

Arizona's State Standards – Science – 7th 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. Formulate questions based on observations that lead to the development of a hypothesis.

PO 2. Select appropriate resources for background information related to a question, for use in the design of a controlled investigation.

PO 3. Explain the role of a hypothesis in a scientific inquiry.

Concept 2: Scientific Testing (Investigating & 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, utilizing multiple trials, to test a hypothesis using scientific processes.

PO 4. Perform measurements using appropriate scientific tools.

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. Analyze results of data collection in order to accept or reject the hypothesis.

PO 4. Determine validity and reliability of results of an investigation.

PO 5. Formulate a conclusion based on data analysis.

PO 6. Refine hypotheses based on results from investigations.

PO 7. Formulate new questions based on the results of a previous 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. Write clear, step-by-step instructions for following procedures (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. Analyze 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. Analyze environmental risks caused by human interaction with biological or geological systems.

PO 2. Analyze environmental benefits of the following human interactions with biological or geological systems:

reforestation, habitat restoration, and construction of dams.

PO 3. Propose possible solutions to address the environmental risks in biological or geological systems.

Concept 2: Science and Technology in Society:

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

PO 2. Compare 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 scientific discovery that influences technology.

Strand 4: Life Science

Concept 3: Populations of Organisms in an Ecosystem:

PO 1. Compare food chains in a specified ecosystem and their corresponding food web.

PO 2. Explain how organisms obtain and use resources to develop and thrive in: niches and predator/prey relationships.

PO 3. Analyze the interactions of living organisms with their ecosystems: limiting factors and carrying capacity.

PO 4. Evaluate data related to problems associated with population growth and the possible solutions.

PO 5. Predict how environmental factors affect survival rates in living organisms.

PO 6. Create a model of the interactions of living organisms within an ecosystem.

Strand 5: Physical Science

There are no performance objectives at this grade level

Strand 6: Earth and Space Science

Concept 1: Structure of the Earth:

PO 1. Classify rocks and minerals by the following observable properties: grain, color, texture, and hardness.

PO 2. Describe the properties and the composition of the following major layers of the Earth: crust, mantle, and core.

PO 3. Explain the following processes involved in the formation of the Earth's structure: erosion, deposition, plate tectonics, and volcanism.

PO 4. Describe how the rock and fossil record show that environmental conditions have changed over geologic and recent time.

Concept 2: Earth's Processes and Systems:

PO 1. Explain the rock cycle.

PO 2. Distinguish the components and characteristics of the rock cycle for the following types of rocks: igneous, metamorphic, and sedimentary.

PO 3. Analyze the evidence that lithospheric plate movements occur.

PO 4. Explain lithospheric plate movement as a result of convection.

PO 5. Relate plate boundary movements to their resulting landforms, including: mountains, faults, rift valleys, trenches, and volcanoes.

PO 6. Describe how earthquakes are measured.

Concept 3: Earth in the Solar System:

PO 1. Explain the phases of the Moon in terms of the relative positions of the Earth, Sun, and Moon.

PO 2. Construct a model for the relative positions of the Earth, Sun, and Moon as they relate to corresponding eclipses.

PO 3. Explain the interrelationship between the Earth's tides and the Moon.

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.

PO 5. Identify the following major constellations visible (seasonally) from the Northern Hemisphere: Orion, Ursa Major (Great Bear), Cygnus, Scorpius, and Cassiopeia.

PO 6. Explain the relationship among common objects in the solar system, galaxy, and the universe.

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