

Science TEKS Review Revised Draft Recommendations

Revised Draft Recommendations
Texas Essential Knowledge and Skills (TEKS) Science, Kindergarten–Grade 8

The document reflects revised draft recommendations to the content standards for the science Texas Essential Knowledge and Skills (TEKS) for kindergarten–grade 8 that have been recommended by the State Board of Education’s TEKS **Work Group C: Middle School** and **Work Group E: Elementary**. These documents are not intended to reflect vertical alignment. The work groups did not make changes to the scientific and engineering practices, knowledge and skills statements (1)–(4). The revised draft recommendations begin with knowledge and skills statement (5) for each grade level.

Proposed additions are shown in green font with underline (additions). Proposed deletions are shown in red font with strikethroughs (~~deletions~~). Text proposed to be moved from its current student expectation is shown in purple italicized font with strikethrough (~~*moved text*~~) and is shown in the proposed new location in purple italicized font with underlines (*new text location*). 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.

- KS: refers to knowledge and skills statement
- SE: refers to student expectation
- Framework: refers to *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*

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5. Matter and its properties interactions . The student knows that objects have physical observable properties that determine how they are it is described and classified. The student is expected to:	5. Matter and its properties interactions . The student knows that objects have physical properties and that determine how they are described and classified objects can be understood by their properties and their interactions . The student is expected to:	5. Matter and its properties interactions . The student knows that matter has physical properties that and those properties determine how it is described, classified, changed , and used. The student is expected to:	ALL: modified to include consistent scientific vocabulary ALL: interactions taken out because not consistent with SEs Grade 1: consistency with Kinder and at suggestion of public feedback
K.5.A identify and record observable physical properties of objects, including shape, color, texture, and material, and generate additional ways to classify objects.	1.5.A classify objects by observable physical properties, including, shape, color, and texture and attributes such as larger and smaller and heavier and lighter; and	2.5.A classify matter by observable physical properties, including texture, flexibility, and relative temperature and identify whether a material is a solid or liquid;	1.5.A and 2.5.A scale/proportion/quantity (recurring themes and concepts)
	1.5.B explain compare and predict changes in materials caused by heating and cooling.	2.5.B conduct a descriptive investigation to explain how demonstrate that physical properties can be changed through processes such as cutting, folding, sanding, and melting, or freezing ; and	1.5.B stability/change and cause/effect with heating and cooling (recurring themes and concepts) 2.5.B incorporated SEP and feedback from field; better aligns with framework and grade 3 by adding “freezing”; energy/matter (recurring themes and concepts) TEKS guide: 1.5.B this should be limited to phase changes between solid and liquid, not evaporation;
		2.5.C demonstrate that small units can be combined or reassembled to form new objects for different purposes and explain the materials chosen based on their physical properties. create a mixture by combining two or more substances and identify the physical properties of the substances and the mixture.	TEKS Guide: examples of small units; supports structure and function (recurring themes and concepts) 2.5.C energy/matter (recurring themes and concepts)

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<p>6. Force and motion. The student knows that forces <u>cause changes in</u> motion, and position <u>in</u> are a part of <u>their</u> everyday life. The student is expected to:</p>	<p>6. Force and, motion. The student knows that forces <u>cause changes in</u> <u>and</u>, motion and <u>position in</u> are related and are a part of everyday life. The student is expected to:</p>	<p>6. Force and motion. The student knows that forces cause changes <u>in motion and position</u> in everyday life. The student is expected to:</p>	<p>KS modified across K-2 for consistency and to better align with SEs.</p> <p>KS 6: cause/effect (recurring themes and concepts)</p> <p>“Friction” and “waves” were concepts the K-2 group were uncertain of including; this should be considered by the vertical alignment workgroup based on the core ideas decisions of group E.</p>
<p><u>K.6.A describe and predict how a magnet interacts with various materials and how they can be used to push or pull.</u></p> <p>K.6.A—describe the location of an object in relation to another such as above, below, behind, in front of, and beside; and</p>	<p><u>1.6.A describe and predict how a magnet interacts with various materials and how they can be used to push or pull.</u></p> <p><u>1.6.A. explain how pushes and pulls can start, stop, and change the speed or direction of an object's motion; and</u></p>	<p><u>2.6.A explain how objects push on each other and can change shape when they touch or collide; and</u></p> <p>2.6.A plan and conduct an investigation that uses pushes and pulls to identify patterns of movement such as sliding, rolling, and spinning.</p>	<p>new K.6.A moved from grade 1 to begin pushes/pulls with magnets at K; previous draft was not specifically science content</p> <p>new 1.6.A incorporates feedback from the field</p> <p>new 2.6.A correctly scaffolds to Newton’s 3rd law</p>
<p>K.6.B describe and demonstrate the ways that objects can move such as in a straight line, zigzag, up and down, back and forth, round and round, and fast and slow.</p>	<p><u>1.6.B plan and conduct a descriptive investigation that predicts how pushes and pulls can start, stop, or change the speed or direction of an object's motion.</u></p>	<p><u>2.6.C plan and conduct an investigation to demonstrate how the strength of a push and pull changes an object's motion.</u></p>	<p>new 1.6.B connects SEP to science concepts</p> <p>new 2.6.A incorporates feedback from the field; scaffold to grade 3</p>

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7. Energy. <u>The student knows that there are multiple phenomena in everyday life that come from the transfer of energy from place to place and between objects.</u> The student knows that energy exists in many forms and is a part of their everyday life. The student is expected to:	7. Energy. <u>The student knows that there are multiple phenomena in everyday life that come from the transfer of energy from place to place and between objects.</u> The student knows that energy exists in many forms and is a part of their everyday life. The student is expected to:	7. Energy. <u>The student knows that there are multiple phenomena in everyday life that come from the transfer of energy from place to place and between objects.</u> The student knows that energy exists in many forms and is a part of their everyday life. The student is expected to:	<p>Framework (p. 120-122) states that “energy” shouldn’t be taught in K-2 but the workgroup felt it was important to still introduce the energy phenomena in this grade band; there are no separate “forms” of energy (e.g. sound energy, light energy) Include rationale in TEKS Guide.</p> <p>Organization feedback suggests a strand title change to “Phenomena” (recurring themes and concepts) but workgroup felt that keeping “Energy” aligned better across all grade levels.</p> <p>This workgroup recommends that “transfer of energy” be addressed in SEs at a later grade band.</p>
K.7.A identify and describe different forms of energy including light, thermal, and sound using the senses;	1.7.A identify and explain how different forms of energy, including light, thermal, and sound, are important to everyday life;	2.7.A compare different forms of energy including light, thermal, and sound energy;	
K.7. <u>AB</u> demonstrate that objects can only be seen when a light source is present and compare the effects of different amounts of light on the appearance of objects; and	1.7. <u>AB</u> investigate and describe applications of <u>heat</u> thermal energy in everyday life such as cooking food or using a hair dryer; and	2.7. <u>AB</u> demonstrate and explain that sound energy is made by vibrating matter and that sound energy can make matter vibrate; and	in addition to the comment above re: “energy”, changing to “heat” keeps the vocabulary consistent between this grade band and others.
K.7. <u>BC</u> identify and demonstrate that light travels through some objects and is blocked by other objects, creating shadows.	1.7. <u>BC</u> describe how some changes caused by <u>heat</u> thermal energy may be reversed, such as melting butter and other changes cannot be reversed, such as <u>cooking an egg or</u> baking a cake.	2.7. <u>BC</u> explain how different levels of sound energy are used in everyday life such as a whisper in a classroom or a fire alarm.	1.7.B TEKS Guide: define the upper boundary; teacher should not delve into chemical change
		<u>2.7.C design and build a device using tools and materials that uses sound to solve the problem of communicating over a distance.</u>	new 2.7.C added at the suggestion of organizational feedback. Workgroup felt that examples should be relegated to TEKS guide: such as a light source to send signals, paper cup and string "telephones" or a pattern of drum beats.

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8. Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:	8. Earth and space. The student knows that the natural world has recognizable patterns. The student is expected to:	8. Earth and space. The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:	KS 8: patterns, systems, stability/change, and scale (recurring themes and concepts)
K.8.A identify, describe, and predict the patterns of day and night and their observable characteristics;	1.8.A describe that air is all around us and demonstrate that wind is moving air using items such as a windsock, pinwheel, or ribbon;	2.8.A illustrate and composed of gases describe the Sun as a star that provides light and <u>heat thermal energy</u> <u>and explain that the Moon reflects the Sun's light</u> ;	1.8.A organizational feedback suggested taking out “describe that air is all around us” but work group felt that it was necessary to scaffold for later learning 2.8.A edits based on organizational feedback; 3-5 grade band had requested “composed of gases” and mentioned by content advisor; but workgroup felt it might not be developmentally appropriate according to framework because 2.8.A Vertical alignment group should consider addressing the use of “reflect” as academic vocabulary at this grade level.
K.8.B observe, describe, and illustrate the Sun, objects in the sky such as the clouds, the Moon, and stars, <u>and objects in the sky such as clouds</u> ; and	1.8.B record <u>observable characteristics of</u> weather including information, including relative temperature such as hot or cold, clear or cloudy, calm or windy, or rainy or icy, <u>and describe their impact on daily choices; and using the senses</u> ;	2.8.B explain that the Sun produces its own light energy and that the Moon reflects the Sun's light energy; and <u>observe and compare how objects in the sky are more visible and can appear different with a telescope than with an unaided eye</u>	Organizational feedback suggested combining 1.8.B and 1.8.C; more concrete and observable for students Workgroup considered content advisor feedback concerning introduction of water cycle; this was not consistent with the framework and gases have not been introduced and are not a concrete concept. new 2.8.B addresses concepts missing in SEs that are in the framework

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K.8.C observe and describe weather changes from day to day and over seasons.	1.8.C identify and describe characteristics of seasonal weather patterns and seasonal choices in clothing and activities; and	2.8.C measure, record, and graph weather information, including temperature and precipitation.	K.8.C organizational feedback suggested taking out seasons but workgroup felt it was natural extension of the day to day weather discussion
	1.8.C. D predict the patterns of seasons of the year such as order of occurrence and changes in nature.	<u>2.8.D investigate different types of severe weather events such as a hurricane, tornado, or flood and explain that some events are more likely than others in a given region.</u>	new 2.8.D added based on core ideas decision chart; introduces the concept that severe weather can impact ecosystems.
9. Earth and space. The student knows that the natural world includes earth materials. The student is expected to:	9. Earth and space. The student knows that the natural world includes earth materials that can be observed in systems and processes. The student is expected to:	9. Earth and space. The student knows that the natural world includes earth materials <u>that can be observed in systems and processes.</u> The student is expected to:	2.9 consistency with 1.9 and supports systems, stability and change (recurring themes and concepts)
K.9.A describe and classify rocks by the observable properties of size, shape, color, and texture.	1.9.A investigate and document <u>the properties of particle size, shape, texture, and color</u> characteristics and <u>the components of different types of soils such as top soil, clay, and sand;</u>	2.9.A investigate and describe how wind and water <u>move</u> can carry soil and rocks across the earth's surface such as wind blowing sand <u>into dunes</u> on a beach or a river carrying rocks as it flows.	1.9.A workgroup considered organizational feedback; mixed content advisor feedback suggested change to “describe” but workgroup felt it was grade appropriate as written; examples of types of soil added per ISD feedback 2.9.A workgroup considered content advisor feedback and felt the suggestion to change to “demonstrate” was not needed based on the use of “investigate”; TEKS Guide: set upper boundary, teachers does not need to teach as “erosion” this is laying the foundation for that later discussion
	1.9.B identify and <u>compare the properties of a variety of natural sources of puddles, ponds, streams, rivers, lakes, and oceans including</u> freshwater and saltwater, <u>color, clarity, size, and shape including streams, lakes, and oceans;</u> and		1.9.B workgroup incorporated some organization feedback into 1.9.A. The suggested additions are not concrete and are already adequately addressed in grade 1 social studies TEKS; reinforces core ideas

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	1.9.C investigate and describe how water can move rocks and soil from one place to another.		1.9.C workgroup considered content advisor feedback and felt the suggestion to change to “demonstrate” was not needed based on the use of “investigate”
10. Earth and Space. The student knows that earth materials, <u>and products made from these materials</u>, are important to everyday life. The student is expected to:	10. Earth and Space. The student knows that earth materials, <u>and products made from these materials</u>, are important to everyday life. The student is expected to:	10. Earth and Space. The student knows that earth materials, <u>and products made from these materials</u>, are important to everyday life. The student is expected to:	KS 10: structure and function, systems (recurring themes and concepts)
K.10.A describe how plants, animals, and humans use rocks, soil, and water.	1.10.A generate examples of practical uses for rocks, soil, and water; and	2.10.A distinguish between natural and manmade resources; and	K.10.A workgroup considered organizational feedback; felt the suggested addition was addressed in KS 11 1.10.A TEKS Guide: provide example of practical uses.
	1.10.B describe ways to conserve and protect natural sources of water such as turning off the faucet when brushing teeth and keeping trash out of bodies of water.	2.10.B demonstrate how <u>to limit human impact by making choices</u> to use , conserve and <u>properly</u> dispose of materials such as reusing or recycling paper, plastic, and metal.	1.10.B sets up the later discussion for non-renewable resources. 2.10.B edits made based on organizational feedback
11. Organisms and environments. The student knows that plants and animals <u>depend on factors in the environment to meet their</u> have basic needs for survival. The student is expected to:	11. Organisms and environments. The student knows that the environment is composed of relationships between living organisms and nonliving components. The student is expected to:	11. Organisms and environments. The student knows that living organisms have basic needs that must be met through interactions within their environment. The student is expected to:	KS 11: stability/change, systems, models (recurring themes and concepts)
K.11.A <u>describe how plants depend on</u> identify that air, sunlight, water, nutrients, and space <u>to grow</u> are basic needs of plants ; and	1.11.A describe and classify living and nonliving things based upon whether they have basic needs and produce young;	2.11.A explain how temperature and precipitation affect growth and behavior of animals through migration and hibernation, and plants responses through dormancy;	K.11.A edits based on organizational feedback; “depend” lays groundwork for “interdependence” at later grades TEKS guide: teachers should not state plants need or depend on soil for survival, clear this misconception.

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K.11.B <u>describe how animals depend on</u> identify that air, water, food, space, and shelter are basic needs of animals .	1.11.B analyze and record examples of interactions <u>and dependence</u> among living and nonliving components in terrariums or aquariums; and	2.11.B design and create a model to demonstrate the ways animals depend on other living things using food chains that include producers and consumers; and	K.11.B edits based on organizational feedback; “depend” lays groundwork for “interdependence” at later grades 1.11.B “dependence” reinforces K11.B lays groundwork and for “interdependence” at later grades
	1.11.C identify and illustrate ways that living organisms depend on each other through food chains.	2.11.C explain and demonstrate how <u>some</u> plants depend on other living things for pollination and to move their seeds around.	2.11.C edit based on content advisor feedback
12. Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them interact <u>with</u> and survive within their environments. The student is expected to:	12. Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them <u>interact and</u> survive within their environments. The student is expected to:	12. Organisms and environments. The student knows that organisms have structures and processes that help them <u>interact and</u> survive within their environments. The student is expected to:	KS 12: systems, structure/function, stability/change (recurring themes and concepts); established the core idea of cycles
K.12.A identify the <u>structures and functions</u> different parts of plants including roots, stems, leaves, flowers, and fruits;	1.12.A identify and compare how the external <u>structures characteristics of different animals and compare how those structures help different animals are related to where it lives, how it moves, and meet their basic needs for survival</u> what it eats ;	2.12.A identify <u>the and compare how plants have</u> roots, stems, leaves, flowers, fruits, and seeds <u>of plants and compare how those structures that help different plants them</u> meet their basic needs <u>for survival to survive, grow, and produce more plants</u> ;	1.12.A reworded to clarify the intent of comparing different structures of animals; lays groundwork for adaptation 2.12.A reworded to clarify the intent of comparing different structures of plants; lays groundwork for adaptation
K.12.B identify that animals have different <u>structures parts</u> that allow them to interact with their environment such as seeing, hearing, moving, and grasping objects;	1.12.B record observations of and describe basic life cycles of animals including a bird, a mammal, and a fish; and	2.12.B record and compare how the <u>structures physical characteristics</u> and behaviors of animals help them to find and take in food, water, and air; and	
K.12.C identify and record the changes from seed, seedling, plant, flower, and fruit in a simple plant life cycle; and	1.12.C compare ways that young animals resemble their parents.	<u>2.12.C record and compare how being part of a group helps animals obtain food, defend themselves, and cope with changes</u> ;	1.12.C the workgroup considered the organizational feedback; already addressed in k.12.C and 1.12.C new 2.12.C added to address the core idea that some animals live in groups and that the group can have benefits

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K.12.D identify ways that young plants resemble the parent plant.		2.12.DC investigate and describe some of the unique life cycles of animals where young animals do not resemble their parents, including butterflies and frogs.	2.12.D TEKS Guide: can define and add more examples of unique life cycles

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Grade 3	Grade 4	Grade 5	Work Group Comments/Rationale
5. Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is <u>identified</u>, classified, changed, and used. The student is expected to:	5. Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is <u>identified</u>, classified, changed, and used. The student is expected to:	5. Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is <u>identified</u>, classified, changed, and used. The student is expected to:	
3.5.A measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float (relative density);	4.5.A classify and describe matter using observable physical properties, including mass, volume, <u>physical</u> states (solid, liquid, gas), temperature, magnetism, and relative density (the ability to sink or float); and	5.5.A compare and contrast matter based on measurable, testable, or observable physical properties, including mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating using water as a reference point), solubility in water, and the ability to conduct or insulate thermal energy and electric energy;	All: “mass” should not mean that a distinction is made between mass and weight at this grade band G3: “relative density” was deleted as unnecessary because sink or float is the concept for this grade. G4: “physical” was added to be consistent w/ grade 5 based on content advisor feedback.
3.5.B describe and classify samples of matter as solids, liquids, and gases and demonstrate that solids have a definite shape and that liquids and gases take the shape of their container;	4.5.B <u>investigate and</u> compare and contrast a variety of mixtures, including solutions that are composed of liquids in liquids and solids in liquids, and explore the conservation of matter.	5.5.B demonstrate and explain that some mixtures maintain physical properties of their substances such as iron filings and sand and sand and water;	4.5B Feedback from content advisor was considered but workgroup felt that context for solutions was helpful for conservation of matter. TSELA feedback informed change to “investigate.” 5.5B feedback from content advisor was considered but workgroup felt the language was sufficient and helps set foundation for chemical change in MS. Boundaries can be elaborated in TEKS guide.
3.5.C predict, observe, and record changes in the state of matter caused by heating or cooling in a variety of substances such as ice becoming liquid water, condensation forming on the outside of a glass, or liquid water being heated to the point of becoming water vapor (gas); and		5.5.C compare the properties of substances before and after they are combined into a solution and demonstrate that matter is conserved; and	G3: considered content advisor feedback but did not make a change because the examples given are in a “such as” and not required.
3.5.D demonstrate that materials can be combined based on their physical properties to create or modify objects such as building a tower or adding clay to sand to make a stronger brick and justify the selection of materials based on their physical properties.		5.5.D model how matter can be divided into particles that are too small to be seen.	G3: considered content advisor feedback 3.5D but did not make a change because mixtures are already introduced in grade 4. Verb in 3.5D “justify” was kept because it supports using evidence.

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Grade 3	Grade 4	Grade 5	Work Group Comments/Rationale
6. Force, motion, and energy. The student knows the nature of forces and <u>the patterns of their interactions</u>. The student is expected to:	6. Force, motion, and energy. The student knows the nature of forces and <u>the patterns of their interactions</u>. The student is expected to:	6. Force, motion, and energy. The student knows the nature of forces and <u>the patterns of their interactions</u>. The student is expected to:	Patterns added to K&S to reinforce a recurring theme.
3.6.A <u>demonstrate and explain</u> observe and identify forces <u>acting on an object in contact or at a distance including</u> such as magnetism, gravity, and pushes and pulls acting on objects; and	4.6.A investigate and record observations of the forces of static electricity and friction; and	5.6.A <u>investigate and explain how equal and unequal forces acting on an object cause patterns of motion and transfer of energy</u> investigate the equal and unequal forces acting on an object and describe the effects that may create movement, including the identification of patterns of motion; and	4.6 CA feedback was considered but no change was made because 4.6A and 4.6B extend 3.6A. Forces in contact or at a distance added to 3.6 and 4.6 to align with core ideas from Framework. 5.6A was revised based on core ideas as well as feedback from TSELA.
3.6.B <u>plan and conduct an investigation to demonstrate and explain how position and motion can be changed by pushing and pulling objects such as swings, balls, and wagons.</u>	4.6.B <u>plan and conduct</u> design a descriptive investigations to explore the effect <u>patterns</u> of forces <u>such as gravity, friction, or magnetism in contact or at a distance</u> on an object.	5.6.B design a simple experimental investigation that tests the effect of force on an object <u>in a system such as a car on a ramp or a balloon rocket on a string.</u>	3.6B and 4.6B were revised based on feedback from TSELA. 4.6B added recurring theme of patterns.
7. Force, motion, and energy. <u>The student knows that energy is everywhere and can be observed in cycles, patterns, or systems.</u> The student knows that forces cause change and that energy exists in many forms. The student is expected to:	Force, motion, and energy. <u>The student knows that energy is everywhere and can be observed in cycles, patterns, or systems.</u> The student knows that forces cause change and that energy exists in many forms. The student is expected to:	Force, motion, and energy. <u>The student knows that energy is everywhere and can be observed in cycles, patterns, or systems.</u> The student knows that forces cause change and that energy exists in many forms. The student is expected to	
3.7.A identify <u>everyday</u> examples <u>that demonstrate the phenomena associated with energy including light, sound, thermal and mechanical systems</u> of mechanical, light, thermal, and sound energy in everyday life and explain how each type of energy can be identified; and	4.7.A <u>Investigate the transfer of energy by objects in motion, waves in water, sound and light;</u> differentiate among mechanical, sound, light, thermal, and electrical energy;	5.7.A <u>Investigate and describe the transformation of energy in systems such as energy in a flashlight battery changes from chemical energy to electrical energy to light energy.</u> investigate and identify the uses of mechanical, light, thermal, electrical, and sound energy;	x.7.A were revised to address feedback that there are no “forms” of energy and reflect better scientific understanding of the concept. 4.7.A added waves for better alignment to middle school. 5.7.A added transformation for better alignment to middle school.
3.7.B <u>Plan and conduct investigations that demonstrate how the speed of an object is related to its mechanical energy</u> describe how the forces of push and pull relate to mechanical energy.	4.7.B identify conductors and insulators of thermal and electrical energy; and	5.7.B <u>demonstrate that electrical energy in series and parallel circuits can be transformed into motion, light, sound, or thermal energy and identify the requirements for a functioning electrical circuit</u> demonstrate that the flow of electricity in series and parallel circuits can produce light, thermal, or sound energy and identify the requirements for a functioning electrical circuit; and	3.7.B was revised to better align to core idea in Framework. 5.7.B was revised to include concept of transformation .

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	4.7.C demonstrate and identify that <u>electrical energy</u> electricity travels in a closed path, creating a series circuit that can produce light and thermal energy.	5.7.C <u>Demonstrate and explain how light travels in a straight line and can be reflected and refracted</u> demonstrate that light travels in a straight line until it strikes an object and is reflected or travels from one medium to another and is refracted and differentiate between reflection and refraction.	4.7.C was revised to use more correct terminology. 5.7.C was revised to simplify the language.
8. Earth and space. The student knows there are recognizable objects and patterns in Earth's solar system. The student is expected to:	8. Earth and space. The student recognizes patterns among the Sun, Earth, and Moon system and their effects. The student is expected to:	8. Earth and space. The student knows that there are recognizable patterns among the Sun, Earth, and Moon system. The student is expected to:	
3.8.A construct models and explain the orbits of the Sun, Earth, and Moon in relation to each other; and	4.8.A collect and analyze data to identify sequences and predict patterns of change in seasons such as change in temperature and length of daylight; and	5.8.A demonstrate that Earth rotates on its axis once approximately every 24 hours causing the day/night cycle, shadows, and the apparent movement of the Sun <u>and constellations</u> across the sky.	5.8A was revised to include constellations for better alignment to Framework.
3.8.B identify the sequence of the planets in Earth's solar system in relation to the Sun.	4.8.B collect and analyze data to identify sequences and predict patterns of change in the observable appearance of the Moon from Earth during the lunar cycle.		
9. Earth and space. The student knows that there are recognizable processes that change the Earth over time. The student is expected to:	9. Earth and space. The student knows that there are processes on Earth that create patterns of change. The student is expected to:	9. Earth and space. The student knows that there are recognizable patterns and processes on Earth. The student is expected to:	
3.9.A compare and describe day-to-day weather in different locations at the same time that include air temperature, wind direction, and precipitation;	4.9.A describe and illustrate the continuous movement of water above and on the surface of Earth through the water cycle and explain the role of the Sun as a major source of energy in this process; and	5.9.A differentiate between weather and climate;	
3.9.B investigate and explain how soils are formed by weathering of rock such as sand and clay and the decomposition of plant and animal remains; and	4.9.B model and describe slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice.	5.9.B explain how the Sun and the ocean interact in the water cycle and affect weather;	
3.9.C model and describe rapid changes in Earth's surface such as volcanic eruptions, earthquakes, and landslides.		5.9.C model and describe the processes that led to the formation of sedimentary rocks and fossil fuels; and	
		5.9.D model and identify how changes to Earth's surface by wind, water, or ice result in the formation of landforms, including deltas, canyons, and sand dunes.	

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Grade 3	Grade 4	Grade 5	Work Group Comments/Rationale
10. Earth and Space. The student understands how natural resources are important and can be managed. The student is expected to:	10. Earth and Space. The student understands how natural resources are important and can be managed. The student is expected to:	10. Earth and Space. The student understands how natural resources are important and can be managed. The student is expected to:	
3.10.A explore and explain how natural resources are used to make products for human use; and	4.10.A identify and classify Earth's renewable resources, including air, plants, water, and animals, and nonrenewable resources, including coal, oil, and natural gas.	5.10.A <u>design and explain solutions to minimize impact on the environment from the use of renewable and non-renewable natural resources such as conservation, recycling or proper disposal</u> explain how conservation, disposal, and recycling of renewable and non-renewable natural resources impact the environment.	New 5.10A was introduced based on TSELA recommendation to incorporate SEP.
3.10.B identify ways to conserve natural resources through reducing, reusing, or recycling.	<u>4.10.B explain how conservation, disposal, and recycling of renewable and non-renewable natural resources impact the environment</u>		4.10B was moved from 5.10A for alignment and to lead to new 5.10A.
11. Organisms and environments. The student knows and can describe patterns, cycles, systems, and relationships within the environments. The student is expected to:	11. Organisms and environments. The student knows and understands that living organisms within an ecosystem interact with one another and with their environment. The student is expected to:	11. Organisms and environments. The student knows that there are relationships, systems, and cycles within environments. The student is expected to:	
3.11.A describe how the physical characteristics of environments <u>including the amount of rainfall</u> support plants and animals within an ecosystem;	4.11.A investigate and explain how most producers <u>can</u> make their own food using sunlight, water, and carbon dioxide <u>through the cycling of matter</u> ; and	5.11.A observe and describe how <u>a variety of</u> organisms survive by interacting with biotic and abiotic factors in <u>a healthy</u> their ecosystem;	3.11.A was revised to better align with Framework. 4.11.A was revised to better align with Framework and include recurring theme. 5.11.A was revised for clarity.
3.11.B identify and describe the flow of energy in a food chain and predict how changes in a food chain affect the ecosystem such as removal of frogs from a pond or bees from a field;	4.11.B describe the <u>cycling of matter and</u> flow of energy through food webs, including the roles of the Sun, producers, consumers, and decomposers; and	5.11.B predict how changes in the ecosystem affect the <u>cycling of matter and</u> flow of energy in a food web; and	4.11.B and 5.11.B were revised to better align with Framework and include recurring theme.
3.11.C describe how natural changes to the environment such as floods and droughts cause some organisms to thrive and others to perish or move to new locations; and	4.11.C identify and describe past environments based on fossil evidence.	5.11.C describe <u>a healthy ecosystem and</u> how human activities <u>can be</u> have beneficial <u>or</u> and harmful <u>to it</u> impacts on ecosystems.	5.11.C was revised to introduce the idea of a healthy ecosystem and include recurring theme of stability and change.
3.11.D identify fossils as evidence of past living organisms.			

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Grade 3	Grade 4	Grade 5	Work Group Comments/Rationale
12. Organisms and environments. The student knows that organisms undergo similar life processes and have structures <u>and functions</u> that help them survive within their environments. The student is expected to:	12. Organisms and environments. The student knows that organisms undergo similar life processes and have structures <u>and functions</u> that help them survive within their environments. The student is expected to:	12. Organisms and environments. The student knows that organisms undergo similar life processes and have structures, <u>functions and behaviors</u> that help them survive within their environments. The student is expected to:	
3.12.A explore and explain how <u>external</u> structures and functions of animals enable them to survive in their environment <u>such as the neck of a giraffe or webbed feet on a duck</u> ; and	4.12.A explore and explain how structures and functions of plants enable them to survive in their environment <u>such as waxy leaves and deep roots</u> ; and	5.12.A analyze the structures and functions of different species to identify how organisms survive in the same environment; and	3.12.A was revised to narrow the focus and provide examples. 4.12.A was revised to provide examples.
3.12.B explore, illustrate, and compare life cycles in <u>living</u> organisms such as beetles, crickets, radishes, or lima beans.	4.12.B differentiate between inherited and acquired physical traits of organisms.	5.12B <u>explain how instinctual and learned behavioral traits increase chances of survival such as turtle hatchlings returning to the sea or orcas hunting in packs.</u> differentiate between instinctual and learned behavioral traits of animals.	3.12.B was simplified. 5.12.B was revised to connect behaviors to survival and to include group behaviors of organisms.

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Grade 6	Grade 7	Grade 8	Work Group Comments/Rationale
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:	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:	5. Matter and energy. The student understands that matter can be classified according to its properties and <u>matter</u> is conserved in chemical changes <u>that occur within closed systems</u>. The student is expected to:	8.5 Edited for clarity Support for recurring concepts and themes (systems)
6.5.A compare solids, liquids, and gases in terms of structure, shape, volume, and energy of atoms and molecules;	7.5.A compare and contrast elements and compounds in terms of atoms and molecules, structure, chemical symbols, and chemical formulas;	8.5.A characterize and classify matter as elements, compounds, homogeneous mixtures, or heterogeneous mixtures;	
6.5.B investigate the properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures;	7.5.B distinguish between physical and chemical changes in matter;	8.5.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;	
6.5.C classify elements on the periodic table as metals, nonmetals, and metalloids using their physical properties;	7.5.C describe aqueous solutions in terms of solute and solvent, concentration, and dilution; and	8.5.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	
6.5.D compare the density of substances relative to various fluids; and	7.5.D investigate and model how temperature, surface area, and agitation affect the rate of dissolution of solid solutes in aqueous solutions.	8.5.D investigate how mass is conserved in chemical reactions and relate conservation of mass to the rearrangement of atoms using chemical equations, including photosynthesis.	
6.5.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.			

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Grade 6	Grade 7	Grade 8	Work Group Comments/Rationale
6.6. Force, motion, and energy. The student knows the nature of forces, and their interactions, <u>and their role in systems that experience stability or change.</u> The student is expected to:	7.6 <u>Force, motion, and energy.</u> The student can describes motion and the cause-and-effect relationship between force and motion <u>how forces can impact the motion of an object.</u> The student is expected to	8.6. Force, motion, and energy. The student understands the relationship between force and motion <u>within systems.</u> The student is expected to:	Support for recurring concepts and themes
6.6.A identify and describe forces that act on objects, including gravity, friction, magnetism, applied forces, and normal forces;	7.6.A calculate average speed using distance and time measurements;	8.6.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	
6.6.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	7.6.B distinguish between speed and velocity in linear motion in terms of distance, displacement, and direction;	8.6.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.	
6.6.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.	7.6.C measure, record, and interpret an object's motion using distance-time graphs; and		
	7.6.D analyze the effect of balanced and unbalanced forces on the state of motion of an object using Newton's First Law of motion.		
6.7 Force, motion, and energy. The student knows that <u>the total energy in systems</u> is conserved <u>through energy transfers and</u> when-transformationsed. The student is expected to:	7.7 Force, motion, and energy. The student understands the behavior of thermal energy <u>as it flows into and out of systems.</u> The student is expected to:	8.7 Force, motion, and energy. The student knows how energy is transferred through waves. The student is expected to:	Support for recurring concepts and themes
6.7.A compare and contrast kinetic energy with gravitational, elastic, and chemical potential energies; and	7.7.A investigate methods of thermal energy transfer <u>into and out of systems</u> , including conduction, convection, and radiation;	8.7.A explain how energy is transferred through transverse and longitudinal waves;	7.7.A more explicit language around how energy transfers occur
6.7. C B describe how energy is conserved through transformations in systems such as electrical circuits, food webs, amusement park rides, and photosynthesis.	7.7.B. investigate how thermal energy moves in a predictable pattern from warmer to cooler until all substances within the system reach thermal equilibrium; and	8.7.B compare the characteristics of amplitude, frequency, and wavelength in transverse waves, including the electromagnetic spectrum; and	TEKS Guide: make connection to law of conservation for 6.7.B and C

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Grade 6	Grade 7	Grade 8	Work Group Comments/Rationale
6.7.B <u>describe and demonstrate how energy transfers between objects due to forces or transforms from one form of energy to another.</u>	7.7.C explain the relationship between temperature and the kinetic energy of the molecules within a substance.	8.7.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.	New 7.7.B Addresses a gap in conceptual understanding around energy transformations while simultaneously connecting to forces as identified by content advisor (Chatelain) TEKS Guide 6.7.C: Forces cause both transfers and transformations, for middle school comprehension, focus is on transfers
6.8 Earth and space. The student <u>describes</u> the effects of and <u>models the</u> resulting from cyclical movements of the Sun, Earth, and Moon. The student is expected to:	7.8 Earth and space. The student understands the <u>patterns of movement</u>, organization, and characteristics of <u>components of objects in</u> our solar system. The student is expected to:	8.8. Earth and space. <u>The student describes the characteristics of the universe and the relative scale of its components.</u> The student knows the characteristics of the universe. The student is expected to:	Support for recurring concepts and themes 7.8 Edited for clarity
6.8.A model and illustrate how the tilted Earth revolves around the Sun, causing changes in seasons;	7.8.A describe the physical properties, locations, and movements of the Sun, planets, moons, meteors, asteroids, comets, Kuiper belt, and Oort cloud;	8.8.A describe the life cycle of stars and compare and classify stars using the Hertzsprung-Russell diagram;	
6.8.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	7.8.B describe how gravity governs the motion <u>within</u> of our solar system; and	8.8.B categorize galaxies as spiral, elliptical, and irregular and locate the solar system within the Milky Way galaxy; and	TEKS Guide: motion
	7.8.C analyze the characteristics of Earth that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere;	8.8.C research how scientific data are used as evidence to develop scientific theories to describe the origin of the universe.	

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Grade 6	Grade 7	Grade 8	Work Group Comments/Rationale
6.9 Earth and space. The student understands the <u>rock cycle and the structure of Earth</u>, and the rock cycle. The student is expected to:	7.9 Earth and space. The student understands the causes and effects of plate tectonics. The student is expected to:	8.9 Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems <u>impact climate</u>. The student is expected to:	The flow of energy within and among the planet's systems are inherently covered across multiple grade levels (4.11.B, 6.9.C, 7.9.A and B, 8.9. A-C) 8.9 Edited for clarity
6.9.A differentiate among the biosphere, hydrosphere, atmosphere, and geosphere and identify their components <u>of each system</u> ;	7.9.A <u>describe the evidence that supports that the Earth has changed over time, including fossil evidence, plate tectonics, and superposition</u> describe the historical development of evidence that supports plate tectonic theory; and	8.9.A describe how weather and climate are influenced by interactions involving sunlight, the hydrosphere, and atmosphere;	7.9.A: Made connections to the geological history of the Earth more explicit and strengthened vertical alignment with K-5
6.9.B model and describe the layers of Earth, including the inner core, outer core, mantle, and crust; and	7.9.B describe how plate tectonics causes ocean basin formation, earthquakes, mountain building, and volcanic eruptions, including supervolcanoes and hot spots.	8.9.B identify global patterns of atmospheric movement and how they influence local weather; and	
6.9.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.	Evidence of the same geologic timelines Superposition and geologic timeline Deeper it is the older it is	8.9.C describe the interactions among ocean currents and air masses that produce el Niño, la Niña, and tropical cyclones, <u>including cyclones, typhoons, and hurricanes</u> .	8.9.C Edited to clarify three types of cyclones
6.10 Earth and space. The student understands how resources are managed. The student is expected to:	7.10 Earth and space. The student understands how human activity can impact the hydrosphere. The student is expected to:	8.10 Earth and space. The student knows that natural events and human activity can impact global climate. The student is expected to:	
6.10.A research and describe how conservation, increased efficiency, and technology can help manage air, water, soil, and energy resources.	7.10.A analyze <u>the beneficial and harmful positive and negative</u> influences of human activity on groundwater and surface water in a watershed; and	8.10.A <u>use scientific evidence to describe how natural events such as</u> describe how volcanic eruptions, meteor impacts, abrupt changes in ocean currents, and the release and absorption of greenhouse gases influence climate; and	Influence is inherent to change and cause and effect and connect recurring themes TEKS Guide 6.10.A: identify energy resources such as fossil fuels, solar, hydro, electric, etc. Revisions to KS 10 are incomplete and should be reviewed by the next work group.

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	7.10.B describe human dependence and influence on ocean systems and explain how human activities have <u>impact</u> modified these systems.	8.10.B <u>use scientific evidence to</u> research and describe how human <u>activities</u> actions can <u>influence</u> affect climate change .	8.10.B Content advisor feedback
6.11 Organisms and environments. The student knows that organisms have an organizational structure and that cells are the fundamental unit of that structure. The student knows that cells are the fundamental units of organisms. The student is expected to:	7.11 Organisms and environments. The student knows how system functions support the health of an organism. The student knows how the systems of an organism function. The student is expected to:	8.11 Organisms and environments. The student knows how cell functions support the health of an organism. The student knows how cells support the health organisms and their environments. The student is expected to:	Genetics is appropriately addressed in the proposed revisions and has been extended to grades 7 and 8. In Grade 6, cell theory is introduced to provide the foundation for scaffolding of genetics in later grades. In Grade 7, inheritance is addressed in the context of reproduction in organisms to be more concrete. In Grade 8, genetics is addressed in the context of cellular function for scaffolding into Biology.
6.11.A <u>describe</u> 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;	7.11.A identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, urinary, reproductive, integumentary, nervous, <u>immune</u> , and endocrine systems; and	8.11.A identify the function of the cell membrane, cell wall, nucleus, ribosomes, cytoplasm, mitochondria, chloroplasts, and vacuoles in plant or animal cells; and	7.11.A Content advisor recommendation Current TEKS: 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; • passing traits between generations is inherited traits which are addressed in 8.11.B (B) compare the results of uniform or diverse offspring from asexual or sexual reproduction; and • 7.11.B (little change) (C) recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus. • addressed in 8.11.B with the function of genes within chromosomes

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Grade 6	Grade 7	Grade 8	Work Group Comments/Rationale
6.11.B describe the hierarchical organization of cells, tissues, organs, and organ systems within plants and animals; and	7.11.B compare the results of <u>asexual and sexual reproduction of plants and animals in relation to the diversity of offspring and the changes in the population over time.</u> uniform or diverse offspring from asexual or sexual reproduction in plants and animals.	8.11.B describe the function of genes within chromosomes in determining inherited traits of offspring.	7.11.B Content advisor recommendation to clarify SE Framework: The proposed KS and SE are consistent with the framework’s boundary. <ul style="list-style-type: none">• Genes, chromosomes, cells, and alleles<ul style="list-style-type: none">○ middle school establishes the foundation as introducing inheritance with genes and chromosomes and Biology picks up with two variants (alleles) and how they are inherited• Genes control proteins which determines traits<ul style="list-style-type: none">○ Determining traits are addressed but biomolecules have not been introduced; therefore, proteins are not grade level appropriate• Mutations to genes change traits<ul style="list-style-type: none">○ Mutations are fully addressed in Biology and beyond the scope for middle school• Sexual reproduction, genetic information from egg and sperm and one set from each parent creates a new individual<ul style="list-style-type: none">○ Addressed in 7.11.A and B○ The function of the reproductive system is addressed and students differentiate between asexual and sexual reproduction• Variations are inherited<ul style="list-style-type: none">○ Variations are addressed in KS12
6.11.C identify the basic characteristics of organisms, including prokaryotic and eukaryotic, unicellular and multicellular, autotrophic and heterotrophic.			

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6.12 Organisms and environments. The student knows <u>how the impact of variations can influence</u> on the survival of populations. The student is expected to:	7.12 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:	8.12 Organisms and environments. The student knows the relationship between adaptation <u>and</u>, variation <u>in relation to</u>, and survival. The student is expected to:	Stability and change are inherent to variations. 6.12 Support for recurring themes and concepts (cause and effect) 8.12 Edit to clarify the KS
6.12.A describe how advantages and disadvantages for the survival of a population can result from variations within the population as environments change.	7.12.A describe how natural and artificial selection <u>and how they</u> change in <u>the frequency of</u> genetic traits in a population over generations.	8.12.A describe how variations within a population lead to adaptations that influence the probability of survival and reproductive success of a species over generations.	7.12.A Content advisor recommendation TEKS Guide: 8.12.A include types of adaptations: Structural, physiological, behavioral for plants and animals
6.13 Organisms and environments. The student knows that interdependence occurs among living systems and the environment. The student is expected to:	7.13 Organisms and environments. The student understands that <u>the stability of ecosystems is dependent upon the biodiversity of the organisms, the cycling of matter, and the flow of energy.</u> energy flows between organisms and the environment. The student is expected to:	8.13 Organisms and environments. The student understands how ecosystems and populations change. The student is expected to:	KS broadened to encompass all of the SEs and support recurring themes and concepts (stability)
6.13.A describe predatory, competitive, and symbiotic relationships between organisms including mutualism, parasitism, and commensalism;	7.13.A diagram the flow of energy within trophic levels and describe how the available energy decreases in successive trophic levels in energy pyramids;	8.13.A analyze the effects on food webs when new species are introduced, existing species are eliminated, and existing populations fluctuate; and	
6.13.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	7.13.B describe how ecosystems are sustained by biodiversity, the continuous flow of energy, and the recycling of matter and nutrients within the biosphere; and	8.13.B describe how primary and secondary ecological succession affect populations and species diversity after ecosystems are disrupted by natural events or human activity.	
6.13.C describe the hierarchical organization of organism, population, and community within an ecosystem.	7.13.C describe how biodiversity contributes to the sustainability of an ecosystem and the <u>health of the organisms within the ecosystem.</u>		TEKS Guide 7.13.C: include examples of how changes in biodiversity influence ecosystem services and human resources

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Grade 6	Grade 7	Grade 8	Work Group Comments/Rationale
	7.14 Organisms and environments. The student knows <u>how the taxonomic system is used to understand relationships between organisms</u>. all organisms are classified into taxonomic groups. The student is expected to:		7.14 Support for recurring themes and concepts (systems)
	7.14.A describe the taxonomic system that categorizes organisms based on similarities and differences shared among groups; and		
	7.14.B describe the characteristics of the recognized kingdoms in ecosystems and their functions such as bacteria aiding digestion or fungi decomposing organic matter.		