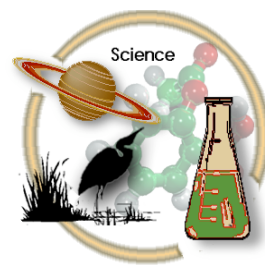


Science

Grade 7



Standard 1: The student develops effective problem-solving strategies.

- 1.1 Makes observations, inferences, predictions and estimations
- 1.2 Collects data through a variety of methods
- 1.3 Classifies and organizes data
- 1.4 Takes measurements and converts measurements within and between systems
- 1.5 Communicates observations, research, results and conclusions through a variety of methods and uses appropriate vocabulary

Standard 2: The student understands the nature of scientific knowledge and investigations.

- 2.1 Knows that an experiment must be repeated many times and yield consistent results before the results are accepted as correct
- 2.2 Knows that all scientific ideas are tentative and subject to change and improvement in principle, but for most core ideas in science, there is much experimental and observational confirmation
- 2.3 Understands that questioning, response to criticism, and open communication are integral to the process of science

Standard 3: The student understands the nature and tools of scientific inquiry.

- 3.1 Knows that there is no fixed procedure called “the scientific method,” but that investigations involve systematic observations, carefully collected, relevant evidence, logical reasoning, and some imagination in developing hypothesis and explanations
- 3.2 Designs and conducts a scientific investigation
- 3.3 Knows that observations can be affected by bias
- 3.4 Uses appropriate tools and techniques to gather, analyze and interpret scientific data
- 3.5 Establishes relationships based on evidence and logical argument
- 3.6 Understands the nature of scientific explanations
- 3.7 Knows that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models and explanations proposed by other scientists
- 3.8 Knows possible outcomes of scientific investigations

Standard 4: The student understands science as a human endeavor.

4.1 Knows that people of all backgrounds and with diverse interests, talents, qualities, and motivations engage in fields of science and engineering; some of these people work in teams and others work alone, but all communicate extensively with others

4.2 Knows that the work of science requires a variety of human abilities, qualities, and habits of mind

4.3 Knows various settings in which scientists and engineers may work

4.4 Understands ethics associated with scientific study

4.5 Knows that throughout history, many scientific innovators have had difficulty breaking through accepted ideas of their time to reach conclusions that are now considered to be common knowledge

4.6 Knows ways in which science and society influence one another

Standard 5: The student understands basic features of the earth.

5.1 Knows that the cycling of water in and out of the atmosphere plays an important role in determining climatic patterns; water evaporates from the surface of the earth, rises and cools, condenses into rain or snow and falls to the surface where it forms rivers and lakes and collects in porous layers of rock

5.2 Knows that the sun is the major source of energy for phenomena on the earth's surface, such as winds, ocean currents, the water cycle and the growth of plants

5.3 Knows that water is a solvent; as it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans

Standard 6: The student understands basic earth processes.

6.1 Knows that the composition and texture of the soil and its fertility are influenced by debris, bacteria, fungi, worms, rodents and other animals as they break up the soil and add organic material to it

Standard 8: The student knows about the diversity and unity that characterize life.

8.1 Knows that animals and plants have a great variety of body plans and internal structures that contribute to their being able to make food and reproduce

8.2 Knows that all organisms, including humans, are part of and depend on two main global food webs

8.3 Knows that organisms can be classified according to the function they serve in a food chain (producer, consumer, decomposer) and by the details of their internal and external features

8.4 Knows that major categories of living organisms are plants, which get their energy directly from sunlight, and animals, which consume energy-rich foods; some kinds of organisms cannot be neatly classified as either plants or animals

8.5 Knows that although different species look very different, the unity among organisms becomes apparent from an analysis of internal structures, observation of the similarity of their chemical processes, analysis of their genetic makeup and the evidence of common ancestry

8.6 Knows that for sexually reproducing organisms, a species comprises all organisms that can mate with one another to produce fertile offspring

Standard 9: The student understands the genetic basis for the transfer of biological characteristics.

9.1 Knows that reproduction is a characteristic of all living systems; since no individual organism lives forever, reproduction is essential to the continuation of species

9.2 Knows that in some kinds of organisms, all the genes come from a single parent, whereas in organisms that have sexes, typically half of the genes come from each parent

9.3 Knows that in sexual reproduction, an egg from a female unites with a sperm from a male to begin the development of a new individual that has an equal contribution of information from its mother and its father; sexually produced offspring are never identical to either of their parents

9.4 Knows that the characteristics of an organism can be described in terms of a combination of traits; some traits are inherited and others result from interactions with the environment

9.5 Knows that hereditary information is contained in genes, located in the chromosomes of each cell; each gene carries a single unit of information, and an inherited trait of an individual can be determined by either one or many genes

9.6 Knows that selective breeding can cause small differences between parents and offspring to accumulate in successive generations so that descendants are very different from their ancestors; selective breeding for particular traits has resulted in new varieties of cultivated plants and domestic animals

Standard 10: The student knows the general structure and function of cells in organisms.

10.1 Knows that living systems at all levels of organization demonstrate complementarity of structure and function; the major levels of organization for structure and function; the major levels of organization include cells, tissues, organs, organ systems, whole organisms and ecosystems

10.2 Knows that all organisms are composed of cells, which are the fundamental units of life; most organisms are single cells, but other organisms are multi-cellular

10.3 Knows that cells carry on the many functions needed to sustain life and that cells are able to grow and divide; this requires that cells take in nutrients, which they use to power their work and then make the materials that a cell or organism needs

10.4 Knows that specialized cells perform specialized functions in multi-cellular organisms; each type of cell, tissue and organ has a distinct structure and set of functions that serve the organism as a whole

10.5 Knows that disease represents a breakdown in structures and functions of an organism; some diseases are the result of intrinsic failures of the system, whereas others are the result of infection by other organisms

Standard 11: The student understands how species depend on one another and on the environment for survival.

11.1 Knows that all species ultimately depend upon one another; interactions between two types of organisms include producer/consumer, predator/prey, parasite/host, and relationships that can be mutually beneficial or competitive

11.2 Knows that populations consist of all individuals of a species that occur together at a given place; all of the population living together (community) and the physical factors with which they interact compose an ecosystem

11.3 Knows that behavior is one kind of response an organism may make to an internal or environmental stimulus, and may be determined by heredity or from past experience

11.4 Knows that the number and types of organisms an ecosystem can support depend on the resources available and abiotic factors such as quantity of light and water, range of temperatures; limitations of resources and other factors such as predation and climate limit the growth of populations in specific niches in the ecosystem

Standard 12: The student understands the cycling of matter and flow of energy through the living environment.

12.1 Knows that almost all food energy ultimately comes from the sun as plants convert light into stored chemical energy; that energy can change from one form to another in living things; and that animals get energy from oxidizing their food, releasing some of its energy as heat

12.2 Knows how matter is transferred from one organism to another repeatedly and between organisms and their physical environment; as in all material systems, the total amount of matter remains constant, even though its form and location change

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