

SCIENCE STANDARD ARTICULATED BY GRADE LEVEL

GRADE 2

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. Formulate relevant questions about the properties of objects, organisms, and events in the environment. (See M02-S2C1-01)

PO 2. Predict the results of an investigation (e.g., in animal life cycles, phases of matter, the water cycle).

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.

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

PO 3. Use simple tools such as rulers, thermometers, magnifiers, and balances to collect data (U.S. customary units). (See M02-S4C4-05 and M02-S4C4-06)

PO 4. Record data from guided investigations in an organized and appropriate format (e.g., lab book, log, notebook, chart paper). (See W02-S3C2-01 and W02-S3C3-01)

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Concept 3: Analysis and Conclusions

Organize and analyze data; compare to predictions.

PO 1. Organize data using graphs (i.e., pictograph, tally chart), tables, and journals.
(See M02-S2C1-02)

PO 2. Construct reasonable explanations of observations on the basis of data obtained (e.g., Based on the data, does this make sense? Could this really happen?).
(See M02-S2C1-04)

PO 3. Compare the results of the investigation to predictions made prior to the investigation.

PO 4. Generate questions for possible future investigations based on the conclusions of the investigation.

Concept 4: Communication

Communicate results of investigations.

PO 1. Communicate the results and conclusions of an investigation (e.g., verbal, drawn, or written).
(See M02-S2C1-02 and W02-S3C2-01)

PO 2. Communicate with other groups to describe the results of an investigation.
(See LS-F1)

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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. Identify how diverse people and/or cultures, past and present, have made important contributions to scientific innovations (e.g., Daniel Hale Williams [physician], supports Strand 4; Charles Drew [physician], supports Strand 4; Elizabeth Blackwell [physician], supports Strand 4).

PO 2. Identify science-related career opportunities.

Concept 2: Nature of Scientific Knowledge

Understand how science is a process for generating knowledge.

PO 1. Identify components of familiar systems (e.g., organs of the digestive system, bicycle).

PO 2. Identify the following characteristics of a system:

- consists of multiple parts or subsystems
- parts work interdependently

PO 3. Identify parts of a system too small to be seen (e.g., plant and animal cells).

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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. Analyze how various technologies impact aspects of people's lives (e.g., entertainment, medicine, transportation, communication).

PO 2. Describe important technological contributions made by people, past and present:

- automobile – Henry Ford
- airplane – Wilbur and Orville Wright
- telephone – Alexander G. Bell

PO 3. Identify a simple problem that could be solved by using a suitable tool.

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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. Identify animal structures that serve different functions (e.g., sensory, defense, locomotion).

PO 2. Identify the following major parts of:

- the digestive system – mouth, esophagus, stomach, small and large intestines
- respiratory system – nose, trachea, lungs, diaphragm
- circulatory system – heart, arteries, veins, blood

(See 1CH-F3-01)

PO 3. Describe the basic functions of the following systems:

- digestive – breakdown and absorption of food, disposal of waste
- respiratory – exchange of oxygen and carbon dioxide
- circulatory – transportation of nutrients and oxygen throughout the body

(See 1CH-F3-02)

Concept 2: Life Cycles

Understand the life cycles of plants and animals.

PO 1. Describe the life cycles of various insects.

PO 2. Describe the life cycles of various mammals.

PO 3. Compare the life cycles of various organisms.

Concept 3: Organisms and Environments

Understand the relationships among various organisms and their environment.

No performance objectives at this grade level

Concept 4: Diversity, Adaptation, and Behavior

Identify plant and animal adaptations.

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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. Describe objects in terms of measurable properties (e.g., length, volume, weight, temperature) using scientific tools.

(See M02-S4C4-01 and M02-S4C4-02)

PO 2. Classify materials as solids, liquids, or gases.

PO 3. Demonstrate that water can exist as a:

- gas – vapor
- liquid – water
- solid – ice

PO 4. Demonstrate that solids have a definite shape and that liquids and gases take the shape of their containers.

Concept 2: Position and Motion of Objects

Understand spatial relationships and the way objects move.

No performance objectives at this grade level

Concept 3: Energy and Magnetism

Investigate different forms of energy.

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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.

No performance objectives at this grade level

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. Measure weather conditions (e.g., temperature, precipitation). (See M02-S4C4-04 and M02-S4C4-05)

PO 2. Record weather conditions (e.g., temperature, precipitation).

PO 3. Identify the following types of clouds:

- cumulus
- stratus
- cirrus

PO 4. Analyze the relationship between clouds, temperature, and weather patterns.

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