</p>
<p>PS.5.5.3 Identify common examples of physical properties:</p> <ul style="list-style-type: none"> • length • mass • area • perimeter • texture • taste • odor • color • elasticity 	<p>Teacher's Guide: 19, 22, 85, 94, 100, 119, 120, 121, 122</p>
<p>PS.5.5.4 State characteristics of physical changes</p>	<p>Teacher's Guide: 94, 100, 119, 120, 121, 122</p>
<p>PS.5.5.5 Identify characteristics and common examples of physical changes</p>	<p>Teacher's Guide: 19, 22, 85, 94, 100, 119, 120, 121, 122</p>
<p>PS.5.5.6 Explain how heat influences the states of matter of a substance:</p> <ul style="list-style-type: none"> • solid • liquid • gas • plasma 	<p>Teacher's Guide: 116</p>
<p>PS.5.5.7 Demonstrate the effect of changes in the physical properties of matter</p>	<p>Teacher's Guide: 94, 100, 119, 120, 121, 122</p>
<p>PS.5.5.8 Model the motion and position of molecules in solids, liquids, and gases in terms of kinetic energy</p>	<p>Teacher's Guide: 116</p>

Standard 6: Motion and Forces

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

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Motions and Forces PS.6.5.1 Classify simple machines	Teacher's Guide: 107-112, 169
PS.6.5.3 Relate simple machines to inventions and discoveries	Teacher's Guide: 111
PS.6.5.4 Compare and contrast potential energy and kinetic energy as applied to motion	Teacher's Guide: 111
PS.6.5.5 Classify real world examples as potential energy or kinetic energy as applied to motion	Teacher's Guide: 110, 111
PS.6.5.6 Conduct investigations using potential energy and kinetic energy	Teacher's Guide: 110, 111
PS.6.5.7 Investigate careers, scientists, and historical breakthroughs related to simple machines and potential and kinetic energy	Teacher's Guide: 107-112

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.

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Energy PS.7.5.1 Summarize how light can interact with matter through absorption, refraction, and reflection	Teacher's Guide: 82, 119-124, 125, 169
PS.7.5.2 Investigate how light travels and interacts with an object or material	Teacher's Guide: 82, 87b, 119, 121, 123, 124
PS.7.5.3 Conduct investigations demonstrating how an object can be seen	Teacher's Guide: 121, 124

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
PS.7.5.5 Investigate physical interactions of light and matter and the effect on color perception: <ul style="list-style-type: none"> • refraction • absorption • transmission • scattering 	Teacher's Guide: 87b, 119, 121, 123, 124
PS.7.5.6 Investigate careers, scientists, and historical breakthroughs related to light energy	Teacher's Guide: 120-121, 123

Strand 4: Earth and Space Systems

Standard 8: Earth Systems

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

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Structure and Properties ESS.8.5.1 Identify some basic elements composing minerals: <ul style="list-style-type: none"> • silicon • oxygen • iron • sodium • chlorine • calcium • carbon • hydrogen • aluminum 	Teacher's Guide: 59, 60-61
ESS.8.5.3 Identify characteristics of minerals	Teacher's Guide: 59, 60-61
ESS.8.5.4 Conduct investigations on mineral properties: <ul style="list-style-type: none"> • luster • hardness • streak • acid test for calcite • fluorescence 	Teacher's Guide: 60-61

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
ESS.8.5.5 Identify the following minerals: <ul style="list-style-type: none"> • halite (salt) • feldspar • sulfur • quartz • diamonds • gypsum • calcite • talc • hematite (iron) • precious metals (gold, silver) 	Teacher's Guide: 59, 60-61
ESS.8.5.10 Investigate careers, scientists, and historical breakthroughs related to minerals and rocks	Teacher's Guide: 59
Cycles ESS.8.5.11 Investigate the formation of soil	Teacher's Guide: 137

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.

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Earth's History ESS.9.5.1 Explain and give examples of how physical evidence from fossils supports the theory that Earth has changed over time	Teacher's Guide: 69-74, 168
ESS.9.5.2 Analyze fossil record evidence about plants and animals that lived long ago	Teacher's Guide: 69-74

Standard 10: Objects in the Universe

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

Student Learning Expectations, Grade 5	Science Daybook, Grade 5
Solar system: Sun, Earth, Moons, Planets, Galaxies ESNS.10.5.2 Demonstrate the order of planets and other space objects in our solar system	Teacher's Guide: 83, 84, 85, 86
ESNS.10.5.3 Compare the properties of planets in our solar system: <ul style="list-style-type: none">• size• shape• density• atmosphere• distance from the sun• orbital path• moons• surface• composition	Teacher's Guide: 81-86
ESNS.10.5.6 Investigate careers, scientists, and historical breakthroughs related to planets	Teacher's Guide: 84, 87



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