Draft Recommendations
Texas Essential Knowledge and Skills (TEKS)
Science, Grades 6–8

The document reflects draft recommendations to the science Texas Essential Knowledge and Skills (TEKS) that have been recommended by the State Board of Education's TEKS review work groups for grades 6–8. Proposed additions are shown in black font with underline (additions). Proposed deletions are shown in red font with strikethroughs (~~deletions~~). Numbering for the knowledge and skills statements in the document will be finalized when the proposal is prepared to file with the *Texas Register*.

Comments in the right-hand column provide explanations for the proposed changes.

SCIENCE, GRADES 6–8

§112.18. Science, Grade 6~~, Adopted 2017.~~		
	TEKS with edits	Work Group Comments/Rationale
(b)	Introduction	
(1)	In Grades 6–8, content is organized into recurring strands. The concepts within each grade level build on prior knowledge, prepare students for the next grade level, and establish a foundation for high school courses. In Grade 6, the following concepts will be addressed in each strand:	
(A)	Scientific and engineering practices. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.	
(i)	Scientific practices. Students should be able to ask questions, plan, and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.	
(ii)	Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.	
(B)	Matter and energy. Students will build upon their knowledge of properties of solids, liquids and gases and will further explore their molecular energies. In Grade 6, students will learn how elements are classified as metals, nonmetals, or metalloids based on their properties on the Periodic Table. Students have previous experience with mixtures in Grade 5. Grade 6 will further their understanding by investigating the different types of mixtures. Subsequent grades will learn about compounds. In Grade 6, students will compare the density of substances relative to other substances and fluids and identify evidence of chemical changes.	
(C)	Force, motion, and energy. Students will investigate the relationship between force and motion using a variety of means, including calculations and measurements through the study of Newton's Third Law of Motion. Subsequent grades will study force & motion through Newton's First and Second Laws of Motion. Energy occurs as either potential or kinetic energy. Potential energy can take several forms, including gravitational, elastic, and chemical energy. Energy is conserved throughout systems by changing from one form to another.	

(D)	Earth and space. Cycles within Sun, Earth, and Moon systems are studied as students learn about seasons and tides. Students will understand that the Earth is divided into spheres and examine the processes within and organization of the geosphere. Researching the advantages and disadvantages of short- and long-term uses of resources enables informed decision making about resource management.	
(E)	Organisms and environments. All living organisms are made up of smaller units called cells. Cells can be organized into tissues, tissues into organs, and organs into organ systems. Ecosystems are organized into communities, populations, and organisms. Students will compare and contrast variations within organisms and how they impact survival. Students will examine relationships and interactions among organisms, biotic factors, and abiotic factors in an ecosystem.	
(2)	Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable.	
(3)	Scientific hypotheses and theories. Students are expected to know that:	
(A)	hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and	
(B)	scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.	
(4)	Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making practices and ethical and social decisions that involve science.	
(5)	Recurring themes and concepts. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include structure and function, systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Stability and change occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide a tool for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.	
(6)	Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	

(b)	Knowledge and skills.	
(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. The student is expected to:	A separate Scientific and Engineering Practices Work Group developed recommendations for revisions to the current process skills for K-12, which have been incorporated into the Work Group C recommendations chart.
(A)	ask questions and define problems based on observations or information from text, phenomena, models, or investigations;	
(B)	use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;	
(C)	use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency approved safety standards;	
(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, and hand lenses;	Work Group C added appropriate scientific tools for Grade 6.
(E)	collect quantitative data using the International System of Units (SI) and qualitative data as evidence;	
(F)	construct appropriate tables, graphs, maps, and charts using repeated trials and means, to organize data;	
(G)	develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and	
(H)	distinguish between scientific hypotheses, theories, and laws	
(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. The student is expected to:	
(A)	identify advantages and limitations of models such as their size, scale, properties, and materials;	
(B)	analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;	
(C)	use mathematical calculations to assess quantitative relationships in data; and	

(D)	evaluate experimental and engineering designs.	**Multiple Viewpoints on Scientific and Engineering Practices SEs:** Add to 2.D, "evaluate experimental and engineering designs" *using multiple criteria, including cost-benefit analysis*.
(3)	Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions.	
(A)	develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;	
(B)	communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and	
(C)	engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.	
(4)	Scientific and engineering practices. The students knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:	
(A)	relate the impact of past and current research on scientific thought and society, including the process of science and contributions of diverse scientists as related to the content;	
(B)	make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, and methods used; and	
(C)	research and explore connections between grade-level appropriate science concepts and STEM careers.	**Multiple Viewpoints on Scientific and Engineering Practices SEs:** Replace 4C. "research and explore connections between grade-level appropriate science SEP concepts and STEM careers" with "*4(C)1. Research three resources such as museums, libraries, organizations, private companies, and online platforms where students can investigate STEM careers.* SEP *4(C)2. Identify three resources to identify mentors employed in a STEM field who could be interviewed for a discussion of the advantages/disadvantages of pursuing a STEM career."*

(5)	Matter and energy. 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:	
(A)	compare solids, liquids, and gases in terms of, structure, shape, volume, and energy of atoms and molecules;	Based on recommendations from Work Group B (Chemistry and IPC) this topic was moved from HS to MS. (Chem.4.C) (IPC.6.A)
(B)	investigate the properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures;	Based on recommendation from Work Group B (Chemistry) this topic was moved from HS to MS. (Chem.4.D)
(C)	classify elements on the periodic table as metals, nonmetals, and metalloids using their physical properties;	Revised from 6.6.A to give greater clarity of expectation and verb changed from compare to classify to increase rigor.
(D)	compare the density of substances relative to various fluids; and	Revised 6.6.B to remove calculate as it does not align with mathematics TEKS for this grade; also to build on conceptual understanding developed in elementary school.
(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.	Revised 6.5.C to focus on energy.
(6)	Force, motion, and energy. The student knows the nature of forces and their interactions. The student is expected to:	Rationale (6.6 A-C): The topics for this strand are distributed across the grade levels. In sixth grade the emphasis is on understanding the fundamentals of forces and introducing Newton's 3rd law.
(A)	identify and describe forces that act on objects, including gravity, friction, magnetism, applied forces, and normal forces;	
(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; and	
(C)	identify simultaneous force pairs that are equal in magnitude and opposite in direction that result from the interactions between objects using Newton's Third Law of motion.	
(7)	Force, motion, and energy. The student knows that energy is conserved when transformed from one type to another. The student is expected to:	
(A)	compare and contrast kinetic energy with gravitational, elastic, and chemical potential energies; and	6.7.A Revised to clarify the potential energies that students should learn about.

(B)	describe how energy is conserved through transformations in systems such as electrical circuits, food webs, amusement park rides, and photosynthesis.	6.7.B Revised 6.9.C to include concept of conservation of energy in systems along with energy transformations.
(8)	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 revolves around the Sun, causing changes in seasons;	(8.7.A) moved to grade 6
(B)	describe and predict how the positions of the sun and moon and their gravitational forces affect daily, spring, and neap cycles of ocean tides; and	6.8.B revised from 8.7C to be more specific about the cycles of tides, relate gravitation as the cause of tides, and introduce specific vocabulary.
(9)	Earth and space. The student understands the structure of Earth, and the rock cycle. The student is expected to:	**Multiple viewpoints:** There was a proposal for an additional SE 6.9D: *Determine the physical properties of permeability and porosity of rocks and relate to the resources that can be stored there.* The rationale for including it is to reinforce for students that the different spheres are not monolithic but overlap with each other and interact as a system. There was concern about the developmental appropriateness and specificity of these concepts in grade 6 as well as the amount of instructional time required.
(A)	differentiate among the biosphere, hydrosphere, atmosphere, and geosphere and identify their components;	6.9A is new to introduce the different spheres that will be a foundation for much of the rest of the MS science TEKS.
(B)	model and describe the layers of Earth, including the inner core, outer core, mantle, and crust; and	6.9.B is revised from existing 6.10.A to take it beyond only modeling and the vocabulary was simplified to make more grade-appropriate.
(C)	describe how rocks change through geologic processes in the rock cycle and classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation.	6.9.C is revised from existing 6.10.B; added the rock cycle to provide context for the classification of rocks according to the processes of formation rather than the characteristics of the sample

(10)	Earth and space. The student understands how resources are managed. The student is expected to:	
(A)	research and describe how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.	Existing 6.7 is recommended to be deleted and replaced with more expansive standard that includes other kinds of resources besides energy resources.
(11)	Organisms and environments. The student knows that cells are the fundamental units of organisms. The student is expected to:	
(A)	identify that organisms are composed of cells, which come from pre-existing cells and are the basic unit of structure and function as explained by cell theory;	6.11.A is a revision of existing 7.12F. The term "cell theory" was kept despite the recommendation of one of the content advisors as it provides a good example of the scientific definition of a theory. Only the foundational components of cell theory are included as this is the first time students are introduced to the concept of cells. Moved to 6th grade for vertical alignment and better distribution of content across the grades.
(B)	describe the hierarchical organization of cells, tissues, organs, and organ systems within plants and animals; and	6.11.B is a revision of 7.12C. The verb was changed to increase rigor. The language of "levels of organization" was changed to "hierarchical organization" to reflect the language of taxonomy that the Biology WG requested. Moved to grade 6 for vertical alignment and better distribution of the content across grades.
(C)	identify the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, autotrophic and heterotrophic.	6.11.C was revised from current 6.12D to limit the scope. Mode of reproduction was deleted because it is not a defining characteristic of groups. Kingdoms were moved to grade 7 to build on this knowledge.
(12)	Organisms and environments. The student knows the impact of variation on the survival of populations. The student is expected to:	
(A)	describe how advantages and disadvantages for the survival of a population can result from variations within the population as environments change.	6.12 was revised from existing 7.11B to focus on the connection between variations and changes in populations over time.

(13)	Organisms and environments. The student knows that interdependence occurs among living systems and the environment. The student is expected to:	
(A)	describe predatory, competitive, and symbiotic relationships between organisms including mutualism, parasitism, and commensalism;	6.12.A food chains & food webs are taught in elementary school, this scaffolds the learning progression toward 7th grade. Other types of relationships (symbiotic) were added on the recommendation of the Biology WG.
(B)	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; and	Current 8.11.A – moved into 6th grade to better connect to similar content in ES & the content of the other SEs in this strand
(C)	describe the hierarchical organization of organism, population, and community within an ecosystem.	Current 6.12.F was revised to maintain continuity with the way the levels of organization within organisms are addressed in 6.11.B. The verb was changed to increase rigor.
~~(a)~~	~~**Introduction.**~~	
~~(1)~~	~~Grade 6 science is interdisciplinary in nature; however, much of the content focus is on physical science. National standards in science are organized as multi-grade blocks such as Grades 5-8 rather than individual grade levels. In order to follow the grade level format used in Texas, the various national standards are found among Grades 6, 7, and 8. Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include change and constancy, patterns, cycles, systems, models, and scale.~~	
	~~The strands for Grade 6 include the following.~~	
~~(A)~~	~~Scientific investigations and reasoning.~~	
~~(i)~~	~~To develop a rich knowledge of science and the natural world, students must become familiar with different modes of scientific inquiry, rules of evidence, ways of formulating questions, ways of proposing explanations, and the diverse ways scientists study the natural world and propose explanations based on evidence derived from their work.~~	

(ii)	Scientific investigations are conducted for different reasons. All investigations require a research question, careful observations, data gathering, and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of organisms or measuring the abiotic components in a given habitat. Descriptive statistics include frequency, range, mean, median, and mode. A hypothesis is not required in a descriptive investigation. On the other hand, when conditions can be controlled in order to focus on a single variable, experimental research design is used to determine causation. Students should experience both types of investigations and understand that different scientific research questions require different research designs.	
(iii)	Scientific investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and the 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. Models have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.	
(B)	Matter and energy.	
(i)	Matter can be classified as elements, compounds, or mixtures. Students have already had experience with mixtures in Grade 5, so Grade 6 will concentrate on developing an understanding of elements and compounds. It is important that students learn the differences between elements and compounds based on observations, description of physical properties, and chemical reactions. Elements are represented by chemical symbols, while compounds are represented by chemical formulas. Subsequent grades will learn about the differences at the molecular and atomic level.	
(ii)	Elements are classified as metals, nonmetals, and metalloids based on their physical properties. The elements are divided into three groups on the Periodic Table. Each different substance usually has a different density, so density can be used as an identifying property. Therefore, calculating density aids classification of substances.	
(iii)	Energy resources are available on a renewable or nonrenewable basis. Understanding the origins and uses of these resources enables informed decision making. Students should consider the ethical/social issues surrounding Earth's natural energy resources, while looking at the advantages and disadvantages of their long-term uses.	
(C)	Force, motion, and energy. Energy occurs in two types, potential and kinetic, and can take several forms. Thermal energy can be transferred by conduction, convection, or radiation. It can also be changed from one form to another. Students will investigate the relationship between force and motion using a variety of means, including calculations and measurements.	

~~(D)~~	~~Earth and space. The focus of this strand is on introducing Earth's processes. Students should develop an understanding of Earth as part of our solar system. The topics include organization of our solar system, the role of gravity, and space exploration.~~	
~~(E)~~	~~Organisms and environments. Students will gain an understanding of the broadest taxonomic classifications of organisms and how characteristics determine their classification. The other major topics developed in this strand include the interdependence between organisms and their environments and the levels of organization within an ecosystem.~~	
~~(2)~~	~~Science, as defined by the National Academy of Science, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.~~	
~~(3)~~	~~Scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions become theories. Scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Students should know that scientific theories, unlike hypotheses, are well established and highly reliable, but they may still be subject to change as new information and technologies are developed. Students should be able to distinguish between scientific decision-making methods and ethical/social decisions that involve the application of scientific information.~~	
~~(4)~~	~~Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.~~	
~~(b)~~	~~**Knowledge and skills.**~~	
~~(1)~~	~~**Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts 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 Texas Education Agency-approved safety standards; and~~	
~~(B)~~	~~practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials.~~	
~~(2)~~	~~**Scientific investigation and reasoning. The student uses scientific practices 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 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.~~	
~~(3)~~	~~**Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:**~~	
~~(A)~~	~~analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;~~	
~~(B)~~	~~use models to represent aspects of the natural world such as a model of Earth's layers;~~	
~~(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.~~	
~~(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, including journals/notebooks, beakers, Petri dishes, meter sticks, graduated cylinders, hot plates, test tubes, balances, microscopes, thermometers, calculators, computers, timing devices, and other necessary equipment to collect, record, and analyze information; 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.~~	
~~(5)~~	~~**Matter and energy. The student knows the differences between elements and compounds. The student is expected to:**~~	
~~(A)~~	~~know that an element is a pure substance represented by a chemical symbol and that a compound is a pure substance represented by a chemical formula;~~	Revised in 7.5.A
~~(B)~~	~~recognize that a limited number of the many known elements comprise the largest portion of solid Earth, living matter, oceans, and the atmosphere; and~~	This SE was deleted to reduce the scope and streamline the instructional time.

~~(C)~~	~~identify the formation of a new substance by using the evidence of a possible chemical change such as production of a gas, change in temperature, production of a precipitate, or color change.~~	Revised and renumbered to 6.5.E.
~~(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;~~	Revised and renumbered to 6.6.A.
~~(B)~~	~~calculate density to identify an unknown substance; and~~	Revised and renumbered to 6.6.B.
~~(C)~~	~~test the physical properties of minerals, including hardness, color, luster, and streak.~~	This SE was deleted because it did not fit with the overall alignment; minerals are not a critical concept for middle school and developmentally inappropriate; physical properties are taught in other SEs
~~(7)~~	~~**Matter and energy. The student knows that some of Earth's energy resources are available on a nearly perpetual basis, while others can be renewed over a relatively short period of time. Some energy resources, once depleted, are essentially nonrenewable. The student is expected to**~~	
	~~research and discuss the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar resources.~~	Deleted and replaced with more expansive standard (6.10) that includes other kinds of resources besides energy resources.
~~(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;~~	Revised and renumbered to 6.7.A.
~~(B)~~	~~identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces;~~	6.8.B deleted and topic moved to grade 7.6.D and 8.6.A for better vertical alignment.
~~(C)~~	~~calculate average speed using distance and time measurements;~~	Moved and renumbered to 7.6.A without revision.
~~(D)~~	~~measure and graph changes in motion; and~~	Revised and moved to grade 7 (7.6.C).
~~(E)~~	~~investigate how inclined planes can be used to change the amount of force to move an object.~~	Deleted because understanding simple machines requires concept of work which is developmentally inappropriate.
~~(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:**~~	

~~(A)~~	~~investigate methods of thermal energy transfer, including conduction, convection, and radiation;~~	Moved and renumbered to 7.7.A without revision.
~~(B)~~	~~verify through investigations that thermal energy moves in a predictable pattern from warmer to cooler until all the substances attain the same temperature such as an ice cube melting; and~~	Revised and moved to grade 7 (7.7.B).
~~(C)~~	~~demonstrate energy transformations such as energy in a flashlight battery changes from chemical energy to electrical energy to light energy.~~	Revised and renumbered to 6.7.B.
~~(10)~~	~~**Earth and space. The student understands the structure of Earth, the rock cycle, and plate tectonics. The student is expected to:**~~	
~~(A)~~	~~build a model to illustrate the compositional and mechanical layers of Earth, including the inner core, outer core, mantle, crust, asthenosphere, and lithosphere;~~	Revised and renumbered to 6.9.B.
~~(B)~~	~~classify rocks as metamorphic, igneous, or sedimentary by the processes of their formation;~~	Revised and renumbered to 6.9.C.
~~(C)~~	~~identify the major tectonic plates, including Eurasian, African, Indo-Australian, Pacific, North American, and South American; and~~	Deleted because it does not add to student's understanding of the broad concepts of plate tectonics.
~~(D)~~	~~describe how plate tectonics causes major geological events such as ocean basin formation, earthquakes, volcanic eruptions, and mountain building.~~	Revised and moved to grade 7 (7.9.B).
~~(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:**~~	
~~(A)~~	~~describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, and comets;~~	Revised and moved to grade 7 (7.8.A).
~~(B)~~	~~understand that gravity is the force that governs the motion of our solar system; and~~	Revised and moved to grade 7 (7.8.B)
~~(C)~~	~~describe the history and future of space exploration, including the types of equipment and transportation needed for space travel.~~	Deleted to reduce the scope and streamline instructional time; there is also some overlap with social studies TEKS.
~~(12)~~	~~**Organisms and environments. The student knows all organisms are classified into domains and kingdoms. Organisms within these taxonomic groups share similar characteristics that allow them to interact with the living and nonliving parts of their ecosystem. The student is expected to:**~~	
~~(A)~~	~~understand that all organisms are composed of one or more cells;~~	Deleted and incorporated into 6.11.A.
~~(B)~~	~~recognize that the presence of a nucleus is a key factor used to determine whether a cell is prokaryotic or eukaryotic;~~	Deleted; concept is part of 6.11.C.
~~(C)~~	~~recognize that the broadest taxonomic classification of living organisms is divided into currently recognized domains;~~	Deleted based on recommendation from content advisor.

~~(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;~~	Revised and renumbered to 6.11.C.
~~(E)~~	~~describe biotic and abiotic parts of an ecosystem in which organisms interact; and~~	Deleted; concept is part of 6.13.B. Recommendation made to K-5 group to introduce vocabulary in grade 5.
~~(F)~~	~~diagram the levels of organization within an ecosystem, including organism, population, community, and ecosystem.~~	Revised and renumbered to 6.13.C.

§112.19. Science, Grade 7~~, Adopted 2017.~~		
TEKS with edits		Work Group Comments/Rationale
(b)	Introduction	
(1)	In Grades 6 – 8, content is organized into recurring strands. The concepts within each grade level build on prior knowledge and prepare students for the next grade level and establish a foundation for high school courses. In Grade 7, the following concepts will be addressed in each strand:	
(A)	Scientific and engineering practices. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.	
(i)	Scientific practices. Students should be able to ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.	
(ii)	Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.	
(B)	Matter and energy. Students have prior experience with elements in Grade 6 and will develop an understanding that compounds are also pure substances in Grade 7. Students will investigate the differences between elements and compounds through observations, descriptions of physical properties, and chemical reactions. Students will build upon their understanding of solutions by exploring aqueous solutions.	
(C)	Force, motion, and energy. Students will measure, calculate, graph, and investigate how forces impact linear motion. Students will build upon their understanding of the laws of motions by exploring Newton's First Law. Temperature is a measure of the average kinetic energy of molecules. Thermal energy is transferred by conduction, convection, or radiation in order to reach thermal equilibrium.	
(D)	Earth and space. Students will explore characteristics and organization of objects and the role of gravity within our solar system. Earth has a specific set of characteristics that allow life to exist. Students will further their understanding of the geosphere by illustrating how Earth's features change over time through tectonic movement. Students will investigate how humans depend on and affect the hydrosphere.	

(E)	Organisms and environments. Students will further their understanding of organ systems by identifying the main functions of the organs within the human body. During both sexual and asexual reproduction, traits are passed onto the next generation. Students will understand how traits in populations can change through the processes of natural and artificial selection. Students will analyze how energy flows through trophic levels and how biodiversity impacts an ecosystem's sustainability. Students will gain an understanding of the taxonomic classifications of organisms and how characteristics determine their classification.	
(2)	Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable.	
(3)	Scientific hypotheses and theories. Students are expected to know that:	
(A)	hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and	
(B)	scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.	
(4)	Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making practices and ethical and social decisions that involve science.	
(5)	Recurring themes and concepts. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include structure and function, systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Stability and change occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide a tool for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.	
(6)	Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	

(b)	Knowledge and skills.	
(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. The student is expected to:	A separate Scientific and Engineering Practices Work Group developed recommendations for revisions to the current process skills for K-12, which have been incorporated into the Work Group C recommendations chart.
(A)	ask questions and define problems based on observations or information from text, phenomena, models, or investigations;	
(B)	use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;	
(C)	use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency approved safety standards;	
(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, and hand lenses;	Work Group C added appropriate scientific tools for Grade 7.
(E)	collect quantitative data using the International System of Units (SI) and qualitative data as evidence;	
(F)	construct appropriate tables, graphs, maps, and charts using repeated trials and means, to organize data;	
(G)	develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and	
(H)	distinguish between scientific hypotheses, theories, and laws	
(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. The student is expected to:	
(A)	identify advantages and limitations of models such as their size, scale, properties, and materials;	
(B)	analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;	
(C)	use mathematical calculations to assess quantitative relationships in data; and	

(D)	evaluate experimental and engineering designs.	**Multiple Viewpoints on Scientific and Engineering Practices SEs:** Add to 2.D, "evaluate experimental and engineering designs" *using multiple criteria, including cost-benefit analysis*.
(3)	Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions.	
(A)	develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;	
(B)	communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and	
(C)	engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.	
(4)	Scientific and engineering practices. The students knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:	
(A)	relate the impact of past and current research on scientific thought and society, including the process of science and contributions of diverse scientists as related to the content;	
(B)	make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, and methods used; and	
(C)	research and explore connections between grade-level appropriate science concepts and STEM careers.	**Multiple Viewpoints on Scientific and Engineering Practices SEs:** Replace 4.C. "research and explore connections between grade-level appropriate science concepts and STEM careers" with "*4(C)1. Research three resources such as museums, libraries, organizations, private companies, and online platforms where students can investigate STEM careers. 4(C)2. Identify three resources to identify mentors employed in a STEM field who could be interviewed for a discussion of the advantages/disadvantages of pursuing a STEM career."*

(5)	Matter and energy. The student distinguishes between elements and compounds, classifies changes in matter, and understands the properties of solutions. The student is expected to:	**Multiple Viewpoints** *7.5.E Interpret the location of rare earth elements in the Periodic Table.* This TEKS would advance student knowledge of the Periodic Table beyond what was known in 1869, and connect it to elements crucial for modern life, such as cell phones, wind turbines and solar cells.
(A)	compare and contrast elements and compounds in terms of atoms and molecules, structure, chemical symbols, and chemical formulas;	7.5.A: Incorporate parts of current 6.5.A and 8.5.D and change verb from "know" to "compare and contrast" in order to increase rigor of expectations. Standard was moved to grade 7 to build on proposed 6.5B and add complexity to the topics by adding structures of atoms and molecules. The concept of chemical bonding is introduced here without explicitly naming it as such. A more complete description of chemical bonding is left for the chemistry or IPC courses.
(B)	distinguish between physical and chemical changes in matter;	7.5.B: No changes were recommended for this student expectation (7.6).
(C)	describe aqueous solutions in terms of solute and solvent, concentration, and dilution; and	7.5.C: Topic was added to fill in gaps in vertical alignment as recommended by content advisors and Work Group A, and also to align with proposed Biology TEKS.
(D)	investigate and model how temperature, surface area, and agitation affect the rate of dissolution of solid solutes in aqueous solutions.	7.5.D: Topic was added to fill in gaps in vertical alignment as recommended by content advisors and Work Group A, and also to align with proposed Chemistry and IPC TEKS.
(6)	Force, motion, and energy. The student can describe motion and how forces can impact the motion of an object. The student is expected to:	
(A)	calculate average speed using distance and time measurements;	7.6.A Moved from 6.8.C to align with mathematics TEKS
(B)	distinguish between speed and velocity in linear motion in terms of distance, displacement, and direction;	7.6.B Provide a foundational concept of velocity that is extended in 8th grade with Newton's 2nd law. Topic is moved from existing 8.6B but removes acceleration to avoid fostering misconceptions.

(C)	measure, record, and interpret an object's motion using distance-time graphs; and	7.6.C Revises existing 6.8D to clarify the types of graphs that students are expected to engage with. Moved from grade 6 to help with alignment.
(D)	analyze the effect of balanced and unbalanced forces on the state of motion of an object using Newton's First Law of motion.	7.6.D Added to introduce Newton's 1st Law and build on the concept of force introduced in grade 6.
(7)	Force, motion, and energy. The student understands the behavior of thermal energy. The student is expected to:	
(A)	investigate methods of thermal energy transfer, including conduction, convection, and radiation;	7.7.A moved from grade 6 (6.9.A) for better vertical alignment
(B)	investigate how thermal energy moves in a predictable pattern from warmer to cooler until all substances within the system reach thermal equilibrium; and	7.7.B moved from grade 6 (6.9.B) and revised to include systems and use more precise language.
(C)	explain the relationship between temperature and the kinetic energy of the molecules within a substance.	7.7.C was added to build on concepts learned in grade 6 and support future topics in chemistry.
(8)	Earth and space. The student understands the organization and characteristics of objects in our solar system. The student is expected to:	
(A)	describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, comets, Kuiper belt, and Oort cloud;	7.8.A moved from 6.11.A for vertical alignment and topics added to be more complete.
(B)	describe how gravity governs the motion of our solar system; and	7.8.B changed verb to be more active and measurable
(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;	7.8.C revised for clarity
(9)	Earth and space. The student understands the causes and effects of plate tectonics. The student is expected to:	
(A)	describe the historical development of evidence that supports plate tectonic theory; and	Existing 8.9.A was moved for vertical alignment.
(B)	describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including supervolcanoes and hot spots.	6.10.D was revised to clarify the language and remove the "such as."
(10)	Earth and space. The student understands how human activity can impact the hydrosphere. The student is expected to:	
(A)	analyze positive and negative influences of human activity on groundwater and surface water in a watershed; and	7.10.A Verb is replaced to focus on higher order thinking of "analyze" and includes positive and negative influences.

(B)	describe human dependence and influence on ocean systems and explain how human activities have modified these systems.	7.10.B is revised from existing 8.11.C to increase rigor from "recognize." The "such as" statement is deleted because the examples are not helpful.
(11)	Organisms and environments. The student knows how the systems of an organism function. The student is expected to:	
(A)	identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, urinary, reproductive, integumentary, nervous, and endocrine systems; and	7.11.A was revised from current 7.12.B to limit the amount of content and for greater clarity.
(B)	compare the results of uniform or diverse offspring from asexual or sexual reproduction in plants and animals.	7.11.B was revised to limit the amount of content and reduce instructional time required.
(12)	Organisms and environments. The student knows that populations and species inherit many of their unique traits through gradual processes over many generations. The student is expected to:	
(A)	describe how natural and artificial selection change genetic traits in a population over generations.	7.12 was revised to focus on the distinction between natural and artificial selection and to emphasize that these changes occur over generations.
(13)	Organisms and environments. The student understands that energy flows between organisms and the environment. 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;	7.5.B was divided between 6th & 7th grade to scaffold the learning progression. SE was reworded to bring clarity to the role and use of energy pyramids.
(B)	describe how ecosystems are sustained by biodiversity, the continuous flow of energy, and the recycling of matter and nutrients within the biosphere; and	
(C)	describe how biodiversity contributes to the sustainability of an ecosystem.	7.10.A&B were combined and revised to connect sustainability to the flow of matter & energy in the biosphere. This connects vertically to concepts in 6th grade and horizontally to concepts in other strands
(14)	Organisms and environments. The student knows all organisms are classified into taxonomic groups. The student is expected to:	
(A)	describe the taxonomic system that categorizes organisms based on similarities and differences shared among groups; and	7.14.A was added based on feedback from the biology working group which deleted taxonomy (Biology 8.B) from the HS TEKS.

(B)	describe the characteristics of the recognized kingdoms in ecosystems and their functions such as bacteria aiding digestion or fungi decomposing organic matter.	7.14.B was added to build on new 6.11C and introduce the kingdoms and also incorporate some of B8.C which was deleted by the biology workgroup.
~~(a)~~	~~Introduction.~~	
~~(1)~~	~~Grade 7 science is interdisciplinary in nature; however, much of the content focus is on organisms and the environment. National standards in science are organized as multi-grade blocks such as Grades 5-8 rather than individual grade levels. In order to follow the grade level format used in Texas, the various national standards are found among Grades 6, 7, and 8. Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include change and constancy, patterns, cycles, systems, models, and scale.~~	
	~~The strands for Grade 7 include the following.~~	
~~(A)~~	~~Scientific investigation and reasoning.~~	
~~(i)~~	~~To develop a rich knowledge of science and the natural world, students must become familiar with different modes of scientific inquiry, rules of evidence, ways of formulating questions, ways of proposing explanations, and the diverse ways scientists study the natural world and propose explanations based on evidence derived from their work.~~	
~~(ii)~~	~~Scientific investigations are conducted for different reasons. All investigations require a research question, careful observations, data gathering, and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of organisms or measuring the abiotic components in a given habitat. Descriptive statistics include frequency, range, mean, median, and mode. A hypothesis is not required in a descriptive investigation. On the other hand, when conditions can be controlled in order to focus on a single variable, experimental research design is used to determine causation. Students should experience both types of investigations and understand that different scientific research questions require different research designs.~~	
~~(iii)~~	~~Scientific investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and the 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. Models have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.~~	

(B)	Matter and energy. Matter and energy are conserved throughout living systems. Radiant energy from the Sun drives much of the flow of energy throughout living systems due to the process of photosynthesis in organisms described as producers. Most consumers then depend on producers to meet their energy needs. Subsequent grade levels will learn about the differences at the molecular and atomic level.	
(C)	Force, motion, and energy. Force, motion, and energy are observed in living systems and the environment in several ways. Interactions between muscular and skeletal systems allow the body to apply forces and transform energy both internally and externally. Force and motion can also describe the direction and growth of seedlings, turgor pressure, and geotropism. Catastrophic events of weather systems such as hurricanes, floods, and tornadoes can shape and restructure the environment through the force and motion evident in them. Weathering, erosion, and deposition occur in environments due to the forces of gravity, wind, ice, and water.	
(D)	Earth and space. Earth and space phenomena can be observed in a variety of settings. Both natural events and human activities can impact Earth systems. There are characteristics of Earth and relationships to objects in our solar system that allow life to exist.	
(E)	Organisms and environments.	
(i)	Students will understand the relationship between living organisms and their environment. Different environments support different living organisms that are adapted to that region of Earth. Organisms are living systems that maintain a steady state with that environment and whose balance may be disrupted by internal and external stimuli. External stimuli include human activity or the environment. Successful organisms can reestablish a balance through different processes such as a feedback mechanism. Ecological succession can be seen on a broad or small scale.	
(ii)	Students learn that all organisms obtain energy, get rid of wastes, grow, and reproduce. During both sexual and asexual reproduction, traits are passed onto the next generation. These traits are contained in genetic material that is found on genes within a chromosome from the parent. Changes in traits sometimes occur in a population over many generations. One of the ways a change can occur is through the process of natural selection. Students extend their understanding of structures in living systems from a previous focus on external structures to an understanding of internal structures and functions within living things.	
(iii)	All living organisms are made up of smaller units called cells. All cells use energy, get rid of wastes, and contain genetic material. Students will compare plant and animal cells and understand the internal structures within them that allow them to obtain energy, get rid of wastes, grow, and reproduce in different ways. Cells can organize into tissues, tissues into organs, and organs into organ systems. Students will learn the major functions of human body systems such as the ability of the integumentary system to protect against infection, injury, and ultraviolet (UV) radiation; regulate body temperature; and remove waste.	

(2)	Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.	
(3)	Scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions become theories. Scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Students should know that scientific theories, unlike hypotheses, are well established and highly reliable, but they may still be subject to change as new information and technologies are developed. Students should be able to distinguish between scientific decision-making methods and ethical/social decisions that involve the application of scientific information.	
(4)	Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(b)	Knowledge and skills.	
(1)	Scientific investigation and reasoning. The student, for at least 40% of the instructional time, conducts 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 Texas Education Agency-approved safety standards; and	
(B)	practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials.	
(2)	Scientific investigation and reasoning. The student uses scientific practices 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 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.~~	
~~(3)~~	~~Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:~~	
~~(A)~~	~~analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student;~~	
~~(B)~~	~~use models to represent aspects of the natural world such as human body systems and plant and animal cells;~~	
~~(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.~~	
~~(4)~~	~~Science 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, including life science models, hand lenses, stereoscopes, microscopes, beakers, Petri dishes, microscope slides, graduated cylinders, test tubes, meter sticks, metric rulers, metric tape measures, timing devices, hot plates, balances, thermometers, calculators, water test kits, computers, temperature and pH probes, collecting nets, insect traps, globes, digital cameras, journals/notebooks, and other necessary equipment to collect, record, and analyze information; 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.~~	
~~(5)~~	~~Matter and energy. The student knows that interactions occur between matter and energy. The student is expected to:~~	
~~(A)~~	~~recognize that radiant energy from the Sun is transformed into chemical energy through the process of photosynthesis; and~~	7.5.A This SE was deleted but the topics covered have been addressed in another proposed SE.

~~(B)~~	~~diagram the flow of energy through living systems, including food chains, food webs, and energy pyramids.~~	7.5.B This SE was deleted but the topics covered have been addressed in another proposed SE.
~~(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~~	
	~~distinguish between physical and chemical changes in matter.~~	Renumbered to 7.5.B.
~~(7)~~	~~Force, motion, and energy. The student knows that there is a relationship among force, motion, and energy. The student is expected to:~~	
~~(A)~~	~~illustrate the transformation of energy within an organism such as the transfer from chemical energy to thermal energy; and~~	Existing 7.7A deleted and combined in new 6.7.B.
~~(B)~~	~~demonstrate and illustrate forces that affect motion in organisms such as emergence of seedlings, turgor pressure, geotropism, and circulation of blood.~~	7.7B This SE was deleted to reduce the scope and streamline the instructional time.
~~(8)~~	~~Earth and space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:~~	
~~(A)~~	~~predict and describe how catastrophic events such as floods, hurricanes, or tornadoes impact ecosystems;~~	Moved to grade 8 and renumbered to 8.13.B.
~~(B)~~	~~analyze the effects of weathering, erosion, and deposition on the environment in ecoregions of Texas; and~~	7.8B This SE was deleted to reduce the scope and streamline the instructional time.
~~(C)~~	~~model the effects of human activity on groundwater and surface water in a watershed.~~	Renumbered to 7.10.A.
~~(9)~~	~~Earth and space. The student knows components of our solar system. The student is expected to:~~	
~~(A)~~	~~analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere; and~~	Renumbered to 7.8.C.
~~(B)~~	~~identify the accommodations, considering the characteristics of our solar system, that enabled manned space exploration.~~	7.9.B was deleted to reduce the scope and streamline instructional time.
~~(10)~~	~~Organisms and environments. The student knows that there is a relationship between organisms and the environment. The student is expected to:~~	
~~(A)~~	~~observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms;~~	7.10.A was specifically recommended to be deleted by content advisors.
~~(B)~~	~~describe how biodiversity contributes to the sustainability of an ecosystem; and~~	Renumbered to 7.13.C.
~~(C)~~	~~observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds.~~	Moved to grade 8 and revised to 8.13.B.

~~(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;~~	7.11.A was deleted to reduce scope and streamline instructional time; the topic no longer fits within the vertical alignment and is not a critical skill for middle school.
~~(B)~~	~~explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb; and~~	7.11.B was deleted to reduce scope; the topics are included in other SEs.
~~(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 and hybrid plants.~~	Revised and renumbered to 7.12.
~~(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:~~	
~~(A)~~	~~investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants;~~	7.12.A was deleted but concepts incorporated into other SEs.
~~(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;~~	Revised and renumbered to 7.11.A.
~~(C)~~	~~recognize levels of organization in plants and animals, including cells, tissues, organs, organ systems, and organisms;~~	Moved to grade 6 and renumbered to 6.11.B.
~~(D)~~	~~differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole;~~	Moved to grade 8 and renumbered to 8.11.A.
~~(E)~~	~~compare the functions of cell organelles to the functions of an organ system; and~~	7.12.E deleted to reduce scope and streamline instructional time.
~~(F)~~	~~recognize the components of cell theory.~~	Moved to grade 6 and revised to 6.11.A.
~~(13)~~	~~Organisms and environments. The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli. The student is expected to:~~	
~~(A)~~	~~investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight; and~~	7.13A & 7.13B deleted on recommendation from content advisors and to reduce scope.
~~(B)~~	~~describe and relate responses in organisms that may result from internal stimuli such as wilting in plants and fever or vomiting in animals that allow them to maintain balance.~~	

~~(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:~~	
~~(A)~~	~~define heredity as the passage of genetic instructions from one generation to the next generation;~~	7.14.A deleted but concept moved to grade 8
~~(B)~~	~~compare the results of uniform or diverse offspring from asexual or sexual reproduction; and~~	Revised to new 7.11.B.
~~(C)~~	~~recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus.~~	Moved to grade 8 and renumbered to 8.11.B.

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TEKS with edits		Work Group Comments/Rationale
(b)	Introduction	
(1)	In Grades 6 – 8, content is organized into recurring strands. The concepts within each grade level build on prior knowledge and prepare students for the next grade level and establish a foundation for high school courses. In Grade 8, the following concepts will be addressed in each strand:	
(A)	Scientific and engineering practices. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.	
(i)	Scientific practices. Students should be able to ask questions, plan, and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.	
(ii)	Engineering practices. Students should be able to identify problems and design solutions using appropriate tools and models.	
(B)	Matter and energy. Students will make connections between elements, compounds, and mixtures that were introduced in prior grade levels. Students will examine the properties of water, acids, and bases. In addition, students will understand the basic concept of conservation of mass using chemical equations.	
(C)	Force, motion, and energy. Students will be introduced to Newton's second law of motion and investigate how all three laws of motion act simultaneously within systems. Students will understand that waves transfer energy and further explore the characteristics and applications of waves.	
(D)	Earth and space. Students learn that stars and galaxies are part of the universe. In addition, students use data to research scientific theories of the origin of the universe. Students learn how interactions in solar, weather, and ocean systems create changes in weather patterns and climate. In addition, they will understand that climate can be impacted by natural events and human activities.	
(E)	Organisms and environments. Students will identify the function of organelles. Traits are contained in genetic material that is found on genes within a chromosome from the parent. These traits influence the success of a species over time. Students explore how organisms and their populations respond to environmental changes, including those caused by human activities.	

(2)	Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable.	
(3)	Scientific hypotheses and theories. Students are expected to know that:	
(A)	hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and	
(B)	scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.	
(4)	Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students should be able to distinguish between scientific decision-making practices and ethical and social decisions that involve science.	
(5)	Recurring themes and concepts. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include structure and function, systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Stability and change occur in systems as patterns and can be observed, measured, and modeled. These patterns help to make predictions that can be scientifically tested, while models allow for boundary specification and provide a tool for understanding the ideas presented. Students should analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.	
(6)	Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	

(b)	Knowledge and skills.	
(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. The student is expected to:	A separate Scientific and Engineering Practices Work Group developed recommendations for revisions to the current process skills for K-12, which have been incorporated into the Work Group C recommendations chart.
(A)	ask questions and define problems based on observations or information from text, phenomena, models, or investigations;	
(B)	use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;	
(C)	use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency approved safety standards;	
(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, and hand lenses;	Work Group C added appropriate scientific tools for Grade 8.
(E)	collect quantitative data using the International System of Units (SI) and qualitative data as evidence;	
(F)	construct appropriate tables, graphs, maps, and charts using repeated trials and means, to organize data;	
(G)	develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and	
(H)	distinguish between scientific hypotheses, theories, and laws	
(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. The student is expected to:	
(A)	identify advantages and limitations of models such as their size, scale, properties, and materials;	
(B)	analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;	
(C)	use mathematical calculations to assess quantitative relationships in data; and	

(D)	evaluate experimental and engineering designs.	**Multiple Viewpoints on Scientific and Engineering Practices SEs:** Add to 2.D, "evaluate experimental and engineering designs" *using multiple criteria, including cost-benefit analysis*.
(3)	Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions.	
(A)	develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;	
(B)	communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and	
(C)	engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.	
(4)	Scientific and engineering practices. The students knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:	
(A)	relate the impact of past and current research on scientific thought and society, including the process of science and contributions of diverse scientists as related to the content;	
(B)	make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, and methods used; and	
(C)	research and explore connections between grade-level appropriate science concepts and STEM careers.	**Multiple Viewpoints on Scientific and Engineering Practices SEs:** Replace 4C. "research and explore connections between grade-level appropriate science SEP concepts and STEM careers" with "*4(C)1. Research three resources such as museums, libraries, organizations, private companies, and online platforms where students can investigate STEM careers.* SEP *4(C)2. Identify three resources to identify mentors employed in a STEM field who could be interviewed for a discussion of the advantages/disadvantages of pursuing a STEM career."*

(5)	Matter and energy. The student understands that matter can be classified according to its properties and is conserved in chemical changes. The student is expected to:	
(A)	characterize and classify matter as elements, compounds, homogeneous mixtures, or heterogeneous mixtures;	8.5.A Based on recommendation from Chemistry Work Group B this topic was moved from HS to MS. (Chem.4.D) This standard elaborates and extends concepts introduced in elementary school and developed in 6th and 7th grade.
(B)	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;	8.5.B Based on recommendations from Biology and Chemistry Work Group B, these topics are introduced to build a foundation for later high school courses.
(C)	compare and contrast the properties of acids and bases including pH relative to water, sour or bitter taste, and how they feel to the touch; and	8.5.C Based on recommendations from content advisors and Biology Work Group B, this topic has been added to build a foundation for later high school courses.
(D)	investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis.	8.5.D Revised from 8.5.E to clarify expectation and vertically align with grades 6 and 7. Conservation of mass is a fundamental concept in science and has been broken out into its own SE.
(6)	Force, motion, and energy. The student understands the relationship between force and motion. 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; and	8.6.A Revised to introduce Newton's 2nd Law and build on the concept of force introduced in 6th and 7th grades. Adds specificity to the SE. Also revised to more clearly distinguish between the existing 8.6.A and 8.6.C.
(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.	8.6.B Revised to avoid introducing the misconception that any of Newton's laws can be applied in isolation.
(7)	Force, motion, and energy. The student knows how energy is transferred through waves. The student is expected to:	The workgroup decided not to include an introduction to wave behavior (reflection, refraction, interference, etc.) due to limited instructional time.
(A)	explain how energy is transferred through transverse and longitudinal waves;	8.7.A added to introduce types of waves and relate to energy transfer

(B)	compare the characteristics of amplitude, frequency, and wavelength in transverse waves, including the electromagnetic spectrum; and	8.7.B added to build on types of waves by introducing their characteristics and essential vocabulary. Calculation of quantities involving wavelength, velocity, and frequency was not included as this is an introduction to the topic and it can be further developed in HS courses.
(C)	explain the use of electromagnetic waves in applications such as radiation therapy, wireless technologies, fiber optics, microwaves, ultraviolet sterilization, astronomical observations, and X-rays.	8.7.C added to add relevance to waves in students' everyday lives
(8)	Earth and space. The student knows characteristics of the universe. The student is expected to:	
(A)	describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram;	8.8.A adapted from 8.8A to clarify student expectation about life cycle of stars
(B)	categorize galaxies as spiral, elliptical, and irregular and locate the solar system within the Milky Way galaxy; and	8.8B adapted from 8.8B to clarify types of galaxies students are expected to know
(C)	research how scientific data are used as evidence to develop scientific theories to describe the origin of the universe.	8.8C recommend keeping to provide opportunities for students to examine evidence in support of scientific theories
(9)	Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:	8.9.B was deleted as duplicative of other content.
(A)	describe how weather and climate are influenced by interactions involving sunlight, the hydrosphere, and atmosphere;	Revised from 8.10.A to focus on interactions.
(B)	identify global patterns of atmospheric movement and how they influence local weather; and	Revised from 8.10.B for clarity.
(C)	describe the interactions among ocean currents and air masses that produce el Niño, la Niña, and tropical cyclones.	Revised from 8.10.C for clarity.
(10)	Earth and space. The student knows that natural events and human activity can impact global climate. The student is expected to:	**Multiple viewpoints:** there was a proposal for an additional SE for grade 8: *Research and describe the costs and benefits of reducing greenhouse gas emissions versus reducing global energy poverty.* There was concern about adding additional instructional time as well as topics such as economics and policy that overlap with content covered in social studies courses.

(A)	describe how volcanic eruptions, meteor impacts, abrupt changes in ocean currents and the release and absorption of greenhouse gases influence climate; and	8.10.A and B were added in response to content advisors' recommendation and includes both natural and human factors that influence climate as well as leaving space for discussions of historical and modern climate change.
(B)	research and describe how human actions can affect climate change.	
(11)	Organisms and environments. The student knows how cells support the health of organisms and their environments. 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; and	8.11.A is revised from existing 7.12.D. The language is clarified to focus on the functions carried out by cellular organelles.
(B)	describe the function of genes within chromosomes in determining inherited traits of offspring.	8.11.B was revised from 7.14C and the verb was changed for greater rigor.
(12)	Organisms and environments. The student knows the relationship between adaptation, variation, and survival. The student is expected to:	
	describe how variations within a population lead to adaptations that influence the probability of survival and reproductive success of a species over generations.	8.12 was added to incorporate the idea of adaptations and relate to the biological concept of fitness.
(13)	Organisms and environments. The student understands how ecosystems and populations change. The student is expected to:	
(A)	analyze the effects on food webs when new species are introduced, existing species are eliminated, and existing populations fluctuate; and	This connects vertically to concepts in 3-8th grades and horizontally to concepts in other strands. This completes the learning progression and prepares students for the proposed Biology TEKS
(B)	describe how primary and secondary ecological succession affect populations and species diversity after ecosystems are disrupted by natural events or human activity.	7.8.A, 7.10.C, 8.11.B, & B.11.B were combined. WGB recommended that succession be taught in MS and removed it from the Biology TEKS.
~~(a)~~	~~Introduction.~~	
~~(1)~~	~~Grade 8 science is interdisciplinary in nature; however, much of the content focus is on earth and space science. National standards in science are organized as multi-grade blocks such as Grades 5-8 rather than individual grade levels. In order to follow the grade level format used in Texas, the various national standards are found among Grades 6, 7, and 8. Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include change and constancy, patterns, cycles, systems, models, and scale.~~	
	~~The strands for Grade 8 include the following.~~	

(A)	Scientific investigation and reasoning.	
(i)	To develop a rich knowledge of science and the natural world, students must become familiar with different modes of scientific inquiry, rules of evidence, ways of formulating questions, ways of proposing explanations, and the diverse ways scientists study the natural world and propose explanations based on evidence derived from their work.	
(ii)	Scientific investigations are conducted for different reasons. All investigations require a research question, careful observations, data gathering, and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of organisms or measuring the abiotic components in a given habitat. Descriptive statistics include frequency, range, mean, median, and mode. A hypothesis is not required in a descriptive investigation. On the other hand, when conditions can be controlled in order to focus on a single variable, experimental research design is used to determine causation. Students should experience both types of investigations and understand that different scientific research questions require different research designs.	
(iii)	Scientific investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations, and the 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. Models have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.	
(B)	Matter and energy. Students recognize that matter is composed of atoms. Students examine information on the Periodic Table to recognize that elements are grouped into families. In addition, students understand the basic concept of conservation of mass. Lab activities will allow students to demonstrate evidence of chemical reactions. They will use chemical formulas to identify substances.	
(C)	Force, motion, and energy. Students experiment with the relationship between forces and motion through the study of Newton's three laws. Students learn how these forces relate to geologic processes and astronomical phenomena. In addition, students recognize that these laws are evident in everyday objects and activities. Mathematics is used to calculate speed using distance and time measurements.	
(D)	Earth and space. Students identify the role of natural events in altering Earth systems. Cycles within Sun, Earth, and Moon systems are studied as students learn about seasons, tides, and lunar phases. Students learn that stars and galaxies are part of the universe. In addition, students use data to research scientific theories of the origin of the universe. Students will illustrate how Earth features change over time by plate tectonics. They will interpret land and erosional features on topographic maps and satellite views. Students learn how interactions in solar, weather, and ocean systems create changes in weather patterns and climate.	

(E)	Organisms and environments. In studies of living systems, students explore the interdependence between these systems. Students describe how biotic and abiotic factors affect the number of organisms and populations present in an ecosystem. In addition, students explore how organisms and their populations respond to short- and long-term environmental changes, including those caused by human activities.	
(2)	Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.	
(3)	Scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions become theories. Scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Students should know that scientific theories, unlike hypotheses, are well established and highly reliable, but they may still be subject to change as new information and technologies are developed. Students should be able to distinguish between scientific decision-making methods and ethical/social decisions that involve the application of scientific information.	
(4)	Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.	
(b)	Knowledge and skills.	
(1)	Scientific investigation and reasoning. The student, for at least 40% of instructional time, conducts 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 Texas Education Agency-approved safety standards; and	
(B)	practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials.	
(2)	Scientific investigation and reasoning. The student uses scientific practices 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 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.~~	
~~(3)~~	~~Scientific investigation and reasoning. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions and knows the contributions of relevant scientists. The student is expected to:~~	
~~(A)~~	~~analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, 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.~~	
~~(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, including lab journals/notebooks, beakers, meter sticks, graduated cylinders, anemometers, psychrometers, hot plates, test tubes, spring scales, balances, microscopes, thermometers, calculators, computers, spectroscopes, timing devices, and other necessary equipment to collect, record, and analyze information; 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.~~	
~~(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;~~	Deleted on recommendation from Workgroup B and these topics have been incorporated into the standards for chemistry.

~~(B)~~	~~identify that protons determine an element's identity and valence electrons determine its chemical properties, including reactivity;~~	Deleted on recommendation from Workgroup B and these topics have been incorporated into the standards for chemistry.
~~(C)~~	~~interpret the arrangement of the Periodic Table, including groups and periods, to explain how properties are used to classify elements;~~	Deleted on recommendation from Workgroup B and these topics have been incorporated into the standards for chemistry.
~~(D)~~	~~recognize that chemical formulas are used to identify substances and determine the number of atoms of each element in chemical formulas containing subscripts; and~~	Moved to grade 7 and revised in 7.5.A.
~~(E)~~	~~investigate how evidence of chemical reactions indicates that new substances with different properties are formed and how that relates to the law of conservation of mass.~~	Revised and renumbered to 8.5.D.
~~(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;~~	Revised under the same number.
~~(B)~~	~~differentiate between speed, velocity, and acceleration; and~~	Deleted because part was included in 7.6.B and acceleration is introduced in revised 8.6.A.
~~(C)~~	~~investigate and describe applications of Newton's three laws of motion such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.~~	Revised and renumbered to 8.6.B.
~~(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;~~	Moved to grade 6 and revised as 6.8.A.
~~(B)~~	~~demonstrate and predict the sequence of events in the lunar cycle; and~~	Deleted with the recommendation to move to grade 5 science TEKS
~~(C)~~	~~relate the positions of the Moon and Sun to their effect on ocean tides.~~	Moved to grade 6 and revised as 6.8.B.
~~(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;~~	Revised under the same number.
~~(B)~~	~~recognize that the Sun is a medium-sized star located in a spiral arm of the Milky Way galaxy and that the Sun is many thousands of times closer to Earth than any other star;~~	Revised under the same number.
~~(C)~~	~~identify how different wavelengths of the electromagnetic spectrum such as visible light and radio waves are used to gain information about components in the universe; and~~	Deleted and an element of it was added to proposed 8.7.C on uses of EM spectrum

~~(D)~~	~~research how scientific data are used as evidence to develop scientific theories to describe the origin of the universe.~~	Renumbered to 8.8.C.
~~(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;~~	Moved to grade 7 and renumbered to 7.9.A.
~~(B)~~	~~relate plate tectonics to the formation of crustal features; and~~	8.9.B was deleted as duplicative of other content.
~~(C)~~	~~interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be reshaped by weathering.~~	8.9.C was deleted to reduce scope and streamline instructional time; interpreting topographic maps and satellite images is not a critical concept for middle school.
~~(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;~~	Revised and renumbered to 8.9.A.
~~(B)~~	~~identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts; and~~	Revised and renumbered to 8.9.B.
~~(C)~~	~~identify the role of the oceans in the formation of weather systems such as hurricanes.~~	Revised and renumbered to 8.9.C.
~~(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)~~	~~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;~~	Moved to grade 6 and renumbered to 6.13.A.
~~(B)~~	~~explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and~~	Revised and renumbered as 8.13.B.
~~(C)~~	~~recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.~~	Deleted and concepts incorporated into other SEs.