



State of Texas Assessments of Academic Readiness

Middle School Science Assessment

Administered in Grade 8

**Eligible Texas Essential
Knowledge and Skills**

STAAR Middle School Science Assessment

Matter and Energy

Grade 8

- 8.6 The student understands that matter can be classified according to its properties and matter is conserved in chemical changes that occur within closed systems. The student is expected to:
- (E) investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis

Grade 7

- 7.6 The student distinguishes between elements and compounds, classifies changes in matter, and understands the properties of solutions. The student is expected to:
- (B) use the periodic table to identify the atoms and the number of each kind within a chemical formula
 - (C) distinguish between physical and chemical changes in matter

Grade 6

- 6.6 The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes. The student is expected to:
- (C) identify elements on the periodic table as metals, nonmetals, metalloids, and rare Earth elements based on their physical properties and importance to modern life
 - (D) compare the density of substances relative to various fluids
 - (E) identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change

Force, Motion, and Energy

Grade 8

- 8.7 The student understands the relationship between force and motion within systems. The student is expected to:
- (A) calculate and analyze how the acceleration of an object is dependent upon the net force acting on the object and the mass of the object using Newton's Second Law of Motion
 - (B) investigate and describe how Newton's three laws of motion act simultaneously within systems such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches
- 8.8 The student knows how energy is transferred through waves. The student is expected to:
- (A) compare the characteristics of amplitude, frequency, and wavelength in transverse waves, including the electromagnetic spectrum

Grade 7

- 7.7 The student describes the cause-and-effect relationship between force and motion. The student is expected to:
- (A) calculate average speed using distance and time measurements from investigations
 - (B) distinguish between speed and velocity in linear motion in terms of distance, displacement, and direction
 - (C) measure, record, and interpret an object's motion using distance-time graphs
- 7.8 The student understands the behavior of thermal energy as it flows into and out of systems. The student is expected to:
- (A) investigate methods of thermal energy transfer into and out of systems, including conduction, convection, and radiation
 - (C) explain the relationship between temperature and kinetic energy of the particles within a substance

Grade 6

- 6.7 The student knows the nature of forces and their role in systems that experience stability or change. The student is expected to:
- (A) identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications
 - (B) calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced
- 6.8 The student knows that the total energy in systems is conserved through energy transfers and transformations. The student is expected to:
- (B) describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis
 - (C) explain how energy is transferred through transverse and longitudinal waves

Earth and Space

Grade 8

- 8.9 The student describes the characteristics of the universe and the relative scale of its components. The student is expected to:
- (A) describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram
 - (B) categorize galaxies as spiral, elliptical, and irregular and locate Earth's solar system within the Milky Way galaxy
- 8.10 The student knows that interactions between Earth, ocean, and weather systems impact climate. The student is expected to:
- (A) describe how energy from the Sun, hydrosphere, and atmosphere interact and influence weather and climate
 - (B) identify global patterns of atmospheric movement and how they influence local weather
 - (C) describe the interactions between ocean currents and air masses that produce tropical cyclones, including typhoons and hurricanes

Grade 7

- 7.9 The student understands the patterns of movement, organization, and characteristics of components of our solar system. The student is expected to:
- (B) describe how gravity governs motion within Earth's solar system
- 7.10 The student understands the causes and effects of plate tectonics. The student is expected to:
- (A) describe the evidence that supports that Earth has changed over time, including fossil evidence, plate tectonics, and superposition
 - (B) describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including supervolcanoes and hot spots
- 7.11 The student understands how human activity can impact the hydrosphere. The student is expected to:
- (A) analyze the beneficial and harmful influences of human activity on groundwater and surface water in a watershed
 - (B) describe human dependence and influence on ocean systems and explain how human activities impact these systems

Grade 6

- 6.9 The student models the cyclical movements of the Sun, Earth, and Moon and describes their effects. The student is expected to:
- (A) model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons
 - (B) describe and predict how the positions of the Earth, Sun, and Moon cause daily, spring, and neap cycles of ocean tides due to gravitational forces
- 6.10 The student understands the rock cycle and the structure of Earth. The student is expected to:
- (B) model and describe the layers of Earth, including the inner core, outer core, mantle, and crust

Organisms and Environments

Grade 8

- 8.12 The student understands stability and change in populations and ecosystems. The student is expected to:
- (B) describe how primary and secondary ecological succession affect populations and species diversity after ecosystems are disrupted by natural events or human activity
 - (C) describe how biodiversity contributes to the stability and sustainability of an ecosystem and the health of the organisms within the ecosystem
- 8.13 The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:
- (A) identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells
 - (B) describe the function of genes within chromosomes in determining inherited traits of offspring
 - (C) describe how variations of traits within a population lead to structural, behavioral, and physiological adaptations that influence the likelihood of survival and reproductive success of a species over generations

Grade 7

- 7.12 The student understands that ecosystems are dependent upon the cycling of matter and the flow of energy. The student is expected to:
- (A) diagram the flow of energy within trophic levels and describe how the available energy decreases in successive trophic levels in energy pyramids
- 7.13 The student knows how systems are organized and function to support the health of an organism and how traits are inherited. The student is expected to:
- (A) identify and model the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, urinary, reproductive, integumentary, nervous, immune, and endocrine systems
 - (C) compare the results of asexual and sexual reproduction of plants and animals in relation to the diversity of offspring and the changes in the population over time
 - (D) describe and give examples of how natural and artificial selection change the occurrence of traits in a population over generations

Grade 6

- 6.12 The student knows that interdependence occurs between living systems and the environment. The student is expected to:
- (A) investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition
- 6.13 The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:
- (A) describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function