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correlated to

Mississippi Science
Framework Competencies
and Objectives

Grades 4-5



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correlated to
Mississippi Science Framework
Competencies and Objectives
Fourth Grade

COMPETENCY 1

Explain and use skills necessary to conduct scientific inquiry.

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
a. Form hypotheses and predict outcomes of problems to be investigated.	Student Book: “Scientific Investigation” pg. 2-9
b. Use the senses and simple tools to gather qualitative information about objects or events (size, shape, color, texture, sound, position, change).	Student Book: “Collecting and Recording Data” pg. 10-14
c. Demonstrate the accurate use of simple tools to gather and compare information. <ul style="list-style-type: none">• Tools (English rulers [to the nearest eighth of an inch], metric rulers [to the nearest centimeter], thermometers, spring scales, hand lenses, balances, microscopes, calculators, clocks, anemometers, rain gauges)• Types of data (height, mass/weight, temperature, length, distance, volume, area, perimeter)	Student Book: “Using Science Tools and Equipment” pg. 38-59, conversion table on inside back cover
d. Use simple sketches, diagrams, tables, charts, and writing to draw conclusions and communicate data results.	Student Book: “Using Tables and Graphs“ pg. 60-73, “Concept Maps” pg. 396
e. Interpret and describe patterns of data using drawings, diagrams, charts, tables, graphs, and maps.	Student Book: “Looking at Data” pg. 15-17
f. Explain why scientists and engineers often work in teams with different individuals doing different things that contribute to the results.	Student Book: “Thinking of New Questions” pg. 20, “Sharing Results” pg. 21

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
g. Draw conclusions about important steps (e.g., making observations, asking questions, trying to solve a problem, etc.) that led to inventions and discoveries.	Student Book: “Explaining Results” pg. 18-19, “Thinking of New Questions” pg. 20, “Sharing Results” pg. 21, “Writing About Your Scientific Investigation” pg. 22-25, “Many Different People Contribute to Science” pg. 367, “Scientists Are Affected by Society” pg. 368

C O M P E T E N C Y 2

Use the properties of objects and materials, position and motion of objects, and transfer of energy to develop an understanding of physical science concepts.

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
a. Recognize that materials may be composed of parts that are too small to be seen without magnification.	Student Book: “Matter” pg. 242-243
b. Distinguish between physical and chemical changes and between objects composed of a single substance from those composed of more than one substance.	Student Book: “Changes in Matter” pg. 260, “Physical Changes” pg. 261-265, “Chemical Changes” pg. 266-267
c. Determine the causes and effects of forces on motion. <ul style="list-style-type: none"> • Force exerted over a distance causes work to be done and that the result (work) is the product of force and distance • Friction on moving objects and actions that increase or decrease friction • Momentum and inertia 	Student Book: “Forces and Motion” pg. 268-283 <ul style="list-style-type: none"> • “Simple Machines” pg. 280, “Energy” pg. 284 • “Friction” pg. 274, “Force, Mass, and Motion” pg. 278 • “Changing Motion” pg. 277
d. Explain how energy flowing through an electrical circuit can be converted from electrical energy to light, sound, or heat energy. <ul style="list-style-type: none"> • Parts of an electric circuit and resulting actions when circuits are opened or closed • Construction and uses of electromagnets • Energy transferred through an electrical circuit to a bulb or bell to its surroundings as light, sound, and heat (thermal) energy 	Student Book: “Electricity and Magnetism” pg. 295-307 <ul style="list-style-type: none"> • “Open and Closed Circuits” pg. 301 • “Magnetism” pg. 304-305, “Electromagnetism” pg. 306-307 • “Electric Circuits” pg. 300, “Series and Parallel Circuits” pg. 302-303
e. Describe how light behaves (travels in a straight line, is absorbed, reflected, refracted, or appears transparent or translucent).	Student Book: “Light” pg. 308-314

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
f. Investigate and draw conclusions about the relationship between the rate of vibrating objects and the pitch of the sound.	Student Book: “Sound” pg. 315-317
g. Describe how heat flows from a warm object to a cold one and categorize examples of materials that may or may not be used as insulators.	Student Book: “Heat” pg. 288-294

C O M P E T E N C Y 3

Analyze the characteristics, structures, life cycles, and environments of organisms.

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
a. Describe the cause and effect relationships that explain the diversity and evolution of organisms over time. <ul style="list-style-type: none"> • Observable traits due to inherited or environmental adaptations • Variations in environment (over time and from place to place) • Variations in species as exemplified by fossils • Extinction of a species due to insufficient adaptive capability in the face of environmental changes 	Student Book: “Adaptations” pg. 77, “Sensing the Environment” pg. 90-91, “Habitats” pg. 127, “Earth’s History and Fossils” pg. 184-186, “Protecting Wildlife” pg. 350-353, “1980” pg. 423, “Luis and Walter Alvarez” pg. 424, “Charles Darwin” pg. 427
b. Classify the organs and functions of the nervous, circulatory, and respiratory systems of the body.	Student Book: “Organ Systems” pg. 108-109, “Respiratory System” pg. 120-121, “Circulatory System” pg. 122-123, “Nervous System” pg. 124-125
c. Compare characteristics of organisms, including growth and development, reproduction, acquisition and use of energy, and response to the environment. <ul style="list-style-type: none"> • Life cycles of various animals to include complete and incomplete metamorphosis • Plant or animal structures that serve different functions in growth, adaptation, and survival • Photosynthesis 	Student Book: “Characteristics of Living Things” pg. 76-91 <ul style="list-style-type: none"> • “Animal Life Cycles” pg. 84-85 • “Getting and Using Energy” pg. 77-81, “Reproduction” pg. 82, “Growth and Development” pg. 83, “Movement” pg. 88-89, “Animal and Plant Behavior” pg. 92-97 • “Photosynthesis” pg. 80-81, “The Oxygen and Carbon Dioxide Cycle” pg. 132
d. Distinguish the parts of plants as they relate to sexual reproduction and explain the effects of various actions on the pollination process (e.g., wind, water, insects, adaptations of flowering plants, negative impacts of pesticides).	Student Book: “Plant Life Cycles” pg. 86-87, “Plant Behavior” pg. 96-97, “Plants” pg. 142, “Pollution” pg. 351

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
e. Analyze food webs to interpret how energy flows from the sun.	Student Book: “Food Chains” pg. 137, “Food Webs” pg. 138
f. Describe the structural and functional relationships among the cells of an organism. <ul style="list-style-type: none"> • Benefit from cooperating • Vary greatly in appearance • Perform very different roles 	Student Book: “Cells, Tissues, Organs, and Systems” pg. 98-109

C O M P E T E N C Y 4

Develop an understanding of the properties of Earth materials, objects in the sky, and changes in Earth and sky.

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
a. Classify sedimentary, metamorphic, and igneous rocks.	Student Book: “Rocks” pg. 164-165, “Identifying Rocks” pg. 166-167
b. Compare and contrast Earth’s geological features and the changes caused by external forces. <ul style="list-style-type: none"> • Bodies of water, beaches, ocean ridges, continental shelves, plateaus, faults, canyons, sand dunes, and ice caps • External forces including heat, wind, and water • Movement of continental plates 	Student Book: <ul style="list-style-type: none"> • “Fresh Water” pg. 190-192, “Oceans” pg. 193-197 • “Soil” pg. 168, “Slow Changes” pg. 170-173 • “Mountain Building” pg. 174-175, “Earth’s Moving Plates” pg. 176-177, “Rapid Changes” pg. 178-183
c. Investigate, record, analyze and predict weather by observing, measuring with simple weather instruments, and recording weather data (e.g., temperature, precipitation, sky conditions, weather events), and using past patterns to predict future patterns.	Student Book: “Weather and Climate” pg. 198-217
d. Describe how human activities have decreased the capacity of the environment to support some life forms. <ul style="list-style-type: none"> • Reducing the amount of forest cover • Increasing the amount of chemicals released into the atmosphere • Farming intensively 	Student Book: “Natural Resources” pg. 320, “Material Resources” pg. 329, “Air” pg. 330, “Pollution” pg. 334, “Air Pollution” pg. 339-341, “Conserving Resources” pg. 344-353
e. Compare and contrast the seasons and explain why seasons vary at different locations on Earth.	Student Book: “Earth’s Rotation” pg. 218-219, “Revolution and Seasons” pg. 220-221

Objectives, Fourth Grade	ScienceSaurus, Grade 4-5
<p>f. Describe objects in the universe including their movement.</p> <ul style="list-style-type: none"> • Physical features of the moon (craters, plains, mountains) • Appearance and movement of Earth and its moon (e.g., waxing/waning of the moon and lunar/solar eclipses) • Why a planet can be seen in different constellations (locations) at different times 	<p>Student Book: “Moon Motions” pg. 222-225, “Properties of the Moon” pg. 225, “Constellations” pg. 236-237</p>
<p>g. Summarize the process that results in deposits of fossil fuels and conclude why fossil fuels are classified as nonrenewable resources.</p>	<p>Student Book: “Natural Resources” pg. 320, “Energy Sources” pg. 321, “Fossil Fuels” pg. 322, “How Fossil Fuels are Formed” pg. 323</p>



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Competencies and Objectives
Fifth Grade

C O M P E T E N C Y 1

Develop and demonstrate an understanding of scientific inquiry using process skills.

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
a. Form a hypothesis, predict outcomes, and conduct a fair investigation that includes manipulating variables and using experimental controls.	Student Book: “Scientific Investigation” pg. 2-4, “Asking Questions” pg. 5, “Making a Hypothesis” pg. 6, “Planning the Investigation” pg. 7, “Controlling Variables” pg. 8
b. Distinguish between observations and inferences.	Student Book: “Making Scientific Observations” pg. 11, “Making Inferences” pg. 18
c. Use precise measurement in conjunction with simple tools and technology to perform tests and collect data. <ul style="list-style-type: none"> • Tools (English rulers [to the nearest one-sixteenth of an inch], metric rulers [to the nearest millimeter], thermometers, scales, hand lenses, microscopes, balances, clocks, calculators, anemometers, rain gauges, barometers, hygrometers) • Types of data (height, mass, volume, temperature, length, time, distance, volume, perimeter, area) 	Student Book: “Using Science Tools and Equipment” pg. 38-59, conversion table on inside back cover
d. Organize and interpret data in tables and graphs to construct explanations and draw conclusions.	Student Book: “Using Tables and Graphs“ pg. 60-73, “Concept Maps” pg. 396
e. Use drawings, tables, graphs, and written and oral language to describe objects and explain ideas and actions.	Student Book: “Looking at Data” pg. 15-17, “Explaining Results” pg. 18-19
f. Make and compare different proposals when designing a solution or product.	Student Book: “Science and Technology” pg. 356-357, “Designing Technology” pg. 358, “How Technology Helps Scientists” pg. 359

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
g. Evaluate results of different data (whether trivial or significant).	Student Book: “Looking at Data” pg. 15-17
h. Infer and describe alternate explanations and predictions.	Student Book: “Explaining Results” pg. 18-19

C O M P E T E N C Y 2

Understand relationships of the properties of objects and materials, position and motion of objects, and transfer of energy to explain the physical world.

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
a. Determine how the properties of an object affect how it acts and interacts.	Student Book: “Matter” pg. 242-243, “Properties of Matter” 244-247, “Atoms” pg. 248-249
b. Differentiate between elements, compounds, and mixtures and between chemical and physical changes (e.g., gas evolves, color, and/or temperature changes).	Student Book: “Elements” pg. 250-253, “Molecules” pg. 254-255, “Compounds, Mixtures, and Solutions” pg. 256-259, “Changes in Matter” pg. 260-267
c. Investigate the motion of an object in terms of its position, direction of motion, and speed. <ul style="list-style-type: none"> • The relative positions and movements of objects using points of reference (distance vs. time of moving objects) • Force required to move an object using appropriate devices (e.g., spring scale) • Variables that affect speed (e.g., ramp height/length/surface, mass of object) • Effects of an unbalanced force on an object’s motion in terms of speed and direction 	Student Book: “Forces and Motion” pg. 268-283 <ul style="list-style-type: none"> • “Speed” pg. 276 • “Measuring Mass and Weight” pg. 46, “Gravity and Motion” pg. 279 • “Changing Motion” pg. 277 • “Force, Mass, and Motion” pg. 278
d. Categorize examples of potential energy as gravitational (e.g., boulder on a hill, child on a slide), elastic (e.g., compressed spring, slingshot, rubber band), or chemical (e.g., unlit match, food).	Student Book: “Forms of Energy” pg. 285-287
e. Differentiate between the properties of light as reflection, refraction, and absorption. <ul style="list-style-type: none"> • Image reflected by a plane mirror and a curved-surfaced mirror • Light passing through air or water • Optical tools such as prisms, lenses, mirrors, and eyeglasses 	Student Book: “Light” pg. 309-314

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
f. Describe physical properties of matter (e.g., mass, density, boiling point, freezing point) including mixtures and solutions. <ul style="list-style-type: none"> • Filtration, sifting, magnetism, evaporation, and flotation • Effects of temperature changes on the solubility of substances 	Student Book: “Matter” pg. 242-259
g. Categorize materials as conductors or insulators and discuss their real life applications (e.g., building construction, clothing, animal covering).	Student Book: “Transfers of Heat Energy” pg. 292-293

C O M P E T E N C Y 3

Predict characteristics, structures, life cycles, environments, evolution, and diversity of organisms.

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
a. Compare and contrast the diversity of organisms due to adaptations to show how organisms have evolved as a result of environmental changes. <ul style="list-style-type: none"> • Diversity based on kingdoms, phyla, and classes (e.g., internal/external structure, body temperature, size, shape) • Adaptations that increase an organism’s chances to survive and reproduce in a particular habitat (e.g., cacti needles/leaves, fur/scales) • Evidence of fossils as indicators of how life and environmental conditions have changed 	Student Book: <ul style="list-style-type: none"> • “Classifying Organisms” pg. 139-155 • “Adaptations” pg. 77, “Sensing the Environment” pg. 90-91, “Habitats” pg. 127, “Protecting Wildlife” pg. 350-353, “1980” pg. 423, “Charles Darwin” pg. 427 • “Sedimentary Rock” pg. 167, 177, “Earth’s History and Fossils” pg. 184-186, “Luis and Walter Alvarez” pg. 424
b. Research and classify the organization of living things. <ul style="list-style-type: none"> • Differences between plant and animal cells • Function of the major parts of body systems (nervous, circulatory, respiratory, digestive, skeletal, muscular) and the ways they support one another • Examples of organisms as single-celled or multi-celled 	Student Book: <ul style="list-style-type: none"> • “Cells” pg. 99-103 • “Organs” pg. 106-107, “Organ Systems” pg. 108-109, “Human Body Systems” pg. 110-125 • “A Classification System of Kingdoms” pg. 140, “Animals” pg. 141, “Plants” pg. 142, “Fungi” 143, “Protists” pg. 144, “Bacteria” pg. 145
c. Research and cite evidence of the work of scientists (e.g., Pasteur, Fleming, Salk) as it contributed to the discovery and prevention of disease.	Student Book: “History of Science” pg. 412-435

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
<p>d. Distinguish between asexual and sexual reproduction.</p> <ul style="list-style-type: none"> • Asexual reproduction processes in plants and fungi (e.g., vegetative propagation in stems, roots, and leaves of plants, budding in yeasts, fruiting bodies in fungi) • Asexual cell division (mushroom spores produced/dispersed) • Sexual reproduction (e.g., eggs, seeds, fruit) 	<p>Student Book: “Reproduction” pg. 82, “Animal Life Cycles” pg. 84-85, “Plant Life Cycles” pg. 86-87, “Animals” pg. 141, “Plants” pg. 142, “Fungi” pg. 143, “Birds” pg. 152, “Reptiles” pg. 153, “Amphibians” pg. 154, “Fish” pg. 155</p>
<p>e. Give examples of how consumers and producers (carnivores, herbivores, omnivores, and decomposers) are related in food chains and food webs.</p>	<p>Student Book: “Living Things in Ecosystems” pg. 133-136, “Food Chains” pg. 137, “Food Webs” pg. 138</p>

COMPETENCY 4

Develop an understanding of the properties of Earth materials, objects in the sky, and changes in Earth and sky.

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
<p>a. Categorize Earth’s materials.</p> <ul style="list-style-type: none"> • Rocks, minerals, soils, water, and atmospheric gases • Layers of the atmosphere, hydrosphere, and lithosphere 	<p>Student Book: “Earth’s Structure” pg. 158-169</p> <ul style="list-style-type: none"> • “Minerals” pg. 160-163, “Soil” pg. 168, “Water” pg. 187-197, “Rocks” pg. 164-167, “Circle Graph” pg. 64, “Earth’s Atmosphere” pg. 198 • “Earth’s Structure” pg. 158, “Layers of the Atmosphere” pg. 199
<p>b. Explain how surface features caused by constructive processes (e.g., depositions, volcanic eruptions, earthquakes) differ from destructive processes (e.g., erosion, weathering, impact of organisms).</p>	<p>Student Book: “Earth’s Changing Surface” pg. 170-186</p>
<p>c. Summarize how weather changes.</p> <ul style="list-style-type: none"> • Weather changes from day to day and over the seasons • Tools by which weather is observed, recorded, and predicted 	<p>Student Book: “Weather and Climate” pg. 198-217</p>

Objectives, Fifth Grade	ScienceSaurus, Grade 4-5
<p>d. Describe changes caused by humans on the environment and natural resources and cite evidence from research of ways to conserve natural resources in the United States, including (but not limited to) Mississippi.</p> <p>Examples of Mississippi efforts include the following:</p> <ul style="list-style-type: none"> • Associated Physics of America, a private company located in Greenwood Mississippi, develops ways to convert a variety of agricultural products into efficient, environment-friendly and cost-effective energy sources. • The Natural Resource Enterprises (NRE) Program of the Department of Wildlife and Fisheries and the Cooperative Extension Service at MSU educate landowners in the Southeast about sustainable natural resource enterprises and compatible habitat management practices. • The Engineer Research and Development Center of the Vicksburg District of the U.S. Army Corps of Engineers provides quality engineering and other professional products and services to develop and manage the Nation’s water resources, reduce flood damage, and protect the environment. 	<p>Student Book: “Natural Resources” pg. 320-333, “Pollution” pg. 334-343, “Conserving Resources” pg. 344-353</p>
<p>e. Predict the movement patterns of the sun, moon, and Earth over a specified time period.</p>	<p>Student Book: “Earth’s Rotation” pg. 218-219, “Revolution and Seasons” pg. 220-221, “Moon Motions” pg. 222-225, “The Sun” pg. 226-227</p>
<p>f. Compare and contrast the physical characteristics of the planets (e.g., mass, surface gravity, distance from the sun, surface characteristics, moons).</p>	<p>Student Book: “The Planets” pg. 228-233</p>
<p>g. Conclude that the supply of many Earth resources (e.g., fuels, metals, fresh water, farmland) is limited and critique a plan to extend the use of Earth’s resources (e.g., recycling, reuse, renewal).</p>	<p>Student Book: “Natural Resources” pg. 320-333, “Pollution” pg. 334-343, “Conserving Resources” pg. 344-353</p>