





Physical Science

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| STANDARDS | PAGE REFERENCES |
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| PHYSICAL SCIENCE | |
| SCIENCE PROCESSES AND INQUIRY | |
| <p>Process Standard 1: Observe and Measure - Observing is the first action taken by the learner to acquire new information about an object or event. Opportunities for observation are developed through the use of a variety of scientific tools. Measurement allows observations to be quantified. The student will accomplish these objectives to meet this process standard.</p> | |
| <p>1. Identify qualitative and quantitative changes given conditions (e.g., temperature, mass, volume, time, position, length) before, during, and after an event.</p> | <p>Student Edition: 38-43, 481-482 <i>Lab</i> 58-59, 484 <i>Launch LAB</i> 157 Teacher Wraparound Edition: SCB 4E-4F; SJ 41</p> |
| <p>2. Use appropriate tools (e.g., metric ruler, graduated cylinder, thermometer, balances, spring scales, stopwatches) when measuring objects and/or events.</p> | <p>Student Edition: 15, 17, 19, 21, 793-794 <i>MiniLAB</i> 19 Teacher Wraparound Edition: CD 17; DI 42; FYI 16; QD 41</p> |

| STANDARDS | PAGE REFERENCES |
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| 3. Use appropriate System International (SI) units (i.e., grams, meters, liters, degrees Celsius, and seconds) and SI prefixes (i.e. micro-, milli-, centi-, and kilo-) when measuring objects and/or events. | Student Edition: 14-19, 827-828 <i>Launch LAB 5</i> <i>National Geographic 20</i> <i>Lab 27, 28-29</i> Teacher Wraparound Edition: AC 17; APM 16; CD 17; DI 16; SJ 15 |
| Process Standard 2: Classify - Classifying establishes order. Objects and events are classified based on similarities, differences, and interrelationships. The student will accomplish these objectives to meet this process standard. | |
| 1. Using observable properties, place an object or event into a classification system. | Student Edition: 450-456, 458-459, 460-463, 641-645, 795 <i>Lab 457</i> <i>MiniLAB 453</i> Teacher Wraparound Edition: IH 9; VL 454 |
| 2. Identify the properties by which a classification system is based. | Student Edition: 448-456, 458-465, 641-645, 795 <i>Lab 457</i> <i>MiniLAB 460</i> Teacher Wraparound Edition: IH 9; TPK 450, 641 |
| Process Standard 3: Experiment - Experimenting is a method of discovering information. It requires making observations and measurements to test ideas. The student will accomplish these objectives to meet this process standard. | |
| 1. Evaluate the design of a physical science investigation. | Student Edition: 7-10 <i>Lab 466-467, 622-623, 716-717</i> Teacher Wraparound Edition: AC 9; FF 8, 10; RC 10; USW 8 |
| 2. Identify the independent variables, dependent variables, and controls in an experiment. | Student Edition: 7-9, 22, 830 Teacher Wraparound Edition: RC 9 |
| 3. Use mathematics to show relationships within a given set of observations. | Student Edition: 22-26, 827, 830-831 <i>Applying Math 24, 40, 102, 128, 487, 493</i> Teacher Wraparound Edition: USW 10 |

| STANDARDS | PAGE REFERENCES |
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| 4. Identify a hypothesis for a given problem in physical science investigations. | Student Edition: 8, 10, 791-792 <i>Lab 344-345, 406-407, 622-623</i> Teacher Wraparound Edition: AC 9; DI 8 |
| 5. Recognize potential hazards and practice safety procedures in all physical science activities. | Student Edition: 797-799 <i>Lab 116-117, 171, 180-181, 214-215, 246-247</i> Teacher Wraparound Edition: RWQ 116, 171, 180, 214, 246 |
| | <p>Process Standard 4: Interpret and Communicate - Interpreting is the process of recognizing patterns in collected data by making inferences, predictions, or conclusions. Communicating is the process of describing, recording, and reporting experimental procedures and results to others. Communication may be oral, written, or mathematical and includes organizing ideas, using appropriate vocabulary, graphs, other visual representations, and mathematical equations. The student will accomplish these objectives to meet this process standard.</p> |
| 1. Select appropriate predictions based on previously observed patterns of evidence.  | Student Edition: 10, 796 <i>MiniLAB 25</i> Teacher Wraparound Edition: AC 9; IES 11; SCB 4E |
| *2. Report data in an appropriate manner.  | Student Edition: 22-26, 813-816 Teacher Wraparound Edition: AC 7; FF 10; USW 10 |
| 3. Interpret data tables, line, bar, trend, and/or circle graphs.  | Student Edition: 22-26, 830-831 <i>MiniLAB 25</i> Teacher Wraparound Edition: DI 23; VL 23 |
| 4. Accept or reject hypotheses when given results of a physical science investigation.  | Student Edition: 8, 791-792 Teacher Wraparound Edition: AC 9; DI 8; FF 8 |

| STANDARDS | PAGE REFERENCES |
|---|---|
| 5. Evaluate experimental data to draw the most logical conclusion.  | Student Edition: 9-10, 17-21, 795-796 <i>MiniLAB 25</i> <i>Lab 28-29, 778-779</i> Teacher Wraparound Edition: AC 9, 17, 18, 20; DI 8, 23; FF 8 |
| *6. Prepare a written report describing the sequence, results, and interpretation of a physical science investigation or event.  | Student Edition: 10, 22-26, 796, 813-816 Teacher Wraparound Edition: AC 197, 510; CC 10; SJ 24, 36 |
| *7. Communicate or defend scientific thinking that resulted in conclusions.  | Student Edition: 796, 816 <i>Lab 90-91, 180-181, 312-313, 496-497, 748-749</i> Teacher Wraparound Edition: SCB 4F |
| 8. Identify and/or create an appropriate graph or chart from collected data, tables, or written description.  | Student Edition: 22-26, 791, 813-815, 830-831 <i>MiniLAB 25</i> Teacher Wraparound Edition: FYI 24; QD 24; SCB 4F |
| <p style="text-align: center;">Process Standard 5: Model - Modeling is the active process of forming a mental or physical representation from data, patterns, or relationships to facilitate understanding and enhance prediction. The student will accomplish these objectives to meet this process standard.</p> | |
| 1. Interpret a model which explains a given set of observations. | Student Edition: 11, 509-511 <i>Lab 148-149, 558-559</i> <i>National Geographic 510</i> Teacher Wraparound Edition: AC 11; IES 11; IP 30 |
| 2. Select predictions based on models. | Student Edition: 11 <i>Lab 148-149, 558-559</i> Teacher Wraparound Edition: AC 11 |
| *3. Compare a given model to the physical world. | Student Edition: 11, 509-511 <i>Lab 148-149, 438-439, 558-559</i> Teacher Wraparound Edition: AC 11; IP 30; IES 11; VL 11 |

| STANDARDS | PAGE REFERENCES |
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| <p>Process Standard 6 Inquiry - Inquiry can be defined as the skills necessary to carry out the process of scientific or systemic thinking. In order for inquiry to occur, students must have the opportunity to ask a question, formulate a procedure, and observe phenomena. The student will accomplish these objectives to meet this process standard.</p> | |
| <p>*1. Formulate a testable hypothesis and design an appropriate experiment relating to the physical world.</p> | <p>Student Edition: 8, 791-792 <i>Lab</i> 28-29, 58-59, 116-117 Teacher Wraparound Edition: AC 9; AIL 214, 716; DI 8; FF 8</p> |
| <p>*2. Design and conduct physical science investigations in which variables are identified and controlled.</p> | <p>Student Edition: 8-10, 792, 830-831 <i>Lab</i> 214-215, 246-247 Teacher Wraparound Edition: AIL 716; USW 8</p> |
| <p>*3. Use a variety of technologies, such as hand tools, measuring instruments, and computers, to collect, analyze, and display data.</p> | <p>Student Edition: 10, 792-796, 813-815, 830-831 <i>Lab</i> 28-29, 406-407 Teacher Wraparound Edition: AIL 716; USW 10</p> |
| <p>*4. Inquiries should lead to the formulation of explanations or models (physical, conceptual, and mathematical). In answering questions, students should engage in discussions (based on scientific knowledge, the use of logic, and evidence from the investigation) and arguments that encourage the revision of their explanations, leading to further inquiry.</p> | <p>Student Edition: 10, 796, 813-816 Teacher Wraparound Edition: AIL 28, 58, 466</p> |
| <p>PHYSICAL SCIENCE</p> | |
| <p>Standard 1: Structure and Properties of Matter - All matter is made up of atoms. Its structure is made up of repeating patterns and has characteristic properties. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:</p> | |
| <p>1. Matter is made up of minute particles called atoms, and atoms are composed of even smaller components (i.e., protons, neutrons, and electrons).</p> | <p>Student Edition: 450, 507-511 <i>National Geographic</i> 451, 510 <i>Lab</i> 457 <i>MiniLAB</i> 509 Teacher Wraparound Edition: DI 507; DLI 511; FYI 508</p> |

| STANDARDS | PAGE REFERENCES |
|--|---|
| <p>2. An element is composed of a single type of atom. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties.</p> | <p>Student Edition: 450, 507, 516-525, 848-849 <i>Lab 457</i></p> <p>Teacher Wraparound Edition: AC 518; FYI 517; SCB 448E</p> |
| <p>3. Matter has characteristic properties, such as boiling points, melting points, and density, which distinguish pure substances and can be used to separate one substance from another.</p> | <p>Student Edition: 450-454, 458-459, 523 <i>Launch LAB 449</i> <i>MiniLAB 453</i></p> <p>Teacher Wraparound Edition: DIN 452; FYI 453; SCB 448E; SJ 452</p> |
| <p>Standard 2: Motion and Forces - The motion of an object can be described by its position, direction of motion, and speed. A change in motion occurs when a net force is applied. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:</p> | |
| <p>1. Objects change their motion only when a net force is applied. Laws of motion are used to determine the effects of forces on the motion of objects.</p> | <p>Student Edition: 52-56, 69-70, 82, 83-84 <i>Lab 57, 58-59</i></p> <p>Teacher Wraparound Edition: IM 53; MM 54; QD 69; VL 53</p> |
| <p>2. Gravitation is a universal force that each mass exerts on any other mass.</p> | <p>Student Edition: 75-80, 82</p> <p>Teacher Wraparound Edition: FF 76; IES 79; TPK 75</p> |
| <p>Standard 3 Interactions of Energy and Matter - Energy, such as potential, kinetic, and field, interacts with matter and is transferred during these interactions. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:</p> | |
| <p>1. All energy can be considered to be either kinetic energy, which is the energy of motion; potential energy, which depends on relative position; or energy contained by a field, such as electromagnetic waves.</p> | <p>Student Edition: 100-104, 107-111, 354-359 <i>Lab 106</i> <i>National Geographic 110</i></p> <p>Teacher Wraparound Edition: CD 104; DI 101; SCB 98-99; SJ 101; USW 102</p> |
| <p>2. Waves, including sounds and seismic waves, waves on water, and light waves, have energy and can transfer energy when they interact with matter (such as used in telescopes, solar power, and telecommunication technology).</p> | <p>Student Edition: 292-293, 295, 303-304, 360-365 <i>National Geographic 294, 397</i> <i>MiniLAB 361</i></p> <p>Teacher Wraparound Edition: AS 295; FYI 292, 355; IHE 363; MM 361; SJ 357, 362</p> |

| STANDARDS | PAGE REFERENCES |
|---|---|
| <p>Standard 4: The Earth System - A system that has changed over time, which includes dynamic changes in the earth's crust, is the Earth system. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:</p> | |
| <p>1. Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations.</p> | <p>Student Edition: 46 (The speed of plate movement is discussed.) Teacher Wraparound Edition: FYI 53</p> |
| <p>2. The solid crust of the earth consists of separate plates that move very slowly pressing against one another in some places and pulling apart in other places (i.e., volcanoes, earthquakes, and mountain building).</p> | <p>Student Edition: 45-46 Teacher Wraparound Edition: AC 45; FYI 53</p> |
| <p>Standard 5: The Universe - The universe is an ever-changing system of matter and energy that exists now, in the past, and in the future. The student will engage in investigations that integrate the process standards and lead to the discovery of the following objectives:</p> | |
| <p>1. The stars differ from each other in size, temperature, and age, but they appear to be made up of the same elements that are found on the earth.</p> | <p>Student Edition: 524 Teacher Wraparound Edition: DI 434; FYI 362</p> |
| <p>2. All stars have a life cycle including birth, development, and death. Fusion reactions in stars release great amounts of energy and matter over millions of years.</p> | <p>Student Edition: 524 (Stars and stages of star development are discussed.)</p> |

NOTE:

Asterisks (*) have been used to identify standards and objectives that must be assessed by the local school district. All other skills may be assessed by the Oklahoma School Testing Program (OSTP).

Book icons (📖) identify Information Literacy skills. Students are best served when these are taught in collaboration and cooperation between the classroom teacher and the library media specialist.