

SCIENCE STANDARD ARTICULATED BY GRADE LEVEL

Kindergarten

Instruction for students identified as having a significant cognitive disability should be developed from Arizona's Alternate Academic Standards. Only those performance objectives that have an identified alternate are required. When developing lessons or activities aligned to the grade level alternate standards, teachers should consider individual student abilities and their need for accommodations, cues, manipulatives/objects, augmentative devices, and communication systems. In addition, the depth and breadth of the alternate academic standard can be simplified based on the student's current cognitive abilities. Teachers can also develop lessons using performance objectives without alternates for those students who have developed those specific skills.

The goal in the development of the standard was to assure that the six strands and five unifying concepts are interwoven into a fabric of science that represents the true nature of science. Students have the opportunity to develop both the skills and content knowledge necessary to be scientifically literate members of the community.

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

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.

PO 1. Observe common objects using multiple senses.

PO 2. Ask questions based on experiences with objects, organisms, and events in the environment.

PO 3. Predict results of an investigation based on life, physical, and Earth and space sciences (e.g., the five senses, changes in weather).

Concept 2: Scientific Testing (Investigating and Modeling)

Participate in planning and conducting investigations, and recording data.

PO 1. Demonstrate safe behavior and appropriate procedures (e.g., use of instruments, materials, organisms) in all science inquiry.

Alternate: Demonstrate safe behavior.

PO 2. Participate in guided investigations in life, physical, and Earth and space sciences.

Alternate: Participate in investigations in life, physical, and Earth and space sciences.

PO 3. Perform simple measurements using non-standard units of measure to collect data.

Concept 3: Analysis and Conclusions

Organize and analyze data; compare to predictions.

PO 1. Organize (e.g., compare, classify, and sequence) objects, organisms, and events according to various characteristics. (See M00-S4C4-01 and M00-S4C4-03)

Alternate: Organize objects according to various characteristics. (e.g. living/non living; water animals/land animals, hard/soft, etc.)

PO 2. Compare objects according to their measurable characteristics (e.g., longer/shorter, lighter/heavier). (See M00-S4C4-01)

Alternate: Compare objects according to their measurable characteristics (e.g., longer/shorter, lighter/heavier).

Concept 4: Communication

Communicate results of investigations.

PO 1. Communicate observations with pictographs, pictures, models, and/or words. (See M00-S2C1-02)

Alternate: Communicate observations with pictographs, pictures, models, and/or words.

PO 2. Communicate with other groups to describe the results of an investigation. (See LS-R3 and LS-R5)

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.

PO 1. Give examples of how diverse people (e.g., children, parents, weather reporters, cooks, healthcare workers, gardeners) use science in daily life.

PO 2. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Jane Goodall [scientist], supports Strand 4; Louis Braille [inventor], supports Strand 4).

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

No performance objectives at this grade level

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.

No performance objectives at this grade level

Concept 2: Science and Technology in Society

Understand the impact of technology.

PO 1. Describe how simple tools (e.g., scissors, pencils, paper clips, hammers) can make tasks easier.

Alternate: Use simple classroom tools.

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.

PO 1. Distinguish between living things and nonliving things.

Alternate: Identify living and nonliving things.

PO 2. Name the following human body parts:

- head
- shoulders
- arms
- elbows
- wrists
- hands
- fingers
- legs
- hips
- knees
- ankles
- feet
- heels
- toes

Alternate: Identify human body parts.

PO 3. Identify the five senses and their related body parts:

- sight – eyes
- hearing – ears
- smell – nose
- taste – tongue
- touch – skin

Alternate: Identify any of the five senses and their related body parts.

Concept 2: Life Cycles

Understand the life cycles of plants and animals.

PO 1. Describe that most plants and animals will grow to physically resemble their parents.

Concept 3: Organisms and Environments

Understand the relationships among various organisms and their environment.

PO 1. Identify some plants and animals that exist in the local environment.

Alternate: Identify an animal that exists in the local environment.

PO 2. Identify that plants and animals need the following to grow and survive:

- food
- water
- air
- space

Alternate: Identify that animals need food and water to grow and survive.

PO 3. Describe changes observed in a small system (e.g., ant farm, plant terrarium, aquarium).

Concept 4: Diversity, Adaptation, and Behavior

Identify plant and animal adaptations.

No performance objectives at this grade level

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 of Objects and Materials

Classify objects and materials by their observable properties.

PO 1. Identify the following observable properties of objects using the senses:

- shape
- texture
- size
- color (See M00-S4C1-02 and M00-S4C1-03)

Alternate: Identify observable properties of objects using one of the 5 senses.

PO 2. Compare objects by the following observable properties:

- size
- color
- type of material (See M00-S4C1-02)

Concept 2: Position and Motion of Objects

Understand spatial relationships and the way objects move.

PO 1. Describe spatial relationships (i.e., above, below, next to, left, right, middle, center) of objects. (See M00-S4C1-02 and 3SS-R1-01)

Concept 3: Energy and Magnetism

Investigate different forms of energy.

PO 1. Investigate how applied forces (push and pull) can make things move.

PO 2. Investigate how forces can make things move without another thing touching them (e.g., magnets, static electricity).

PO 3. Sort materials according to whether they are or are not attracted by a magnet.

Alternate: Use a magnet.

PO 4. Identify familiar everyday uses of magnets (e.g., in toys, cabinet locks, decoration).

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: Properties of Earth Materials

Identify the basic properties of Earth materials.

PO 1. Identify rocks, soil, and water as basic Earth materials.

Alternate: Identify rocks, soil, and water.

PO 2. Compare physical properties (e.g., color, texture, capacity to retain water) of basic Earth materials.

PO 3. Classify a variety of objects as being natural or man-made.

PO 4. Identify ways some natural or man-made materials can be reused or recycled (e.g., efficient use of paper, recycle aluminum cans).

Concept 2: Objects in the Sky

Identify objects in the sky.

No performance objectives at this grade level

Concept 3: Changes in the Earth and Sky

Understand characteristics of weather conditions and climate.

PO 1. Identify the following aspects of weather:

- temperature
- wind
- precipitation
- storms

PO 2. Describe observable changes in weather.

Alternate: Describe weather.

PO 3. Give examples of how the weather affects people's daily activities.