



ARIZONA
Science Standards Grade 8
***Introduction to Physical Science* © 2005**

| OBJECTIVES | PAGE REFERENCES |
|---|--|
| Strand 1: Inquiry Process | |
| Concept 1: Observations, Questions, and Hypotheses | |
| Formulate predictions, questions, or hypotheses based on observations. Locate appropriate resources. | |
| PO 1. <i>Formulate questions based on observations that lead to the development of a hypothesis. (See M08-S2C1-01)</i> | SE: 6-7, 12-13, 73, 77-78 <i>Applying Science</i> 89, 229, 496, 617 <i>Mini LAB</i> 74 <i>Science Skill Handbook</i> 670 |
| PO 2. Use appropriate research information, not limited to a single source, to use in the development of a testable hypothesis. (See R08-S3C2-03 and W-E8-01) | SE: 12-14 <i>Applying Science</i> 167, 390, 651 <i>Design Your Own Lab</i> 208-209 <i>Lab</i> 31, 207 <i>Science and Society</i> 272, 606 <i>Science Skill Handbook</i> 670-673 |
| PO 3. Generate a hypothesis that can be tested. | SE: 14-15 <i>Design Your Own Lab</i> 150-151, 208-209, 330-331, 424-425, 450-451, 480-481, 540-541 <i>Science and History</i> 542 <i>Science Skill Handbook</i> 673 |
| Concept 2: Scientific Testing (Investigating and Modeling) | |
| Design and conduct controlled investigations. | |
| PO 1. <i>Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.</i> | SE: 19-20 <i>Design Your Own Lab</i> 208-209, 540-541 <i>Lab</i> 149, 207, 261, 270-271, 603 <i>Science Skill Handbook</i> 679-681 TWE: D 19 |
| PO 2. Design a controlled investigation to support or reject a hypothesis. | SE: 15, 18 <i>Design Your Own Lab</i> 60-61, 124-125, 208-209, 330-331, 424-425, 450-451, 480-481 <i>Science Skill Handbook</i> 674 |
| PO 3. Conduct a controlled investigation to support or reject a hypothesis. | SE: <i>Design Your Own Lab</i> 60-61, 124-125, 150-151, 208-209, 330-331, 424-425, 450-451, 480-481 <i>Mini LAB</i> 194 <i>Science Skill Handbook</i> 674 |

| OBJECTIVES | PAGE REFERENCES |
|---|---|
| <p>PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).</p> | <p>SE: 52-54 <i>Design Your Own Lab</i> 208-209, 450-451 Lab 55, 355 Launch Lab 41 Mini LAB 44 Science Skill Handbook 675-677</p> <p>TWE: A 43 TPK 42</p> |
| <p>PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs.</p> | <p>SE: 15, 28-29 <i>Design Your Own Lab</i> 124-125, 150-151, 208-209, 450-451, 480-481 Lab 55 Science Skill Handbook 674-675</p> <p>TWE: FF 193</p> |
| <p>Concept 3: Analysis and Conclusions Analyze and interpret data to explain correlations and results; formulate new questions.</p> | |
| <p>PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M08-S2C1-08)</p> | <p>SE: 57 <i>Applying Science</i> 390, 651 <i>Design Your Own Lab</i> 450-451 Lab 604-605 Math Skill Handbook 710 Use the Internet Lab 362-363</p> <p>TWE: LD 57</p> |
| <p>PO 2. Form a logical argument about a correlation between variables or sequence of events (e.g., construct a cause-and-effect chain that explains a sequence of events).</p> | <p>SE: <i>Design Your Own Lab</i> 450-451 Launch Lab 217 National Geographic 278-279 Science and History 152 Science and Society 452 Science Skill Handbook 671-672, 677-678 Use the Internet Lab 362-363</p> |
| <p>PO 3. Interpret data that show a variety of possible relationships between two variables, including:</p> <ul style="list-style-type: none"> • positive relationship • negative relationship • no relationship | <p>SE: 57, 119-120, 227, 286, 644 <i>Applying Science</i> 229, 390 <i>Design Your Own Lab</i> 450-451 Lab 604-605 Math Skill Handbook 710</p> |
| <p>PO 4. Formulate a future investigation based on the data collected.</p> | <p>SE: <i>Design Your Own Lab</i> 124-125, 330-331, 424-425 Lab 180-181, 572-573</p> <p>TWE: AIL 270, 330, 424, 510 DIN 16</p> |
| <p>PO 5. Explain how evidence supports the validity and reliability of a conclusion.</p> | <p>SE: 16, 77 <i>Design Your Own Lab</i> 60-61, 208-209 Lab 32-33, 149, 472, 603 Science Skill Handbook 678</p> <p>TWE: FYI 16</p> |

| OBJECTIVES | PAGE REFERENCES |
|--|--|
| PO 6. Identify the potential investigational error that may occur (e.g., flawed investigational design, inaccurate measurement, computational errors, unethical reporting). | SE: 27-30 <i>Integrate Astronomy</i> 51 TWE: D 15, 28 DIN 165 EA 33, 125, 209, 573 TPK 27 |
| PO 7. Critique scientific reports from periodicals, television, or other media. | SE: 27-30 <i>Applying Science</i> 89, 111 <i>Integrate Astronomy</i> 51 <i>Science and History</i> 152 <i>Science and Society</i> 606 <i>Science Skill Handbook</i> 678 TWE: CU 30 FYI 29 TPK 27 |
| PO 8. Formulate new questions based on the results of a previous investigation. | SE: 12, 16 <i>Design Your Own Lab</i> 124-125, 208-209, 330-331, 450-451 <i>Lab</i> 92-93 <i>Science Skill Handbook</i> 670, 678 TWE: LD 105 |
| Concept 4: Communication Communicate results of investigations. | |
| PO 1. Communicate the results of an investigation. | SE: 15, 17, 57-59 <i>Communicating Your Data</i> 61, 209 <i>Math Skill Handbook</i> 703 <i>Science Skill Handbook</i> 677-678 <i>Technology Skill Handbook</i> 695 TWE: D 15 LD 57 |
| PO 2. Choose an appropriate graphic representation for collected data: <ul style="list-style-type: none"> • line graph • double bar graph • stem and leaf plot • histogram (See M08-S2C1-03) | SE: 57-59 <i>Design Your Own Lab</i> 60-61, 450-451 <i>Lab</i> 115, 444 <i>Math Skill Handbook</i> 710-711 <i>Technology Skill Handbook</i> 695 TWE: LD 57 |
| PO 3. Present analyses and conclusions in clear, concise formats. (See W-E6-PO1) | SE: 16-17 <i>Communicating Your Data</i> 115, 299, 355 <i>Science Skill Handbook</i> 678 TWE: CYD 86, 209, 386, 411, 444 |
| PO 4. Write clear, step-by-step instructions for conducting investigations or operating equipment (without the use of personal pronouns). | SE: <i>Design Your Own Lab</i> 60-61, 124-125, 150-151, 208-209, 300-301, 330-331, 424-425, 450-451, 480-481, 510-511 |

| OBJECTIVES | PAGE REFERENCES |
|--|---|
| PO 5. <i>Communicate the results and conclusion of the investigation.</i> | SE: 16-17 <i>Communicating Your Data</i> 61, 125, 209, 331, 425, 451 <i>Math Skill Handbook</i> 710-711 <i>Science Skill Handbook</i> 678 <i>Technology Skill Handbook</i> 695-696 |
| Strand 2: History and Nature of Science | |
| Concept 1: History of Science as a Human Endeavor | |
| Identify individual, cultural, and technological contributions to scientific knowledge. | |
| PO 1. <i>Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Watson and Crick [scientists], support Strand 4; Rosalind Franklin [scientist], supports Strand 4; Charles Darwin [scientist], supports Strand 4; George Washington Carver [scientist, inventor], supports Strand 4; Joseph Priestley [scientist], supports Strand 5; Sir Francis Bacon [philosopher], supports Strand 5; Isaac Newton [scientist], supports Strand 5).</i> | SE: 9, 73-79 <i>National Geographic</i> 82 <i>Science and History</i> 34 <i>Science and Society</i> 272 TWE: CC 121, 146 FF 119 FYI 82, 118 |
| PO 2. Evaluate the effects of the following major scientific milestones on society: <ul style="list-style-type: none"> • Mendelian Genetics • Newton's Laws | SE: 312-313, 316-321, 323-328, 356-357, 359-361 <i>Science and Society</i> 332 TWE: CC 312 CU 328 D 326 FF 327 For a discussion of Mendelian Genetics, see Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 129, 131, 134 |
| PO 3. Evaluate the impact of a major scientific development occurring within the past decade. | SE: 537-539 <i>Integrate Astronomy</i> 533 <i>Science and Society</i> 606, 662 <i>Use the Internet Lab</i> 660-661 TWE: B 542 D 538, 569 TPK 535 VL 539 |
| PO 4. Evaluate career opportunities related to life and physical sciences. | SE: <i>Integrate Career</i> 13, 43, 78, 148, 229, 264, 352, 448, 654 |

| OBJECTIVES | PAGE REFERENCES |
|--|---|
| Concept 2: Nature of Scientific Knowledge Understand how science is a process for generating knowledge. | |
| <p>PO 1. Apply the following scientific processes to other problem solving or decision making situations:</p> <ul style="list-style-type: none"> • observing • questioning • communicating • comparing • measuring • classifying • predicting • organizing data • inferring • generating hypotheses • identifying variables | SE: 506-507, 600-602 <i>Design Your Own Lab</i> 510-511 TWE: AS 539 CC 558, 572, 644 RT 554 SJ 252, 529 |
| <p>PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.</p> | SE: 73-79, 312-315 <i>Science and History</i> 542 <i>Science and Society</i> 606 TWE: A 84 CC 73 DIN 165 FYI 74 |
| <p>PO 3. Defend the principle that accurate record keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society.</p> | SE: 15, 17, 28-29 <i>Design Your Own Lab</i> 208-209, 480-481 <i>Science Skill Handbook</i> 674-675, 678 TWE: D 15, 29 FF 193 |
| <p>PO 4. Explain why scientific claims may be questionable if based on very small samples of data, biased samples, or samples for which there was no control.</p> | SE: 28-30 <i>Design Your Own Lab</i> 208-209, 480-481 <i>Science Skill Handbook</i> 678 TWE: D 29 |
| Strand 3: Science in Personal and Social Perspectives | |
| Concept 1: Changes in Environments Describe the interactions between human populations, natural hazards, and the environment. | |
| <p>PO 1. Analyze the risk factors associated with natural, human induced, and/or biological hazards, including:</p> <ul style="list-style-type: none"> • waste disposal of industrial chemicals • greenhouse gases | SE: 388, 389, 530 <i>Integrate Environment</i> 656 <i>Integrate Life Science</i> 443 <i>National Geographic</i> 234, 278-279 <i>Science and History</i> 152 <i>Science and Society</i> 606 |
| <p>PO 2. Analyze possible solutions to address the environmental risks associated with chemicals and biological systems.</p> | SE: 443, 530 <i>Use the Internet Lab</i> 396-397 TWE: A 234 FYI 529 ILS 236 UA 530 |

| OBJECTIVES | PAGE REFERENCES |
|---|---|
| Concept 2: Science and Technology in Society Develop viable solutions to a need or problem. | |
| PO 1. Propose viable methods of responding to an identified need or problem. | SE: Applying Science 111, 617 Lab 411, 424-425 Science and History 152 Science and Society 332, 426, 606 Use the Internet Lab 660-661 TWE: NG 234 |
| PO 2. Compare solutions to best address an identified need or problem. | SE: 388-395 Applying Science 89 Science and Society 606 Use the Internet Lab 396-397, 660-661 TWE: NG 234 |
| PO 3. Design and construct a solution to an identified need or problem using simple classroom materials. | SE: Design Your Own Lab 300-301, 424-425, 450-451 Lab 240-241, 270-271, 411, 620, 632-633 Mini LAB 391, 622 |
| PO 4. Compare risks and benefits of the following technological advances: • radiation treatments • genetic engineering (See Strand 4 Concept 2) • airbags (See Strand 5 Concept 2) | SE: 530-531 Science and Society 332 TWE: D 332 IM 531 For a discussion of genetic engineering, see Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 143-145 |
| Strand 4: Life Science | |
| Concept 1: Structure and Function in Living Systems Understand the relationships between structures and functions of organisms. | |
| No performance objectives at this grade level | |
| Concept 2: Reproduction and Heredity Understand the basic principles of heredity. | |
| PO 1. Explain the purposes of cell division: • growth and repair • reproduction | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 98, 102, 103-104, 106 |
| PO 2. Explain the basic principles of heredity using the human examples of: • eye color • widow's peak • blood type | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 137, 138, 151 |
| PO 3. Distinguish between the nature of dominant and recessive traits in humans. | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 139-141 |
| Concept 3: Populations of Organisms in an Ecosystem Analyze the relationships among various organisms and their environment. | |
| No performance objectives at this grade level | |
| Concept 4: Diversity, Adaptation, and Behavior Identify structural and behavioral adaptations. | |
| PO 1. Explain how an organism's behavior allows it to survive in an environment. | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 160 |

| OBJECTIVES | PAGE REFERENCES |
|---|--|
| PO 2. Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment. | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 17 |
| PO 3. Determine characteristics of organisms that could change over several generations. | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 118-119, 141-142, 158-163 |
| PO 4. Compare the symbiotic and competitive relationships in organisms within an ecosystem (e.g., lichen, mistletoe/tree, clownfish/sea anemone, native/non-native species). | See Glencoe's <i>Ecology E</i> © 2005 SE: 22 |
| PO 5. Analyze the following behavioral cycles of organisms: <ul style="list-style-type: none"> • hibernation • migration • dormancy (plants) | See Glencoe's <i>From Bacteria to Plants B</i> © 2005 SE: 112, 137 See Glencoe's <i>Animal Diversity C</i> © 2005 SE: 147, 148 |
| PO 6. Describe the following factors that allow for the survival of living organisms: <ul style="list-style-type: none"> • protective coloration • beak design • seed dispersal • pollination | See Glencoe's <i>Life's Structure and Function A</i> © 2005 SE: 103, 108-109, 110-113, 158, 160 |
| Strand 5: Physical Science | |
| Concept 1: Properties and Changes of Properties in Matter | |
| Understand physical and chemical properties of matter. | |
| PO 1. Identify different kinds of matter based on the following physical properties: <ul style="list-style-type: none"> • states • density • boiling point • melting point • solubility | SE: 109, 112, 134-136, 224-227 <i>Applying Math</i> 121 <i>Lab</i> 86 <i>Reference Handbooks</i> 712-713 TWE: IL 226 QD 135 |
| PO 2. Identify different kinds of matter based on the following chemical properties: <ul style="list-style-type: none"> • reactivity • pH • oxidation (corrosion) | SE: 137-138, 139-142, 236-237 <i>Lab</i> 240-241, 270-271 TWE: AS 138 QD 238 |
| PO 3. Identify the following types of evidence that a chemical reaction has occurred: <ul style="list-style-type: none"> • formation of a precipitate • generation of gas • color change • absorption or release of heat | SE: 190, 192, 196-199 <i>Integrate Life Science</i> 193 <i>National Geographic</i> 191 TWE: FYI 197 QD 193 SJ 196 VL 198 |

| OBJECTIVES | PAGE REFERENCES |
|--|--|
| PO 4. Classify matter in terms of elements, compounds, or mixtures. | SE: 80-85, 87-90, 218-223 <i>Lab 86</i> TWE: A 81 DIN 90 FYI 82, 88 QD 220 TPK 87 |
| PO 5. Classify mixtures as being homogeneous or heterogeneous. | SE: 91, 219-223 <i>Lab 92-93, 231</i> TWE: AIL 92 CC 90 D 221 RT 91 USW 222 |
| PO 6. Explain the systematic organization of the periodic table. | SE: 81, 83-85 <i>Lab 86</i> <i>National Geographic 82</i> TWE: A 84 NG 82 RT 85 UA 81 |
| PO 7. Investigate how the transfer of energy can affect the physical and chemical properties of matter. | SE: 374, 376-378, 463, 520, 524, 527-531 <i>Launch Lab 373</i> TWE: A 376 FYI 464 QD 530 |
| Concept 2: Motion and Forces Understand the relationship between force and motion. | |
| PO 1. Demonstrate velocity as the rate of change of position over time. | SE: 282-287 TWE: CC 286 D 287 IM 284 VL 285 |
| PO 2. Identify the conditions under which an object will continue in its state of motion (Newton's 1 st Law of Motion). | SE: 310-315 <i>Lab 329</i> <i>National Geographic 325</i> TWE: A 312 USW 311 |
| PO 3. Describe how the acceleration of a body is dependent on its mass and the net applied force (Newton's 2 nd Law of Motion). | SE: 316-321 <i>Lab 329</i> <i>National Geographic 325</i> TWE: A 319 AS 322 CC 317 VL 318, 320 |
| PO 4. Describe forces as interactions between bodies (Newton's 3 rd Law of Motion). | SE: 323-324, 326-328 <i>Lab 329</i> <i>National Geographic 325</i> TWE: AS 328 DIN 326 LD 327 |

| OBJECTIVES | PAGE REFERENCES |
|--|--|
| PO 5. Create a graph devised from measurements of moving objects and their interactions, including: <ul style="list-style-type: none"> • position-time graphs • velocity-time graphs | SE: 286-287, 292 <i>Math Skill Handbook</i> 710 TWE: CC 286 CU 287, 292 |
| Concept 3: Transfer of Energy | |
| Understand that energy can be stored and transferred. | |
| No performance objectives at this grade level | |
| Strand 6: Earth and Space Science | |
| Concept 1: Structure of the Earth | |
| Describe the composition and interactions between the structure of the Earth and its atmosphere. | |
| No performance objectives at this grade level | |
| Concept 2: Earth's Processes and Systems | |
| Understand the processes acting on the Earth and their interaction with the earth systems. | |
| No performance objectives at this grade level | |
| Concept 3: Earth in the Solar System | |
| Understand the relationships of the Earth and other objects in the solar system. | |
| No performance objectives at this grade level | |

Codes Used for TWE Pages

| | |
|-----|----------------------------|
| A | Activity |
| AIL | Alternative Inquiry Lab |
| AS | Assessment |
| B | Brainstorm |
| CC | Curriculum Connection |
| CU | Check for Understanding |
| CYD | Communicate Your Data |
| D | Discussion |
| DIN | Differentiated Instruction |
| EA | Error Analysis |
| FF | Fun Fact |
| FYI | Teacher FYI |
| IL | Inquiry Lab |
| ILS | Integrate Life Science |
| IM | Identifying Misconceptions |
| LD | Lab Demonstration |
| NG | National Geographic |
| QD | Quick Demo |
| RT | Reteach |
| SJ | Science Journal |
| TPK | Tie to Prior Knowledge |
| UA | Use an Analogy |
| USW | Use Science Words |
| VL | Visual Learning |