Process Standards (Scientific and Engineering Practices/Recurring Themes and Concepts)

8.1 **Scientific and engineering practices.** The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models.

8.2 **Scientific and engineering practices.** The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs.

8.5 **Recurring themes and concepts.** The student understands that recurring themes and concepts provide a framework for making connections across disciplines.

Tools to Know

8.1(A) ask questions and define problems based on observations or information from text, phenomena, models, or investigations
8.1(B) use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems
8.1(C) use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards
8.1(D) use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, weather maps, hand lenses, and lab notebooks or journals
8.1(E) collect quantitative data using the International System of Units (SI) and qualitative data as evidence
8.1(F) construct appropriate tables, graphs, maps, and charts using repeated trials and means to organize data
8.2(D) evaluate experimental and engineering designs
8.5(A) identify and apply patterns to understand and connect scientific phenomena or to design solutions

Properties of Matter

8.6 **Matter and energy.** The student understands that matter can be classified according to its properties and matter is conserved in chemical changes that occur within closed systems.

Readiness Standards

8.6(E) investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis
7.6(B) use the periodic table to identify the atoms and the number of each kind within a chemical formula

Supporting Standards

7.6(C) distinguish between physical and chemical changes in matter
6.6(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
6.6(D) compare the density of substances relative to various fluids
6.6(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

SEs Not Included in Assessed Curriculum

8.6(A) explain by modeling how matter is classified as elements, compounds, homogeneous mixtures, or heterogeneous mixtures
8.6(B) use the periodic table to identify the atoms involved in chemical reactions
8.6(C) describe the properties of cohesion, adhesion, and surface tension in water and relate to observable phenomena such as the formation of droplets, transport in plants, and insects walking on water
8.6(D) compare and contrast the properties of acids and bases, including pH relative to water

Force and Motion

8.7 **Force, motion, and energy.** The student understands the relationship between force and motion within systems.

Readiness Standards

8.7(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
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

Supporting Standards

7.7(A) calculate average speed using distance and time measurements from investigations
7.7(B) distinguish between speed and velocity in linear motion in terms of distance, displacement, and direction
7.7(C) measure (record) and interpret an object's motion using distance-time graphs
6.7(A) identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real world applications
6.7(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

Energy

8.8 Force, motion, and energy. The student knows how energy is transferred through waves.

Readiness Standards	Supporting Standards
	8.8(A) compare the characteristics of amplitude, frequency, and wavelength in transverse waves, including the electromagnetic spectrum 7.8(A) investigate methods of thermal energy transfer into and out of systems, including conduction, convection, and radiation 7.8(C) explain the relationship between temperature and kinetic energy of the particles within a substance 6.8(B) describe how energy is conserved through transfers and transformation 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

SEs Not Included in Assessed Curriculum	*8.8(B) explain the use of electromagnetic waves in applications such as radiation therapy, wireless technologies, fiber optics, microwaves, ultraviolet sterilization, astronomical observations, and X-rays*

The Universe

8.9 Earth and space. The student describes the characteristics of the universe and the relative scale of its components.

8.9(A) describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram 7.10(B) describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including super volcanoes and hot spots	8.9(B) categorize galaxies as spiral, elliptical, and irregular and locate Earth's solar system within the Milky Way galaxy 7.9(B) describe how gravity governs motion within Earth's solar system 7.10(A) describe the evidence that supports that Earth has changed over time, including fossil evidence, plate tectonics, and superposition 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 6.10(B) model and describe the layers of Earth, including the inner core, outer core, mantle, and crust

SEs Not Included in Assessed Curriculum	*8.9(C) research and analyze scientific data used as evidence to develop scientific theories to describe the origin of the universe*

Weather

8.10 Earth and space. The student knows that interactions between Earth, ocean, and weather systems impact climate.

8.10(A) describe how energy from the Sun, hydrosphere, and atmosphere interact and influence weather and climate	8.10(B) identify global patterns of atmospheric movement and how they influence local weather 8.10(C) describe the interactions between ocean currents and air masses that produce tropical cyclones, including typhoons and hurricanes

Climatic Influences

8.11 Earth and space. The student knows that natural events and human activity can impact global climate.

8.10(A) describe how energy from the Sun, hydrosphere, and atmosphere interact and influence weather and climate	
SEs Not Included in Assessed Curriculum	*8.11(A) use scientific evidence to describe how natural events, including volcanic eruptions, meteor impacts, abrupt changes in ocean currents, and the release and absorption of greenhouse gases influence climate* *8.11(B) use scientific evidence to describe how human activities, including the release of greenhouse gases, deforestation, and urbanization, can influence climate* *8.11(C) describe the carbon cycle*

Organisms and Environments

8.12 Organisms and environments. The student understands stability and change in populations and ecosystems.

Readiness Standards	Supporting Standards
8.12(B) describe how primary and secondary ecological succession affect populations and species diversity after ecosystems are disrupted by natural events or human activity	8.12(C) describe how biodiversity contributes to the stability and sustainability of an ecosystem and the health of the organisms within the ecosystem 7.11(A) analyze the beneficial and harmful influences of human activity on groundwater and surface water in a watershed 7.11(B) describe human dependence and influence on ocean systems and explain how human activities impact these systems 7.12(A) diagram the flow of energy within trophic levels and describe how the available energy decreases in successive trophic levels in energy pyramids 6.12(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 quantity of light, water, range of temperatures, or soil composition
SEs Not Included in Assessed Curriculum	*8.12(A) explain how disruptions such as population changes, natural disasters, and human intervention impact the transfer of energy in food webs in ecosystems*

Structure, Function, and Survival

8.13 Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival.

8.13(A) identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells 8.13(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	8.13(B) describe the function of genes within chromosomes in determining inherited traits of offspring 7.13(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 7.13(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 7.13(D) describe and give examples of how natural and artificial selection change the occurrence of traits in a population over generations 6.13(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

STAAR	**28-30 questions**	**35 points**	**21-25 questions (1-point multiple choice/non-multiple choice)**	**5-7 questions (2-point non-multiple choice)**

Process Standards (Scientific and Engineering Practices/Recurring Themes and Concepts)	
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8.2	**Scientific and engineering practices.** The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs.
8.3	**Scientific and engineering practices.** The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions.
8.4	**Scientific and engineering practices.** The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society.
8.5	**Recurring themes and concepts.** The student understands that recurring themes and concepts provide a framework for making connections across disciplines.

Ways to Show	
8.1(G)	develop and use models to represent phenomena, systems, processes, or solutions to engineering problems
8.1(H)	distinguish between scientific hypotheses, theories, and laws
8.2(A)	identify advantages and limitations of models such as their size, scale, properties, and materials
8.2(B)	analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations
8.2(C)	use mathematical calculations to assess quantitative relationships in data
8.3(A)	develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories
8.3(B)	communicate explanations and solutions individually and collaboratively in a variety of settings and formats
8.3(C)	engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence
8.4(A)	relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content
8.4(B)	make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, cost-effectiveness, and methods used
8.4(C)	research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers
8.5(A)	identify and apply patterns to understand and connect scientific phenomena or to design solutions
8.5(B)	identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems
8.5(C)	analyze how differences in scale, proportion, or quantity affect a system's structure or performance
8.5(D)	examine and model the parts of a system and their interdependence in the function of the system
8.5(E)	analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems
8.5(F)	analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems
8.5(G)	analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems

NOTE: The classification of standards on this Snapshot represents the reviewed and synthesized input of a sample of Texas Science educators. This Snapshot DOES NOT represent a publication of the Texas Education Agency. District curriculum materials may reflect other classifications.