ScienceSaurus®

correlated to

Mississippi Science Framework Competencies and Objectives

Grades 6-8

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correlated to
Mississippi Science Framework
Competencies and Objectives
Sixth Grade

C O M P E N T E N C Y 1

Conduct a scientific investigation utilizing appropriate process skills.

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
a. Design and conduct an investigation that includes predicting outcomes, using experimental controls, and making inferences.	**Student Book:** "Scientific Inquiry" pg. 002-016, "Designing Your Own Investigations" pg. 017-019
b. Distinguish between qualitative and quantitative observations and make inferences based on observations.	**Student Book:** "Drawing Conclusions" pg. 013, "Organizing Data Tables" pg. 386-388, "Bar Graphs" pg. 391
c. Use simple tools and resources to gather and compare information (using standard, metric, and non-standard units of measurement). • Tools (e.g., 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, telescopes, compasses, spring scales) • Types of data (e.g., linear measures, mass, volume, temperature, time, area, perimeter) • Resources (e.g., Internet, electronic encyclopedias, journals, community resources, etc.)	**Student Book:** "Glassware and Microscopes" pg. 046-052, "Measurement" pg. 053-072 • "Microscopes and Slides" pg. 049-052, "Measurement" 053-072 • "Measurement" pg. 053-072, "Conversion Tables" pg. 438 • "Researching Information" pg. 420-426
d. Analyze data collected from a scientific investigation to construct explanations and draw conclusions.	**Student Book:** "Analyzing and Concluding" pg. 011-013

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
e. Communicate scientific procedures and conclusions using diagrams, charts, tables, graphs, maps, written explanations, and/or scientific models.	**Student Book:** "Recording Data" pg. 010, "Analyzing and Concluding" pg. 011-013, "Scientific Models" pg. 013, "Communicating Results" pg. 014-015, "Using Data Tables and Graphs" pg. 385-401
f. Evaluate the results or solutions to problems by considering how well a product or design met the challenge to solve a problem.	**Student Book:** "Tradeoffs" pg. 369-370, "Risk-Benefit Analysis" pg. 371-373
g. Infer explanations for why scientists might draw different conclusions from a given set of data.	**Student Book:** "Analyzing and Concluding" pg. 011-013, "Conclusions Based on Data" pg. 015
h. Recognize and analyze alternative explanations and predictions	**Student Book:** "Analyzing and Concluding" pg. 011-013, "Conclusions Based on Data" pg. 015

C O M P E N T E N C Y 2

Analyze chemical and physical changes and interactions involving energy and forces that affect motion of objects.

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
a. Recognize that atoms of a given element are all alike but atoms of other elements have different atomic structures.	**Student Book:** "Atoms" pg. 255, "Atomic Structure" pg. 256-257, "Atomic Size" pg. 256-257, "Elements" pg. 259-260
b. Distinguish physical properties of matter (e.g., melting points, boiling points, solubility) as it relates to changes in states. • Between solids, liquids, and gases through models that relate matter to particles in motion • Solubility in water of various solids to activities (e.g., heating, stirring, shaking, crushing) on the rate of solution • Use of solubility differences to identify components of a mixture (e.g., chromatography)	**Student Book:** "Matter" pg. 250-273 • "States of Matter" pg. 253-254 • "Mixtures, Solutions, and Suspensions" pg. 271-273
c. Investigate and describe the effects of forces acting on objects. • Gravity, friction, magnetism, drag, lift, and thrust • Forces affecting the motion of objects	**Student Book:** "Forces and Motion" pg. 274-298 • "Gravity" pg. 276, "Electric and Magnetic Forces" pg. 277, "Friction" pg. 279, "Lift" pg. 297 • "Forces in Nature" pg. 275-279, "Balanced and Unbalanced Forces" pg. 250-282, "Newton's Laws of Motion" pg. 283-286

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
d. Investigate the mechanical and chemical forms of energy and demonstrate the transformations from one form to another. • Energy transformations represented in the use of common household objects • Mechanical energy transformed to another form of energy (e.g., vibrations, heat through friction) • Chemical energy transformed to another form of energy (e.g., light wands, lightning bugs, batteries, bulbs)	**Student Book:** "Energy" pg. 299-321
e. Apply the laws of reflection and refraction to explain everyday phenomena. • Properties of reflection, refraction, transmission, and absorption of light • Images formed by plane, convex, and concave lenses and mirrors, and reflecting and refracting telescopes • Objects that are opaque, transparent, or translucent	**Student Book:** "Light" pg. 308-311
f. Develop a logical argument to explain how the forces which affect the motion of objects has real-world applications including (but not limited to) examples of Mississippi's contributions as follows: • Automotive industry (Nissan's new production plant is located in Canton, MS. Toyota's new facility is in Tupelo, MS.) • Aerospace industry (The Raspet Flight Research Laboratory, housed at Mississippi State University, is one of the premier university flight research facilities in the country.) • Shipbuilding industry (Ingall's Shipbuilding, of Pascagoula, MS, is a leading supplier of marine vessels to the United States Navy.	**Student Book:** *opportunity exists* "Forces and Motion" pg. 274-298
g. Predict and explain factors that affect the flow of heat in solids, liquids, and gases. • Insulating factors in real life applications (e.g., building, construction, clothing, animal covering) • Conduction, convection, or radiation factors used to enhance the flow of heat • Temperature differences on the movement of water	**Student Book:** *opportunity exists* ""Energy" pg. 299-321

C O M P E N T E N C Y 3

Explain the organization of living things, the flow of matter and energy through ecosystems, the diversity and interactions among populations, and the natural and human-made pressures that impact the environment.

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
a. Describe and predict interactions (among and within populations) and the effects of these interactions on population growth to include the effects on available resources. • How cooperation, competition and predation affect population growth • Effects of overpopulation within an ecosystem on the amount of resources available • How natural selection acts on a population of organisms in a particular environment via enhanced reproductive success	**Student Book:** "Change and Diversity" pg. 124-128 • "Populations" pg. 129-130, "Factors That Affect Populations" pg. 131, "Relationships Between Populations" pg. 132 • "Feeding Relationships" pg. 133, "Food Chains" pg. 134, "Food Web" pg. 135 • ""The Theory of Evolution" pg. 125-126, "Natural Selection" pg. 126-127, "Extinction" pg. 128
b. Compare and contrast structure and function in living things to include cells and whole organisms. • Hierarchy of cells, tissues, organs, and organ systems to their functions in an organism • Function of plant and animal cell parts (vacuoles, nucleus, cytoplasm, cell membrane, cell wall, chloroplast) • Vascular and nonvascular plants, flowering and non-flowering plants, deciduous and coniferous trees	**Student Book:** "Structure of Life" pg. 074-082 • "Tissues, Organs, and Systems" pg. 082 • "Animal Cells" pg. 077, "Plant Cells" pg. 078 • "Vascular and Nonvascular Plants" pg. 162, "Plant Physiology" pg. 107, "Coniferous Forests" pg. 143, "Deciduous Forests" pg. 144, "Plant Kingdom" pg. 153
c. Distinguish between the organization and development of humans to include the effects of disease. • How systems work together (e.g., respiratory, circulatory) • Fertilization, early cell division, implantation, embryonic and fetal development, infancy, childhood, adolescence, adulthood, and old age • Common diseases caused by microorganisms (e.g., bacteria, viruses, malarial parasites)	**Student Book:** "Human Biology" Pg. 083-102 • "Skeletal and Muscular Systems: pg. 085-087, "Digestive and Excretory Systems" pg. 088-090, "Respiratory and Circulatory Systems" pg. 091-093, "Nervous and Endocrine Systems" pg. 094-097, "Immune System" pg. 098 • "Reproductive System" pg. 099, "Cell Division" pg. 080-081 • *opportunity exists* "Immune Systems" pg. 098, "1984" pg. 449

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
d. Describe and summarize how an egg and sperm unite in the reproduction of angiosperms and gymnosperms. • The path of the sperm cells to the egg cell in the ovary of a flower • The structures and functions of parts of a seed in the formation of a plant and of fruits • How the combination of sex cells results in a new combination of genetic information different from either parent	**Student Book:** "Plant Life Cycles" pg. 108, "Heredity" pg. 121-123, "1984" pg. 448 *opportunity exists* "Reproduction" pg. 112-114
e. Construct a diagram of the path of solar energy through food webs that include humans and explain how the organisms relate to each other. • Autotrophs and heterotrophs, producers, consumers and decomposers • Predator/prey relationships, competition, symbiosis, parasitism, commensalism	**Student Book:** "Ecosystems" pg. 129-140 • "Feeding Relationships" pg. 133, "Autotrophs and Heterotrophs" pg. 158-160 • "Relationships Between Populations" pg. 132

C O M P E N T E N C Y 4

Establish connections among Earth's layers including the lithosphere, hydrosphere, and atmosphere.

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
a. Compare and contrast the relative positions and components of the Earth's crust (e.g., mantle, liquid and solid core, continental crust, oceanic crust).	**Student Book:** "Earth Structure and Composition" pg. 175-177, "Map of Plate Boundaries" pg. 185, "Ocean Floor" pg. 207-209
b. Draw conclusions about historical processes that contribute to the shaping of planet Earth. • Movements of the continents through time • Continental plates, subduction zones, trenches etc.	**Student Book:** "Geology" pg. 175-200 • "Continental Drift" pg. 182, "Earth's Continents Through Time" pg. 199-200 • "Lithospheric Plates" pg. 183, "Plate Boundaries" pg. 184-185
c. Analyze climate data to draw conclusions and make predictions.	**Student Book:** "Climate" pg. 227-230
d. Summarize the causes and effects of pollution on people and the environment (e.g., air pollution, ground pollution, chemical pollution) and justify how and why pollution should be minimized.	**Student Book:** "Resource Conservation" pg. 332-344, "Pollution" pg. 341-342, "Solid Waste and Pollution" pg. 345-353

Objectives, Sixth Grade	ScienceSaurus, Grade 6-8
e. Explain the daily and annual changes in the Earth's rotation and revolution. • How the positions of the moon and the sun affect tides • The phases of the moon (e.g., new, crescent, half, gibbous, full, waxing, waning)	**Student Book:** "Astronomy" pg. 231-248 • "Tides" pg. 237 • "Moon Phases" pg. 235
f. Differentiate between objects in the universe (e.g., stars, moons, solar systems, asteroids, galaxies).	**Student Book:** "Solar System Objects" pg. 238-248
g. Research and cite evidence of current resources in Earth's systems. • Resources such as fuels, metals, fresh water, wetlands, and farmlands • Methods being used to extend the use of Earth's resources through recycling, reuse, and renewal • Factors that contribute to and result from runoff (e.g., water cycle, groundwater, drainage basin (watershed)	**Student Book:** "Earth's Natural Resources" pg. 323-331 • "Energy Resources" pg. 324-328, "Material Resources" pg. 329-331 • "Conservation of Energy" pg. 333-336, "Conservation of Material Resources" pg. 335-339 • "Erosion and Deposition" pg. 192-193, "Divides and Drainage Basins" pg. 192-193, "Water Pollution" pg. 352-353

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Competencies and Objectives
Seventh Grade

C O M P E N T E N C Y 1

Design and conduct a scientific investigation utilizing appropriate process skills and technology.

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
a. Design, conduct, and draw conclusions from an investigation that includes using experimental controls.	**Student Book:** "Scientific Inquiry" pg. 002-016, "Designing Your Own Investigations" pg. 017-019
b. Discriminate among observations, inferences, and predictions.	**Student Book:** "Prediction" pg. 002, "Drawing Conclusions" pg. 013
c. Collect and display data using simple tools and resources to compare information (using standard, metric, and non-standard measurement). • Tools (e.g., 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, telescopes, compasses, spring scales, pH indicators, stopwatches) • Types of data (e.g., linear measures, mass, volume, temperature, area, perimeter) • Resources (e.g., Internet, electronic encyclopedias, journals, community resources, etc.)	**Student Book:** "Glassware and Microscopes" pg. 046-052, "Measurement" pg. 053-072 • "Microscopes and Slides" pg. 049-052, "Measurement" 053-072 • "Measurement" pg. 053-072, "Conversion Tables" pg. 438 • "Researching Information" pg. 420-426
d. Organize data in tables and graphs and analyze data to construct explanations and draw conclusions.	**Student Book:** "Analyzing and Concluding" pg. 011-013, "Communicating Results" pg. 014-015, "Using Data Tables and Graphs" pg. 385-401, "Organizing Data Tables" pg. 386-388, "Bar Graphs" pg. 391

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
e. Communicate results of scientific procedures and explanations through a variety of written and graphic methods.	**Student Book:** "Recording Data" pg. 010, "Analyzing and Concluding" pg. 011-013, "Scientific Models" pg. 013, "Communicating Results" pg. 014-015, "Using Data Tables and Graphs" pg. 385-401
f. Explain how science and technology are reciprocal.	**Student Book:** "Science and Technology" pg. 355-361
g. Develop a logical argument to explain why scientists often review and ask questions about the results of other scientists' work.	**Student Book:** "Science and Society" pg. 362-373

C O M P E N T E N C Y 2

Develop an understanding of chemical and physical changes, interactions involving energy, and forces that affect motion of objects.

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
a. Identify patterns (e.g., atomic mass, increasing atomic numbers) and common characteristics (metals, nonmetals, gasses) of elements found in the periodic table of elements.	**Student Book:** "Atoms" pg. 255, "Atomic Structure" pg. 256-257, "Atomic Size" pg. 256-257, "Periodic Table" pg. 265
b. Categorize types of chemical changes, including synthesis and decomposition reactions, and classify acids and bases using the pH scale and indicators.	**Student Book:** "Elements, Molecules, and Compounds" pg. 259-264, "Chemical Formulas, Reactions, and Equations" pg. 266-270
c. Compare the force (effort) required to do the same amount of work with and without simple machines (e.g., levers, pulleys, wheel and axle, inclined planes).	**Student Book:** "Work" pg. 287, "Simple Machines" pg. 288-294, "Physical Science Equations" pg. 298
d. Describe cause and effect relationships of electrical energy. • Energy transfers through an electric circuit (using common pictures and symbols) • Electric motor energy transfers (e.g., chemical to electrical to mechanical motion) and generators	**Student Book:** "Electricity and Magnetism" pg. 314-321 • "Current Electricity" pg. 317, "Electric Circuits" pg. 318, "Ohm's Law" pg. 319 • "Magnetism" pg. 320, "Electromagnetism" pg. 321, "Renewable Energy Resources" pg. 328
e. Distinguish how various types of longitudinal and transverse waves (e.g., water, light, sound, seismic) transfer energy. • Frequency • Wavelength • Speed • Amplitude	**Student Book:** "Waves" pg. 305-307, "Light" pg. 308-311, "Sound" pg. 312-313, "Earthquakes" pg. 186

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
f. Describe the effects of unbalanced forces on the speed or direction of an object's motion. • Variables that describe position, distance, displacement, speed, and change in speed of an object • Gravity, friction, drag, lift, electric forces, and magnetic forces	**Student Book:** "Forces and Motion" pg. 274-298 • "Gravity" pg. 276, "Electric and Magnetic Forces" pg. 277, "Friction" pg. 279, "Balanced and Unbalanced Forces" pg. 250-282, "Newton's Laws of Motion" pg. 283-286 , "Forces in Fluid" pg. 295-296 • "Forces in Nature" pg. 275-279, "Lift" pg. 297

C O M P E N T E N C Y 3

Distinguish the characteristics of living things and explain the interdependency between form and function using the systems of the human organism to illustrate this relationship.

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
a. Assess how an organism's chances for survival are influenced by adaptations to its environment. • The importance of fungi as decomposers • Major characteristics of land biomes (e.g., tropical rainforests, temperate rainforests, deserts, tundra, coniferous forests/taiga, and deciduous forests) • Adaptations of various plants to survive and reproduce in different biomes	**Student Book:** "Change and Diversity of Life" pg. 124-128 • "Feeding Relationships" pg. 133, "Food Webs" pg. 135 • "Biomes" pg. 141-149, "Patterns of World Climates" pg. 230 • "adaptation" pg. 127, "Ecological Succession" pg. 140, "Biomes" pg. 141-149, "Plant Kingdom" pg. 153, "1859" pg. 445
b. Classify the organization and development of living things to include prokaryotic (e.g., bacteria) and eukaryotic organisms (e.g., protozoa, certain fungi, multicellular animals and plants).	**Student Book:** "Cells" pg. 076, "Classification" pg. 150-164
c. Evaluate how health care technology has improved the quality of human life (e.g., computerized tomography [CT], artificial organs, magnetic resonance imaging [MRI], ultrasound).	**Student Book:** "Science and Society" pg. 362-373
d. Compare and contrast reproduction in terms of the passing of genetic information (DNA) from parent to offspring. • Sexual and asexual reproduction • Reproduction that accounts for evolutional adaptability of species • Mitosis and meiosis • Historical contributions and significance of discoveries of Gregor Mendel and Thomas Hunt Morgan as related to genetics	**Student Book:** • "Reproduction" pg. 113-114, "Did You Know?" pg. 114 • "The Theory of Evolution" pg. 126-128 • "Cell Division" pg. 080, "Stages of Cell Division" pg. 081, "Sexual Reproduction" pg. 114 • "Heredity" pg. 121-123, "1857" pg. 445

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
e. Compare and contrast how organisms obtain and utilize matter and energy. • How organisms use resources, grow, reproduce, maintain stable internal conditions (homeostasis) and recycle waste • How plants break down sugar to release stored chemical energy through respiration	**Student Book:** "Energy and Matter in Ecosystems" pg. 136-139 • "The Human Body" pg. 084, "Energy" pg. 136-137, "Carbon Dioxide-Oxygen Cycle" pg. 138, "Nitrogen Cycle" pg. 138 • "Cell Processes" pg. 079

C O M P E N T E N C Y 4

Describe the properties and structure of the sun and the moon with respect to the Earth.

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
a. Justify the importance of Earth materials (e.g., rocks, minerals, atmospheric gases, water) to humans.	**Student Book:** "Earth's Natural Resources" pg. 323-331
b. Explain the causes and effects of historical processes shaping the planet Earth (e.g., movements of the continents, continental plates, subduction zones, trenches, etc.)	**Student Book:** "Geology" pg. 175-200 • "Continental Drift" pg. 182, "Earth's Continents Through Time" pg. 199-200 • "Lithospheric Plates" pg. 183, "Plate Boundaries" pg. 184-185
c. Describe the causes and effects of heat transfer as it relates to the circulation of ocean currents, atmospheric movement, and global wind patterns (e.g., trade winds, the jet stream). Provide examples of how these global patterns can affect local weather. • Characteristics of the Gulf Stream and other large ocean currents • Effects on climate in Eastern North America and Western Europe • Effects of heat transfer to the movement of air masses, high and low pressure areas, and fronts in the atmosphere	**Student Book:** "Oceanography" pg. 201-211, "Meteorology" pg. 212-230 • "Ocean Currents" pg. 203-206 • "Global Winds and Jet Streams" pg. 217, "Climate" pg. 227-230 • "Weather" pg. 218-226

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
d. Conclude why factors, such as lack of resources and climate can limit the growth of populations in specific niches in the ecosystem. • Abiotic factors that affect population, growth, and size (quantity of light, water, range of temperatures, soil compositions) • Cycles of water, carbon, oxygen, and nitrogen in the environment • Role of single-celled organisms (e.g., phytoplankton) in the carbon and oxygen cycles	**Student Book:** "Ecosystems" pg. 129-149 • "Factors That Affect Populations" pg. 131 • "Energy and Matter in Ecosystems" pg. 136-139, "Water Cycle" pg. 216 • "Carbon Dioxide-Oxygen Cycle" pg. 138, "Fungi" pg. 155, Archaebacteria and Eubacteria Kingdoms" pg. 157
e. Research and develop a logical argument to support the funding of NASA's Space Programs. • Space exploration (e.g., telescopes, radio telescopes, X-ray telescopes, cameras, spectro-meters, etc.) • Spinoffs (e.g., laser, pacemaker, dehydrated food, flame retardant clothing, global positioning system [GPS], satellite imagery, global weather information, diagnostic imagery) • Mississippi's contributions to the space industry	**Student Book:** *opportunity exists* "Science and Society" pg. 362-373
f. Distinguish the structure and movements of objects in the solar system. • Sun's atmosphere (corona, chromosphere, photosphere and core) • How phenomena on the sun's surface (e.g., sunspots, prominences, solar wind, solar flares) affect Earth (e.g., auroras, interference in radio and television communication) • Eclipses relative to the position of the sun, moon, and Earth • Contributions of Copernicus, Galileo, and Kepler in describing the solar system	**Student Book:** "Astronomy" pg. 231-248, *opportunity exists* "Scientific Models" pg. 013

Objectives, Seventh Grade	ScienceSaurus, Grade 6-8
g. Research and evaluate the use of renewable and nonrenewable resources and critique efforts in the United States including (but not limited) to Mississippi to conserve natural resources and reduce global warming. • How materials are reused in a continuous cycle in ecosystems, (e.g., Mississippi Ethanol Gasification Project to develop and demonstrate technologies for the conversion of biomass to ethanol) • Benefits of solid waste management (reduce, reuse, recycle) • Conserving renewable and nonrenewable resources (e.g., The Recycling and Solid Waste Reduction Program in Jackson, MS)	**Student Book:** "Earth's Natural Resources" pg. 323-331, "Resource Conservation" pg. 332-344, "Solid Waste and Pollution" pg. 345-353
h. Predict weather events by analyzing clouds, weather maps, satellites, and various data.	**Student Book:** "Weather" pg. 218-226, "Climate" pg. 227-230

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Competencies and Objectives
Eighth Grade

C O M P E N T E N C Y 1

Draw conclusions from scientific investigations including controlled experiments.

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
a. Design, conduct, and analyze conclusions from an investigation that includes using experimental controls.	**Student Book:** "Scientific Inquiry" pg. 002-016, "Designing Your Own Investigations" pg. 017-019
b. Distinguish between qualitative and quantitative observations and make inferences based on observations.	**Student Book:** "Drawing Conclusions" pg. 013, "Organizing Data Tables" pg. 386-388, "Bar Graphs" pg. 391
c. Summarize data to show the cause and effect relationship between qualitative and quantitative observations (using standard, metric, and non-standard units of measurement). • Tools (e.g., 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, telescopes, compasses, spring scales, pH indicators, stopwatches, graduated cylinders, medicine droppers) • Types of data (e.g., linear measures, mass, volume, temperature, area, perimeter) • Resources (e.g., Internet, electronic encyclopedias, journals, community resources, etc.)	**Student Book:** "Glassware and Microscopes" pg. 046-052, "Measurement" pg. 053-072 • "Microscopes and Slides" pg. 049-052, "Measurement" 053-072 • "Measurement" pg. 053-072, "Conversion Tables" pg. 438 • "Researching Information" pg. 420-426
d. Analyze evidence that is used to form explanations and draw conclusions.	**Student Book:** "Analyzing and Concluding" pg. 011-013

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
e. Develop a logical argument defending conclusions of an experimental method.	**Student Book:** *opportunity exists* "Drawing Conclusions" pg. 013
f. Develop a logical argument to explain why perfectly designed solutions do not exist.	**Student Book:** *opportunity exists* "Identifying Questions for Further Investigation" pg. 016
g. Justify a scientist's need to revise conclusions after encountering new experimental evidence that does not match existing explanations.	**Student Book:** "Conclusions Based on Data" pg. 015
h. Analyze different ideas and recognize the skepticism of others as part of the scientific process in considering alternative conclusions.	**Student Book:** "Conclusions Based on Data" pg. 015

C O M P E N T E N C Y 2

Apply concepts relating to an understanding of chemical and physical changes, interactions involving energy, and forces that affect motion of objects.

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
a. Identify patterns found in chemical symbols, formulas, reactions, and equations that apply to the law of conservation of mass. • Chemical symbols and chemical formulas of common substances such as NaCl (table salt), H_20 (water), $C_6H_{12}O_6$ (sugar), O_2 (oxygen gas), CO_2 (carbon dioxide), and N_2 (nitrogen gas) • Mass of reactants before a change and products after a change • Balanced chemical equations such as photosynthesis and respiration	**Student Book:** "Matter" pg. 250-273 • "Compounds" pg. 262, "Chemical Bonds" pg. 263, "Families of Chemical Compounds" pg. 264, "Periodic Table of Elements" pg. 265, "Chemical Formulas" pg. 267, "Electron-Dot Diagrams" pg. 268 • "Chemical Reactions" pg. 269-270 • "Cell Processes" pg. 079
b. Predict the properties and interactions of given elements using the periodic table of the elements. • Metals and nonmetals • Acids and bases • Chemical changes in matter (e.g., rusting [slow oxidation], combustion [fast oxidation], food spoilage)	**Student Book:** "Matter" pg. 250-273 • *opportunity exists* " "Periodic Table" pg. 265 • "Acids and Bases" pg. 264 • "Physical and Chemical Changes" pg. 252, *opportunity exists* "Chemical Weathering" pg. 190
c. Distinguish the motion of an object by its position, direction of motion, speed, and acceleration and represent resulting data in graphic form in order to make a prediction.	**Student Book:** "Newton's Laws of Motion" pg. 283-286, "Physical Science Equations" pg. 298, "Using Data Tables and Graphs" pg. 385-401

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
d. Relate how electrical energy transfers through electric circuits, generators, and power grids, including the importance of contributions from Mississippi companies. • The Electrical Power Products Division of Howard Industries, a leading manufacturer of electrical distribution equipment in such locations as Laurel and Ellisville, MS • Kuhlman Electric Corporation, located in Crystal Springs, MS	**Student Book:** *opportunity exists* "Electricity and Magnetism" pg. 314-321
e. Contrast various components of the electromagnetic spectrum (e.g., infrared, visible light, ultraviolet) and predict their impacts on living things.	**Student Book:** "Light" pg. 308-311
f. Recognize Newton's Three Laws of Motion and identify situations that illustrate each law (e.g., inertia, acceleration, action, reaction forces).	**Student Book:** "Newton's Laws of Motion" pg. 283-286

C O M P E N T E N C Y 3

Compare and contrast the structure and functions of the cell, levels of organization of living things, basis of heredity, and adaptations that explain variations in populations.

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
a. Analyze how adaptations to a particular environment (e.g., desert, aquatic, high altitude) can increase an organism's survival and reproduction and relate organisms and their ecological niches to evolutionary change and extinction.	**Student Book:** "Change and Diversity of Life" pg. 124-128, "Factors That Affect Populations" pg. 131, "Biomes" pg. 141-149, *opportunity exists* "Patter of World Climates" pg. 230
b. Compare and contrast the major components and functions of different types of cells. • Differences in plant and animal cells • Structures (nucleus, cytoplasm, cell membrane, cell wall, mitochondrion, and nuclear membrane) • Different types of cells and tissues (e.g., epithelial, nerve, bone, blood, muscle)	**Student Book:** "Structure of Life" pg. 074-082 • "Animal Cells" pg. 077, "Plant Cells" pg. 078 • "Tissues, Organs, and Systems" pg. 082, "Main Tissue Types" pg. 084
c. Describe how viruses, bacteria, fungi, and parasites may infect the human body and interfere with normal body functions.	**Student Book:** *opportunity exists* "Immune Systems" pg. 098, "1984" pg. 449

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
d. Describe heredity as the passage of instructions from one generation to another and recognize that hereditary information is contained in genes, located in the chromosomes of each cell. • How traits are passed from parents to offspring through pairs of genes • Phenotypes and genotypes • Hierarchy of DNA, genes, and chromosomes and their relationship to phenotype • Punnett square calculations	**Student Book:** "Genes and Heredity" pg. 112-123 • "Reproduction" pg. 113-114, "DNA" pg. 115, "Genes" pg. 116-120 • "phenotype" and "genotype" pg. 123 • "Dominant and Recessive Alleles" pg. 122 • "Punnett Squares" pg. 123
e. Explain energy flow in a specified ecosystem. • Populations, communities, and habitats • Niches, ecosystems and biomes • Producers, consumers and decomposers in an ecosystem	**Student Book:** "Ecosystems" pg. 129-149 • "Populations" pg. 129-130, "Factors That Affect Populations" pg. 131 • "Populations" pg. 129-130, "Factors That Affect Populations" pg. 131, "Biomes" pg. 141-149 • "Feeding Relationships" pg. 133, "Food Chains" pg. 134, "Food Webs" pg. 135, "Energy and Matter in Ecosystems" pg. 136-139
f. Develop a logical argument for or against research conducted in selective breeding and genetic engineering, including (but not limited to) research conducted in Mississippi. Examples from Mississippi include the following: • The Animal Functional Genomics Laboratory at Mississippi State University • The Stoneville Pedigreed Seed Company in Stoneville, MS • Catfish Genetics Research Unit at the Thad Cochran National Warm Water Aquaculture Center in Stoneville, MS	**Student Book:** "The Human Genome" pg. 117, "The Human Genome Project" pg. 118, "Cloning" pg. 120, "Ethical Limits on Technology" pg. 361
g. Research and draw conclusions about the use of single-celled organisms in industry, in the production of food, and impacts on life.	**Student Book:** *opportunity exists* "Ethical Limits on Technology" pg. 361
h. Describe how an organism gets energy from oxidizing its food and releasing some of its energy as heat.	**Student Book:** "Cell Processes" pg. 079, "Animal Physiology" pg. 105

C O M P E N T E N C Y 4

Describe the Earth's System in terms of its position to objects in the universe, structure and composition, climate, and renewable and nonrenewable resources.

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
a. Compare and contrast the lithosphere and the asthenosphere. • Composition, density, and location of continental crust and oceanic crust • Physical nature of the lithosphere (brittle and rigid) with the asthenosphere (plastic and flowing) • How the lithosphere responds to tectonic forces (faulting and folding)	**Student Book:** • "Structure of Earth" pg. 177, "Lithospheric Plates" pg. 183 • "Plate Tectonics and Mountain Building" pg. 181-187
b. Describe the cause and effect relationship between the composition of and movement within the Earth's lithosphere. • Seismic wave velocities of earthquakes and volcanoes to lithospheric plate boundaries using seismic data • Volcanoes formed at mid-ocean ridges, within intra-plate regions, at island arcs, and along some continental edges • Modern distribution of continents to the movement of lithospheric plates since the formation of Pangaea	**Student Book:** • "Earthquakes" pg. 186 • "Plate Boundaries" pg. 184, "Map of Plate Boundaries" pg. 185, "Volcanoes" pg. 187 • "Continental Drift" pg. 181-182, "Lithospheric Plates" pg. 183
c. Examine weather forecasting and describe how meteorologists use atmospheric features and technology to predict the weather. • Temperature, precipitation, wind (speed/direction), dew point, relative humidity, and barometric pressure • How the thermal energy transferred to the air results in vertical and horizontal movement of air masses, Coriolis effect • Global wind patterns (e.g., trade winds, westerlies, jet streams) • Satellites and computer modeling	**Student Book:** • "Weather" pg. 218-226 • "Air Masses" pg. 221, "coriolis effect" pg. 217 • "Global Winds and Jet Stream" pg. 217, "global winds" pg. 228 • "Collecting Weather Data" pg. 219
d. Research the importance of the conservation of renewable and nonrenewable resources, including (but not limited to) Mississippi, and justify methods that might be useful in decreasing the human impact on global warming. • Greenhouse gases • The effects of the human population • Relationships of the cycles of water, carbon, oxygen, and nitrogen	**Student Book:** "Earth's Natural Resources" pg. 323-331, "Resource Conservation" pg. 332-344, "Solid Waste and Pollution" pg. 345-353 • "Greenhouse Effect" pg. 349 • "Habitat Loss" pg. 341, "Pollution" pg. 342, "Over Hunting" pg. 343, "Solid Waste and Pollution" pg. 345-353 • "Carbon Dioxide-Oxygen Cycle" pg. 138, "Nitrogen Cycle" pg. 139, "Water Cycle" pg. 216

Objectives, Eighth Grade	ScienceSaurus, Grade 6-8
e. Explain how the tilt of Earth's axis and the position of the Earth in relation to the sun determine climatic zones, seasons, and length of the days.	**Student Book:** "Rotation" pg. 233-234, "Revolution and Seasons" pg. 234
f. Describe the hierarchical structure (stars, clusters, galaxies, galactic clusters) of the universe and examine the expanding universe to include its age and history and the modern techniques (e.g., radio, infrared, ultraviolet and X-ray astronomy) used to measure objects and distances in the universe).	**Student Book:** "Stars, Galaxies, and Constellations" pg. 244-248
g. Justify the importance of continued research and use of new technology in the development and commercialization of potentially useful natural products, including, but not limited to research efforts in Mississippi. • The Thad Cochran National Center for Natural Products Research, housed at the University of Mississippi • The Jamie Whitten Delta States Research Center in Stoneville, MS, • The Mississippi Polymer Institute, housed at the University of Southern Mississippi	**Student Book:** *opportunity exists* "Earth's Natural Resources" pg. 323-331, "Science and Technology" pg. 355-361, "Science and Society" pg. 362-373
h. Justify why an imaginary hurricane might or might not hit a particular area, using important technological resources including (but not limited to) the following: • John C. Stennis Space Center Applied Research and Technology Project Office in Hancock County • National Oceanic and Atmospheric Administration (NOAA) • The National Weather Service	**Student Book:** *opportunity exists* "Ocean Currents" pg. 203-206, "Global Winds and Jet Streams" pg. 217, "Weather" pg. 218-226