Grade 6 Side-by-Side

2021 Knowledge and Skill Statement/Student Expectation	2021 Text	2017 Knowledge and Skill Statement/Student Expectation	2017 Text	Notes from TEA Staff
SCIENCE.6.1	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:	6.1	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:	
		6.2	Scientific ~~investigation and reasoning~~. The student ~~uses scientific practices during~~ laboratory and field investigations. The student is expected to:	
SCIENCE.6.1.A	ask questions and define problems based on observations or information from text, phenomena, models, or investigations;	6.2.A	~~plan and implement comparative and descriptive~~ investigations ~~by making~~ observations, asking ~~well-defined~~ questions, ~~and using appropriate equipment and technology~~;	
SCIENCE.6.1.B	use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems;	6.2.B	~~design and implement~~ experimental investigations ~~by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology~~;	
SCIENCE.6.1.C	use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards;	6.1.A	~~demonstrate~~ safe practices during laboratory and field investigations as outlined in Texas Education Agency-approved safety standards; and	
		6.4	~~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:~~	
		6.4.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~~.	
SCIENCE.6.1.D	use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals;	6.4	~~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:~~	
		6.4.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	
SCIENCE.6.1.E	collect quantitative data using the International System of Units (SI) and qualitative data as evidence;	6.2.C	collect ~~and record~~ data using the International System of Units (SI) and qualitative ~~means such as labeled drawings, writing, and graphic organizers~~;	
SCIENCE.6.1.F	construct appropriate tables, graphs, maps, and charts using repeated trials and means to organize data;	6.2.D	construct tables and graphs, using repeated trials and means, to organize data ~~and identify patterns~~; and	
SCIENCE.6.1.G	develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and	6.3.B	use models to represent ~~aspects of the natural world such as a model of Earth's layers~~;	
SCIENCE.6.1.H	distinguish between scientific hypotheses, theories, and laws.			
SCIENCE.6.2	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:			
SCIENCE.6.2.A	identify advantages and limitations of models such as their size, scale, properties, and materials;	6.3.C	identify advantages and limitations of models such as size, scale, properties, and materials; and	

SCIENCE.6.2.B	analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;	**6.2.E**	analyze data ~~to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends~~.	Data analysis, explanations, and conclusions were split into separate Student Expectations, 6.2.B, 6.3.A, and 6.3.B.
SCIENCE.6.2.C	use mathematical calculations to assess quantitative relationships in data; and			
SCIENCE.6.2.D	evaluate experimental and engineering designs.			
SCIENCE.6.3	Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:			
SCIENCE.6.3.A	develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;	**6.3.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~~ ;	
SCIENCE.6.3.B	communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and	**6.2.E**	~~analyze data to formulate reasonable~~ explanations, communicate ~~valid conclusions supported by the data, and predict trends~~.	Data analysis, explanations, and conclusions were split into separate Student Expectations, 6.2.B, 6.3.B, and 6.3.C.
SCIENCE.6.3.C	engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.			
SCIENCE.6.4	Scientific and engineering practices. The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:	**6.3**	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:	Critical thinking and the contributions of scientists were split into separate Knowledge and Skill statements, 6.3 and 6.4.
SCIENCE.6.4.A	relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content;	**6.3.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.	
SCIENCE.6.4.B	make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, cost-effectiveness, and methods used; and			
SCIENCE.6.4.C	research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.			
SCIENCE.6.5	Recurring themes and concepts. The student understands that recurring themes and concepts provide a framework for making connections across disciplines. The student is expected to:			
SCIENCE.6.5.A	identify and apply patterns to understand and connect scientific phenomena or to design solutions;			
SCIENCE.6.5.B	identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;			
SCIENCE.6.5.C	analyze how differences in scale, proportion, or quantity affect a system's structure or performance;			
SCIENCE.6.5.D	examine and model the parts of a system and their interdependence in the function of the system;			
SCIENCE.6.5.E	analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;			
SCIENCE.6.5.F	analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems; and			

6.5.G	analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.			
6.6	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:			
6.6.A	compare solids, liquids, and gases in terms of their structure, shape, volume, and kinetic energy of atoms and molecules;			
6.6.B	investigate the physical properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures;	**6.5.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~~;	The concepts of chemical formulas and symbols were moved to Grade 7.
6.6.C	identify elements on the periodic table as metals, nonmetals, metalloids , and rare Earth elements based on their physical properties and importance to modern life;	**6.6.A**	~~compare~~ metals, nonmetals, and metalloids ~~using~~ physical properties ~~such as luster, conductivity, or malleability~~;	
6.6.D	compare the density of substances relative to various fluids; and	**6.6.B**	~~calculate~~ density ~~to identify an unknown~~ substance;	
6.6.E	identify the formation of a new substance by using the evidence of a possible chemical change, including production of a gas, change in thermal energy, production of a precipitate, and color change.	**6.5.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.	
		~~6.5~~	~~Matter and energy. The student knows the differences between elements and compounds. The student is expected to:~~	Elements and compounds were moved to Grade 7.
		~~6.5.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~~	The elemental composition of the Earth was deleted from middle school.
		~~6.6~~	~~Matter and energy. The student knows matter has physical properties that can be used for classification. The student is expected to:~~	Classification by physical properties is covered in elementary school.
		~~6.6.C~~	~~test the physical properties of minerals, including hardness, color, luster, and streak.~~	Properties of minerals have been deleted from middle school.
6.7	Force, motion, and energy. The student knows the nature of forces and their role in systems that experience stability or change. The student is expected to:			
SCIENCE.6.7.A	identify and explain how forces act on objects, including gravity, friction, magnetism, applied forces, and normal forces, using real-world applications;			
SCIENCE.6.7.B	calculate the net force on an object in a horizontal or vertical direction using diagrams and determine if the forces are balanced or unbalanced; and	**8.6.A**	~~demonstrate and~~ calculate how unbalanced forces ~~change the speed or direction of an object's motion~~;	The concept of unbalanced forces causing a change in motion was moved from Grade 8.
SCIENCE.6.7.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.	**8.6.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~~.	The concept of Newton's Third Law was moved from Grade 8.
		~~6.11.B~~	~~understand that gravity is the force that governs the motion of our solar system; and~~	The concept of gravity was moved to Grade 7.
SCIENCE.6.8	Force, motion, and energy. The student knows that the total energy in systems is conserved through energy transfers and transformations. The student is expected to:			
SCIENCE.6.8.A	compare and contrast gravitational, elastic, and chemical potential energies with kinetic energy;	**6.8**	Force, motion, and energy. ~~The student knows force and motion are related to~~ potential and kinetic energy. ~~The student is expected to:~~	
		6.8.A	compare and contrast potential and kinetic energy;	

SCIENCE.6.8.B	describe how energy is conserved through transfers and transformations in systems such as electrical circuits, food webs, amusement park rides, or photosynthesis; and	**6.9.C**	~~demonstrate~~ energy transformations ~~such as energy in a flashlight battery changes from chemical energy to electrical energy to light energy~~.	
SCIENCE.6.8.C	explain how energy is transferred through transverse and longitudinal waves.			
		~~**6.8.B**~~	~~identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces;~~	Changes to an object due to unbalanced forces are now introduced in Grade 5.
		~~**6.8.C**~~	~~calculate average speed using distance and time measurements;~~	Average speed was moved to Grade 7.
		~~**6.8.D**~~	~~measure and graph changes in motion; and~~	Graphing changes in motion were moved to Grade 7.
		~~**6.8.E**~~	~~investigate how inclined planes can be used to change the amount of force to move an object.~~	The concept of inclined planes was deleted from middle school.
		~~**6.9**~~	~~Force, motion, and energy. The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form. The student is expected to:~~	Conservation of energy was moved to Grade 7.
		~~**6.9.A**~~	~~investigate methods of thermal energy transfer, including conduction, convection, and radiation;~~	Thermal energy transfer was moved to Grade 7.
		~~**6.9.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~~	Thermal energy transfer was moved to Grade 7.
SCIENCE.6.9	Earth and space. The student models the cyclical movements of the Sun, Earth, and Moon and describes their effects. The student is expected to:	~~**6.11**~~	~~Earth and space. The student understands the organization of our solar system and the relationships among the various bodies that comprise it. The student is expected to:~~	
SCIENCE.6.9.A	model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons; and	**8.7.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;	Day and night are covered in elementary school.
SCIENCE.6.9.B	describe and predict how the positions of the Earth, Sun, and Moon cause daily, spring, and neap cycles of ocean tides due to gravitational forces.	~~**8.7**~~	~~Earth and space. The student knows the effects resulting from cyclical movements~~ of the Sun, Earth, and Moon. ~~The student is expected to:~~	The concept of tides was moved from Grade 8.
		8.7.C	~~relate~~ the positions of the Moon and Sun ~~to their effect on~~ ocean tides.	
		~~**6.11.C**~~	~~describe the history and future of space exploration, including the types of equipment and transportation needed for space travel.~~	Space exploration was deleted from middle school.
SCIENCE.6.10	Earth and space. The student understands the rock cycle and the structure of Earth. The student is expected to:	**6.10**	Earth and space. The student understands the structure of Earth, the rock cycle, ~~and plate tectonics~~. The student is expected to:	Plate tectonics was moved to Grade 7.
SCIENCE.6.10.A	differentiate between the biosphere, hydrosphere, atmosphere, and geosphere and identify components of each system;			
SCIENCE.6.10.B	model and describe the layers of Earth, including the inner core, outer core, mantle, and crust; and	**6.10.A**	~~build a~~ model ~~to illustrate the compositional and mechanical~~ layers of Earth, including the inner core, outer core, mantle, crust, ~~asthenosphere, and lithosphere~~;	
SCIENCE.6.10.C	describe how metamorphic, igneous, and sedimentary rocks form and change through geologic processes in the rock cycle.	**6.10.B**	~~classify~~ rocks as metamorphic, igneous, or sedimentary ~~by the processes of their~~ formation;	
		~~**6.10.C**~~	~~identify the major tectonic plates, including Eurasian, African, Indo-Australian, Pacific, North American, and South American; and~~	Plate tectonics was moved to Grade 7.

		~~6.10.D~~	~~describe how plate tectonics causes major geological events such as ocean basin formation, earthquakes, volcanic eruptions, and mountain building.~~	Plate tectonics was moved to Grade 7.
		~~6.11.A~~	~~describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, and comets~~;	Movements of objects in the solar system was moved to Grade 7.
SCIENCE.6.11	Earth and space. The student understands how resources are managed. The student is expected to:	**6.7**	~~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:	
SCIENCE.6.11.A	research and describe why resource management is important in reducing global energy, poverty, malnutrition, and air and water pollution; and	**6.7.A**	research and ~~discuss the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar~~ resources.	The advantages and disadvantages of energy resources were moved to Grade 4.
SCIENCE.6.11.B	explain how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.	**6.1.B**	~~practice appropriate use and~~ conservation ~~of~~ resources~~, including disposal, reuse, or recycling of materials.~~	
SCIENCE.6.12	Organisms and environments. The student knows that interdependence occurs between living systems and the environment. The student is expected to:			
SCIENCE.6.12.A	investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as availability of light and water, range of temperatures, or soil composition;	**6.12.E**	~~describe~~ biotic and abiotic parts of an ecosystem in which organisms ~~interact~~;	
SCIENCE.6.12.B	describe and give examples of predatory, competitive, and symbiotic relationships between organisms, including mutualism, parasitism, and commensalism; and	**Bio.12.A**	~~interpret~~ relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms;	The concept of relationships is now introduced in Grade 6. It is reinforced and expanded on in Biology.
SCIENCE.6.12.C	describe the hierarchical organization of organism, population, and community within an ecosystem.	**6.12.F**	~~diagram the levels of~~ organization within an ecosystem, including organism, population, community, and ecosystem.	
SCIENCE.6.13	Organisms and environments. The student knows that organisms have an organizational structure and variations can influence survival of populations. The student is expected to:	~~6.12~~	~~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:~~	
SCIENCE.6.13.A	describe the historical development of cell theory and explain how organisms are composed of one or more cells, which come from pre-existing cells and are the basic unit of structure and function;	**6.12.A**	~~understand that all~~ organisms are composed of one or more cells;	
		7.12.F	~~recognize the components of~~ cell theory.	The concept of cell theory was moved in from Grade 7.
SCIENCE.6.13.B	identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, and autotrophic and heterotrophic; and	**6.12.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~~;	The concept of classification was moved to Grade 8.
		6.12.B	~~recognize that the presence of a nucleus is a key factor used to determine whether a cell is~~ prokaryotic or eukaryotic;	
SCIENCE.6.13.C	describe how variations within a population can be an advantage or disadvantage to the survival of a population as environments change.	**7.11.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~~.	The concept of variations was moved in from Grade 7.
		~~6.12.C~~	~~recognize that the broadest taxonomic classification of living organisms is divided into currently recognized domains;~~	The concept of domains has been deleted from middle school.
KEY	**Blue double underline: indicates content new to the grade level**		**~~Orange strike through: indicates content was deleted~~**	