

§112.22. Science, Grade 6.

(a) Introduction.

- (1) In Grade 6, the study of science includes conducting field and laboratory investigations using scientific methods, analyzing data, making informed decisions, and using tools such as beakers, test tubes, and spring scales to collect, analyze, and record information. Students also use computers and information technology tools to support scientific investigations.
- (2) As students learn science skills, they identify components of the solar system including the Sun, planets, moon, and asteroids and learn how seasons and the length of the day are caused by the tilt and rotation of the Earth as it orbits the Sun. Students investigate the rock cycle and identify sources of water in a watershed. In addition, students identify changes in objects including position, direction, and speed when acted upon by a force.
- (3) Students classify substances by their chemical properties and identify the water cycle and decay of biomass as examples of the interactions between matter and energy. They identify life processes and the relationships between structure and function of organisms.
- (4) Science is a way of learning about the natural world. Students should know how science has built a vast body of changing and increasing knowledge described by physical, mathematical, and conceptual models, and also should know that science may not answer all questions.
- (5) A system is a collection of cycles, structures, and processes that interact. Students should understand a whole in terms of its components and how these components relate to each other and to the whole. All systems have basic properties that can be described in terms of space, time, energy, and matter. Change and constancy occur in systems and can be observed and measured as patterns. These patterns help to predict what will happen next and can change over time.
- (6) Investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.

(b) Knowledge and skills.

(6.1) **Scientific processes.** The student conducts field and laboratory investigations using safe, environmentally appropriate, and ethical practices.

The student is expected to:

- (A) demonstrate safe practices during field and laboratory investigations; and
- (B) make wise choices in the use and conservation of resources and the disposal or recycling of materials.

(6.2) **Scientific processes.** The student uses scientific inquiry methods during field and laboratory investigations.

The student is expected to:

- (A) plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting and using equipment and technology;
- (B) collect data by observing and measuring;

- (C) analyze and interpret information to construct reasonable explanations from direct and indirect evidence;
- (D) communicate valid conclusions; and
- (E) construct graphs, tables, maps, and charts using tools including computers to organize, examine, and evaluate data.

(6.3) **Scientific processes.** The student uses critical thinking and scientific problem solving to make informed decisions.

The student is expected to:

- (A) analyze, review, and critique scientific explanations, including hypotheses and theories, as to their strengths and weaknesses using scientific evidence and information;
- (B) draw inferences based on data related to promotional materials for products and services;
- (C) represent the natural world using models and identify their limitations;
- (D) evaluate the impact of research on scientific thought, society, and the environment; and
- (E) connect Grade 6 science concepts with the history of science and contributions of scientists.

(6.4) **Scientific processes.** The student knows how to use a variety of tools and methods to conduct science inquiry.

The student is expected to:

- (A) collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes; and
- (B) identify patterns in collected information using percent, average, range, and frequency.

(6.5) **Scientific concepts.** The student knows that systems may combine with other systems to

The student is expected to:

- (A) identify and describe a system that results from the combination of two or

form a larger system.

more systems such as in the solar system; and

- (B) describe how the properties of a system are different from the properties of its parts.

(6.6) **Science concepts.** The student knows that there is a relationship between force and motion.

The student is expected to:

- (A) identify and describe the changes in position, direction of motion, and speed of an object when acted upon by force;
- (B) demonstrate that changes in motion can be measured and graphically represented; and
- (C) identify forces that shape features of the Earth including uplifting, movement of water, and volcanic activity.

(6.7) **Science concepts.** The student knows that substances have physical and chemical properties.

The student is expected to:

- (A) demonstrate that new substances can be made when two or more substances are chemically combined and compare the properties of the new substances to the original substances; and
- (B) classify substances by their physical and chemical properties.

(6.8) **Science concepts.** The student knows that complex interactions occur between matter and energy.

The student is expected to:

- (A) define matter and energy;
- (B) explain and illustrate the interactions between matter and energy in the water cycle and in the decay of biomass such as in a compost bin; and
- (C) describe energy flow in living systems including food chains and food webs.

(6.9) **Science concepts.** The student knows that obtaining, transforming, and distributing energy affects the environment.

The student is expected to:

- (A) identify energy transformations occurring during the production of energy for human use such as electrical energy to heat energy or heat energy to electrical energy;

- (B) compare methods used for transforming energy in devices such as water heaters, cooling systems, or hydroelectric and wind power plants; and
- (C) research and describe energy types from their source to their use and determine if the type is renewable, non-renewable, or inexhaustible.

(6.10) **Science concepts.** The student knows the relationship between structure and function in living systems.

The student is expected to:

- (A) differentiate between structure and function;
- (B) determine that all organisms are composed of cells that carry on functions to sustain life; and
- (C) identify how structure complements function at different levels of organization including organs, organ systems, organisms, and populations.

(6.11) **Science concepts.** The student knows that traits of species can change through generations and that the instructions for traits are contained in the genetic material of the organisms.

The student is expected to:

- (A) identify some changes in traits that can occur over several generations through natural occurrence and selective breeding;
- (B) identify cells as structures containing genetic material; and
- (C) interpret the role of genes in inheritance.

(6.12) **Science concepts.** The student knows that the responses of organisms are caused by internal or external stimuli.

The student is expected to:

- (A) identify responses in organisms to internal stimuli such as hunger or thirst;
- (B) identify responses in organisms to external stimuli such as the presence or absence of heat or light; and
- (C) identify components of an ecosystem to which organisms may respond.

(6.13) **Science concepts.** The student knows components of our solar system.

The student is expected to:

- (A) identify characteristics of objects in our solar system including the Sun,

planets, meteorites, comets,
asteroids, and moons; and

- (B) describe types of equipment and transportation needed for space travel.

(6.14) **Science concepts.** The student knows the structures and functions of Earth systems.

The student is expected to:

- (A) summarize the rock cycle;
- (B) identify relationships between groundwater and surface water in a watershed; and
- (C) describe components of the atmosphere, including oxygen, nitrogen, and water vapor, and identify the role of atmospheric movement in weather change.

Source: The provisions of this §112.22 adopted to be effective September 1, 1998, 22 TexReg 7647.