

Arizona's State Standards – Science – 6th Grade Standards Placemat

The six strands and five unifying concepts are interwoven into a fabric of science. Strands 1, 2, and 3 are designed to be explicitly taught *and* embedded *within* each of the content Strands 4, 5, and 6, and are not intended to be taught in isolation. The processes, skills, and content of the first three strands are designed to “umbrella” and complement the content of Life Science, Physical Science, and Earth and Space Science.

Strand 1: Inquiry Process

Concept 1: Observations, Questions, and Hypotheses

- PO 1. Differentiate among a question, hypothesis, and prediction.
- PO 2. Formulate questions based on observations that lead to the development of a hypothesis.
- PO 3. Locate research information, not limited to a single source, for use in the design of a controlled investigation.

Concept 2: Scientific Testing (Investigating and Modeling)

- PO 1. Demonstrate safe behavior and appropriate procedures*
- PO 2. Design an investigation to test individual variables using scientific processes.
- PO 3. Conduct a controlled investigation using scientific processes.
- PO 4. Perform measurements using appropriate scientific tools (e.g., balances, microscopes, probes, micrometers).
- PO 5. Keep a record of observations, notes, sketches, questions, and ideas using tools such as written and/or computer logs.

Concept 3: Analysis and Conclusions

- PO 1. Analyze data obtained in a scientific investigation to identify trends.
- PO 2. Form a logical argument about a correlation between variables or sequence of events
- PO 3. Evaluate the observations and data reported by others.
- PO 4. Interpret simple tables and graphs produced by others.
- PO 5. Analyze the results from previous and/or similar investigations to verify the results of the current investigation.
- PO 6. Formulate new questions based on the results of a completed investigation.

Concept 4: Communication

- PO 1. Choose an appropriate graphic representation for collected data: line graph, double bar graph, stem and leaf plot, and histogram.

- PO 2. Display data collected from a controlled investigation.
- PO 3. Communicate the results of an investigation with appropriate use of qualitative and quantitative information.
- PO 4. Create a list of instructions that others can follow in carrying out a procedure (without the use of personal pronouns).
- PO 5. Communicate the results and conclusion of the investigation.

Strand 2: History and Nature of Science

Concept 1: History of Science as a Human Endeavor

- PO 1. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations*
- PO 2. Describe how a major milestone in science or technology has revolutionized the thinking of the time
- PO 3. Analyze the impact of a major scientific development occurring within the past decade.
- PO 4. Describe the use of technology in science-related careers.

Concept 2: Nature of Scientific Knowledge

- PO 1. Describe how science is an ongoing process that changes in response to new information and discoveries.
- PO 2. Describe how scientific knowledge is subject to change as new information and/or technology challenges prevailing theories.
- PO 3. Apply the following scientific processes to other problem solving or decision making situations: observing, questioning, communicating, comparing, measuring, classifying, predicting, organizing data, inferring, generating hypotheses, and identifying variables.

Strand 3: Science in Personal and Social Perspectives

Concept 1: Changes in Environments

- PO 1. Evaluate the effects of the following natural hazards: sandstorm, hurricane, tornado, ultraviolet light, and lightning-caused fire.
- PO 2. Describe how people plan for, and respond to, the following natural disasters: drought, flooding, and tornadoes.

Concept 2: Science and Technology in Society

- PO 1. Propose viable methods of responding to an identified need or problem.

- PO 2. Compare possible solutions to best address an identified need or problem.
- PO 3. Design and construct a solution to an identified need or problem using simple classroom materials.
- PO 4. Describe a technological discovery that influences science.

Strand 4: Life Science

Concept 1: Structure and Function in Living Systems

- PO 1. Explain the importance of water to organisms.
- PO 2. Describe the basic structure of a cell, including: cell wall, cell membrane, and nucleus.
- PO 3. Describe the function of each of the following cell parts: cell wall, cell membrane, and nucleus.
- PO 4. Differentiate between plant and animal cells.
- PO 5. Explain the hierarchy of cells, tissues, organs, and systems.
- PO 6. Relate the following structures of living organisms to their functions:

Animals

- respiration – gills, lungs
- digestion – stomach, intestines
- circulation – heart, veins, arteries, capillaries
- locomotion – muscles, skeleton

Plants

- transpiration – stomata, roots, xylem, phloem
- absorption – roots, xylem, phloem
- response to stimulus (phototropism, hydrotropism, geotropism) – roots, xylem, phloem

- PO 7. Describe how the various systems of living organisms work together to perform a vital function: respiratory and circulatory, muscular and skeletal, digestive and excretory.

Concept 3: Populations of Organisms in an Ecosystem

- PO 1. Explain that sunlight is the major source of energy for most ecosystems. (See S5 C3 and S6 C2)
- PO 2. Describe how the following environmental conditions affect the quality of life: water quality, climate, population density, and smog.

Strand 5: Physical Science

Concept 3: Transfer of Energy

- PO 1. Identify various ways in which electrical energy is generated using renewable and nonrenewable resources.

- PO 2. Identify several ways in which energy may be stored.
- PO 3. Compare the following ways in which energy may be transformed: mechanical to electrical, and electrical to thermal.
- PO 4. Explain how thermal energy (heat energy) can be transferred by: conduction, convection, and radiation.

Strand 6: Earth and Space Science

Concept 1: Structure of the Earth

- PO 1. Describe the properties and the composition of the layers of the atmosphere.
- PO 2. Explain the composition, properties, and structure of the Earth's lakes and rivers.
- PO 3. Explain the composition, properties, and structures of the oceans' zones and layers.
- PO 4. Analyze the interactions between the Earth's atmosphere and the Earth's bodies of water (water cycle).
- PO 5. Describe ways scientists explore the Earth's atmosphere and bodies of water. (See S2 C1)

Concept 2: Earth's Processes and Systems

- PO 1. Explain how water is cycled in nature.
- PO 2. Identify the distribution of water within or among the following: atmosphere, lithosphere, and hydrosphere.
- PO 3. Analyze the effects that bodies of water have on the climate of a region.
- PO 4. Analyze the following factors that affect climate: ocean currents, elevation, and location.
- PO 5. Analyze the impact of large-scale weather systems on the local weather.
- PO 6. Create a weather system model that includes: The Sun, the atmosphere, and bodies of water.

Underlying all of the science standard strands are the five unifying concepts:

- Systems, Order, and Organization
- Evidence, Models, and Explanation
- Constancy, Change, and Measurement
- Evolution and Equilibrium
- Form and Function