



MISSOURI
Science Grade Level Expectations
Scope and Sequence Grade 6
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| STANDARDS | PAGE REFERENCES |
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| Standard 1: Properties and Principles of Matter and Energy | |
| 1. Changes in properties and states of matter provide evidence of the atomic theory of matter | |
| <p>A. Objects, and the materials they are made of, have properties that can be used to describe and classify them</p> <p>a. Recognize that matter is anything that has mass and volume</p> <p>b. Describe and compare the volumes (the amount of space an object takes up) of objects or substances directly using a graduated cylinder and/or indirectly using displacement methods</p> <p>c. Describe and compare the masses (amount of matter) of objects to the nearest gram using a balance</p> <p>d. Classify the types of matter in an object into pure substances or mixtures using their specific physical properties</p> | <p>SE: 70-79, 80-86, 115-117 <i>Lab</i> 118-119</p> <p>TWE: Activity 77, 116 Curriculum Connection 84, 116 Differentiated Instruction 115, 116 Fun Fact 72 Identifying Misconceptions 72 Quick Demo 116 Tie to Prior Knowledge 80 Visual Learning 73</p> <p>TR Chapter Resources Fast File <i>Atoms, Elements, and the Periodic Table</i> Chapter Resources Fast File <i>Matter and Its Changes</i> Laboratory Activities Manual 13-15 Mastering Standardized Test 15-18, 19-22 Performance Assessment 35 Science Inquiry Lab Manual 25-26 Study Guide and Reinforcement 9, 10, 12, 13 Transparency Chapter 3, Assessment Examview Pro Chapter 3 Examview Pro Chapter 4</p> |
| <p>B. Properties of mixtures depend upon the concentrations, properties and interactions of particles</p> <p>a. Describe the properties of each component in a mixture/solution and their distinguishing properties (e.g. salt water, oil and vinegar, pond water, Kool-Aid)</p> <p>b. Describe appropriate ways to separate the components of different types of mixtures, (sorting, evaporation, filtration, magnets, boiling, chromatography or screening)</p> <p>c. Predict how various solids (soluble/insoluble) behave (e.g. dissolve, settle, float) when mixed with water</p> | <p>SE: 115-117 <i>Lab</i> 118-119</p> <p>TWE: Activity 116 Curriculum Connection 116 Differentiated Instruction 115, 116 Integrate Earth Science 117 Quick Demo 116</p> <p>TR Chapter Resources Fast File <i>Atoms, Elements, and the Periodic Table</i> Laboratory Activities Manual 21-22 Mastering Standardized Test 19-22 Study Guide and Reinforcement 13 Examview Pro Chapter 4</p> |

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| <p>C. Properties of matter can be explained in terms of moving particles too small to be seen without tremendous magnification</p> <p>a. Recognize evidence (e.g., diffusion of food coloring in water, light reflecting off of dust particles in the air, condensation of water vapor by increased pressure or decreased temperature) that supports the theory that matter is composed of small particles (atoms, molecules) that are in constant, random motion</p> | <p>SE: 69-79</p> <p>TWE: Make a Model 74 Quick Demo 75 Teacher FYI 73 Visual Learning 74</p> <p>TR Chapter Resources Fast File <i>Matter and Its Changes</i> Mastering Standardized Test 15-18 Science Inquiry Lab Manual 37-38 Study Guide and Reinforcement 9 Transparency Chapter 3, Section 3 Teaching Transparency Examview Pro Chapter 3</p> |
| <p>D. Physical changes in the state of matter that result from thermal changes can be explained by moving particles (The kinetic theory of matter)</p> <p>a. Describe the relationship between the change in the volume of water and changes in temperature as it relates to the properties of water (i.e., water expands and becomes less dense when frozen)</p> | <p>SE: 74-75</p> <p>TWE: Make a Model 74 Quick Demo 75 Visual Learning 74</p> <p>TR Chapter Resources Fast File <i>Matter and Its Changes</i> Critical Thinking and Problem Solving-Physical Science 10 Mastering Standardized Test 15-18 Science Inquiry Lab Manual 37-38 Study Guide and Reinforcement 9 Transparency Chapter 3, Section 3 Teaching Transparency Examview Pro Chapter 3</p> |
| <p>G. Properties of objects and states of matter can change chemically and/or physically</p> <p>b. Recognize and classify changes in matter as chemical and/or physical</p> <p>c. Identify chemical changes (i.e. rusting, oxidation, burning, decomposition by acids, decaying, baking) in common objects (i.e. rocks such as limestone, minerals, wood, steel wool, plants) as a result of interactions with sources of energy or other matter that form new substances (compounds) with different characteristic properties</p> <p>d. Identify physical changes in common objects (e.g. rocks, minerals, wood, water, steel wool, plants) and describe the processes which caused the change (e.g. weathering, erosion, cutting, dissolving)</p> | <p>SE: 71, 80-84, 88-89 <i>MiniLab</i> 84</p> <p>TWE: Discussion 84 Fun Fact 83 Identifying Misconceptions 81 Integrate Health 81 Mini Lab 84 Quick Demo 71, 82 Teacher FYI 81 Use an Analogy 82 Visual Learning 82</p> <p>TR Chapter Resources Fast File <i>Matter and Its Changes</i> Critical Thinking/ Problem Solving-Physical Science 10 Laboratory Activities Manual 17-19 Mastering Standardized Test 15-18 Study Guide and Reinforcement 9-10 Transparency Chapter 3, Section 2 Examview Pro Chapter 3</p> |

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| <p>I. Mass is conserved during any physical or chemical change</p> <p>a. Demonstrate and provide evidence that mass is conserved during a physical change</p> | <p>SE: 84-86, 100</p> <p>TWE: Differentiated Instruction 85 Inquiry Lab 85 Teacher FYI 100</p> <p>TR Chapter Resources Fast File <i>Matter and Its Changes</i> Critical Thinking/ Problem Solving-Physical Science 10 Laboratory Activities Manual 17-19 Mastering Standardized Test 15-18 Study Guide and Reinforcement 9-10 Examview Pro Chapter 3</p> |
| <p>2. Energy has a source, can be transferred, and transformed into various forms but is conserved between and within systems.</p> | |
| <p>A. Forms of energy have a source, a means of transfer (work and heat) and a receiver</p> <p>a. Identify sources of visible light (e.g., the sun and other stars, flint, bulb, flames, lightning)</p> <p>b. Describe evidence (i.e., cannot bend around walls) that visible light travels in a straight line using the appropriate tools (i.e., pinhole viewer, ray box and/or laser pointer)</p> <p>c. Compare the reflection of visible light by various surfaces (i.e. mirror, smooth and rough surfaces, shiny and dull surfaces, moon)</p> <p>d. Compare the refraction of visible light passing through different transparent and translucent materials (e.g. prisms, water, a lens)</p> <p>e. Predict how visible light behaves (reflects, refracts, absorbs, transmits) when it interacts with different surfaces (transparent, translucent, opaque)</p> <p>f. Identify receivers of visible light energy (e.g., eye, photocell)</p> <p>g. Recognize that an object is “seen” only when the object emits or reflects light to the eye</p> <p>h. Recognize that differences in wavelength within that range of visible light that can be seen by the human eye are perceived as differences in color</p> <p>i. Describe how sound energy is transferred by wave-like disturbances that spread away from the source through a medium</p> <p>j. Predict how the properties of the medium (e.g., air, water, empty space, rock) affect the speed of different types of mechanical waves (i.e., earthquake, sound)</p> | <p>SE: 226, 230, 237-241 <i>Science Stats</i> 246</p> <p>TWE: Teacher FYI 239 Tie to Prior Knowledge 237 Visual Learning 232, 239</p> <p>TR: Chapter Resources Fast File <i>Waves</i> Critical Thinking/Problem Solving-Physical Science 22 Mastering Standardized Test 35-38 Study Guide and Reinforcement 27- 29 Transparency Chapter 8, Section 2 Examview Pro Chapter 8</p> |

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| <p>C. Electromagnetic energy from the sun (solar radiation) is a major source of energy on Earth</p> <p>a. Recognize that the energy from the Sun is transferred to Earth in a range of wavelengths including visible light, infrared radiation, and ultraviolet radiation</p> <p>b. Recognize that the sun is the source of almost all energy used to produce the food for living organisms</p> | <p>SE: 624, 651</p> <p>TWE: Differentiated Instruction 624 Tie to Prior Knowledge 633</p> <p>TR Chapter Resources Fast File <i>Ecology</i> Cultural Diversity 41-42 Laboratory Activities Manual 95-97 Mastering Standardized Test 87-90 Study Guide and Reinforcement 69, 71 Transparency Chapter 21, Section 3 Examview Pro Chapter 21</p> |
| Standard 3: Characteristic and Interactions of Living Organisms | |
| 1. There is a fundamental unity underlying the diversity of all living organisms | |
| <p>A. Organisms have basic needs for survival</p> <p>a. Describe the common life processes of living organisms (i.e. growth, reproduction, life span, response to stimuli, energy use, exchange of gases, use of water, and eliminate of waste)</p> | <p>SE: 480, 498-499</p> <p>TWE: Tie to Prior Knowledge 498</p> <p>TR Laboratory Activities Manual 103-105, 107-110 Study Guide and Reinforcement 57 Critical Thinking Problem Solving-Life Science 8</p> |
| <p>C. Cells are the fundamental units of structure and function of all living things</p> <p>a. Recognize that all organisms are composed of cells, the fundamental units of life, which carry on all life processes</p> | <p>SE: 474-481, 483-487 <i>Lab</i> 482, 488-489</p> <p>TWE: Activity 478 Cultural Diversity 479 Differentiated Instruction 478, 479 Fun Fact 477 Make a Model 478 Science Journal 484 Teacher FYI 477 Use an Analogy 479 Visual Learning 478, 484</p> <p>TR Chapter Resources Fast File <i>Cells-The Units of Life</i> Laboratory Activities Manual 103-105, 107-110 Mastering Standardized Test 67-69 Probeware Lab Manual 16-23 Study Guide and Reinforcement 55-56 Transparency Chapter 16-all transparencies Examview Pro Chapter 16</p> |

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| <p>E. Biological classifications are based on how organisms are related</p> <p>a. Recognize that most of the organisms on Earth are unicellular (e.g., bacteria, protists) and other organisms, including humans, are multi-cellular</p> <p>b. Identify examples of unicellular (e.g., bacteria, some protists, and fungi) and examples of multi-cellular organisms (e.g., some fungi, plants, animals)</p> | <p>SE: 497, 530-531 <i>Lab</i> 500</p> <p>TWE: Quick Demo 531 Tie to Prior Knowledge 530</p> <p>TR Chapter Resources Fast File <i>Vertebrate Animals</i> Critical Thinking Problem Solving-Earth Science 12 Science Inquiry Lab Manual 3-4 Mastering Standardized Test 75-78 Study Guide and Reinforcement 61 Transparency Chapter 18, Section 1 Teaching Transparency Examview Pro Chapter 18</p> |
| 2. Living organisms carry out life processes in order to survive | |
| <p>A. The cell contains a set of structures called organelles that interact to carry out life processes through physical and chemical means</p> <p>a. Compare and contrast the following plant and animal cell structures: cell membrane, nucleus, cell wall, chloroplast and cytoplasm</p> <p>b. Recognize the chloroplast as the cell structure where food is produced in plants and some unicellular organisms (e.g., algae, some protists)</p> | <p>SE: 477-481, 483-484 <i>Lab</i> 482, 488-489</p> <p>TWE: Activity 478 Cultural Diversity 479 Differentiated Instruction 478, 479 Fun Fact 477 Make a Model 478 Science Journal 484 Teacher FYI 477 Use an Analogy 479 Visual Learning 478, 484</p> <p>TR Chapter Resources Fast File <i>Cells-The Units of Life</i> Laboratory Activities Manual 103-105 Mastering Standardized Test 67-69 Probeware Lab Manual 16-23 Study Guide and Reinforcement 55-56 Transparency Chapter 16-all transparencies Examview Pro Chapter 16</p> |
| <p>B. Photosynthesis and cellular respiration are complementary processes necessary to the survival of most organisms on Earth</p> <p>a. Recognize that plants use energy from the sun to produce food and oxygen through the process of photosynthesis</p> | <p>SE: 180, 377, 391, 481, 634</p> <p>TWE: Integrate Physics 634 Tie to Prior Knowledge 633</p> <p>TR Critical Thinking Problem Solving Life Science 8 Laboratory Activities Manual 137-138 Mastering Standardized Test 87-90 Study Guide and Reinforcement 71 Transparency Chapter 21, Section 2 Teaching Transparency Examview Pro Chapter 21</p> |
| Standard 4: Changes in Ecosystems and Interactions of Organisms With Their Environments | |
| 1. Organisms are interdependent with one another and with their environment | |

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| <p>A. All populations living together within communities interact with one another and with their environment in order to survive and maintain a balanced ecosystem</p> <p>a. Identify the biotic factors (populations of organisms) and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition) that make up an ecosystem</p> | <p>SE: 618-625, 627-632 <i>Lab</i> 626, 636-637</p> <p>TWE: Activity 619, 630 Curriculum Connection 619 Differentiated Instruction 621 Inquiry Lab 622 Teacher FYI 620</p> <p>TR: Chapter Resources Fast File <i>Ecology</i> Critical Thinking Problem Solving Earth Science 20 Laboratory Activities Manual 137-138 Mastering Standardized Tests 87-90 Mathematics Skills Activities 26, 32, 46 Probeware Lab Manual 38-44 Reading and Writing Skill Activities 49-50 Study Guide and Reinforcement 69-70 Examview Pro Chapter 21</p> |
| <p>B. Living organisms have the capacity to produce populations of infinite size but environments and resources are finite</p> <p>a. Identify populations within a community that are in competition with one another for resources</p> <p>b. Recognize the factors that affect the number and types of organisms an ecosystem can support (e.g. food availability, abiotic factors such as quantity of light and water, temperature and temperature range, soil composition, disease, competitions from other organisms, predation)</p> <p>c. Predict the effects of changes in the number and types of organisms in an ecosystem on the populations of other organisms within that ecosystem</p> | <p>SE: 627-631, 631 <i>Lab</i> 636-637</p> <p>TWE: Activity 630 Differentiated Instruction 629 Quick Demo 631 Science Journal 629 Teacher FYI 629 Tie to Prior Knowledge 627</p> <p>TR: Chapter Resources Fast File <i>Ecology</i> Critical Thinking Problem Solving Life Science 7 Laboratory Activities Manual 135-136 Mastering Standardized Test 87-90 Mathematic Skill Activity 26 Probeware Lab Manual 38-44 Study Guide and Reinforcement 70 Examview Pro Chapter 21</p> |
| <p>D. The diversity of species within an ecosystem is affected by changes in the environment which can be caused by other organisms or outside processes</p> <p>a. Describe beneficial and harmful activities of organisms, including humans, (e.g., deforestation, overpopulation, water and air pollution, global warming, restoration of natural environments, river bank/coastal stabilization, recycling, channelization, reintroduction of species, depletion of resources) and explain how these activities affect organisms within an ecosystem</p> <p>b. Predict the impact (beneficial or harmful) of a natural environmental change (e.g., forest fire, flood, volcanic eruption, avalanche) on the organisms in an ecosystem</p> <p>c. Describe possible solutions to potentially harmful environmental changes within an ecosystem</p> | <p>SE: 549, 631, 632, 646-648, 656, 658-662, 667 <i>Lab</i> 550-551</p> <p>TWE: Quick Demo 631 Science Journal 656 Visual Learning 647</p> <p>TR: Chapter Resources Fast File <i>Earth's Resources</i> Critical Thinking Problem Solving Life Science 7 Laboratory Activities Manual 135-136 Mastering Standardized Test 87-90, 92-94 Probeware Lab Manual 38-44 Study Guide and Reinforcement 70, 74-75</p> |

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| 2. Matter and energy flow through an ecosystem | |
| <p>A. As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use</p> <p>a. Diagram and describe the transfer of energy in an aquatic food web and a land food web with reference to producers, consumers, decomposers, scavengers, and predator/prey relationships</p> <p>b. Classify populations of unicellular and multi-cellular organisms as producers, consumers, decomposers by the role they serve in the ecosystem</p> | <p>SE: 391-395, 630-631, 633-635</p> <p>TWE: Activity 393, 634 Differentiated Instruction 393 Discussion 630 Fun Fact 630 Make a Model 391, 634 Teacher FYI 394, 633 Tie to Prior Knowledge 633 Visual Learning 634</p> <p>TR: Chapter Resources Fast File <i>Ecology</i> Laboratory Activities Manual 95-97 Mastering Standardized Test 137-138 Study Guide and Reinforcement 69-71 Transparency Chapter 21, Section 2 Examview Pro Chapter 21</p> |
| 3. Genetic variation sorted by the natural selection process explains evidence of biological evolution | |
| <p>A. Evidence for the nature and rates of evolution can be found in anatomical and molecular characteristics of organisms and in the fossil record Scope and Sequence –Ecosystems and Populations</p> <p>a. Identify fossils as evidence that some types of organisms (e.g., dinosaurs, trilobites, mammoths, giant tree ferns) that once lived in the past and have since become extinct have similarities with and differences from organisms today</p> | <p>SE: 500</p> |
| <p>C. Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem</p> <p>a. Relate examples of adaptations (specialized structures or behaviors) within a species to its ability to survive in a specific environment (e.g., hollow bones/flight, hollow hair/insulation, dense root structure/compact soil, seeds/food and protection for plant embryo vs. spores, fins/movement in water)</p> <p>b. Predict how certain adaptations, such as behavior, body structure, or coloration, may offer a survival advantage to an organism in a particular environment</p> | <p>SE: 535-537, 539, 542, 604</p> <p>TWE: Differentiated Instruction 542 Discussion 536 Quick Demo 536 Tie to Prior Knowledge 535</p> <p>TR: Mastering Standardized Test 77, 78 Study Guide and Reinforcement 62-63 Transparency Chapter 18, Section 2 Teaching Transparency Examview Pro Chapter 18</p> |
| Standard 5: Processes and Interactions of the Earth's Systems (Geosphere, Atmosphere and Hydrosphere) | |
| 1. Earth's Systems (Geosphere, Atmosphere and Hydrosphere) have common components and unique structures | |

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| <p>A. The Earth's crust is composed of various materials including soil, minerals, and rocks with characteristic properties</p> <p>a. Describe the components of soil and other factors that influence soil texture, fertility, and resistance to erosion (e.g., plant roots and debris, bacteria, fungi, worms, rodents)</p> | <p>SE: 261-263, 272, 290, 299-305 TWE: Differentiated Instruction 260 Quick Demo 300 Science Journal 273 Teacher FYI 262, 301 Use an Analogy 300 Visual Learning 263</p> <p>TR: Chapter Resources Fast File <i>Rock and Minerals</i> Cultural Diversity 39-40 Mastering Standardized Tests 39-42 Study Guide and Reinforcement 31-33 Examview Pro Chapter 9 Examview Pro Chapter 10</p> |
| <p>B. The hydrosphere is composed of water (a material with unique properties), gases, and other materials</p> <p>a. Recognize the properties of water that make it an essential component of the Earth system (e.g., its ability to act as a solvent, its ability to remain as a liquid at most Earth temperatures)</p> | <p>SE: 56, 75, 345-347 TWE: Activity 346 TR Chapter Resources Fast File <i>The Atmosphere in Motion</i> Mastering Standardized Test 52 Mathematics Skill Activities 49-50 Science Inquiry Lab Manual 5-6 Transparency Chapter 12, Section 2 Teaching Transparency Examview Pro Chapter 12</p> |
| <p>2. Earth's Systems (Geosphere, Atmosphere and Hydrosphere) interact with one another as they undergo change by common processes</p> | |
| <p>A. The Earth's materials and surface features are changed through a variety of external processes</p> <p>a. Make inferences about the formation of sedimentary rocks from their physical properties (e.g., layering and the presence of fossils indicate sedimentation)</p> <p>b. Explain how the formation of sedimentary rocks depends on weathering and erosion</p> <p>c. Describe how weathering agents and erosional processes (i.e., force of water as it freezes or flows, expansion/contraction due to temperature, force of wind, force of plant roots, action of gravity, chemical decomposition) slowly cause surface changes that create and/or change landforms</p> <p>d. Describe how the Earth's surface and surface materials can change abruptly through the activity of floods, rock/mudslides or volcanoes</p> | <p>E: 292-297, 299-305, 316-321, 323-331 <i>Time: Science and History</i> 334</p> <p>TWE: Activity 293, 317 Curriculum Connection 300, 325, 327 Differentiated Instruction 304, 325 Discussion 303, 318 Identifying Misconceptions 325 Make a Model 327, 329 Quick Demo 300 Teacher FYI 301, 318 Use an Analogy 317 Visual Learning 302</p> <p>TR Chapter Resources Fast File <i>Forces Shaping Earth</i> Chapter Resources Fast File <i>Weathering and Erosion</i> Critical Thinking/ Problem Solving-Earth Science 7 Laboratory Activities Manual 63-65, 67-69 Mastering Standardized Test 43-50 Science Inquiry Lab Manual 13-14 Study Guide and Reinforcement 36-38 Transparency Chapter 10, Section 2 Transparency Chapter 11, Section 2 Examview Pro Chapter 10 Examview Pro Chapter 11</p> |

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| <p>B. There are internal processes and sources of energy within the geosphere that cause changes in Earth's crustal plates</p> <p>a. Identify events (Earthquakes and volcanic eruptions) and the landforms created by them on the Earth's surface that occur at different plate boundaries.</p> | <p>SE: 62, 265, 293, 295, 296, 302-303</p> <p>TWE: Activity 293, 302 Differentiated Instruction 295 Discussion 296 Fun Fact 303 Quick Demo Teacher FYI 296 Visual Learning 293, 295, 302</p> <p>TR Chapter Resources Fast File <i>Forces Shaping Earth</i> Critical Thinking Problem Solving Earth Science 10 Laboratory Activities Manual 63-65 Mastering Standardized Test 43-46 Performance Assessment 42 Probeware Lab Manual 52-56 Study Guide and Reinforcement 35, 36 Transparency Chapter 10, Section 1 Teaching Transparency Examview Pro Chapter 10</p> |
| <p>D. Changes in the Earth over time can be inferred through rock and fossil evidence</p> <p>a. Explain the types of fossils and the processes by which they are formed (i.e., replacement, mold and cast, preservation, trace)</p> <p>b. Use fossil evidence to make inferences about changes on Earth and in its environment (i.e., superposition of rock layers, similarities between fossils in different geographical locations, fossils of seashells indicate the area was once underwater)</p> | <p>SE: 269, 271</p> <p>TR Science Inquiry Lab Manual 21</p> |
| <p>3. Human activity is dependent upon and affects Earth's resources and systems</p> | |

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| <p>A. Earth's materials are limited natural resources that are affected by human activity</p> <p>a. Relate the comparative amounts of fresh water and salt water on the Earth to the availability of water as a resource for living organisms and human activity</p> <p>b. Describe the affect of human activities (e.g., landfills, use of fertilizers and herbicides, farming, septic systems) on the quality of water</p> <p>c. Analyze the ways humans affect the erosion and deposition of soil and rock materials (e.g., clearing of land, planting vegetation, paving land, construction of new buildings, building or removal of dams)</p> | <p>SE: 644-653, 655-662, 663-667 <i>Lab</i> 654, 668-669</p> <p>TWE: Activity 649, 657, 665 Cultural Diversity 651, 658 Curriculum Connection 652, 661 Differentiated Instruction 647, 654, 657 Discussion 653 Fun Fact 652, 664 Quick Demo 656 Science Journal 656 Teacher FYI 649, 657 Tie to Prior Knowledge 646, 655 Visual Learning 647, 650, 651, 659</p> <p>TR Chapter Resources Fast File <i>Earth's Resources</i> Critical Thinking Problem Solving Earth Science 10 Cultural Diversity 53-54 Laboratory Activities Manual 139-141 Mastering Standardized Test 91-94 Performance Assessment 53-54 Study Guide and Reinforcement 73-75 Transparency Chapter 22, All transparencies Examview Pro Chapter 22</p> |
| Standard 7: Scientific Inquiry | |
| 1. Science understanding is developed through the use of science process skills and scientific knowledge in combination with scientific investigation, reasoning, and critical thinking | |
| <p>A. Scientific inquiry includes the ability of students to formulate a testable question and explanation and to select appropriate investigative methods in order to obtain evidence relevant to the explanation</p> <p>a. Formulate testable questions and hypotheses</p> <p>b. Recognize the importance of the independent variable, dependent variables, control of constants, and multiple trials to the design of a valid experiment</p> <p>c. Design and conduct a valid experiment</p> <p>d. Evaluate the design of an experiment and make suggestions for reasonable improvements or extensions of an experiment</p> <p>e. Recognize that different kinds of questions suggest different kinds of scientific investigations (e.g., some involve observing and describing objects organisms, or events; some involve collecting specimens; some involve experiments; some involve making observations in nature; some involve discovery of new objects and phenomena; and some involve making models)</p> | <p>SE: 12-18 <i>Lab</i> 60-61, 88-89, 151, 236, 244-245, 332-333, 396-397, 447, 488-489, 520-521, 573, 606-607, 636-637, 668-669</p> <p>TWE: Curriculum Connection 15 Differentiated Instruction 13, 16 Identifying Misconceptions 15, 18 Quick Demo 18 Tie to Prior Knowledge 12 Visual Learning 13</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Home and Community Involvement 15-22, 30, 32-38 Laboratory Activities Manual This objective is met throughout this book Mastering Standardized Test 7-10 Probeware Lab Manual This objective is met throughout this book Science Inquiry Lab Manual This objective is met throughout this book Study Guide and Reinforcement 2 Transparency Chapter 1, Section 2 Teaching Transparency Examview Pro Chapter 1</p> |

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| <p>B. Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations</p> <ol style="list-style-type: none"> Make qualitative observations using the five senses Determine the appropriate tools and techniques to collect data Use a variety of tools and equipment to gather data (e.g., microscopes, thermometers, computers, spring scales, balances, magnets, metric rulers, graduated cylinders, stopwatches) Measure length to the nearest millimeter, mass to the nearest gram, volume to the nearest milliliter, temperature to the nearest degree Celsius, force (weight) to the nearest Newton, time to the nearest second Compare amounts/measurements Judge whether measurements and computation of quantities are reasonable | <p>SE: 12-18 <i>Lab</i> 60-61, 88-89, 151, 236, 244-245, 332-333, 396-397, 447, 488-489, 520-521, 573, 606-607, 636-637, 668-669</p> <p>TWE: Curriculum Connection 15 Differentiated Instruction 13, 16 Identifying Misconceptions 15, 18 Quick Demo 18 Tie to Prior Knowledge 12 Visual Learning 13</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Home and Community Involvement 19 Laboratory Activities Manual This objective is met throughout this book Mastering Standardized Test 7-10 Probeware Lab Manual This objective is met throughout this book Science Inquiry Lab Manual This objective is met throughout this book Study Guide and Reinforcement 2 Transparency Chapter 1, Section 2 Teaching Transparency Examview Pro Chapter 1</p> |
| <p>C. Evidence is used to formulate explanations</p> <ol style="list-style-type: none"> Use quantitative and qualitative data to construct reasonable explanations (conclusions) Use data to describe relationships and make predictions to be tested Recognize the possible effects of errors in observations, measurements, and calculations on the formulation of explanations (conclusions) | <p>SE: 14, 16, 17 <i>Lab</i> 55, 61, 87, 89, 112, 119, 151, 153, 183, 185, 215, 217, 236, 245, 277, 279, 298, 307, 322, 333, 363, 397, 414, 431, 447, 465, 519, 521, 551, 573, 598, 607, 626, 637</p> <p>TWE: Teacher FYI 16</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Home and Community Involvement 15-19 Laboratory Activities Manual This objective is met throughout this book Mastering Standardized Test 7-10 Probeware Lab Manual This objective is met throughout this book Science Inquiry Lab Manual This objective is met throughout this book Study Guide and Reinforcement 2 Transparency Chapter 1, Section 2 Teaching Transparency Examview Pro Chapter 1</p> |

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| <p>D. Scientific inquiry includes evaluation of explanations (hypotheses, laws, theories) in light of scientific principles (understandings)</p> <p>a. Make predictions supported by scientific knowledge/explanations</p> <p>b. Analyze whether evidence (data) supports proposed explanations (hypotheses, laws, theories)</p> <p>c. Evaluate the reasonableness of an explanation (conclusion)</p> | <p>SE: 16, 17, 27-30 <i>Lab</i> 55, 61, 87, 89, 112, 119, 151, 153, 183, 185, 215, 217, 236, 245, 277, 279, 298, 307, 322, 333, 363, 397, 414, 431, 447, 465, 519, 521, 551, 573, 598, 607, 626, 637</p> <p>TWE: Differentiated Instruction 16, 29 Discussion 29</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Home and Community Involvement 21-22, 47-48 Laboratory Activities Manual This objective is met throughout this book Mastering Standardized Test 7-10 Probeware Lab Manual This objective is met throughout this book Science Inquiry Lab Manual This objective is met throughout this book Study Guide and Reinforcement 2 Transparency Chapter 1, Section 2 Teaching Transparency Examview Pro Chapter 1</p> |
| <p>E. The nature of science relies upon communication of results and justification of explanations</p> <p>a. Communicate the procedures and results of investigations and explanations through:</p> <ul style="list-style-type: none"> ⇒ oral presentations ⇒ drawings and maps ⇒ data tables ⇒ graphs (bar, single line, pictographs) ⇒ writings <p>b. Interpret data in order to make and support conclusions</p> | <p>SE: 17 <i>Lab</i> 56-59, 61, 119, 151, 183, 185, 236, 245, 279, 333, 430, 607, 637, 654, 669</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Home and Community Involvement 23, 49 Laboratory Activities Manual This objective is met throughout this book Mastering Standardized Test 7-10 Probeware Lab Manual This objective is met throughout this book Science Inquiry Lab Manual This objective is met throughout this book Study Guide and Reinforcement 2 Transparency Chapter 1, Section 2 Teaching Transparency Examview Pro Chapter 1</p> |
| <p>Standard 8: Impact of Science, Technology and Human Activity</p> | |
| <p>1. The nature of technology is advanced by and can advance science as it seeks to apply scientific knowledge in ways that meet human needs</p> | |

| STANDARDS | PAGE REFERENCES |
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| <p>A. Designed objects are used to do things better or more easily and to do some things that could not otherwise be done at all</p> <p>a. Identify and evaluate the physical, social, economic, and/or environmental problems that may be overcome using science and technology (e.g., the need for alternative fuels, human travel in space, AIDS)</p> <p>b. Explain how technological improvements such as those developed for use in space exploration or by the military have led to the invention of new products that may improve our lives here on Earth (e.g., materials, freeze-dried foods, infrared goggles, Velcro, satellite imagery, robotics)</p> | <p>SE: 415-422, 423-429</p> <p>TWE: Activity 427 Differentiated Instruction 428 Visual Learning 425</p> <p>TR Chapter Resources Fast File <i>Exploring Space</i> Cultural Diversity 51 Mastering Standardized Test 59-62 Study Guide and Reinforcement 48-49 Examview Pro Chapter 14</p> |
| <p>B. Advances in technology often result in improved data collection and an increase in scientific information</p> <p>a. Identify the link between technological developments and the scientific discoveries made possible through their development (e.g., Hubble telescope and stellar evolution, composition and structure of the universe; the electron microscope and cell organelles; sonar and the composition of the Earth; manned and unmanned space missions and space exploration; Doppler radar and weather conditions; MRI and CAT-scans and brain activity)</p> | <p>SE: 415-422, 423-429</p> <p>TWE: Activity 427 Differentiated Instruction 428 Visual Learning 425</p> <p>TR Chapter Resources Fast File <i>Exploring Space</i> Cultural Diversity 51 Mastering Standardized Test 59-62 Study Guide and Reinforcement 48-49 Examview Pro Chapter 14</p> |
| <p>C. Technological solutions to problems often have drawbacks as well as benefits</p> <p>a. Describe how technological solutions to problems can have both benefits and drawbacks (e.g., storm water runoff, fiber optics, windmills, efficient car design, electronic trains without conductors, sonar, robotics, Hubble telescope)</p> | <p>SE: 11, 154, 186, 214, 230, 415-422, 423-429, 463, 577</p> <p>TWE: Activity 427 Content Background 154 Differentiated Instruction 418, 427 Discussion 214, 417, 426 Integrate Physics 186, 230, 577</p> <p>TR Cultural Diversity 41, 51, 53, 65</p> |
| <p>2. A historical perspective of scientific explanations helps to improve understanding of the nature of science and how science knowledge and technology evolve over time</p> | |

| STANDARDS | PAGE REFERENCES |
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| <p>A. People from various cultures, races, and of different gender have contributed to scientific discoveries and the invention of technological innovations</p> <p>a. Describe how the contributions of scientists and inventors have contributed to science, technology and human activity (e.g., George Washington Carver, Thomas Edison, Thomas Jefferson, Isaac Newton, Marie Curie, Galileo, Albert Einstein, Mae Jemison, Edwin Hubble, Charles Darwin, Jonas Salk, Louis Pasteur, Jane Goodall, Tom Akers, John Wesley Powell)</p> | <p>SE: 9, 26, 34, 85, 99-105, 108, 138, 198, 421, 442, 476, 552, 582</p> <p>TWE: Cultural Diversity 18, 75, 145, 149, 166, 176, 238, 275, 292, 358, 376, 479, 510, 620, 651 Curriculum Connection 15, 47, 99, 138, 173, 262, 352, 416, 570 Differentiated Instruction 205 Discussion 34, 90, 120, 218 Fun Fact 108, 204, 205 Integrate History 99 Teacher FYI 9, 108</p> <p>TR Cultural Diversity This objective is met throughout this book</p> |
| <p>B. Scientific theories are developed based on the body of knowledge that exists at any particular time and must be rigorously questioned and tested for validity</p> <p>a. Recognize the difficulty science innovators experienced as they attempted to break through the accepted ideas (hypotheses, laws, theories) of their time to reach conclusions that are now considered to be common knowledge (e.g., Darwin, Copernicus, Newton)</p> <p>b. Recognize that explanations have changed over time as a result of new evidence</p> | <p>SE: 5, 7, 138, 140</p> <p>TWE: Curriculum Connection 138 Discussion 7 Visual Learning 7</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Cultural Diversity This objective is met throughout the book</p> |
| 3. Science is a Human Endeavor | |
| <p>B. Social, political, economic, ethical, and environmental factors strongly influence and are influenced by the direction of progress of science and technology</p> <p>a. Describe ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals in society think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social priorities often influence research priorities through the availability of funding for research)</p> | <p>SE: 26, 34, 108, 120, 138, 218, 253, 280, 405, 411, 415-422, 423-429, 476, 648-649</p> <p>TWE: Activity 427 Content Background 34, 120, 218, 280 Cultural Diversity 416 Curriculum Connection 138, 418 Discussion 411, 424 Teacher FYI 108, 417</p> <p>TR Chapter Resources Fast File <i>The Nature of Science</i> Cultural Diversity This objective is met throughout the book</p> |
| <p>C. Technological solutions to problems often have drawbacks as well as benefits</p> <p>a. Identify and evaluate the environmental costs and benefits of scientific or technological solutions to a given problem (e.g., damming a river for flood control, using pesticides to eliminate mosquitoes)</p> | <p>SE: 11, 47, 154, 186, 214, 230, 417, 423-429, 463, 577</p> <p>TWE: Content Background 154 Curriculum Connection 425 Differentiated Instruction 418 Discussion 214, 417, 414 Integrate Physics 186, 230, 577 Visual Learning 463</p> <p>TR Cultural Diversity 41, 51, 53, 65</p> |

