

Snapshots: Grade 7 Science

Snapshots are ideas for classroom activities that address the intent of the Texas Essential Knowledge and Skills for Science. Snapshots may cover part of a TEKS statement, but not necessarily the whole statement. Snapshots represent one way, out of many possible ways, of addressing specific TEKS statements.

The TEKS for Science listed here are from *Chapter 112. Texas Essential Knowledge and Skills for Science. Subchapter B. Middle School. §112.23. Science, Grade 7. (a) Introduction and (b) Knowledge and skills.* The middle school TEKS for Science can be viewed and downloaded on the Texas Education Agency website or purchased in book form through our [online catalog](#).

(a) Introduction.

- (1) In Grade 7, the study of science includes conducting field and laboratory investigations using scientific methods, critical-thinking, problem-solving, and using tools such as weather instruments and calculators to collect and analyze information to explain a phenomenon. Students also use computers and information technology tools to support scientific investigations.
- (2) As students learn science skills, they identify gravity and phases of the moon as components of the solar system and explore the effects of events such as hurricanes on the Earth. Students use pulleys and levers to understand the relationship between force and motion. Students then relate the concept to processes in the human organism such as the movement of blood. In addition, students study chemical and physical properties of substances by examining the tarnishing of metal or burning of wood as examples of chemical processes, and by identifying physical properties used to place elements on the periodic table.
- (3) Students learn about kinetic and potential energy and identify photosynthesis as an example of the transformation of radiant energy from the Sun into chemical energy for use by plants. Students investigate systems in humans to identify their structures and functions. Student compare asexual and sexual reproduction to illustrate that genetic materials are responsible for both dominant and recessive traits in 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.

(7.1) 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.

(7.2) 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. organize, analyze, make inferences, and predict trends 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.

(7.3) 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 7 science concepts with the history of science and contributions of scientists.

(7.4) Scientific processes. The student knows how to use tools and methods to conduct science inquiry.

The student is expected to:

- a. collect, analyze, and record information to explain a phenomenon using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, hot plates, dissecting equipment, test tubes, safety goggles, spring scales, balances, microscopes, telescopes, thermometers, calculators, field equipment, computers, computer probes, timing devices, magnets, and compasses; and
- b. collect and analyze information to recognize patterns such as rates of change.

(7.5) Science concepts. The student knows that an equilibrium of a system may change.

The student is expected to:

- a. describe how systems may reach an equilibrium such as when a volcano erupts; and
- b. observe and describe the role of ecological succession in maintaining an equilibrium in an ecosystem.

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

The student is expected to:

- a. demonstrate basic relationships between force and motion using simple machines including pulleys and levers;

Snapshot:

- Design a Rube Goldberg apparatus (a complex series of simple machines that does a simple task) with at least one of each simple machine type. Explain the forces and motions at work in the operation of the machine or device.

- b. demonstrate that an object will remain at rest or move at a constant speed and in a straight line if it is not being subjected to an unbalanced force; and

Snapshot:

- Investigate different situations that can be explained using Newton's first law of motion. For example, collect a plastic tumbler, an index card, and several coins of different sizes. Place the index card on the tumbler. Place a coin in the center of the index card. Pull the card out quickly. Observe and record the results for different coins. Analyze the outcome in terms of forces.

- c. relate forces to basic processes in living organisms including the flow of blood and the emergence of seedlings.

Snapshot:

- Fill a small paper drinking cup one-fourth of the way with plaster of paris. Add five to eight green pea or lima bean seeds to the cup and then fill it the rest of the way with plaster of paris. After the plaster hardens, remove the paper cup and set the plaster mold in a petri dish filled with water. Have students observe the set-up each day until the seeds germinate.

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

The student is expected to:

- a. identify and demonstrate everyday examples of chemical phenomena such as rusting and tarnishing of metals and burning of wood;

Snapshot:

- Explore examples of chemical phenomena, such as making yogurt, baking a cake, developing Polaroid film, burning a sparkler, or activating a hot or cold pack. Have students explain why these phenomena are considered chemical changes.

- b. describe physical properties of elements and identify how they are used to position an element on the periodic table; and

Snapshots:

- Observe and record in a science journal the physical properties of common elements like gold, helium, and sulfur.
- Illustrate a family portrait of an element, describing its special properties and "home" on the periodic table.

- c. recognize that compounds are composed of elements.

Snapshot:

- Show students a 5-gram sample of sulfur powder and a 5-gram sample of iron filings. Have students record observations of the elements, such as their color, smell, magnetism, etc. Mix the two elements in a test tube and heat the test tube over a Bunsen burner until the contents turn red hot or appear to "boil." Allow the test tube to cool, break the test tube open, and show the resulting product to the students. Have them record observations of the compound.

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

The student is expected to:

a. illustrate examples of potential and kinetic energy in everyday life such as objects at rest, movement of geologic faults, and falling water; and

Snapshot:

- Investigate and classify everyday examples and natural occurrences of kinetic and potential energy, such as a bouncing ball, a golf swing, a pogo stick, a baseball bat, a waterfall, or an earthquake.

b. identify that radiant energy from the Sun is transferred into chemical energy through the process of photosynthesis.

Snapshot:

- Observe plant cells under a microscope to identify the site of photosynthesis. Research the process of photosynthesis. Combine the laboratory investigative experience with the research information to construct a roadmap that identifies how radiant energy from the sun is transferred to chemical energy through photosynthesis.

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

The student is expected to:

a. identify the systems of the human organism and describe their functions; and

Snapshots:

- Research the function of a human body system.
- Assess students' ability to transfer their understanding by performing a crawfish dissection to explore the internal body systems.
- Construct a Venn diagram to compare the function of the organ systems of two different organisms.

b. describe how organisms maintain stable internal conditions while living in changing external environments.

Snapshot:

- Investigate the relationship between body temperature and the temperature inside and outside the classroom. Graph and analyze the results. Describe ways organisms maintain internal stability, such as shivering, sweating, or panting.

(7.10) Science concepts. The student knows that 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 that sexual reproduction results in more diverse offspring and asexual reproduction results in more uniform offspring;

Snapshot:

- Perform a simple classroom investigation observing the asexual reproduction of ivy stems, lily bulbs, strawberry plants, or planaria. Keep a record over time of the characteristics of the offspring. Observe photographs of offspring, such as mammals, birds, and reptiles, resulting from sexual reproduction. Compare the diversity of asexually and sexually produced offspring.

b. compare traits of organisms of different species that enhance their survival and reproduction; and

Snapshot:

- View pictures of different birds, reptiles, or fish. Research their habitats and determine what characteristics make them successful in their habitats. Discuss which organisms might survive if moved to a new habitat.

c. distinguish between dominant and recessive traits and recognize that inherited traits of an individual are contained in genetic material.

Snapshot:

- Determine if a trait is dominant or recessive using a simple pedigree chart displaying at least three generations. Describe reasons for determining if the trait is dominant or recessive.

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

The student is expected to:

a. analyze changes in organisms such as a fever or vomiting that may result from internal stimuli; and

Snapshot:

- Research physical conditions that may result from some internal stimuli such as headache, fever, vomiting, or stomach pain. Research the probable cause or causes of each of these conditions.

b. identify responses in organisms to external stimuli found in the environment such as the presence or absence of light.

Snapshot:

- Investigate earthworm responses to the presence and absence of light, moisture, and texture.

(7.12) Science concepts. The student knows that there is a relationship between organisms and the environment.

The student is expected to:

a. identify components of an ecosystem;

Snapshot:

- Investigate an ecosystem like the schoolyard, a pond, or an aquarium. Identify its component parts, such as plants, air, soil, water, sunlight, food sources, etc.

b. observe and describe how organisms including producers, consumers, and decomposers live together in an environment and use existing resources;
c. describe how different environments support different varieties of organisms; and

Snapshot:

- Visit a local informal science institution like a zoo, museum, or aquarium. Observe organisms within the context of their simulated or natural living environments, such as birds in an aviary or cacti in a desert biome. Prepare a presentation describing how different environments support particular organisms.

d. observe and describe the role of ecological succession in ecosystems.

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

The student is expected to:

a. identify and illustrate how the tilt of the Earth on its axis as it rotates and revolves around the Sun causes changes in seasons and the length of a day; and
b. relate the Earth's movement and the moon's orbit to the observed cyclical phases of the moon.

(7.14) Science concepts. The student knows that natural events and human activity can alter Earth systems.

The student is expected to:

a. describe and predict the impact of different catastrophic events on the Earth;

Snapshot:

- Research several catastrophic events like flooding, earthquakes, or drought. Describe the effects (such as ecological, cultural, or economic) on the land and on people and other living organisms.

b. analyze effects of regional erosional deposition and weathering; and

Snapshot:

- Prepare a visual chronology of the events that have led to the positive or negative effects of erosion or weathering on the area.

c. make inferences and draw conclusions about effects of human activity on Earth's renewable, non-renewable, and inexhaustible resources.

Snapshots:

- Brainstorm a list of human activities that affect the Earth's resources.