Grade Five

The fifth-grade standards emphasize the importance of selecting appropriate instruments for measuring and recording observations. The organization, analysis, and application of data continue to be an important focus of classroom inquiry. Science skills from preceding grades, including questioning, using and validating evidence, and systematic experimentation, are reinforced at this level. Students are introduced to more detailed concepts of sound and light and the tools used for studying them. Key concepts of matter, including those about atoms, molecules, elements, and compounds, are studied, and the properties of matter are defined in greater detail. The cellular makeup of organisms and the distinguishing characteristics of groups of organisms are stressed. Students learn about the characteristics of the oceans and the Earth's changing surface.

The fifth-grade standards focus on student growth in understanding the nature of science. This scientific view defines the idea that explanations of nature are developed and tested using observation, experimentation, models, evidence, and systematic processes. The nature of science includes the concepts that scientific explanations are based on logical thinking; are subject to rules of evidence; are consistent with observational, inferential, and experimental evidence; are open to rational critique; and are subject to refinement and change with the addition of new scientific evidence. The nature of science includes the concept that science can provide explanations about nature, can predict potential consequences of actions, but cannot be used to answer all questions.

Scientific Investigation, Reasoning, and Logic

5.1 The student will plan and conduct investigations in which
- a) rocks, minerals, and organisms are identified using a classification key;
- b) estimations of length, mass, and volume are made;
- c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;
- d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);
- e) data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);
- f) predictions are made using patterns, and simple graphical data are extrapolated;
- g) manipulated and responding variables are identified; and
- h) an understanding of the nature of science is developed and reinforced.

Force, Motion, and Energy

5.2 The student will investigate and understand how sound is transmitted and is used as a means of communication. Key concepts include
- a) frequency, waves, wavelength, vibration;
- b) the ability of different media (solids, liquids, and gases) to transmit sound; and
- c) uses and applications (voice, sonar, animal sounds, and musical instruments).

5.3 The student will investigate and understand basic characteristics of visible light and how it behaves. Key concepts include
a) the visible spectrum and light waves;
b) refraction of light through water and prisms;
c) reflection of light from reflective surfaces (mirrors);
d) opaque, transparent, and translucent; and
e) historical contributions in understanding light.

Matter

5.4 The student will investigate and understand that matter is anything that has mass, takes up space, and occurs as a solid, liquid, or gas. Key concepts include
a) atoms, elements, molecules, and compounds;
b) mixtures including solutions; and
c) the effect of heat on the states of matter.

Living Systems

5.5 The student will investigate and understand that organisms are made of cells and have distinguishing characteristics. Key concepts include
a) basic cell structures and functions;
b) kingdoms of living things;
c) vascular and nonvascular plants; and
d) vertebrates and invertebrates.

Interrelationships in Earth/Space Systems

5.6 The student will investigate and understand characteristics of the ocean environment. Key concepts include
a) geological characteristics (continental shelf, slope, rise);
b) physical characteristics (depth, salinity, major currents); and
c) biological characteristics (ecosystems).

Earth Patterns, Cycles, and Change

5.7 The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include
a) the rock cycle including identification of rock types;
b) Earth history and fossil evidence;
c) the basic structure of the Earth's interior;
d) plate tectonics (earthquakes and volcanoes);
e) weathering and erosion; and
f) human impact.