

# SCIENCE SAURUS

## Grades 4-8

correlated to

# Arizona

# Academic Content Standards Science Standard Articulated by Grade Level

**Great Source®**

EDUCATION GROUP



A Houghton Mifflin Company

**YOUR ARIZONA GREAT SOURCE REPRESENTATIVE**

**SUSAN VERMILYEA**  
800-289-4490, option 4  
[Susan\\_Vermilyea@hmco.com](mailto:Susan_Vermilyea@hmco.com)



**ScienceSaurus © 2005**  
**correlated to**  
**Arizona Academic Content Standards**  
**Science Standard Articulated by Grade Level**  
**Grade 4**

**Strand 1:**  
**Inquiry Process**

Inquiry Process establishes the basis for students' learning in science. Students use scientific processes: questioning, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically about relationships between evidence and explanations, and communicating results.

**Concept 1: Observations, Questions, and Hypotheses**

Observe, ask questions, and make predictions.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Differentiate inferences from observations.	<b>Handbook:</b> 10-19, 21-27, 60-73
PO 2. Formulate a relevant question through observations that can be tested by an investigation. (See M04-S2C1-01)	<b>Handbook:</b> 2, 4, 5, 6, 11, 20
PO 3. Formulate predictions in the realm of science based on observed cause and effect relationships.	<b>Handbook:</b> 19
PO 4. Locate information (e.g., book, article, website) related to an investigation. (See W04-S3C6-01 and R04-S3C1-05)	<b>Handbook:</b> 7, 23, 389-393

**Concept 2: Scientific Testing (Investigating and Modeling)**

Participate in planning and conducting investigations, and recording data.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
<i>PO 1. Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.</i>	<b>Handbook:</b> 28-37, 38-59

<b>Performance Objectives, Grade 4</b>	<b>ScienceSaurus, Grades 4-5</b>
PO 2. Plan a simple investigation that identifies the variables to be controlled.	<b>Handbook:</b> 2-27
PO 3. Conduct controlled investigations (e.g., related to erosion, plant life cycles, weather, magnetism) in life, physical, and Earth and space sciences.	<b>Handbook:</b> 7-27, 38-50, 86, 246, 304-305
PO 4. Measure using appropriate tools (e.g., ruler, scale, balance) and units of measure (i.e., metric, U.S. customary). (See M04-S4C4-03 and M04-S4C4-07)	<b>Handbook:</b> 7-19, 21-25, 31, 38-55, 60-73, 374, 408-410
PO 5. Record data in an organized and appropriate format (e.g., t-chart, table, list, written log). (See W04-S3C2-01 and W04-S3C3-01)	<b>Handbook:</b> 4, 12, 13, 14, 60-63

### **C o n c e p t 3 : A n a l y s i s a n d C o n c l u s i o n s**

**Organize and analyze data; compare to predictions.**

<b>Performance Objectives, Grade 4</b>	<b>ScienceSaurus, Grades 4-5</b>
PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M04-S2C1-03)	<b>Handbook:</b> 16, 17, 19, 23-25
PO 2. Formulate conclusions based upon identified trends in data. (See M04-S2C1-03)	<b>Handbook:</b> 12-19, 21-25, 27
PO 3. Determine that data collected is consistent with the formulated question.	<b>Handbook:</b> 17, 21-27
PO 4. Determine whether the data supports the prediction for an investigation.	<b>Handbook:</b> 19, 21-27
PO 5. Develop new questions and predictions based upon the data collected in the investigation.	<b>Handbook:</b> 20, 22-25

### **C o n c e p t 4 : C o m m u n i c a t i o n**

**Communicate results of investigations.**

<b>Performance Objectives, Grade 4</b>	<b>ScienceSaurus, Grades 4-5</b>
PO 1. Communicate verbally or in writing the results of an inquiry. (See W04-S3C3-01)	<b>Handbook:</b> 21-27

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 2. Choose an appropriate graphic representation for collected data: <ul style="list-style-type: none"> <li>• bar graph</li> <li>• line graph</li> <li>• Venn diagram</li> <li>• model</li> </ul> (See M04-S2C1-02)	<b>Handbook:</b> 16, 24, 66-73
PO 3. Communicate with other groups or individuals to compare the results of a common investigation.	<b>Handbook:</b> 4, 11, 13, 18-27

**Strand 2:  
History and Nature of Science**

Scientific investigation grows from the contributions of many people. History and Nature of Science emphasizes the importance of the inclusion of historical perspectives and the advances that each new development brings to technology and human knowledge. This strand focuses on the human aspects of science and the role that scientists play in the development of various cultures.

**Concept 1: History of Science as a Human Endeavor**

**Identify individual and cultural contributions to scientific knowledge.**

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
<i>PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Margaret Mead [anthropologist], supports Strand 4; Nikola Tesla [engineer, inventor] supports Strand 5; Michael Faraday [scientist], supports Strand 5; Benjamin Franklin [scientist], supports Strand 5).</i>	<b>Handbook:</b> 367, 413-435
<i>PO 2. Describe science-related career opportunities.</i>	<b>Handbook:</b> 357, 358, 359, 361, 367

**Concept 2: Nature of Scientific Knowledge**

**Understand how science is a process for generating knowledge.**

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Explain the role of experimentation in scientific inquiry.	<b>Handbook:</b> 2-27
PO 2. Describe the interaction of components in a system (e.g., flashlight, radio).	<b>Handbook:</b> 300-302

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 3. Explain various ways scientists generate ideas (e.g., observation, experiment, collaboration, theoretical and mathematical models).	<b>Handbook:</b> 2-27, 380-385

## Strand 3: Science in Personal and Social Perspectives

Science in Personal and Social Perspectives emphasizes developing the ability to design a solution to a problem, to understand the relationship between science and technology, and the ways people are involved in both. Students understand the impact of science and technology on human activity and the environment. This strand affords students the opportunity to understand their place in the world – as living creatures, consumers, decision makers, problem solvers, managers, and planners.

### Concept 1: Changes in Environments

Describe the interactions between human populations, natural hazards, and the environment.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Describe how natural events and human activities have positive and negative impacts on environments (e.g., fire, floods, pollution, dams).	<b>Handbook:</b> 178-179, 180-181, 182-183, 334, 335, 336-337, 338, 339-340, 341, 342, 343
PO 2. Evaluate the consequences of environmental occurrences that happen either rapidly (e.g., fire, flood, tornado) or over a long period of time (e.g., drought, melting ice caps, the greenhouse effect, erosion).	<b>Handbook:</b> 170, 171, 172, 173, 178-179, 180-181, 182-183, 213, 214, 215

### Concept 2: Science and Technology in Society

Understand the impact of technology.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Describe how science and technology (e.g., computers, air conditioning, medicine) have improved the lives of many people.	<b>Handbook:</b> 356, 357, 360, 361, 362, 367, 369
PO 2. Describe benefits (e.g., easy communications, rapid transportation) and risks (e.g., pollution, destruction of natural resources) related to the use of technology.	<b>Handbook:</b> 320, 323, 334, 335, 336-337, 338, 339-340, 341, 342, 343, 356-357, 360, 362
PO 3. <i>Design and construct a technological solution to a common problem or need using common materials.</i>	<b>Handbook:</b> 356

## Strand 4: Life Science

Life Science expands students' biological understanding of life by focusing on the characteristics of living things, the diversity of life, and how organisms and populations change over time in terms of biological adaptation and genetics. This understanding includes the relationship of structures to their functions and life cycles, interrelationships of matter and energy in living organisms, and the interactions of living organisms with their environment.

### Concept 1: Characteristics of Organisms

Understand that basic structures in plants and animals serve a function.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Compare structures in plants (e.g., roots, stems, leaves, flowers) and animals (e.g., muscles, bones, nerves) that serve different functions in growth and survival.	<b>Handbook:</b> 80, 81, 86, 87, 96, 97, 104-105, 106, 107, 108
PO 2. Classify animals by identifiable group characteristics: <ul style="list-style-type: none"> <li>• vertebrates – mammals, birds, fish, reptiles, amphibians</li> <li>• invertebrates – insects, arachnids</li> </ul>	<b>Handbook:</b> 146, 147, 148, 149, 150-155

### Concept 3: Organisms and Environments

Understand the relationships among various organisms and their environment.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Describe ways various resources (e.g., air, water, plants, animals, soil) are utilized to meet the needs of a population.	<b>Handbook:</b> 130-131
PO 2. Differentiate renewable resources from nonrenewable resources.	<b>Handbook:</b> 320, 322-323, 324, 325, 326, 327, 328, 332-333, 345
PO 3. Analyze the effect that limited resources (e.g., natural gas, minerals) may have on an environment.	<b>Handbook:</b> 319, 320, 333
PO 4. Describe ways in which resources can be conserved (e.g., by reducing, reusing, recycling, finding substitutes).	<b>Handbook:</b> 344, 345, 346-347, 348, 349

## C o n c e p t 4 : D i v e r s i t y , A d a p t a t i o n , a n d B e h a v i o r

Identify plant and animal adaptations.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Recognize that successful characteristics of populations are inherited traits that are favorable in a particular environment.	<b>Handbook:</b> 93
PO 2. Give examples of adaptations that allow plants and animals to survive. <ul style="list-style-type: none"> <li>• camouflage – horned lizards, coyotes</li> <li>• mimicry – Monarch and Viceroy butterflies</li> <li>• physical – cactus spines</li> <li>• mutualism – species of acacia that harbor ants, which repel other harmful insects</li> </ul>	<b>Handbook:</b> 77, 79, 85, 86, 88-89, 92-93, 96, 127, 135, 141, 142, 143, 149, 151, 152, 154

## S t r a n d 5 : P h y s i c a l S c i e n c e

Physical Science affords students the opportunity to increase their understanding of the characteristics of objects and materials they encounter daily. Students gain an understanding of the nature of matter and energy, including their forms, the changes they undergo, and their interactions.

By studying objects and the forces that act upon them, students develop an understanding of the fundamental laws of motion, knowledge of the various ways energy is stored in a system, and the processes by which energy is transferred between systems and surroundings.

## C o n c e p t 3 : E n e r g y a n d M a g n e t i s m

Investigate different forms of energy.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Demonstrate that electricity flowing in circuits can produce light, heat, sound, and magnetic effects.	<b>Handbook:</b> 300
PO 2. Construct series and parallel electric circuits.	<b>Handbook:</b> 302, 303
PO 3. Explain the purpose of conductors and insulators in various practical applications.	<b>Handbook:</b> 299
PO 4. Investigate the characteristics of magnets (e.g., opposite poles attract, like poles repel, the force between two magnet poles depends on the distance between them).	<b>Handbook:</b> 304
PO 5. State cause and effect relationships between magnets and circuitry.	<b>Handbook:</b> 306, 307

## Strand 6: Earth and Space Science

Earth and Space Science provides the foundation for students to develop an understanding of the Earth, its history, composition, and formative processes, and an understanding of the solar system and the universe. Students study the regularities of the interrelated systems of the natural world. In doing so, they develop understandings of the basic laws, theories, and models that explain the world (NSES, 1995). By studying the Earth from both a historical and current time frame, students can make informed decisions about issues affecting the planet on which they live.

### Concept 2: Earth's Processes and Systems

Understand the processes acting on the Earth and their interaction with the Earth systems.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Identify the Earth processes that cause erosion.	<b>Handbook:</b> 165, 172-173
PO 2. Describe how currents and wind cause erosion and land changes.	<b>Handbook:</b> 172-173
PO 3. Describe the role that water plays in the following processes that alter the Earth's surface features: <ul style="list-style-type: none"> <li>• erosion</li> <li>• deposition</li> <li>• weathering</li> </ul>	<b>Handbook:</b> 168, 170-173
PO 4. Compare rapid and slow processes that change the Earth's surface, including: <ul style="list-style-type: none"> <li>• rapid – earthquakes, volcanoes, floods</li> <li>• slow – wind, weathering</li> </ul>	<b>Handbook:</b> 170-183
PO 5. Identify the Earth events that cause changes in atmospheric conditions (e.g., volcanic eruptions, forest fires).	<b>Handbook:</b> 178-179
PO 6. Analyze evidence that indicates life and environmental conditions have changed (e.g., tree rings, fish fossils in desert regions, ice cores).	<b>Handbook:</b> 170, 177, 185, 186

### Concept 3: Changes in the Earth and Sky

Understand characteristics of weather conditions and climate.

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 1. Identify the sources of water within an environment (e.g., ground water, surface water, atmospheric water, glaciers).	<b>Handbook:</b> 187-192

Performance Objectives, Grade 4	ScienceSaurus, Grades 4-5
PO 2. Describe the distribution of water on the Earth's surface.	<b>Handbook:</b> 187, 193
PO 3. Differentiate between weather and climate as they relate to the southwestern United States.	<b>Handbook:</b> 216
PO 4. Measure changes in weather (e.g., precipitation, wind speed, barometric pressure).	<b>Handbook:</b> 200-207, 208-211
PO 5. Interpret the symbols on a weather map or chart to identify the following: <ul style="list-style-type: none"> <li>• temperatures</li> <li>• fronts</li> <li>• precipitation</li> </ul>	<b>Handbook:</b> 208
PO 6. Compare weather conditions in various locations (e.g., regions of Arizona, various U.S. cities, coastal vs. interior geographical regions).	<b>Handbook:</b> 210-211, 213

**ScienceSaurus © 2005**  
 correlated to  
**Arizona Academic Content Standards**  
**Science Standard Articulated by Grade Level**  
**Grade 5**

**Strand 1:**  
**Inquiry Process**

**Inquiry Process** establishes the basis for students' learning in science. Students use scientific processes: questioning, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically about relationships between evidence and explanations, and communicating results.

**Concept 1: Observations, Questions, and Hypotheses**

**Formulate predictions, questions, or hypotheses based on observations.**  
**Locate appropriate resources.**

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
<i>PO 1. Formulate a relevant question through observations that can be tested by an investigation. (See M05-S2C1-01)</i>	<b>Handbook:</b> 2, 4, 5, 6, 11, 20
<i>PO 2. Formulate predictions in the realm of science based on observed cause and effect relationships.</i>	<b>Handbook:</b> 19
<i>PO 3. Locate information (e.g., book, article, website) related to an investigation. (See W05-S3C6-01 and R05-S3C1-05)</i>	<b>Handbook:</b> 7, 23, 389-393

**Concept 2: Scientific Testing (Investigating and Modeling)**

**Design and conduct controlled investigations.**

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
<i>PO 1. Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.</i>	<b>Handbook:</b> 28-37, 38-59

<b>Performance Objectives, Grade 5</b>	<b>ScienceSaurus, Grades 4-5</b>
<i>PO 2. Plan a simple investigation that identifies the variables to be controlled.</i>	<b>Handbook:</b> 2-27
<b>PO 3.</b> Conduct simple investigations (e.g., related to forces and motion, Earth processes) based on student-developed questions in life, physical, and Earth and space sciences.	<b>Handbook:</b> 7-27, 38-50, 174, 225, 275, 277, 278
<i>PO 4. Measure using appropriate tools (e.g., ruler, scale, balance) and units of measure (i.e., metric, U.S. customary). (See M05-S4C4-01)</i>	<b>Handbook:</b> 7-19, 21-25, 31, 38-55, 60-73, 374, 408-410
<i>PO 5. Record data in an organized and appropriate format (e.g., t-chart, table, list, written log). (See W05-S3C2-01 and W05-S3C3-01)</i>	<b>Handbook:</b> 4, 12, 13, 14, 60-63

### **C o n c e p t 3 : A n a l y s i s a n d C o n c l u s i o n s**

**Analyze and interpret data to explain correlations and results; formulate new questions.**

<b>Performance Objectives, Grade 5</b>	<b>ScienceSaurus, Grades 4-5</b>
<b>PO 1.</b> Analyze data obtained in a scientific investigation to identify trends and form conclusions. (See M05-S2C1-03)	<b>Handbook:</b> 16, 17, 19, 23-25
<b>PO 2.</b> Analyze whether the data is consistent with the proposed explanation that motivated the investigation.	<b>Handbook:</b> 17, 21-27
<b>PO 3.</b> Evaluate the reasonableness of the outcome of an investigation.	<b>Handbook:</b> 5, 17, 21-27
<b>PO 4.</b> Develop new investigations and predictions based on questions that arise from the findings of an investigation.	<b>Handbook:</b> 20, 22-25
<b>PO 5.</b> Identify possible relationships between variables in simple investigations (e.g., time and distance; incline and mass of object).	<b>Handbook:</b> 8, 15

## C o n c e p t 4 : C o m m u n i c a t i o n

Communicate results of investigations.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
<p><i>PO 1. Communicate verbally or in writing the results of an inquiry. (See W05-S3C3-01)</i></p>	<p><b>Handbook:</b> 21-27</p>
<p><i>PO 2. Choose an appropriate graphic representation for collected data:</i></p> <ul style="list-style-type: none"> <li>• <i>bar graph</i></li> <li>• <i>line graph</i></li> <li>• <i>Venn diagram</i></li> <li>• <i>model</i></li> </ul> <p><i>(See M05-S2C1-02)</i></p>	<p><b>Handbook:</b> 16, 24, 66-73</p>
<p><i>PO 3. Communicate with other groups or individuals to compare the results of a common investigation.</i></p>	<p><b>Handbook:</b> 4, 11, 18-27</p>

## S t r a n d 2 :

### H i s t o r y a n d N a t u r e o f S c i e n c e

Scientific investigation grows from the contributions of many people. History and Nature of Science emphasizes the importance of the inclusion of historical perspectives and the advances that each new development brings to technology and human knowledge. This strand focuses on the human aspects of science and the role that scientists play in the development of various cultures.

### C o n c e p t 1 : H i s t o r y o f S c i e n c e a s a H u m a n E n d e a v o r

Identify individual, cultural, and technological contributions to scientific knowledge.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
<p><i>PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Percy Lavon Julian [scientist], supports Strand 4; Niels Bohr [scientist], supports Strand 5; Edwin Hubble [scientist], supports Strand 6).</i></p>	<p><b>Handbook:</b> 367, 413-435</p>

## Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 1. Provide examples that support the premise that science is an ongoing process that changes in response to new information and discoveries (e.g., space exploration, medical advances).	<b>Handbook:</b> 359, 361, 367, 369
PO 2. Explain the cycle by which new scientific knowledge generates new scientific inquiry.	<b>Handbook:</b> 20
PO 3. Describe how scientific knowledge is subject to modification and/or change as new information/technology challenges prevailing theories.	<b>Handbook:</b> 367, 369
PO 4. Compare collaborative approaches that scientists use for investigations (e.g., teams, individual with peer review).	<b>Handbook:</b> 4, 20, 21, 367, 369
PO 5. Describe qualities of the scientists' habits of mind (e.g., openness, skepticism, integrity, tolerance).	<b>Handbook:</b> 357, 368

## Strand 3:

### Science in Personal and Social Perspectives

Science in Personal and Social Perspectives emphasizes developing the ability to design a solution to a problem, to understand the relationship between science and technology, and the ways people are involved in both. Students understand the impact of science and technology on human activity and the environment. This strand affords students the opportunity to understand their place in the world – as living creatures, consumers, decision makers, problem solvers, managers, and planners.

## Concept 1: Changes in Environments

Describe the interactions between human populations, natural hazards, and the environment.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 1. Explain the impacts of natural hazards on habitats (e.g., global warming, floods, asteroid or large meteor impacts).	<b>Handbook:</b> 182-183, 340
PO 2. Propose a solution, resource, or product that addresses a specific human, animal, or habitat need.	<b>Handbook:</b> 324, 325, 326, 327, 328, 332-333, 338, 345, 346-347, 348, 349, 356

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 3. Evaluate the possible strengths and weaknesses of a proposed solution to a specific problem relevant to human, animal, or habitat needs.	<b>Handbook:</b> 325, 326, 328, 336-337, 338

**Concept 2: Science and Technology in Society**  
**Develop viable solutions to a need or problem.**

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 1. Describe the relationship between science and technology.	<b>Handbook:</b> 357, 359, 361
PO 2. Explain how scientific knowledge, skills, and technological capabilities are integral to a variety of careers.	<b>Handbook:</b> 357, 358, 359, 361, 362, 424-435
PO 3. <i>Design and construct a technological solution to a common problem or need using common materials.</i>	<b>Handbook:</b> 356

**Strand 4:**  
**Life Science**

Life Science expands students' biological understanding of life by focusing on the characteristics of living things, the diversity of life, and how organisms and populations change over time in terms of biological adaptation and genetics. This understanding includes the relationship of structures to their functions and life cycles, interrelationships of matter and energy in living organisms, and the interactions of living organisms with their environment.

**Concept 1: Structure and Function in Living Systems**

Understand the relationships between structures and functions of organisms.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 1. Identify the functions and parts of the skeletal system: <ul style="list-style-type: none"> <li>• protection – rib cage, cranium</li> <li>• support – vertebrae</li> <li>• movement – pelvis, femur, hip</li> </ul>	<b>Handbook:</b> 111, 113, 115
PO 2. Identify the following types of muscles: <ul style="list-style-type: none"> <li>• cardiac – heart</li> <li>• smooth – stomach</li> <li>• skeletal – biceps</li> </ul>	<b>Handbook:</b> 111, 114, 115, 117

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 3. Identify the functions and parts of the nervous system: <ul style="list-style-type: none"> <li>• control center – brain</li> <li>• relay mechanism – spinal cord</li> <li>• transport messages – nerves</li> </ul>	<b>Handbook:</b> 111, 124, 125

## Strand 5: Physical Science

Physical Science affords students the opportunity to increase their understanding of the characteristics of objects and materials they encounter daily. Students gain an understanding of the nature of matter and energy, including their forms, the changes they undergo, and their interactions.

By studying objects and the forces that act upon them, students develop an understanding of the fundamental laws of motion, knowledge of the various ways energy is stored in a system, and the processes by which energy is transferred between systems and surroundings.

### Concept 1: Properties and Changes of Properties of Matter

Understand physical and chemical properties of matter.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 1. Identify that matter is made of smaller units called: <ul style="list-style-type: none"> <li>• molecules (e.g., H<sub>2</sub>O, CO<sub>2</sub>)</li> <li>• atoms (e.g., H, N, Na)</li> </ul>	<b>Handbook:</b> 248-249, 250-251, 254-255
PO 2. Distinguish between mixtures and compounds.	<b>Handbook:</b> 254-255, 256-257, 258, 259
PO 3. Describe changes of matter: <ul style="list-style-type: none"> <li>• physical – cutting wood, ripping paper, freezing water</li> <li>• chemical – burning of wood, rusting of iron, milk turning sour</li> </ul>	<b>Handbook:</b> 260, 261-265, 266-267

### Concept 2: Motion and Forces

Understand the relationship between force and motion.

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 1. Describe the following forces: <ul style="list-style-type: none"> <li>• gravity</li> <li>• friction</li> </ul>	<b>Handbook:</b> 270-271, 274
PO 2. Describe the various effects forces can have on an object (e.g., cause motion, halt motion, change direction of motion, cause deformation).	<b>Handbook:</b> 268, 269, 270-274

<b>Performance Objectives, Grade 5</b>	<b>ScienceSaurus, Grades 4-5</b>
PO 3. Examine forces and motion through investigations using simple machines (e.g., wedge, plane, wheel and axle, pulley, lever).	<b>Handbook:</b> 280-283
PO 4. Demonstrate effects of variables on an object's motion (e.g., incline angle, friction, applied forces).	<b>Handbook:</b> 280-281

## **Strand 6: Earth and Space Science**

**Earth and Space Science provides the foundation for students to develop an understanding of the Earth, its history, composition, and formative processes, and an understanding of the solar system and the universe. Students study the regularities of the interrelated systems of the natural world. In doing so, they develop understandings of the basic laws, theories, and models that explain the world (NSES, 1995). By studying the Earth from both a historical and current time frame, students can make informed decisions about issues affecting the planet on which they live.**

### **Concept 2: Earth's Processes and Systems**

**Understand the processes acting on the Earth and their interaction with the Earth systems.**

<b>Performance Objectives, Grade 5</b>	<b>ScienceSaurus, Grades 4-5</b>
PO 1. Describe how the Moon's appearance changes during a four-week lunar cycle.	<b>Handbook:</b> 23, 222-223
PO 2. Describe how Earth's rotation results in day and night at any particular location.	<b>Handbook:</b> 218-219
PO 3. Distinguish between revolution and rotation.	<b>Handbook:</b> 218-219, 220-221
PO 4. Describe the role of gravity as an attractive force between celestial objects.	<b>Handbook:</b> 226, 227, 270

### **Concept 3: Earth in the Solar System**

**Understand the relationships of the Earth and other objects in the solar system.**

<b>Performance Objectives, Grade 5</b>	<b>ScienceSaurus, Grades 4-5</b>
PO 1. Identify the known planets of the solar system.	<b>Handbook:</b> 228-233
PO 2. Describe the distinguishing characteristics of the known planets in the solar system.	<b>Handbook:</b> 198, 199, 225, 229-233

Performance Objectives, Grade 5	ScienceSaurus, Grades 4-5
PO 3. Describe various objects in the sky (e.g., asteroids, comets, stars, meteors/shooting stars).	<b>Handbook:</b> 230, 233, 234, 235, 236-237
PO 4. Describe the change in position and motion of the following objects in the sky over time: <ul style="list-style-type: none"> <li>• real motion – Moon, planets</li> <li>• apparent motion (due to the motion of the Earth) – Sun, Moon, stars</li> </ul>	<b>Handbook:</b> 218, 228
PO 5. Explain the apparent motion of the Sun and stars.	<b>Handbook:</b> 218
PO 6. Describe efforts to explore space (e.g., Apollo missions, space shuttles, Hubble space telescope, space probes). (See Strand 2)	<b>Handbook:</b> 225, 227, 239, 359

**ScienceSaurus © 2006**  
 correlated to  
**Arizona Academic Content Standards**  
**Science Standard Articulated by Grade Level**  
**Grade 6**

**S t r a n d 1 :**  
**I n q u i r y P r o c e s s**

**Inquiry Process establishes the basis for students' learning in science. Students use scientific processes: questioning, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically about relationships between evidence and explanations, and communicating results.**

**C o n c e p t 1 : O b s e r v a t i o n s , Q u e s t i o n s ,**  
**a n d H y p o t h e s e s**

**Formulate predictions, questions, or hypotheses based on observations.**  
**Locate appropriate resources.**

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Differentiate among a question, hypothesis, and prediction.	<b>Handbook:</b> 002, 003, 004, 006, 017, 018, 414-416
PO 2. Formulate questions based on observations that lead to the development of a hypothesis. (See M06-S2C1-01)	<b>Handbook:</b> 004, 007, 016, 017, 018, 414-416
PO 3. Locate research information, not limited to a single source, for use in the design of a controlled investigation. (See W06-S3C6-01, R06-S3C1-06, and R06-S3C2-03)	<b>Handbook:</b> 005, 017, 420-426

**C o n c e p t 2 : S c i e n t i f i c T e s t i n g**  
**( I n v e s t i g a t i n g a n d M o d e l i n g )**

**Design and conduct controlled investigations.**

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. <i>Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.</i>	<b>Handbook:</b> 020-072, 436

<b>Performance Objectives, Grade 6</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 2. Design an investigation to test individual variables using scientific processes.	<b>Handbook:</b> 003-019, 411-413
PO 3. Conduct a controlled investigation using scientific processes.	<b>Handbook:</b> 003-019
PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers). (See M06-S4C4-02)	<b>Handbook:</b> 009, 047, 049, 050, 053-072
PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W06-S3C2-01 and W06-S3C3-01)	<b>Handbook:</b> 010, 014-015, 414-416

### **C o n c e p t 3 : A n a l y s i s a n d C o n c l u s i o n s**

**Analyze and interpret data to explain correlations and results; formulate new questions.**

<b>Performance Objectives, Grade 6</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M06-S2C1-03)	<b>Handbook:</b> 002, 011-015, 017-019, 368, 409
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).	<b>Handbook:</b> 011-015, 018, 385-401, 402-409
PO 3. Evaluate the observations and data reported by others.	<b>Handbook:</b> 011-015, 017, 018, 368, 409, 418, 424
PO 4. Interpret simple tables and graphs produced by others.	<b>Handbook:</b> 010, 012, 015, 385-400
PO 5. Analyze the results from previous and/or similar investigations to verify the results of the current investigation.	<b>Handbook:</b> 005
PO 6. Formulate new questions based on the results of a completed investigation.	<b>Handbook:</b> 016, 017, 414-416

## C o n c e p t 4 : C o m m u n i c a t i o n

Communicate results of investigations.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
<p>PO 1. Choose an appropriate graphic representation for collected data:</p> <ul style="list-style-type: none"> <li>• line graph</li> <li>• double bar graph</li> <li>• stem and leaf plot</li> <li>• histogram (See M06-S2C1-02)</li> </ul>	<b>Handbook:</b> 012, 015, 392, 394, 395
<p>PO 2. Display data collected from a controlled investigation. (See M06-S2C1-02)</p>	<b>Handbook:</b> 010, 012, 015, 385-400
<p>PO 3. Communicate the results of an investigation with appropriate use of qualitative and quantitative information. (See W06-S3C2-01)</p>	<b>Handbook:</b> 002, 014, 015, 017, 019, 386-388
<p>PO 4. Create a list of instructions that others can follow in carrying out a procedure (without the use of personal pronouns). (See W06-S3C3-01)</p>	<b>Handbook:</b> 002, 015, 017
<p>PO 5. Communicate the results and conclusion of the investigation. (See W06-S3C6-02)</p>	<b>Handbook:</b> 002, 014, 015, 017, 019, 386-388

## S t r a n d 2 :

### H i s t o r y a n d N a t u r e o f S c i e n c e

Scientific investigation grows from the contributions of many people. History and Nature of Science emphasizes the importance of the inclusion of historical perspectives and the advances that each new development brings to technology and human knowledge. This strand focuses on the human aspects of science and the role that scientists play in the development of various cultures.

## C o n c e p t 1 : H i s t o r y o f S c i e n c e a s a H u m a n E n d e a v o r

Identify individual, cultural, and technological contributions to scientific knowledge.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
<p><i>PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Jacques Cousteau [inventor, marine explorer], supports Strand 4; William Beebe [scientist], supports Strand 4; Thor Heyerdahl [anthropologist], supports Strand 6).</i></p>	<b>Handbook:</b> 450-461

<b>Performance Objectives, Grade 6</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 2. Describe how a major milestone in science or technology has revolutionized the thinking of the time (e.g., Cell Theory, sonar, SCUBA, underwater robotics).	<b>Handbook:</b> 356, 357, 363, 366
PO 3. Analyze the impact of a major scientific development occurring within the past decade.	<b>Handbook:</b> 361
PO 4. Describe the use of technology in science-related careers.	<b>Handbook:</b> 363-368

## C o n c e p t 2 : N a t u r e o f S c i e n t i f i c K n o w l e d g e

Understand how science is a process for generating knowledge.

<b>Performance Objectives, Grade 6</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 1. Describe how science is an ongoing process that changes in response to new information and discoveries.	<b>Handbook:</b> 241, 356
PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.	<b>Handbook:</b> 002, 126-128, 182-184
PO 3. Apply the following scientific processes to other problem solving or decision making situations: <ul style="list-style-type: none"> <li>• observing</li> <li>• questioning</li> <li>• communicating</li> <li>• comparing</li> <li>• measuring</li> <li>• classifying</li> <li>• predicting</li> <li>• organizing data</li> <li>• inferring</li> <li>• generating hypotheses</li> <li>• identifying variables</li> </ul>	<b>Handbook:</b> 002-008, 013-019, 053-072, 150-164, 388, 389, 385-400, 414-416

## **Strand 3: Science in Personal and Social Perspectives**

Science in Personal and Social Perspectives emphasizes developing the ability to design a solution to a problem, to understand the relationship between science and technology, and the ways people are involved in both. Students understand the impact of science and technology on human activity and the environment. This strand affords students the opportunity to understand their place in the world – as living creatures, consumers, decision makers, problem solvers, managers, and planners.

### **Concept 1: Changes in Environments**

Describe the interactions between human populations, natural hazards, and the environment.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Evaluate the effects of the following natural hazards: <ul style="list-style-type: none"> <li>• sandstorm</li> <li>• hurricane</li> <li>• tornado</li> <li>• ultraviolet light</li> <li>• lightning-caused fire</li> </ul>	<b>Handbook:</b> 350

### **Concept 2: Science and Technology in Society**

Develop viable solutions to a need or problem.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Propose viable methods of responding to an identified need or problem.	<b>Handbook:</b> 354, 355, 356, 357, 363, 365
PO 2. Compare possible solutions to best address an identified need or problem.	<b>Handbook:</b> 369
PO 3. Design and construct a solution to an identified need or problem using simple classroom materials.	<b>Handbook:</b> 019
PO 4. Describe a technological discovery that influences science.	<b>Handbook:</b> 357, 361, 363

## Strand 4: Life Science

Life Science expands students' biological understanding of life by focusing on the characteristics of living things, the diversity of life, and how organisms and populations change over time in terms of biological adaptation and genetics. This understanding includes the relationship of structures to their functions and life cycles, interrelationships of matter and energy in living organisms, and the interactions of living organisms with their environment.

### Concept 1: Structure and Function in Living Systems

Understand the relationships between structures and functions of organisms.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Explain the importance of water to organisms.	<b>Handbook:</b> 079, 105, 107, 138
PO 2. Describe the basic structure of a cell, including: <ul style="list-style-type: none"> <li>• cell wall</li> <li>• cell membrane</li> <li>• nucleus</li> </ul>	<b>Handbook:</b> 077, 078, 102, 153, 155
PO 3. Describe the function of each of the following cell parts: <ul style="list-style-type: none"> <li>• cell wall</li> <li>• cell membrane</li> <li>• nucleus</li> </ul>	<b>Handbook:</b> 077, 078
PO 4. Differentiate between plant and animal cells.	<b>Handbook:</b> 077, 078
PO 5. Explain the hierarchy of cells, tissues, organs, and systems.	<b>Handbook:</b> 076, 082
PO 6. Relate the following structures of living organisms to their functions: Animals <ul style="list-style-type: none"> <li>• respiration – gills, lungs</li> <li>• digestion – stomach, intestines</li> <li>• circulation – heart, veins, arteries, capillaries</li> <li>• locomotion – muscles, skeleton</li> </ul> Plants <ul style="list-style-type: none"> <li>• transpiration – stomata, roots, xylem, phloem</li> <li>• absorption – roots, xylem, phloem</li> <li>• response to stimulus (phototropism, hydrotropism, geotropism) – roots, xylem, phloem</li> </ul>	<b>Handbook:</b> 082, 105, 107, 111

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 7. Describe how the various systems of living organisms work together to perform a vital function: <ul style="list-style-type: none"> <li>• respiratory and circulatory</li> <li>• muscular and skeletal</li> <li>• digestive and excretory</li> </ul>	<b>Handbook:</b> 075, 082, 085, 086, 087, 088, 089, 090, 091, 092, 093

### C o n c e p t 3 : P o p u l a t i o n s o f O r g a n i s m s i n a n E c o s y s t e m

**Analyze the relationships among various organisms and their environment.**

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Explain that sunlight is the major source of energy for most ecosystems. (See Strand 5 Concept 3 and Strand 6 Concept 2)	<b>Handbook:</b> 136, 137
PO 2. Describe how the following environmental conditions affect the quality of life: <ul style="list-style-type: none"> <li>• water quality</li> <li>• climate</li> <li>• population density</li> <li>• smog</li> </ul>	<b>Handbook:</b> 131, 132, 141, 342, 345, 348, 352, 353

### S t r a n d 5 : P h y s i c a l S c i e n c e

Physical Science affords students the opportunity to increase their understanding of the characteristics of objects and materials they encounter daily. Students gain an understanding of the nature of matter and energy, including their forms, the changes they undergo, and their interactions.

By studying objects and the forces that act upon them, students develop an understanding of the fundamental laws of motion, knowledge of the various ways energy is stored in a system, and the processes by which energy is transferred between systems and surroundings.

### C o n c e p t 3 : T r a n s f e r o f E n e r g y

**Understand that energy can be stored and transferred.**

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Identify various ways in which electrical energy is generated using renewable and nonrenewable resources (e.g., wind, dams, fossil fuels, nuclear reactions).	<b>Handbook:</b> 325, 326, 328, 346
PO 2. Identify several ways in which energy may be stored.	<b>Handbook:</b> 300

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 3. Compare the following ways in which energy may be transformed: <ul style="list-style-type: none"> <li>• mechanical to electrical</li> <li>• electrical to thermal</li> </ul>	<b>Handbook:</b> 300, 301-304, 328
PO 4. Explain how thermal energy (heat energy) can be transferred by: <ul style="list-style-type: none"> <li>• conduction</li> <li>• convection</li> <li>• radiation</li> </ul>	<b>Handbook:</b> 304

## Strand 6: Earth and Space Science

Earth and Space Science provides the foundation for students to develop an understanding of the Earth, its history, composition, and formative processes, and an understanding of the solar system and the universe. Students study the regularities of the interrelated systems of the natural world. In doing so, they develop understandings of the basic laws, theories, and models that explain the world (NSES, 1995). By studying the Earth from both a historical and current time frame, students can make informed decisions about issues affecting the planet on which they live.

### Concept 1: Structure of the Earth

Describe the composition and interactions between the structure of the Earth and its atmosphere.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Describe the properties and the composition of the layers of the atmosphere.	<b>Handbook:</b> 213-215
PO 2. Explain the composition, properties, and structure of the Earth's lakes and rivers.	<b>Handbook:</b> 148
PO 3. Explain the composition, properties, and structures of the oceans' zones and layers.	<b>Handbook:</b> 149, 202-208, 209, 210, 211
PO 4. Analyze the interactions between the Earth's atmosphere and the Earth's bodies of water (water cycle).	<b>Handbook:</b> 216
PO 5. Describe ways scientists explore the Earth's atmosphere and bodies of water. (See Strand 2 Concept 1)	<b>Handbook:</b> 208, 209, 210, 211, 213, 214, 219

## Concept 2: Earth's Processes and Systems

Understand the processes acting on the Earth and their interaction with the Earth systems.

Performance Objectives, Grade 6	ScienceSaurus, Grades 6-8
PO 1. Explain how water is cycled in nature.	<b>Handbook:</b> 216
PO 2. Identify the distribution of water within or among the following: <ul style="list-style-type: none"><li>• atmosphere</li><li>• lithosphere</li><li>• hydrosphere</li></ul>	<b>Handbook:</b> 216
PO 3. Analyze the effects that bodies of water have on the climate of a region.	<b>Handbook:</b> 228, 229
PO 4. Analyze the following factors that affect climate: <ul style="list-style-type: none"><li>• ocean currents</li><li>• elevation</li><li>• location</li></ul>	<b>Handbook:</b> 228, 229
PO 5. Analyze the impact of large-scale weather systems on the local weather.	<b>Handbook:</b> 228, 229
PO 6. Create a weather system model that includes: <ul style="list-style-type: none"><li>• the Sun</li><li>• the atmosphere</li><li>• bodies of water</li></ul>	<b>Handbook:</b> 215

**ScienceSaurus © 2006**  
 correlated to  
**Arizona Academic Content Standards**  
**Science Standard Articulated by Grade Level**  
**Grade 7**

**Strand 1:**  
**Inquiry Process**

**Inquiry Process establishes the basis for students' learning in science. Students use scientific processes: questioning, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically about relationships between evidence and explanations, and communicating results.**

**Concept 1: Observations, Questions, and Hypotheses**

**Formulate predictions, questions, or hypotheses based on observations.**  
**Locate appropriate resources.**

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
<i>PO 1. Formulate questions based on observations that lead to the development of a hypothesis. (See M07-S2C1-01)</i>	<b>Handbook:</b> 004, 007, 016, 017, 018, 414-416
PO 2. Select appropriate resources for background information related to a question, for use in the design of a controlled investigation. (See W07-S3C6-01, R07-S3C1-06, and R07-S3C2-03)	<b>Handbook:</b> 005, 017, 120, 420-426
PO 3. Explain the role of a hypothesis in a scientific inquiry.	<b>Handbook:</b> 006, 017, 018

**Concept 2: Scientific Testing (Investigating and Modeling)**

**Design and conduct controlled investigations.**

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
<i>PO 1. Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.</i>	<b>Handbook:</b> 020-072, 436

<b>Performance Objectives, Grade 7</b>	<b>ScienceSaurus, Grades 6-8</b>
<i>PO 2. Design an investigation to test individual variables using scientific processes.</i>	<b>Handbook:</b> 003-019
<b>PO 3. Conduct a controlled investigation, utilizing multiple trials, to test a hypothesis using scientific processes.</b>	<b>Handbook:</b> 003-019
<i>PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).</i>	<b>Handbook:</b> 009, 047, 049, 050, 053-072
<i>PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W07-S3C2-01 and W07-S3C3-01)</i>	<b>Handbook:</b> 010, 014-015

### **Concept 3: Analysis and Conclusions**

**Analyze and interpret data to explain correlations and results; formulate new questions.**

<b>Performance Objectives, Grade 7</b>	<b>ScienceSaurus, Grades 6-8</b>
<i>PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M07-S2C1-07 and M07-S2C1-08)</i>	<b>Handbook:</b> 002, 011-015, 017-019, 368, 409
<i>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).</i>	<b>Handbook:</b> 011-015, 018, 385-401, 402-409
<b>PO 3. Analyze results of data collection in order to accept or reject the hypothesis.</b>	<b>Handbook:</b> 011, 012, 017, 018
<b>PO 4. Determine validity and reliability of results of an investigation.</b>	<b>Handbook:</b> 009, 010, 011-015, 017, 018, 399, 400, 409
<b>PO 5. Formulate a conclusion based on data analysis.</b>	<b>Handbook:</b> 002, 011-015, 017-019, 368, 409
<b>PO 6. Refine hypotheses based on results from investigations.</b>	<b>Handbook:</b> 015
<b>PO 7. Formulate new questions based on the results of a previous investigation.</b>	<b>Handbook:</b> 016, 017, 414-416

## C o n c e p t 4 : C o m m u n i c a t i o n

Communicate results of investigations.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
<p><i>PO 1. Choose an appropriate graphic representation for collected data:</i></p> <ul style="list-style-type: none"> <li>• <i>line graph</i></li> <li>• <i>double bar graph</i></li> <li>• <i>stem and leaf plot</i></li> <li>• <i>histogram (See M07-S2C1-03)</i></li> </ul>	<p><b>Handbook:</b> 012, 015, 392, 394, 395</p>
<p><i>PO 2. Display data collected from a controlled investigation. (See M07-S2C1-03)</i></p>	<p><b>Handbook:</b> 010, 012, 015, 385-400</p>
<p><i>PO 3. Communicate the results of an investigation with appropriate use of qualitative and quantitative information. (See W07-S3C2-01)</i></p>	<p><b>Handbook:</b> 002, 014, 015, 017, 019, 386-388</p>
<p><i>PO 4. Write clear, step-by-step instructions for following procedures (without the use of personal pronouns). (See W07-S3C3-01)</i></p>	<p><b>Handbook:</b> 002, 015, 017</p>
<p><i>PO 5. Communicate the results and conclusion of the investigation. (See W07-S3C6-02)</i></p>	<p><b>Handbook:</b> 002, 014, 015, 017, 019, 386-388</p>

## S t r a n d 2 :

### H i s t o r y a n d N a t u r e o f S c i e n c e

Scientific investigation grows from the contributions of many people. History and Nature of Science emphasizes the importance of the inclusion of historical perspectives and the advances that each new development brings to technology and human knowledge. This strand focuses on the human aspects of science and the role that scientists play in the development of various cultures.

## C o n c e p t 1 : H i s t o r y o f S c i e n c e a s a H u m a n E n d e a v o r

Identify individual, cultural, and technological contributions to scientific knowledge.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
<p><i>PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Rachel Carson [scientist], supports Strand 4; Luis Alvarez [scientist] and Walter Alvarez [scientist], support Strand 6; Percival Lowell [scientist], supports Strand 6; Copernicus [scientist], supports Strand 6).</i></p>	<p><b>Handbook:</b> 450-461</p>

<b>Performance Objectives, Grade 7</b>	<b>ScienceSaurus, Grades 6-8</b>
<i>PO 2. Describe how a major milestone in science or technology has revolutionized the thinking of the time (e.g., global positioning system, telescopes, seismographs, photography).</i>	<b>Handbook:</b> 356, 357, 363, 366
<i>PO 3. Analyze the impact of a major scientific development occurring within the past decade.</i>	<b>Handbook:</b> 361
<i>PO 4. Analyze the use of technology in science-related careers.</i>	<b>Handbook:</b> 363-368

## Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

<b>Performance Objectives, Grade 7</b>	<b>ScienceSaurus, Grades 6-8</b>
<i>PO 1. Describe how science is an ongoing process that changes in response to new information and discoveries.</i>	<b>Handbook:</b> 241, 356
<i>PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.</i>	<b>Handbook:</b> 002, 126-128, 182-184
<i>PO 3. Apply the following scientific processes to other problem solving or decision making situations:</i> <ul style="list-style-type: none"> <li>• <i>observing</i></li> <li>• <i>questioning</i></li> <li>• <i>communicating</i></li> <li>• <i>comparing</i></li> <li>• <i>measuring</i></li> <li>• <i>classifying</i></li> <li>• <i>predicting</i></li> <li>• <i>organizing data</i></li> <li>• <i>inferring</i></li> <li>• <i>generating hypotheses</i></li> <li>• <i>identifying variables</i></li> </ul>	<b>Handbook:</b> 001-008, 013-019, 053-072, 150-164, 385-400, 414-416

## Strand 3: Science in Personal and Social Perspectives

Science in Personal and Social Perspectives emphasizes developing the ability to design a solution to a problem, to understand the relationship between science and technology, and the ways people are involved in both. Students understand the impact of science and technology on human activity and the environment. This strand affords students the opportunity to understand their place in the world – as living creatures, consumers, decision makers, problem solvers, managers, and planners.

### Concept 1: Changes in Environments

Describe the interactions between human populations, natural hazards, and the environment.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
PO 1. Analyze environmental risks (e.g., pollution, destruction of habitat) caused by human interaction with biological or geological systems.	<b>Handbook:</b> 341, 342, 346, 348-351, 352, 353
PO 2. Analyze environmental benefits of the following human interactions with biological or geological systems: <ul style="list-style-type: none"> <li>• reforestation</li> <li>• habitat restoration</li> <li>• construction of dams</li> </ul>	<b>Handbook:</b> 323, 341, 344
PO 3. Propose possible solutions to address the environmental risks in biological or geological systems.	<b>Handbook:</b> 328

### Concept 2: Science and Technology in Society

Develop viable solutions to a need or problem.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
<i>PO 1. Propose viable methods of responding to an identified need or problem.</i>	<b>Handbook:</b> 354, 355, 356, 357, 363, 365
<i>PO 2. Compare solutions to best address an identified need or problem.</i>	<b>Handbook:</b> 369
<i>PO 3. Design and construct a solution to an identified need or problem using simple classroom materials.</i>	<b>Handbook:</b> 019
PO 4. Describe a scientific discovery that influences technology.	<b>Handbook:</b> 357, 361, 363

## Strand 4: Life Science

Life Science expands students' biological understanding of life by focusing on the characteristics of living things, the diversity of life, and how organisms and populations change over time in terms of biological adaptation and genetics. This understanding includes the relationship of structures to their functions and life cycles, interrelationships of matter and energy in living organisms, and the interactions of living organisms with their environment.

### Concept 3: Populations of Organisms in an Ecosystem

Analyze the relationships among various organisms and their environment.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
PO 1. Compare food chains in a specified ecosystem and their corresponding food web.	<b>Handbook:</b> 134, 135, 137, 139
PO 2. Explain how organisms obtain and use resources to develop and thrive in: <ul style="list-style-type: none"> <li>• niches</li> <li>• predator/prey relationships</li> </ul>	<b>Handbook:</b> 110, 131, 132
PO 3. Analyze the interactions of living organisms with their ecosystems: <ul style="list-style-type: none"> <li>• limiting factors</li> <li>• carrying capacity</li> </ul>	<b>Handbook:</b> 131
PO 4. Evaluate data related to problems associated with population growth (e.g., overgrazing, forest management, invasion of non-native species) and the possible solutions.	<b>Handbook:</b> 345, 398-400
PO 5. Predict how environmental factors (e.g., floods, droughts, temperature changes) affect survival rates in living organisms.	<b>Handbook:</b> 128, 341
PO 6. Create a model of the interactions of living organisms within an ecosystem.	<b>Handbook:</b> 134, 135

## Strand 6: Earth and Space Science

Earth and Space Science provides the foundation for students to develop an understanding of the Earth, its history, composition, and formative processes, and an understanding of the solar system and the universe. Students study the regularities of the interrelated systems of the natural world. In doing so, they develop understandings of the basic laws, theories, and models that explain the world (NSES, 1995). By studying the Earth from both a historical and current time frame, students can make informed decisions about issues affecting the planet on which they live.

### Concept 1: Structure of the Earth

Describe the composition and interactions between the structure of the Earth and its atmosphere.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
PO 1. Classify rocks and minerals by the following observable properties: <ul style="list-style-type: none"> <li>• grain</li> <li>• color</li> <li>• texture</li> <li>• hardness</li> </ul>	<b>Handbook:</b> 179, 180
PO 2. Describe the properties and the composition of the following major layers of the Earth: <ul style="list-style-type: none"> <li>• crust</li> <li>• mantle</li> <li>• core</li> </ul>	<b>Handbook:</b> 177
PO 3. Explain the following processes involved in the formation of the Earth's structure: <ul style="list-style-type: none"> <li>• erosion</li> <li>• deposition</li> <li>• plate tectonics</li> <li>• volcanism</li> </ul>	<b>Handbook:</b> 182-184, 187, 192, 195
PO 4. Describe how the rock and fossil record show that environmental conditions have changed over geologic and recent time.	<b>Handbook:</b> 128, 180, 198

### Concept 2: Earth's Processes and Systems

Understand the processes acting on the Earth and their interaction with the Earth systems.

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
PO 1. Explain the rock cycle.	<b>Handbook:</b> 180

<b>Performance Objectives, Grade 7</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 2. Distinguish the components and characteristics of the rock cycle for the following types of rocks: <ul style="list-style-type: none"> <li>• igneous</li> <li>• metamorphic</li> <li>• sedimentary</li> </ul>	<b>Handbook:</b> 180
PO 3. Analyze the evidence that lithospheric plate movements occur.	<b>Handbook:</b> 183, 185
PO 4. Explain lithospheric plate movement as a result of convection.	<b>Handbook:</b> 183
PO 5. Relate plate boundary movements to their resulting landforms, including: <ul style="list-style-type: none"> <li>• mountains</li> <li>• faults</li> <li>• rift valleys</li> <li>• trenches</li> <li>• volcanoes</li> </ul>	<b>Handbook:</b> 184, 186, 187, 207
PO 6. Describe how earthquakes are measured.	<b>Handbook:</b> 186

### **C o n c e p t 3 : E a r t h i n t h e S o l a r S y s t e m**

**Understand the relationships of the Earth and other objects in the solar system.**

<b>Performance Objectives, Grade 7</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 1. Explain the phases of the Moon in terms of the relative positions of the Earth, Sun, and Moon.	<b>Handbook:</b> 235
PO 2. Construct a model for the relative positions of the Earth, Sun, and Moon as they relate to corresponding eclipses.	<b>Handbook:</b> 236
PO 3. Explain the interrelationship between the Earth's tides and the Moon.	<b>Handbook:</b> 237
PO 4. Explain the seasons in the Northern and Southern Hemispheres in terms of the tilt of the Earth's axis relative to the Earth's revolution around the Sun.	<b>Handbook:</b> 233

Performance Objectives, Grade 7	ScienceSaurus, Grades 6-8
<p>PO 5. Identify the following major constellations visible (seasonally) from the Northern Hemisphere:</p> <ul style="list-style-type: none"> <li>• Orion</li> <li>• Ursa Major (Great Bear)</li> <li>• Cygnus</li> <li>• Scorpius</li> <li>• Cassiopeia</li> </ul>	<p><b>Handbook:</b> 246, 248</p>
<p>PO 6. Explain the relationship among common objects in the solar system, galaxy, and the universe.</p>	<p><b>Handbook:</b> 244, 247, 248</p>

**ScienceSaurus © 2006**  
 correlated to  
**Arizona Academic Content Standards**  
**Science Standard Articulated by Grade Level**  
**Grade 8**

**S t r a n d 1 :**  
**I n q u i r y P r o c e s s**

**Inquiry Process** establishes the basis for students' learning in science. Students use scientific processes: questioning, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically about relationships between evidence and explanations, and communicating results.

**C o n c e p t 1 : O b s e r v a t i o n s , Q u e s t i o n s ,**  
**a n d H y p o t h e s e s**

**Formulate predictions, questions, or hypotheses based on observations.**  
**Locate appropriate resources.**

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 1. <i>Formulate questions based on observations that lead to the development of a hypothesis. (See M08-S2C1-01)</i>	<b>Handbook:</b> 004, 007, 016, 017, 018, 414-416
PO 2. Use appropriate research information, not limited to a single source, to use in the development of a testable hypothesis. (See W08-S3C6-01, R08-S3C1-06, and R08-S3C2-03)	<b>Handbook:</b> 005, 017, 420-426
PO 3. Generate a hypothesis that can be tested.	<b>Handbook:</b> 006, 007, 008, 015, 018, 416

**C o n c e p t 2 : S c i e n t i f i c T e s t i n g**  
**( I n v e s t i g a t i n g a n d M o d e l i n g )**

**Design and conduct controlled investigations.**

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 1. <i>Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.</i>	<b>Handbook:</b> 020-072, 436

<b>Performance Objectives, Grade 8</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 2. Design a controlled investigation to support or reject a hypothesis.	<b>Handbook:</b> 003-019
PO 3. Conduct a controlled investigation to support or reject a hypothesis.	<b>Handbook:</b> 003-019
<i>PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).</i>	<b>Handbook:</b> 009, 047, 049, 050, 53-072
<i>PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs. (See W08-S3C2-01 and W08-S3C3-01)</i>	<b>Handbook:</b> 010, 014-015, 414-416

### **C o n c e p t 3 : A n a l y s i s a n d C o n c l u s i o n s**

**Analyze and interpret data to explain correlations and results; formulate new questions.**

<b>Performance Objectives, Grade 8</b>	<b>ScienceSaurus, Grades 6-8</b>
<i>PO 1. Analyze data obtained in a scientific investigation to identify trends. (See M08-S2C1-08)</i>	<b>Handbook:</b> 002, 011-015, 017-019, 368, 409
<i>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).</i>	<b>Handbook:</b> 011-015, 018, 385-401, 402-409
PO 3. Interpret data that show a variety of possible relationships between two variables, including: <ul style="list-style-type: none"> <li>• positive relationship</li> <li>• negative relationship</li> <li>• no relationship</li> </ul>	<b>Handbook:</b> 398, 399
PO 4. Formulate a future investigation based on the data collected.	<b>Handbook:</b> 009, 016, 017
PO 5. Explain how evidence supports the validity and reliability of a conclusion.	<b>Handbook:</b> 013
PO 6. Identify the potential investigational error that may occur (e.g., flawed investigational design, inaccurate measurement, computational errors, unethical reporting).	<b>Handbook:</b> 368

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 7. Critique scientific reports from periodicals, television, or other media.	<b>Handbook:</b> 368
<i>PO 8. Formulate new questions based on the results of a previous investigation.</i>	<b>Handbook:</b> 016, 017, 414-416

## C o n c e p t 4 : C o m m u n i c a t i o n

### Communicate results of investigations.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 1. Communicate the results of an investigation.	<b>Handbook:</b> 002, 014, 015, 017, 019, 386-388
<p><i>PO 2. Choose an appropriate graphic representation for collected data:</i></p> <ul style="list-style-type: none"> <li>• <i>line graph</i></li> <li>• <i>double bar graph</i></li> <li>• <i>stem and leaf plot</i></li> <li>• <i>histogram (See M08-S2C1-03)</i></li> </ul>	<b>Handbook:</b> 392, 394, 395
PO 3. Present analyses and conclusions in clear, concise formats. (See W08-S3C6-02)	<b>Handbook:</b> 002, 011-015, 017-019, 368, 409
PO 4. Write clear, step-by-step instructions for conducting investigations or operating equipment (without the use of personal pronouns). (See W08-S3C3-01)	<b>Handbook:</b> 002, 015, 017
<i>PO 5. Communicate the results and conclusion of the investigation. (See W08-S3C6-02)</i>	<b>Handbook:</b> 002, 014, 015, 017, 019, 386-388

## Strand 2: History and Nature of Science

Scientific investigation grows from the contributions of many people. History and Nature of Science emphasizes the importance of the inclusion of historical perspectives and the advances that each new development brings to technology and human knowledge. This strand focuses on the human aspects of science and the role that scientists play in the development of various cultures.

### Concept 1: History of Science as a Human Endeavor

Identify individual, cultural, and technological contributions to scientific knowledge.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
<p>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 Frances Bacon [philosopher], supports Strand 5; Isaac Newton [scientist], supports Strand 5).</i></p>	<p><b>Handbook:</b> 450-461</p>
<p>PO 2. Evaluate the effects of the following major scientific milestones on society:</p> <ul style="list-style-type: none"> <li>• Mendelian Genetics</li> <li>• Newton's Laws</li> </ul>	<p><b>Handbook:</b> 121, 283-286</p>
<p>PO 3. Evaluate the impact of a major scientific development occurring within the past decade.</p>	<p><b>Handbook:</b> 361</p>
<p>PO 4. Evaluate career opportunities related to life and physical sciences.</p>	<p><b>Handbook:</b> 363-368</p>

## Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
<p>PO 1. Apply the following scientific processes to other problem solving or decision making situations:</p> <ul style="list-style-type: none"> <li>• observing</li> <li>• questioning</li> <li>• communicating</li> <li>• comparing</li> <li>• measuring</li> <li>• classifying</li> <li>• predicting</li> <li>• organizing data</li> <li>• inferring</li> <li>• generating hypotheses</li> <li>• identifying variables</li> </ul>	<p><b>Handbook:</b> 002-008, 010, 013-019, 053-072, 150-164, 385-400, 414-416</p>
<p>PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.</p>	<p><b>Handbook:</b> 002, 126-128, 182-184</p>
<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>	<p><b>Handbook:</b> 009, 015</p>
<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>	<p><b>Handbook:</b> 368, 424</p>

## Strand 3: Science in Personal and Social Perspectives

Science in Personal and Social Perspectives emphasizes developing the ability to design a solution to a problem, to understand the relationship between science and technology, and the ways people are involved in both. Students understand the impact of science and technology on human activity and the environment. This strand affords students the opportunity to understand their place in the world – as living creatures, consumers, decision makers, problem solvers, managers, and planners.

### Concept 1: Changes in Environments

Describe the interactions between human populations, natural hazards, and the environment.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 1. Analyze the risk factors associated with natural, human induced, and/or biological hazards, including: <ul style="list-style-type: none"> <li>• waste disposal of industrial chemicals</li> <li>• greenhouse gases</li> </ul>	<b>Handbook:</b> 347, 349
PO 2. Analyze possible solutions to address the environmental risks associated with chemicals and biological systems.	<b>Handbook:</b> 328

### Concept 2: Science and Technology in Society

Develop viable solutions to a need or problem.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
<i>PO 1. Propose viable methods of responding to an identified need or problem.</i>	<b>Handbook:</b> 354, 355, 356, 357, 363, 365
<i>PO 2. Compare solutions to best address an identified need or problem.</i>	<b>Handbook:</b> 369
<i>PO 3. Design and construct a solution to an identified need or problem using simple classroom materials.</i>	<b>Handbook:</b> 019
PO 4. Compare risks and benefits of the following technological advances: <ul style="list-style-type: none"> <li>• radiation treatments</li> <li>• genetic engineering (See Strand 4 Concept 2)</li> <li>• airbags (See Strand 5 Concept 2)</li> </ul>	<b>Handbook:</b> 361

## Strand 4: Life Science

Life Science expands students' biological understanding of life by focusing on the characteristics of living things, the diversity of life, and how organisms and populations change over time in terms of biological adaptation and genetics. This understanding includes the relationship of structures to their functions and life cycles, interrelationships of matter and energy in living organisms, and the interactions of living organisms with their environment.

### Concept 2: Reproduction and Heredity

Understand the basic principles of heredity.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 1. Explain the purposes of cell division: <ul style="list-style-type: none"> <li>• growth and repair</li> <li>• reproduction</li> </ul>	<b>Handbook:</b> 080, 099
PO 2. Explain the basic principles of heredity using the human examples of: <ul style="list-style-type: none"> <li>• eye color</li> <li>• widow's peak</li> <li>• blood type</li> </ul>	<b>Handbook:</b> 121, 122
PO 3. Distinguish between the nature of dominant and recessive traits in humans.	<b>Handbook:</b> 122

### Concept 4: Diversity, Adaptation, and Behavior

Identify structural and behavioral adaptations.

Performance Objectives, Grade 8	ScienceSaurus, Grades 6-8
PO 1. Explain how an organism's behavior allows it to survive in an environment.	<b>Handbook:</b> 103, 109-111
PO 2. Describe how an organism can maintain a stable internal environment while living in a constantly changing external environment.	<b>Handbook:</b> 110
PO 3. Determine characteristics of organisms that could change over several generations.	<b>Handbook:</b> 125, 127
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).	<b>Handbook:</b> 132, 140

<b>Performance Objectives, Grade 8</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 5. Analyze the following behavioral cycles of organisms: <ul style="list-style-type: none"> <li>• hibernation</li> <li>• migration</li> <li>• dormancy (plants)</li> </ul>	<b>Handbook:</b> 110, 344
PO 6. Describe the following factors that allow for the survival of living organisms: <ul style="list-style-type: none"> <li>• protective coloration</li> <li>• beak design</li> <li>• seed dispersal</li> <li>• pollination</li> </ul>	<b>Handbook:</b> 108, 127

## Strand 5: Physical Science

Physical Science affords students the opportunity to increase their understanding of the characteristics of objects and materials they encounter daily. Students gain an understanding of the nature of matter and energy, including their forms, the changes they undergo, and their interactions.

By studying objects and the forces that act upon them, students develop an understanding of the fundamental laws of motion, knowledge of the various ways energy is stored in a system, and the processes by which energy is transferred between systems and surroundings.

### Concept 1: Properties and Changes of Properties in Matter

Understand physical and chemical properties of matter.

<b>Performance Objectives, Grade 8</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 1. Identify different kinds of matter based on the following physical properties: <ul style="list-style-type: none"> <li>• states</li> <li>• density</li> <li>• boiling point</li> <li>• melting point</li> <li>• solubility</li> </ul>	<b>Handbook:</b> 251, 253, 254, 273
PO 2. Identify different kinds of matter based on the following chemical properties: <ul style="list-style-type: none"> <li>• reactivity</li> <li>• pH</li> <li>• oxidation (corrosion)</li> </ul>	<b>Handbook:</b> 190, 264
PO 3. Identify the following types of evidence that a chemical reaction has occurred: <ul style="list-style-type: none"> <li>• formation of a precipitate</li> <li>• generation of gas</li> <li>• color change</li> <li>• absorption or release of heat</li> </ul>	<b>Handbook:</b> 269

<b>Performance Objectives, Grade 8</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 4. Classify matter in terms of elements, compounds, or mixtures.	<b>Handbook:</b> 259, 260, 262, 271
PO 5. Classify mixtures as being homogeneous or heterogeneous.	<b>Handbook:</b> 271
PO 6. Explain the systematic organization of the periodic table.	<b>Handbook:</b> 265
PO 7. Investigate how the transfer of energy can affect the physical and chemical properties of matter.	<b>Handbook:</b> 254

## **C o n c e p t 2 : M o t i o n a n d F o r c e s**

**Understand the relationship between force and motion.**

<b>Performance Objectives, Grade 8</b>	<b>ScienceSaurus, Grades 6-8</b>
PO 1. Demonstrate velocity as the rate of change of position over time.	<b>Handbook:</b> 284
PO 2. Identify the conditions under which an object will continue in its state of motion (Newton's 1 <sup>st</sup> Law of Motion).	<b>Handbook:</b> 284
PO 3. Describe how the acceleration of a body is dependent on its mass and the net applied force (Newton's 2 <sup>nd</sup> Law of Motion).	<b>Handbook:</b> 285
PO 4. Describe forces as interactions between bodies (Newton's 3 <sup>rd</sup> Law of Motion).	<b>Handbook:</b> 286
PO 5. Create a graph devised from measurements of moving objects and their interactions, including: <ul style="list-style-type: none"> <li>• position-time graphs</li> <li>• velocity-time graphs</li> </ul>	<b>Handbook:</b> 395-400



---

TOLL FREE: 800-289-4490

VISIT OUR WEB SITE: [WWW.GREATSOURCE.COM](http://WWW.GREATSOURCE.COM)

---