Science Standards
Grade 4

Strand:

S1 Scientific Inquiry: The student demonstrates abilities necessary to do scientific inquiry and an understanding about scientific inquiry; that is, the student:

Standards: S1a: proposes questions about scientific phenomena, objects, and organisms.

Components:

S1a1. groups questions according to those that are not scientific questions; those that can be answered through scientific investigations; and those that can be answered through secondary resources.

S1a2. refines questions that can be answered through investigations.

Standards: S1b: uses observations and past experiences to make predictions and explain the reasoning behind the predictions.

S1c: plans and conducts a "fair test."

Components:

S1c1. gathers materials and/or information needed to conduct a "fair test".

S1c2. identifies variables to be controlled in a "fair test".

S1c3. follows logical steps to conduct a "fair test."

S1c4. uses simple tools (such as scales, thermometers, timers, microscopes, hot plate, etc.) and units of measure (U.S. customary units and metric units).

S1c5. records data from investigations in an organized and appropriate format (e.g., lab book, log, notebook, t-chart, etc).

Standards: S1d: compares data, identifies patterns, and forms conclusions based on investigations.

S1e: compares and groups objects based on observable and measurable characteristics (e.g., characteristics of the phases of matter) and justifies the groups based on a logical classification scheme.

S1f: analyzes and makes statements about models and data displayed in a Venn diagram, graph and table.

S1g: communicates scientific explorations through discussions with peers, drawing, graphs, tables, reports, and poster presentations.

S1h: demonstrates safe practices in science.

Components:

S1h1. explains and conducts safe Sun viewing procedures and practices.

S1h2. explains and conducts safe use of tools.

S1h3. explains and conducts safe experiments with batteries and bulbs.

Strand:

S2 History and Nature of Science: The student demonstrates an understanding of science as a human endeavor, that is, the student:

Standards: S2a: realizes how difficult it can be for scientific innovators to break through the accepted ideas of their time to reach conclusions we currently take for granted.

S2b: understands that scientists value peer review and making public the result of scientific pursuits; science is not separate from society.

S2c: understands that doing science requires varying human abilities, interest, and habits of mind (such as: reasoning, insight, skill, creativity, intellectual honesty, skepticism, and openness to new ideas).

Strand:

S3 Personal & Social Perspectives: The student demonstrates an understanding of safety, types of resources, and changes in the environment; that is, the student:

Standards: S3a: identifies natural and human-made changes in the environment and explains how they affect resources in the environment.

S3b: recognizes that science and technology are used to identify ways to extend resources and contribute solutions to social problems.

Strand:

S4 Science and Technology: The student demonstrates an understanding of science and technology and the nature of technological design; that is, the student:

Standards: S4a: identifies a problem, implements a proposed solution for the problem, discusses the merit of the solution, and improves on the solution after evaluation.

S4b: identifies some of the technological solutions that make life easier and the trade-offs (safety, cost, efficiency, health and environmental side effects, etc.) involved in those solutions.

S4c: gives examples of ways technology is essential for the advancement of scientific knowledge.

Strand:

S5 Physical Science: The student demonstrates a conceptual understanding of matter, motion, and energy; that is, the student:

Standards: S5a: demonstrates an understanding that many of the observable properties of materials allow us to group them into categories such as solid, liquid, or gas.

Components:

S5a1. describe the properties matter.

S5a2. distinguish among solids, liquids and gases (i.e. volume, shape they take in container).

Standards: S5b: explains that water can change from one state to another by heating or cooling.

Components:

S5b1. explains that water can freeze, melt, evaporate, and condense.

S5b2. demonstrates that changes of state are reversible.

S5b3. observes and measures conservation of mass as water changes from a solid to a liquid and back.

Standards: S5c: Recognizes that heat can spread from one place to another.

Components:

S5c1. Demonstrates that heat moves from one place to another by conduction.

S5c2. Compares materials for their ability to conduct heat.

Strand:

S6 Life Science: The student demonstrates a conceptual understanding of organisms, and their environments; that is, the student:

Standards: S6a: builds awareness that reproduction is essential to the continuation of a species.

Components:

S6a1. examines and describes the production of offspring in observed animals (e.g., snails, fish, brine shrimp).

S6a2. investigates and provides examples of the varying reproductive strategies in organisms (e.g., lots of eggs, one offspring that is cared for, wide dispersal of seeds), citing evidence from observations and readings.

Standards: S6b: builds an awareness of variations and similarities in organisms.

Components:

S6b1. illustrates through simulations how different variations of a structure (e.g., bird beaks) are suited to specific functions (e.g., cracking seeds, digging for worms).

S6b2. describes that internal and external cues influence the behavior of organisms.

S6b3. identifies variations and similarities in the behavior of organisms.

S6b4. classifies animals according to various organizational schemes and recognizes that the organizing schemes can vary according to purpose.

Standards: S6c: differentiates between inherited physical traits and those that are not inherited in animals.

Components:

S6c1. discusses that when animals reproduce, both biological parents pass on information that determine characteristics of the offspring.

S6c2. lists physical characteristics of animals that are caused by interaction with the environment and those that are inherited.

S6c3. explains that learned behaviors are not passed on to the next generation.

Standards: S6d: explains that variations in organisms can determine whether the individual will survive and reproduce.

Components:

S6d1. describes how individuals of the same species vary and sometimes these variations can help the organism survive and reproduce.

Standards: S6e: illustrates the interdependence of organisms in an ecosystem.

Components:

S6e1. discusses and provides examples of how all organisms ultimately depend on plants.

S6e2. identifies that some organisms depend on dead plants and animals for food.

S6e3. identifies microorganisms as necessary components in all ecosystems.

S6e4. describes and explains that the world has many distinct environments (e.g., rainforest, desert, plains, wetlands).

S6e5. identifies factors in the ecosystem that enable or prevent an organism from surviving and reproducing.

S6e6. provides examples of how an organism's patterns of behavior are affected by the environment (e.g., availability of food sources, change in the number of predators).

Strand:

S7 Earth & Space Sciences: The student demonstrates a conceptual understanding of Earth materials, objects in the sky, and changes in Earth and sky; that is, the student:

Standards: S7a: develops an understanding of the importance of water as an earth material.

Components:

S7a1. identifies major sources of water on earth.

S7a2. verifies that water can be found underground, on the surface of earth and in the atmosphere.

Standards: S7b: explains that water on earth can exist in different states.

Components:

S7b1. investigates conditions associated with change in the states of water.

Standards: S7c: examines components and relationships in the solar system.

Components:

S7c1. describes common objects (i.e. Sun, planets, moons) in the solar system.

S7c2. observes safely, records, and describes the yearly pattern of the Sun's apparent path (i.e., seasonal change in length of day/night, changes in point of Sunrise/set, changes in noon altitude).

S7c3. identifies the predictable monthly pattern of the moon's phases (new, crescent quarter, gibbous, full).

S7c4. identifies, observes and describes the physical features of the moon (e.g. craters, plains, mountains) using photographic images.

S7c5. demonstrates and explains that the rotation of planet earth produces the night and day cycle.