



Middle School Science

The ISK Science program is designed to engage students' natural curiosity. Teachers begin by laying a foundation of knowledge, and then students' own interests and curiosity help guide the learning. Many units integrate concepts and skills multiple curricular areas, such as: math, library, art, music and technology.

Science units are designed to provide opportunities for students to learn through inquiry and hands-on activities. Units are centered around five general strands:

1. *Nature of Science and Scientific Inquiry (integrated into all units)*
2. *Life Sciences*
3. *Physical Sciences*
4. *Earth and Beyond*
5. *Environmental Sciences (integrated into all units)*



Grade 6

1. NATURE OF SCIENCE

Standard 1.1: Understand the nature of scientific inquiry (*Understand and use the scientific method*)

- 1.1.1 Develop a hypothesis
- 1.1.2 Recognize whether evidence is consistent with a proposed explanation
- 1.1.3 Identify variables in a scientific investigation

Standard 1.2: Communicate scientific ideas and activities clearly

- 1.2.1 Write a report of an investigation that includes conducting tests, collecting data or examining evidence and drawing conclusions

Standard 1.3: Investigate using appropriate tools and instruments to conduct scientific activities

- 1.3.1 Select and use appropriate tools and technology to perform tests, collect data, and display data

Standard 1.4: Understand the nature of scientific knowledge and enterprise (*Understand why science is important*)

- 1.4.1 Understand the nature of scientific explanations (e.g. emphasis on evidence; use of logically consistent arguments...)
- 1.4.2 Know 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
- 1.4.3 Know 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

2. LIFE SCIENCES

Standard 2.1: Understand biological evolution and diversity (scientific comparisons)

- 2.1.1 Know ways in which living things can be classified (taxonomy of animals, response to stimuli, internal/external features, function in an ecosystem...)

Standard 2.2: Understand the structure and function of cells and organisms

- 2.2.1 Describe cell theory
- 2.2.2 Compare and contrast plant and animals cells
- 2.2.3 Explain cell diversity
- 2.2.4 Know the levels of organization in living systems (cells, tissues, organs...)
- 2.2.5 Know that organisms have a great variety of body plans
- 2.2.6 Know that multicellular organisms have a variety of specialized cells, tissues, organs and organ systems that perform specialized functions

Standard 2.5: Understand the principles of heredity and related concepts

- 2.5.1 Know that reproduction is a characteristic of all living things and is essential to the continuation of a species

3. PHYSICAL SCIENCES

Standard 3.1: Understand the structure and properties of matter

- 3.1.1 Know that matter is made up of tiny particles called atoms
- 3.1.2 Know the structure of atoms (protons, neutrons, electrons)
- 3.1.3 Know that many elements can be grouped according to similar properties (e.g., highly reactive metals, less-reactive metals, highly reactive nonmetals, almost completely nonreactive gases)
- 3.1.4 Know that substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties

Standard 3.2: Understand the sources and properties of energy

- 3.2.1 Understand the law of conservation of energy
- 3.2.2 Know that heat energy flows from warmer materials or regions to cooler ones through conduction, convection, and radiation



Grade 6

- 3.2.3 Know the organization of a simple electric circuit
- 3.2.4 Know that electrical circuits provide a means of transferring electrical energy to produce heat, light, sound, and chemical changes

4. EARTH AND BEYOND

Standard 4.1: Understand the composition, structure and features of the geosphere, hydrosphere and atmosphere (Earth, Water and Air)

- 4.1.1 Know that the Earth is comprised of layers including a core, mantle, lithosphere, hydrosphere, and atmosphere
- 4.1.2 Know how land forms are created through a combination of constructive and destructive forces
- 4.1.3 Know components of soil and other factors that influence soil texture, fertility, and resistance to erosion (e.g., plant roots and debris, bacteria, fungi, worms, rodents)
- 4.1.4 Know that the Earth's crust is divided into plates that move at extremely slow rates in response to movements in the mantle
- 4.1.5 Know processes involved in the rock cycle
- 4.1.6 Know that sedimentary, igneous, and metamorphic rocks contain evidence of the minerals, temperatures, and forces that created the
- 4.1.7 Know how successive layers of sedimentary rock and the fossils contained within them can be used to confirm the age, history, and changing life forms of the Earth, and how this evidence is affected by the folding, breaking, and uplifting of layers
- 4.1.8 Know that fossils provide important evidence of how environmental conditions have changed on the Earth over time

5. ENVIRONMENTAL SCIENCES

Standard 5.1: Understand atmospheric processes and cycles

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- 5.1.1 Explain the importance of biodiversity

Standard 5.2: Understand how society uses and conserves resources and energy

- 5.2.1 Differentiate between renewable and non-renewable resources including how different resources are produced, rates of use, renewal rates and limitations of sources.

Standard 5.3: Identify, investigate and evaluate environmental problems and issues

- 5.3.1 Give examples of human impact on various ecosystems

Standard 5.4: Develop an understanding and commitment to environmental responsibility

- 5.4.1 Describe the actual and potential effects of habitat destruction, erosion and depletion of soil fertility associated with human activities.
- 5.4.2 Explain how the environment is perceived differently by various cultures