



# **Grade 8 Science Assessment**

## **Eligible Texas Essential Knowledge and Skills**

# STAAR Grade 8 Science Assessment

## Reporting Category 1: Matter and Energy

The student will demonstrate an understanding of the properties of matter and energy and their interactions.

### Grade 8

- (8.5) **Matter and energy.** The student knows that matter is composed of atoms and has chemical and physical properties. The student is expected to
- (A) describe the structure of atoms, including the masses, electrical charges, and locations, of protons and neutrons in the nucleus and electrons in the electron cloud;  
*Readiness Standard*
  - (B) identify that protons determine an element's identity and valence electrons determine its chemical properties, including reactivity;  
*Readiness Standard*
  - (C) interpret the arrangement of the Periodic Table, including groups and periods, to explain how properties are used to classify elements; *Readiness Standard*
  - (D) recognize that chemical formulas are used to identify substances and determine the number of atoms of each element in chemical formulas containing subscripts; *Readiness Standard*
  - (E) investigate how evidence of chemical reactions indicate that new substances with different properties are formed; and  
*Readiness Standard*
  - (F) recognize whether a chemical equation containing coefficients is balanced or not and how that relates to the law of conservation of mass. *Supporting Standard*

## **Grade 7**

- (7.5) **Matter and energy.** The student knows that interactions occur between matter and energy. The student is expected to
- (C) diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids.  
*Supporting Standard*
- (7.6) **Matter and energy.** The student knows that matter has physical and chemical properties and can undergo physical and chemical changes. The student is expected to
- (A) identify that organic compounds contain carbon and other elements such as hydrogen, oxygen, phosphorus, nitrogen, or sulfur; and  
*Supporting Standard*
  - (B) distinguish between physical and chemical changes in matter in the digestive system. *Supporting Standard*

## **Grade 6**

- (6.5) **Matter and energy.** The student knows the differences between elements and compounds. The student is expected to
- (C) differentiate between elements and compounds on the most basic level. *Supporting Standard*
- (6.6) **Matter and energy.** The student knows matter has physical properties that can be used for classification. The student is expected to
- (A) compare metals, nonmetals, and metalloids using physical properties such as luster, conductivity, or malleability; and  
*Supporting Standard*
  - (B) calculate density to identify an unknown substance.  
*Supporting Standard*

## Reporting Category 2: Force, Motion, and Energy

The student will demonstrate an understanding of force, motion, and energy and their relationships.

### Grade 8

- (8.6) **Force, motion, and energy.** The student knows that there is a relationship between force, motion, and energy. The student is expected to
- (A) demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion;  
*Readiness Standard*
  - (B) differentiate between speed, velocity, and acceleration; and  
*Supporting Standard*
  - (C) investigate and describe applications of Newton's law of inertia, law of force and acceleration, and law of action-reaction such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches. *Readiness Standard*

### Grade 7

- (7.7) **Force, motion, and energy.** The student knows that there is a relationship among force, motion, and energy. The student is expected to
- (A) contrast situations where work is done with different amounts of force to situations where no work is done such as moving a box with a ramp and without a ramp, or standing still.  
*Supporting Standard*

### Grade 6

- (6.8) **Force, motion, and energy.** The student knows force and motion are related to potential and kinetic energy. The student is expected to
- (A) compare and contrast potential and kinetic energy;  
*Supporting Standard*

- (C) calculate average speed using distance and time measurements; and  
***Supporting Standard***
  - (D) measure and graph changes in motion.  
***Supporting Standard***
- (6.9) **Force, motion, and energy.** The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form. The student is expected to
- (C) demonstrate energy transformations such as energy in a flashlight battery changes from chemical energy to electrical energy to light energy. ***Supporting Standard***

## Reporting Category 3: Earth and Space

The student will demonstrate an understanding of components, cycles, patterns, and natural events of Earth and space systems.

### Grade 8

- (8.7) **Earth and space.** The student knows the effects resulting from cyclical movements of the Sun, Earth, and Moon. The student is expected to
- (A) model and illustrate how the tilted Earth rotates on its axis, causing day and night, and revolves around the Sun causing changes in seasons; ***Readiness Standard***
  - (B) demonstrate and predict the sequence of events in the lunar cycle; and ***Readiness Standard***
  - (C) relate the position of the Moon and Sun to their effect on ocean tides. ***Supporting Standard***
- (8.8) **Earth and space.** The student knows characteristics of the universe. The student is expected to
- (A) describe components of the universe, including stars, nebulae, and galaxies, and use models such as the Hertzsprung-Russell diagram for classification; ***Readiness Standard***
  - (B) recognize that the Sun is a medium-sized star near the edge of a disc-shaped galaxy of stars and that the Sun is many thousands of times closer to Earth than any other star; ***Supporting Standard***
  - (C) explore how different wavelengths of the electromagnetic spectrum such as light and radio waves are used to gain information about distances and properties of components in the universe; and ***Supporting Standard***
  - (D) model and describe how light years are used to measure distances and sizes in the universe. ***Supporting Standard***

- (8.9) **Earth and space.** The student knows that natural events can impact Earth systems. The student is expected to
- (A) describe the historical development of evidence that supports plate tectonic theory; *Supporting Standard*
  - (B) relate plate tectonics to the formation of crustal features; and *Readiness Standard*
  - (C) interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be reshaped by weathering. *Readiness Standard*
- (8.10) **Earth and space.** The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to
- (A) recognize that the Sun provides the energy that drives convection within the atmosphere and oceans, producing winds and ocean currents; *Supporting Standard*
  - (B) identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts; and *Supporting Standard*
  - (C) identify the role of the oceans in the formation of weather systems such as hurricanes. *Supporting Standard*

### **Grade 7**

- (7.8) **Earth and space.** The student knows that natural events and human activity can impact Earth systems. The student is expected to
- (C) model the effects of human activity on groundwater and surface water in a watershed. *Supporting Standard*

### **Grade 6**

- (6.11) **Earth and space.** The student understands the organization of our solar system and the relationships among the various bodies that comprise it. The student is expected to
- (B) understand that gravity is the force that governs the motion of our solar system. *Supporting Standard*

## Reporting Category 4: Organisms and Environments

The student will demonstrate an understanding of the structures and functions of living organisms and their interdependence on each other and on their environment.

### Grade 8

- (8.11) **Organisms and environments.** The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems. The student is expected to
- (A) describe producer/consumer, predator/prey, and parasite/host relationships as they occur in food webs within marine, freshwater, and terrestrial ecosystems; ***Readiness Standard***
  - (B) investigate how organisms and populations in an ecosystem depend on and may compete for biotic and abiotic factors such as quantity of light, water, range of temperatures, or soil composition; ***Readiness Standard***
  - (C) explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and ***Readiness Standard***
  - (D) recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems. ***Supporting Standard***

### Grade 7

- (7.10) **Organisms and environments.** The student knows that there is a relationship between organisms and the environment. The student is expected to
- (B) describe how biodiversity contributes to the sustainability of an ecosystem; and ***Supporting Standard***
  - (C) observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds. ***Supporting Standard***

- (7.11) **Organisms and environments.** The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many generations. The student is expected to
- (A) examine organisms or their structures such as insects or leaves and use dichotomous keys for identification; and ***Supporting Standard***
  - (C) identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (*Geospiza fortis*) or domestic animals.  
***Supporting Standard***
- (7.12) **Organisms and environments.** The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. The student is expected to
- (B) identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems; ***Supporting Standard***
  - (D) differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole; and  
***Supporting Standard***
  - (F) recognize that according to cell theory all organisms are composed of cells and cells carry on similar functions such as extracting energy from food to sustain life.  
***Supporting Standard***
- (7.14) **Organisms and environments.** The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to
- (B) compare the results of uniform or diverse offspring from sexual reproduction or asexual reproduction; and  
***Supporting Standard***
  - (C) recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus. ***Supporting Standard***

## **Grade 6**

- (6.12) **Organisms and environments.** The student knows all organisms are classified into Domains and Kingdoms. Organisms within these taxonomic groups share similar characteristics which allow them to interact with the living and nonliving parts of their ecosystem. The student is expected to
- (D) identify the basic characteristics of organisms, including prokaryotic or eukaryotic, unicellular or multicellular, autotrophic or heterotrophic, and mode of reproduction, that further classify them in the currently recognized Kingdoms. *Supporting Standard*

## Scientific Investigation and Reasoning Skills

These skills will not be listed under a separate reporting category. Instead, they will be incorporated into at least 40% of the test questions in reporting categories 1–4 and will be identified along with content standards.

### Grade 8

- (8.1) **Scientific investigation and reasoning.** The student, for at least 40% of instructional time, conduct laboratory and field investigations following safety procedures and environmentally appropriate and ethical practices. The student is expected to
- (A) demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards; and
  - (B) practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials.
- (8.2) **Scientific investigation and reasoning.** The student uses scientific inquiry methods during laboratory and field investigations. The student is expected to
- (A) plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology;
  - (B) design and implement comparative and experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology;
  - (C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers;
  - (D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns; and
  - (E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.

- (8.3) **Scientific investigation and reasoning.** The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and know the contributions of relevant scientists. The student is expected to
- (A) in all fields of science, analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, including examining all sides of scientific evidence of those scientific explanations, so as to encourage critical thinking by the student;
  - (B) use models to represent aspects of the natural world such as an atom, a molecule, space, or a geologic feature;
  - (C) identify advantages and limitations of models such as size, scale, properties, and materials; and
  - (D) relate the impact of research on scientific thought and society, including the history of science and contributions of scientists as related to the content.
- (8.4) **Scientific investigation and reasoning.** The student knows how to use a variety of tools and safety equipment to conduct science inquiry. The student is expected to
- (A) use appropriate tools to collect, record, and analyze information, including lab journals/notebooks, beakers, meter sticks, graduated cylinders, anemometers, psychrometers, hot plates, test tubes, spring scales, balances, microscopes, thermometers, calculators, computers, spectrometers, timing devices, and other equipment as needed to teach the curriculum; and
  - (B) use preventative safety equipment, including chemical splash goggles, aprons, and gloves, and be prepared to use emergency safety equipment, including an eye/face wash, a fire blanket, and a fire extinguisher.