Texas Essential Knowledge and Skills
Vertical Alignment for STAAR Alternate 2

Science

Prekindergarten through Biology

Effective as of the 2024–2025 school year

NOTE: This document has been updated according to 2022 Texas Prekindergarten Guidelines, Texas Essential Knowledge and Skills for Science, Elementary and Middle School, Adopted 2021, and 2024 Texas Essential Knowledge

Matter and Energy

Texas Prekindergarten Guidelines, VI. Science Domain, A. Physical Science. The student learns to explore properties of materials, positions, and motion of objects through investigations.
Texas Essential Knowledge and Skills, Kς8, Matter and its properties. The student knows that objects have physical properties that determine how they are described and classified (K.6; 1.6). The student knows that matter has physical properties that determine how it is described, classified, and used (2.6).
Texas Essential Knowledge and Skills, Kς8, Matter and energy. The student knows that matter has measurable physical properties that determine how matter is identified, classified, changed, and used (3.6; 4.6; 5.6). The student knows that matter is made of atoms, can be classified according to its properties, and can undergo changes (6.6). The student distinguishes between elements and compounds, classifies changes in matter, and understands the properties of solutions (7.6). The student understands that matter can be classified according to its properties and matter is conserved in chemical changes that occur within closed systems (8.6). The student is expected to:

PK4.VI.A.1: Observe, investigate, describe, and discuss characteristics of common objects.
PK4.VI.A.3: Use simple scientific tools to learn about objects.
K.6: Identify and record observable physical properties of objects, including shape, color, texture, and material, and generate ways to classify objects.
1.6.A: Classify objects by observable physical properties, including, shape, color, and texture, and attributes such as larger and smaller and heavier and lighter.
1.6.B: Explain and predict changes in materials caused by heating and cooling.
1.6.C: Demonstrate and explain that a whole object is a system made of organized parts such as a toy that can be taken apart and put back together.
2.6.A: Classify matter by observable physical properties, including texture, flexibility, and relative temperature, and identify whether a material is a solid or liquid.
2.6.B: Conduct a descriptive investigation to explain how physical properties can be changed through processes such as cutting, folding, sanding, melting, or freezing.
2.6.C: Demonstrate that small units such as building blocks can be combined or reassembled to form new objects for different purposes and explain the materials chosen based on their physical properties.
3.6.A: Measure, test, and record physical properties of matter, including temperature, mass,

Force, Motion, and Energy

8.7.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.

Texas Prekindergarten Guidelines, VI. Science Domain, A. Physical Science. The student learns about sources of energy by investigating and discussing light, heat, electricity, and magnetism.
Texas Essential Knowledge and Skills, Kς8, Force, motion, and energy. The student knows that energy is everywhere and can be observed in everyday life (K.8; 1.8; 2.8). The student knows that energy is everywhere and can be observed in cycles, patterns, and systems (3.8; 4.8; 5.8). The student knows that the total energy in systems is conserved through energy transfers and transformations (6.8). The student understands the behavior of thermal energy as it flows into and out of systems (7.8). The student knows how energy is transferred through waves (8.8). The student is expected to:

PK4.VI.A.4: Observe, investigate, describe, and discuss sources of energy including light, heat, and electricity.
K.8.A: Communicate the idea that objects can only be seen when a light source is present and compare the effects of different amounts of light on the appearance of objects.
K.8.B: Demonstrate and explain that light travels through some objects and is blocked by other objects, creating shadows.
1.8.A: Investigate and describe applications of heat in everyday life such as cooking food or using a clothes dryer.
1.8.B: Describe how some changes caused by heat may be reversed such as melting butter and other changes cannot be reversed such as cooking an egg or baking a cake.
2.8.A: Demonstrate and explain that sound is made by vibrating matter and that vibrations can be caused by a variety of means, including sound.
2.8.B: Explain how different levels of sound are used in everyday life such as a whisper in a classroom or a fire alarm.
2.8.C: Design and build a device using tools and materials that uses sound to solve the problem of communicating over a distance.
3.8.A: Identify everyday examples of energy, including light, sound, thermal, and mechanical.
3.8.B: Plan and conduct investigations that demonstrate how the speed of an object is related to its mechanical energy.
4.8.A: Investigate and identify the transfer of energy by objects in motion, waves in water, and sound.
4.8.B: Identify conductors and insulators of thermal and electrical energy.
4.8.C: Demonstrate and describe how electrical energy travels in a closed path that can produce

6.8.B: Describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis.
6.8.C: Explain how energy is transferred through transverse and longitudinal waves.

Earth and Space

Texas Prekindergarten Guidelines, VI. Science Domain, C. Earth and Space Science. The student observes clouds, the Sun, and the Moon in the sky. The student is aware of changing seasons and weather conditions.

Texas Essential Knowledge and Skills, Kς8, Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky (K.9; 2.9). The student knows that the natural world has recognizable patterns (1.9). The student knows there are recognizable objects and patterns in Earth's solar system (3.9). The student recognizes patterns among the Sun, Earth, and Moon system and their effects (4.9; 5.9). The student models the cyclical movements of the Sun, Earth, and Moon and describes their effects (6.9). The student understands the patterns of movement, organization, and characteristics of components of our solar system (7.9). The student describes the characteristics of the universe and the relative scale of its components (8.9). The student is expected to:

PK4.VI.C.2: Identify, observe, describe, and discuss objects in the sky.
PK4.VI.C.3: Observe and describe what happens during changes in the earth and sky.
K.9.A: Identify, describe, and predict the patterns of day and night and their observable characteristics.
K.9.B: Observe, describe, and illustrate the Sun, Moon, stars, and objects in the sky such as clouds.
1.9: Describe and predict the patterns of seasons of the year such as order of occurrence and changes in nature.
2.9.A: Describe the Sun as a star that provides light and heat and explain that the Moon reflects the Sun's light.
2.9.B: Observe objects in the sky using tools such as a telescope and compare how objects in the sky are more visible and can appear different with a tool than with an unaided eye.
3.9.A: Construct models and explain the orbits of the Sun, Earth, and Moon in relation to each other.
3.9.B: Identify the order of the planets in Earth's solar system in relation to the Sun.
4.9.A: Collect and analyze data to identify sequences and predict patterns of change in seasons such as change in temperature and length of daylight.
4.9.B: Collect and analyze data to identify sequences and predict patterns of change in the observable appearance of the Moon from Earth.
5.9: Demonstrate that Earth rotates on its axis once approximately every 24 hours and explain how that causes the day/night cycle and the appearance of the Sun moving across the sky, resulting in changes in shadow positions and shapes.
6.9.A: Model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons.
6.9.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.
7.9.A: Describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, comets, Kuiper belt, and Oort cloud.
7.9.B: Describe how gravity governs motion within Earth's solar system.
7.9.C: Analyze the characteristics of Earth that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.
8.9.A: Describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram.

8.9.B: Categorize galaxies as spiral, elliptical, and irregular and locate Earth's solar system within the Milky Way galaxy.
8.9.C: Research and analyze scientific data used as evidence to develop scientific theories that describe the origin of the universe.

Texas Essential Knowledge and Skills, Kς8, Earth and space. The student knows that the natural world includes earth materials and systems that can be observed (K.10). The student knows that the natural world includes earth materials that can be observed in systems and processes (1.10; 2.10). The student knows that there are recognizable processes that change Earth over time (3.10). The student knows that there are processes on Earth that create patterns of change (4.10). The student knows that there are recognizable patterns and processes on Earth (5.10). The student understands the rock cycle and the structure of Earth (6.10). The student understands the causes and effects of plate tectonics (7.10). The student knows that interactions between Earth, ocean, and weather systems impact climate (8.10). The student is expected to:

PK4.VI.C.3: Observe and describe what happens during changes in the earth and sky.
K.10.A: Describe and classify rocks by the observable properties of size, shape, color, and texture.
K.10.B: Observe and describe weather changes from day to day and over seasons.
K.10.C: Identify evidence that supports the idea that air is all around us and demonstrate that wind is moving air using items such as a windsock, pinwheel, or ribbon.
1.10.A: Investigate and document the properties of particle size, shape, texture, and color and the components of different types of soils such as topsoil, clay, and s/LBody ,

5.10.B: Model and describe the processes that led to the formation of sedimentary rocks and fossil fuels.

5.10.C: Model and identify how changes to Earth's surface by wind, water, or ice result in the formation of landforms, including deltas, canyons, and sand dunes.

6.10.A: Differentiate between the biosphere, hydrosphere, atmosphere, and geosphere and identify components of each system.

6.10.B: Model and describe the layers of Earth, including the inner core, outer core, mantle, and crust.

6.10.C: Describe how metamorphic, igneous, and sedimentary rocks form and change through geologic processes in the rock cycle.

7.10.A: Describe the evidence that supports that Earth has changed over time, including fossil evidence, plate tectonics, and superposition.

x 7.10.B: Describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including supervolc4f lc4 and

Organisms and Environments

Texas Prekindergarten Guidelines, VI. Science Domain, B. Life Science. The student observes the unique features of organisms and what they need to survive and thrive.
Texas Essential Knowledge and Skills, Kς8, Organisms and environments. The student knows that

4.12.A: Investigate and explain how most producers can make their own food using sunlight, water, and carbon dioxide through the cycling of matter.

1.13.C: Compare ways that young animals resemble their parents.
2.13.A: Identify the roots, stems, leaves, flowers, fruits, and seeds of plants and compare how those structures help different plants meet their basic needs for survival.
2.13.B: Record and compare how the structures and behaviors of animals help them find and take in food, water, and air.
2.13.C: Record and compare how being part of a group helps animals obtain food, defend themselves, and cope with changes.
2.13.D: Investigate and describe some of the unique life cycles of animals where young animals do not resemble their parents, including butterflies and frogs.
3.13.A: Explore and explain how external structures and functions of animals such as the neck of a giraffe or webbed feet on a duck enable them to survive in their environment.
3.13.B: Explore, illustrate, and compare life cycles in organisms such as beetles, crickets,

BIO.5.A: Relate the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids, to the structure and function of a cell.
BIO.5.B: Compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity.
BIO.5.C: Investigate homeostasis through the cellular transport of molecules.
BIO.5.D: Compare the structures of viruses to cells and explain how viruses spread and cause disease.
BIO.6.A: Explain the importance of the cell cycle to the growth of organisms, including an overview of the stages of the cell cycle and deoxyribonucleic acid (DNA) replication models.
BIO.6.B: Explain the process of cell specialization through cell differentiation, including the role of environmental factors.
BIO.6.C: Relate disruptions of the cell cycle to how they lead to the development of diseases such as cancer.