

Grade 8 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.8.1	Scientific and engineering practices . The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom , laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models . The student is expected to:	8.1	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:	
		8.2	Scientific investigation and reasoning . The student uses scientific practices during laboratory and field investigations. The student is expected to:	
SCIENCE.8.1.A	ask questions and define problems based on observations or information from text, phenomena, models , or investigations;	8.2.A	plan and implement comparative and descriptive investigations by making observations, asking well-defined questions, and using appropriate equipment and technology ;	
SCIENCE.8.1.B	use scientific practices to plan and conduct descriptive, comparative , and experimental investigations and use engineering practices to design solutions to problems ;	8.2.B	design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology ;	
SCIENCE.8.1.C	use appropriate safety equipment and practices during laboratory, classroom , and field investigations as outlined in Texas Education Agency-approved safety standards;	8.1.A	demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency-approved safety standards; and	
		8.4	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:	
		8.4.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.8.1.D	use appropriate tools such as graduated cylinders, metric rulers, periodic tables , balances, scales , thermometers, temperature probes , laboratory ware, timing devices, pH indicators , hot plates, models , microscopes, slides , life science models , petri dishes, dissecting kits , magnets , spring scales or force sensors , tools that model wave behavior , satellite images , weather maps , hand lenses , and lab notebooks or journals ;	8.4	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:	
		8.4.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.8.1.E	collect quantitative data using the International System of Units (SI) and qualitative data as evidence ;	8.2.C	collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers;	
SCIENCE.8.1.F	construct appropriate tables, graphs, maps , and charts using repeated trials and means to organize data;	8.2.D	construct tables and graphs, using repeated trials and means, to organize data and identify patterns ; and	
SCIENCE.8.1.G	develop and use models to represent phenomena, systems, processes, or solutions to engineering problems; and	8.3.B	use models to represent aspects of the natural world such as a model of Earth's layers ;	
SCIENCE.8.1.H	distinguish between scientific hypotheses, theories, and laws.			

		8.1.B	practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials.	Conservation is now part of the content Student Expectations, mainly in elementary school.
SCIENCE.8.2	<u>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:</u>			
SCIENCE.8.2.A	identify advantages and limitations of models such as <u>their</u> size, scale, properties, and materials;	8.3.C	identify advantages and limitations of models such as size, scale, properties, and materials; and	
SCIENCE.8.2.B	analyze data <u>by identifying any significant descriptive statistical features, patterns, sources of error, or limitations;</u>	8.2.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, 8.2.B, 8.3.A, and 8.3.B.
SCIENCE.8.2.C	<u>use mathematical calculations to assess quantitative relationships in data; and</u>			
SCIENCE.8.2.D	<u>evaluate experimental and engineering designs.</u>			
SCIENCE.8.3	<u>Scientific and engineering practices. The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:</u>			
SCIENCE.8.3.A	<u>develop</u> explanations and <u>propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;</u>	8.3.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.8.3.B	<u>communicate</u> explanations and <u>solutions individually and collaboratively in a variety of settings and formats;</u> and	8.2.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, 8.2.B, 8.3.A, and 8.3.B.
SCIENCE.8.3.C	<u>engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.</u>			
SCIENCE.8.4	Scientific <u>and engineering practices.</u> The student knows the contributions of scientists <u>and recognizes the importance of scientific research and innovation on society.</u> The student is expected to:	8.3	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, 8.3 and 8.4.
SCIENCE.8.4.A	relate the impact of <u>past and current</u> research on scientific thought and society, including the <u>process of science, cost-benefit analysis,</u> and contributions of diverse scientists as related to the content;	8.3.D	relate the impact of research on scientific thought and society, including the <u>history of science</u> and contributions of scientists as related to the content.	
SCIENCE.8.4.B	<u>make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, cost-effectiveness, and methods used; and</u>			
SCIENCE.8.4.C	<u>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.</u>			
SCIENCE.8.5	<u>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:</u>			
SCIENCE.8.5.A	<u>identify and apply patterns to understand and connect scientific phenomena or to design solutions;</u>			
SCIENCE.8.5.B	<u>identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems;</u>			
SCIENCE.8.5.C	<u>analyze how differences in scale, proportion, or quantity affect a system's structure or performance;</u>			

SCIENCE.8.5.D	examine and model the parts of a system and their interdependence in the function of the system;			
SCIENCE.8.5.E	analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems;			
SCIENCE.8.5.F	analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems; and			
SCIENCE.8.5.G	analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.			
SCIENCE.8.6	Matter and energy. The student understands that matter can be classified according to its properties and matter is conserved in chemical changes that occur within closed systems . The student is expected to:	8.5	Matter and energy. The student knows that matter is composed of atoms and has chemical and physical properties. The student is expected to:	
SCIENCE.8.6.A	explain by modeling how matter is classified as elements, compounds, homogeneous mixtures, or heterogeneous mixtures;			
SCIENCE.8.6.B	use the periodic table to identify the atoms involved in chemical reactions;			
SCIENCE.8.6.C	describe the properties of cohesion, adhesion, and surface tension in water and relate to observable phenomena such as the formation of droplets, transport in plants, and insects walking on water;			
SCIENCE.8.6.D	compare and contrast the properties of acids and bases, including pH relative to water; and			
SCIENCE.8.6.E	investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis .	8.5.E	investigate how indirect evidence of chemical reactions indicates that new substances with different properties are formed and how that relates to the law of conservation of mass.	
		8.5.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;	Atomic structure was moved to Chemistry.
		8.5.B	identify that protons determine an element's identity and valence electrons determine its chemical properties, including reactivity;	Atomic structure was moved to Chemistry.
		8.5.C	interpret the arrangement of the Periodic Table, including groups and periods, to explain how properties are used to classify elements;	Atomic properties was moved to Chemistry.
		8.5.D	recognize that chemical formulas are used to identify substances and determine the number of atoms of each element in chemical formulas containing subscripts;	Chemical formulas was moved to Grade 7. (See 7.6.A and 7.6.B)
SCIENCE.8.7	Force, motion, and energy. The student understands the relationship between force and motion within systems . The student is expected to:	8.6	Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy. The student is expected to:	Force, motion, and energy were split between two Knowledge and Skill statements, 8.7 and 8.8.
SCIENCE.8.7.A	calculate and analyze how the acceleration of an object is dependent upon the net force acting on the object and the mass of the object using Newton's Second Law of Motion; and	8.6.A	demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion;	
SCIENCE.8.7.B	investigate and describe how Newton's three laws of motion act simultaneously within systems such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.	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.	
		8.6.B	differentiate between speed, velocity, and acceleration; and	The difference between speed, velocity was moved to Grade 7. Acceleration was moved to 8.7.A.
SCIENCE.8.8	Force, motion, and energy. The student knows how energy is transferred through waves . The student is expected to:	8.6	Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy. The student is expected to:	Force, motion, and energy were split between two Knowledge and Skill statements, 8.7 and 8.8.

SCIENCE.8.8.A	compare the characteristics of amplitude, frequency, and wavelength in transverse waves, including the electromagnetic spectrum; and			
SCIENCE.8.8.B	explain the use of electromagnetic waves in applications such as radiation therapy, wireless technologies, fiber optics.	8.8.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	
SCIENCE.8.9	Earth and space. The student describes the characteristics of the universe and the relative scale of its components . The student is expected to:	8.8	Earth and space. The student knows characteristics of the universe. The student is expected to:	
SCIENCE.8.9.A	describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram;	8.8.A	describe components of the universe, including stars, nebulae, and galaxies, and use models such as the Hertzsprung-Russell diagram for classification;	
SCIENCE.8.9.B	categorize galaxies as spiral, elliptical, and irregular and locate Earth's solar system within the Milky Way galaxy; and	8.8.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;	
SCIENCE.8.9.C	research and analyze scientific data used as evidence to develop scientific theories to describe the origin of the universe.	8.8.D	research how scientific data are used as evidence to develop scientific theories to describe the origin of the universe.	
		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;	The concept of rotation was moved to elementary school and revolution was moved to Grade 6.
		8.7.B	demonstrate and predict the sequence of events in the lunar cycle; and	The lunar phases were moved to Grade 4.
		8.7.C	relate the positions of the Moon and Sun to their effect on ocean tides.	The concept of tides was moved to Grade 6.
SCIENCE.8.10	Earth and space. The student knows that interactions between Earth, ocean, and weather systems impact climate . The student is expected to:	8.10	Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:	
SCIENCE.8.10.A	describe how energy from the Sun, hydrosphere, and atmosphere interact and influence weather and climate ;	8.10.A	recognize that the Sun provides the energy that drives convection within the atmosphere and oceans, producing winds;	
SCIENCE.8.10.B	identify global patterns of atmospheric movement and how they influence local weather; and	8.10.B	identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts;	
SCIENCE.8.10.C	describe the interactions between ocean currents and air masses that produce tropical cyclones, including typhoons and hurricanes.	8.10.C	identify the role of the oceans in the formation of weather systems such as hurricanes.	
		8.9	Earth and space. The student knows that natural events can impact Earth systems. The student is expected to:	The concept of natural events affecting Earth systems was deleted from middle school.
		8.9.A	describe the historical development of evidence that supports plate tectonic theory;	Plate tectonics was moved to Grade 7.
		8.9.B	relate plate tectonics to the formation of crustal features; and	Plate tectonics was moved to Grade 7.
		8.9.C	interpret topographic maps and satellite views to identify land and erosional features and predict how these features may be reshaped by weathering.	How weathering and erosion change land features was deleted from middle school.
SCIENCE.8.11	Earth and space. The student knows that natural events and human activity can impact global climate. The student is expected to:			
SCIENCE.8.11.A	use scientific evidence to describe how natural events, including volcanic eruptions, meteor impacts, abrupt changes in ocean currents, and the release and absorption of greenhouse gases influence climate;			
SCIENCE.8.11.B	use scientific evidence to describe how human activities, including the release of greenhouse gases, deforestation, and urbanization, can influence climate; and			

SCIENCE.8.11.C	describe the carbon cycle.	Bio.12.D	describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and	Carbon cycle was moved from Biology.
SCIENCE.8.12	<u>Organisms and environments. The student understands stability and change in populations and ecosystems. The student is expected to:</u>	8.11	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:	
SCIENCE.8.12.A	<u>explain how disruptions such as population changes, natural disasters, and human intervention impact the transfer of energy in food webs in ecosystems;</u>	8.11.B	explore how short and long-term environmental changes affect organisms and traits in subsequent populations;	
SCIENCE.8.12.B	describe how <u>primary and secondary</u> ecological succession <u>affect</u> populations and species diversity <u>after ecosystems are disrupted by natural events or human activity</u> ; and	7.10.C	observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds.	Succession was moved from Grade 7 and Biology.
		Bio.11.B	describe how events and processes that occur during ecological succession can change populations and species diversity.	
SCIENCE.8.12.C	describe how biodiversity contributes to the <u>stability and sustainability</u> of an ecosystem <u>and the health of the organisms within the ecosystem</u> .	7.10.B	describe how biodiversity contributes to the sustainability of an ecosystem; and	The concept of biodiversity was moved from Grade 7.
		8.11.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;	Biotic and abiotic factors are covered in elementary school.
		8.11.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.	Human dependence on ocean systems was deleted from middle school.
SCIENCE.8.13	<u>Organisms and environments. The student knows how cell functions support the health of an organism and how adaptation and variation relate to survival. The student is expected to:</u>			
SCIENCE.8.13.A	<u>identify the</u> function <u>of</u> the cell membrane, cell wall, nucleus, <u>ribosomes</u> , cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells;	7.12.D	differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole;	The functions of organelles were moved from Grade 7.
SCIENCE.8.13.B	<u>describe the function of genes within chromosomes in determining inherited traits of offspring; and</u>	7.14.A	define heredity as the passage of genetic instructions from one generation to the next generation;	Heredity was moved from Grade 7.
SCIENCE.8.13.C	<u>describe</u> how variations of <u>traits</u> within a population <u>lead to</u> structural, behavioral, and physiological <u>adaptations that influence the likelihood of</u> survival <u>and reproductive success of a species over generations</u> .	7.12.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;	The concept of variations influencing the survival of populations was moved from Grade 7.
		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.	
		Bio.12.B	compare variations and adaptations of organisms in different ecosystems;	
KEY	<u>Blue double underline: indicates content new to the grade level</u>		Orange strike through: indicates content was deleted	
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