

Proposed Science TEKS

Elementary School (Grades K-5)

OFFICIAL PUBLIC COMMENTS

Alignment of Comments with Proposed TEKS

<u>Course</u>	<u>Introduction Statements</u>	<u>Total Number of Knowledge/Skills (KS) and Student Expectations (SE)</u>	<u>Number of KS or SE Statements with at Least One Comment</u>
Kindergarten	4	41	10
Grade 1	4	41	14
Grade 2	4	45	18
Grade 3	4	44	16
Grade 4	4	41	22
Grade 5	4	46	19
		258	99

Proposed Science TEKS – Elementary School – 1st Reading Version (rule text), January 2009
Official Public Comments – Compiled from February 13 – March 20, 2009

<u>Text of Proposed Revisions to 19 TAC</u>	<u>Number of Comments</u>	<u>Public Comment/Recommendation</u>
<p>Chapter 112. Texas Essential Knowledge and Skills for Science Subchapter A. Elementary School</p>	<p>1 1 1 1 1 1 1 1 1 1 1 1 1 6 1</p>	<p>TEKS are precise in providing example for each objective.</p> <p>The concept of "changes in materials caused by heating and cooling" repeats in K.5 B, 1.5 B, 2.5 B, 3.5 C, and 4.5 B with not enough difference in rigor to warrant so much repeatability.</p> <p>The topic "magnets" is in K.6 B, 1.6 B, 2.6 B and 3.6 C. In grade 3 students are expected to observe force of magnetism. In the other grades, little, if any, differentiation.</p> <p>The quantity of science equipment greater. Budget concern.</p> <p>Deletion of the systems TEKS in all grade levels is a problem.</p> <p>Include how old the world is and that reproduction is a basic need of life.</p> <p>TEKS are broad and shallow.</p> <p>Need more authentic tasks-i.e. in Gr. 1 3.C: describe what scientists do--students should demonstrate how scientists investigate the natural world.</p> <p>Lab and field language, "encouraged" in introduction isn't strong enough to compel instruction. Revise KS as follows: (1). The student, for at least 80% of instructional time, conducts..."</p> <p>Children need to be given environmental education outdoors. Approve of 50% lab and field.</p> <p>Revisions are more detailed and to the point. Thank you.</p> <p>Need more mention of the solar system and order of planets.</p> <p>Gloves not necessary at elementary level.</p>

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	1	Please specify time in minutes per week that students should spend in science by grade level and have some kind of accountability. (Rationale: In the primary grades science isn't being taught in many districts and the time is given to math and reading due to TAKS testing).
	2	Shift order of TEKS so life science follows process skills.
	2	Include inexhaustible resources.
	2	Include materials and equipment for sifting to lists of tools.
	1	Vibrations producing sound is not represented anywhere in elementary TEKS.
	6	Approve of more on recycling and providing alternative energy.
	1	Keep TAKscope lessons in science.
	1	I do not agree with recommended % of science investigations.
	42	Increase the percentage of time spent in classroom and outdoor investigations to 80% in all elementary grades. With the new TEKS revision, the state of Texas is sending a message to elementary science teachers and school districts that classroom and outdoor investigations are less important as students advance through the grade levels. The revised TEKS begin with a recommendation to spend 80% of teaching time on investigations in Kindergarten and 1st grade, but reduce the recommended time to 60% in grades 2 and 3, and then reduce again to 50% in grades 4 and 5. We believe that this is the wrong message and goes against everything that we know about "teaching for understanding."
	1	In regards to all grade levels the increased specificity is much appreciated.
	2	In the proposed recommendations for K-5 Science, there is no mention of the planets, only the Earth, Moon, and Sun system. When is the solar system going to be introduced to students?
	1	I am concerned that the "average" teacher will not be able to easily interpret the TEKS the way they are written. Could they be written in a less "scientific" way?

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Scientific investigation and reasoning involves practicing safe procedures, asking questions about the natural world, and seeking answers to those questions through simple observations and descriptive investigations.		
(B) Matter is described in terms of its physical properties, including relative size and mass, shape, color, and texture. The importance of light, heat, and sound energy is identified as it relates to the students' everyday life. The location and motion of objects are explored.		
(C) Weather is recorded and discussed on a daily basis so students may begin to recognize patterns in the weather. Other patterns are observed in the appearance of objects in the sky.	1 1	Revise "...on a daily basis..." should be changed to "one consistent week of each month" to show patterns in seasonal changes throughout the year. This needs to include using thermometers and include how the weather feels, not just how it looks in the sky. This would cause more discussion of clothing choices, etc...
(D) In life science, students recognize the interdependence of organisms in the natural world. They understand that all organisms have basic needs that can be satisfied through interactions with living and nonliving things. Students will investigate the life cycle of plants and identify likenesses between parents and offspring.		
(b) Knowledge and skills.		
(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and uses environmentally appropriate and responsible practices. The student is expected to:	1	Replace KS to read: The student for at least 80% of instructional time, conducts investigations in the classroom and outdoor investigations following home and school safety procedures.
(A) identify and demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations, including wearing safety goggles, washing hands, and using materials appropriately;		
(B) discuss the importance of safe practices to keep self and others safe and healthy; and		
(C) demonstrate how to use, conserve, and dispose of natural resources and materials such as conserving water and reusing or recycling paper, plastic, and metal.	266	Replace SE with: demonstrate how to use and conserve materials such as conserving water and reusing or recycling of paper: (Rationale: align with K, 1 and 2, so not same each year and vocabulary is more appropriate).

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(2) Scientific investigation and reasoning. The student develops abilities to ask questions and seek answers in classroom and outdoor investigations. The student is expected to:		
(A) ask questions about organisms, objects, and events observed in the natural world;		
(B) plan and conduct simple descriptive investigations such as ways objects move;		
(C) collect data and make observations using simple equipment such as hand lenses, primary balances, and non-standard measurement tools;	1	Edit SE to include standard units of measurement as well nonstandard, such as inches and centimeters on a ruler.
(D) record and organize data and observations using pictures, numbers, and words; and		
(E) communicate observations with others about simple descriptive investigations.		
(3) Scientific investigation and reasoning. The student knows that information and critical thinking are used in scientific problem solving. The student is expected to:		
(A) identify and explain a problem such as the impact of littering on the playground and propose a solution in his/her own words;		
(B) make predictions based on observable patterns in nature such as the shapes of leaves; and	266	Replace SE with: make observations of patterns in nature, such as the shapes of leaves; (verb alignment for difficulty from K-1).
(C) explore that scientists investigate different things in the natural world and use tools to help in their investigations.	2	Replace SE with: explore what scientists do and how they investigate things in the natural world and use tools to help in their investigations.

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(4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world. The student is expected to:		
(A) collect information using tools, including cameras; computers; hand lenses; non-standard measuring items such as paper clips and clothespins; weather instruments such as demonstration thermometers and wind socks; primary balances; cups; bowls; timing devices, including clocks and timers; magnets; collecting nets; notebooks; and materials to support observations of habitats of organisms such as terrariums and aquariums; and	267	Replace SE with: collect information using tools including computers, hand lenses, nonstandard measuring items, demonstration thermometers, wind sock, primary balances, cups, bowls, magnets, notebooks and safety goggles; (Rationale: cameras, terrariums, and aquariums are too expensive for large districts; give specific weather instrument used; clocks are not taught in math; collection nets are not developmentally appropriate; and we know what nonstandard measuring items are).
	10	Remove "timing devices."
(B) use senses as a tool of observation to identify properties and patterns of organisms, objects, and events in the environment.		
(5) Matter and energy. The student knows that objects have properties and patterns. The student is expected to:		
(A) observe and record properties of objects, including relative size and mass, such as bigger or smaller and heavier or lighter, shape, color, and texture; and	269	Replace SE with: observe and record properties of objects, including size (bigger or smaller), mass, (heavier or lighter), shape, color, and texture; (Rationale: relative size and mass are not developmentally correct vocabulary for K).
(B) observe, record, and discuss how materials can be changed by heating or cooling.		
(6) Force, motion, and energy. The student knows that energy, force, and motion are related and are a part of their everyday life. The student is expected to:		
(A) use the five senses to explore different forms of energy such as light, heat, and sound;	12	Replace SE with: explore different forms of energy such as light, heat, and sound.
(B) explore interactions between magnets and various materials;		
(C) observe and describe the location of an object in relation to another such as above, below, behind, in front of, and beside; and		
(D) observe and describe 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.	10	Insert: "such as push or pull."

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(7) Earth and space. The student knows that the natural world includes earth materials. The student is expected to:		
(A) observe, describe, compare, and sort rocks by size, shape, color, and texture;		
(B) observe and describe physical properties of natural sources of water, including color and clarity; and	13	Replace SE with: observe and describe properties of water.
(C) give examples of ways rocks, soil, and water are useful.		
(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:		
(A) observe and describe weather changes from day to day and over seasons;		
(B) identify events that have repeating patterns, including seasons of the year and day and night; and		
(C) observe, describe, and illustrate objects in the sky such as the clouds, Moon, and stars, including the Sun.	266	Replace SE with: observe and describe objects in the sky such as the Moon and Sun; (Rationale: more developmentally appropriate and aligned with other grade levels).
	1	The "record changes" part of this SE is not appropriate for 6 year olds in regards to Moon and stars, we should start with clouds.
(9) Organisms and environments. The student knows that plants and animals have basic needs and depend on the living and nonliving things around them for survival. The student is expected to:		
(A) differentiate between living and nonliving things based upon whether they have basic needs and produce offspring; and		
(B) examine evidence that living organisms have basic needs such as food, water, and shelter for animals and air, water, nutrients, sunlight, and space for plants.		

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(10) Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to:	13	Replace KS with: The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. (same text as Grade 3).
(A) sort plants and animals into groups based on physical characteristics such as color, size, body covering, or leaf shape;		
(B) identify parts of plants such as roots, stem, and leaves and parts of animals such as head, eyes, and limbs;		
(C) identify ways that young plants resemble the parent plant; and	11	Delete SE.
(D) observe changes that are part of a simple life cycle of a plant: seed, seedling, plant, flower, and fruit.		

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Science, Grade 1, Beginning with School Year 2010-2011		
(a) Introduction.	1	These skills are not age appropriate no do they engage the students in meaningful learning for their age.
(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."		
(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.		
(3) The study of elementary science includes planning and safely implementing classroom and outdoor investigations using scientific processes, including inquiry methods, analyzing information, making informed decisions, and using tools to collect and record information, while addressing the major concepts and vocabulary, in the context of physical, earth, and life sciences. Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time.	12	Replace (3) with: Scientific investigations are conducted in different ways using different types of scientific research designs. However, all investigations require a well-designed research question or hypothesis, careful observations, data gathering and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of pond organisms or measuring the abiotic component of a habitat. Descriptive statistics include frequency, mean, median, and mode. No hypothesis and no dependent and independent variables are used in this type of investigation.
	12	Move to new paragraph (4): Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time. Vary percentage as appropriate for grade level. Renumber subsequent paragraphs.
(4) In Grade 1, students observe and describe the natural world using their five senses. Students do science as inquiry in order to develop and enrich their abilities to understand the world around them in the context of scientific concepts and processes. Students develop vocabulary through their experiences investigating properties of common objects, earth materials, and organisms.		
(A) A central theme in first grade science is active engagement in asking questions, communicating ideas, and exploring with scientific tools in order to explain scientific concepts and processes like scientific investigation and reasoning; matter and energy; force, motion, and energy; Earth and space; and organisms and environment. Scientific investigation and reasoning involves practicing safe procedures, asking questions about the natural world, and seeking answers to those questions through simple observations and descriptive investigations.		

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(B) Matter is described in terms of its physical properties, including relative size and mass, shape, color, and texture. The importance of light, heat, and sound energy is identified as it relates to the students' everyday life. The location and motion of objects are explored.		
(C) Weather is recorded and discussed on a daily basis so students may begin to recognize patterns in the weather. In addition, patterns are observed in the appearance of objects in the sky.		
(D) In life science, students recognize the interdependence of organisms in the natural world. They understand that all organisms have basic needs that can be satisfied through interactions with living and nonliving things. Students will investigate life cycles of animals and identify likenesses between parents and offspring.		
(b) Knowledge and skills.		
(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and uses environmentally appropriate and responsible practices. The student is expected to:	1	Edit KS to read: The student for at least 80% of instructional time, conducts investigations in the classroom ...
(A) recognize and demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations, including wearing safety goggles, washing hands, and using materials appropriately;		
(B) recognize the importance of safe practices to keep self and others safe and healthy; and		
(C) identify and learn how to use natural resources and materials, including conservation and reuse or recycling of paper, plastic, and metals.	258	Replace SE with: identify and learn how to use materials including conservation and reuse or recycling of paper and metals; (Rationale: more developmentally appropriate and aligned with other grade levels).

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(2) Scientific investigation and reasoning. The student develops abilities to ask questions and seek answers in classroom and outdoor investigations. The student is expected to:		
(A) ask questions about organisms, objects, and events observed in the natural world;		
(B) plan and conduct simple descriptive investigations such as ways objects move;		
(C) collect data and make observations using simple equipment such as hand lenses, primary balances, and non-standard measurement tools;		
(D) record and organize data using pictures, numbers, and words; and		
(E) communicate observations and provide reasons for explanations using student-generated data from simple descriptive investigations.		
(3) Scientific investigation and reasoning. The student knows that information and critical thinking are used in scientific problem solving. The student is expected to:		
(A) identify and explain a problem such as finding a home for a classroom pet and propose a solution in his/her own words;	1	Question relevancy to all students? (Finding a home for a classroom pet.)
(B) make predictions based on observable patterns; and		
(C) describe what scientists do.	12	Replace SE with: demonstrate how scientists investigate the natural world.
(4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world. The student is expected to:		
(A) collect, record, and compare information using tools, including cameras; computers; hand lenses; non-standard measuring items such as paper clips and clothespins; weather tools such as classroom demonstration thermometers and weather vanes; primary balances; cups; bowls; timing devices, including clocks and timers; magnets; collecting nets; notebooks; materials to support observations of habitats of organisms such as aquariums and terrariums; and safety goggles; and	258	Replace TEKS with: collect and record information using tools including computers, hand lenses, non-standard measuring items, thermometers, primary balances, cups and bowls, magnets, notebooks and safety goggles; (Rationale: we know what nonstandard measuring items are; cameras, terrariums and aquariums too expensive; give specific weather instrument used; clocks are not appropriate since time to the minute is not in math TEKS; collecting nets are not developmentally appropriate).
(B) measure and compare organisms and objects using non-standard units.	258	Remove cameras from list of tools.

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(5) Matter and energy. The student knows that objects have properties and patterns. The student is expected to:		
(A) classify objects by observable properties of the materials from which they are made such as larger and smaller, heavier and lighter, shape, color, and texture; and		
(B) predict and identify changes in materials caused by heating and cooling such as ice melting, water freezing, and water evaporating.	10	For scientific correctness heating and cooling should read the addition or reduction of heat.
(6) Force, motion, and energy. The student knows that force, motion, and energy are related and are a part of everyday life. The student is expected to:		
(A) identify and discuss how different forms of energy such as light, heat, and sound are important to everyday life;	10	Replace SE with: explore different forms of energy such as light, heat, and sound.
(B) predict and describe how a magnet can be used to push or pull an object;	258	Replace SE with: “predict and describe” with “observe” (Rationale: grade level alignment of verbs).
(C) describe the change in the location of an object such as closer to, nearer to, and farther from; and		
(D) demonstrate and record the ways that objects can move such as in a straight line, zig zag, up and down, back and forth, round and round, and fast and slow.	10	Add “such as a push or pull.”
(7) Earth and space. The student knows that the natural world includes rocks, soil, and water that can be observed in cycles, patterns, and systems. The student is expected to:		
(A) observe, compare, describe, and sort components of soil by size, texture, and color;		
(B) identify and describe a variety of natural sources of water, including streams, lakes, and oceans; and		
(C) gather evidence of how rocks, soil, and water help to make useful products.		

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(8) Earth and space. The student knows that the natural world includes the air around us and objects in the sky. The student is expected to:		
(A) record weather information, including relative temperature, such as hot or cold, clear or cloudy, calm or windy, and rainy or icy;	258	Replace SE with: record weather information including temperature such as hot and cold, clear or cloudy, and rainy or icy; (Rationale: more developmentally appropriate in language and concepts).
(B) observe and record changes in the appearance of objects in the sky such as clouds, the Moon, and stars, including the Sun;	1	The "record changes" part of this SE is not appropriate for 6 year olds in regards to Moon and stars, we should start with clouds.
(C) identify characteristics of the seasons of the year; and	258	Revise SE to read: identify characteristics of the seasons of the year and day and night; (Rationale: continue TEKS from K.)
(D) demonstrate that air is all around us and observe that wind is moving air.	258	Delete SE (Rationale: not developmentally appropriate).
(9) Organisms and environments. The student knows that the living environment is composed of relationships between organisms and the life cycles that occur. The student is expected to:	12	Replace KS with: The student knows that the living environment is composed of relationships between organisms.
(A) sort and classify living and nonliving things based upon whether or not they have basic needs and produce offspring;		
(B) analyze and record examples of interdependence found in various situations such as terrariums and aquariums or pet and caregiver; and	1	Aquariums /terrariums will be very expensive for each and every classroom though ideal.
(C) gather evidence of interdependence among living organisms such as energy transfer through food chains and animals using plants for shelter.	258 1	Revise SE to read: "energy transfer through food chains and" (Rationale: this is not developmentally appropriate). Too complex. What will it look like: "gather evidence of interdependence among living organisms"? They can watch a plant die or a snake eat a rat. Energy transfer is too abstract.
(10) Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to:	13	Replace KS with: The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. (Rationale: same text as Grade 3).
(A) investigate how the external characteristics of an animal are related to where it lives, how it moves, and what it eats;		
(B) identify and compare the parts of plants;		
(C) compare ways that young animals resemble their parents; and	11	Replace SE with: compare ways that many young animals resemble their parents.
(D) observe and record life cycles of animals such as a chicken, frog, or fish.	1	Remove "chickens" from the such as statement. Can be a salmonella issue and teachers get away from teaching the science in order to teach their favorite themes.

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Science, Grade 2, Beginning with School Year 2010-2011		
(a) Introduction.	1	Instead of 5 “themes” there are 3 revelations (patterns, changes, and cycles) that occur within 3 disciplines. What about systems? Using the term 'system' only in the life science area will lead to teacher misconceptions.
(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."		
(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.		
(3) The study of elementary science includes planning and safely implementing classroom and outdoor investigations using scientific processes, including inquiry methods, analyzing information, making informed decisions, and using tools to collect and record information, while addressing the major concepts and vocabulary, in the context of physical, earth, and life sciences. Districts are encouraged to facilitate classroom and outdoor investigations for at least 60% of instructional time.	10	Replace (3) with: Scientific investigations are conducted in different ways using different types of scientific research designs. However, all investigations require a well-designed research question or hypothesis, careful observations, data gathering and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of pond organisms or measuring the abiotic component of a habitat. Descriptive statistics include frequency, mean, median, and mode. No hypothesis and no dependent and independent variables are used in this type of investigation.
(4) In Grade 2, careful observation and investigation are used to learn about the natural world and reveal patterns, changes, and cycles. Students should understand that certain types of questions can be answered by using observation and investigations and that the information gathered in these may change as new observations are made. As students participate in investigation, they develop the skills necessary to do science as well as develop new science concepts.	10	Shift numbers to allow time statement to stand alone. (4) Districts are encouraged to facilitate classroom and outdoor investigations for at least 60% of instructional time.
	42	Revise last sentence to read: Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time.

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(A) Within the physical environment, students expand their understanding of the properties of objects such as shape, mass, temperature, and flexibility then use those properties to compare, classify, and then combine the objects to do something that they could not do before. Students manipulate objects to demonstrate a change in motion and position.	10	Edit last sentence to read: "...demonstrate position, frame of reference, and a change in position and motion."
(B) Within the natural environment, students will observe the properties of earth materials as well as predictable patterns that occur on Earth and in the sky. The students understand that those patterns are used to make choices in clothing, activities, and transportation.		
(C) Within the living environment, students explore patterns, systems, and cycles by investigating characteristics of organisms, life cycles, and interactions among all the components within their habitat. Students examine how living organisms depend on each other and on their environment.		
(b) Knowledge and skills.		
(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures. The student is expected to:	1	Replace KS to read: The student for at least 60% of instructional time, conducts investigations in the classroom and outdoor investigations following home and school safety procedures.
(A) identify and demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations, including wearing safety goggles, washing hands, and using materials appropriately;		
(B) describe the importance of safe practices; and		
(C) identify and demonstrate how to use, conserve, and dispose of natural resources and materials such as conserving water and reuse or recycling of paper, plastic, and metal.		
(2) Scientific investigation and reasoning. The student develops abilities necessary to do scientific inquiry in classroom and outdoor investigations. The student is expected to:		
(A) ask questions about organisms, objects, and events during observations and investigations;		
(B) plan and conduct descriptive investigations such as how organisms grow;		

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(C) collect data from observations using simple equipment such as hand lenses, primary balances, thermometers, and non-standard measurement tools;		
(D) record and organize data using pictures, numbers, and words;		
(E) communicate observations and justify explanations using student-generated data from simple descriptive investigations; and		
(F) compare results of investigations with what students and scientists know about the world.		
(3) Scientific investigation and reasoning. The student knows that information and critical thinking, scientific problem solving, and the contributions of scientists are used in making decisions. The student is expected to:		
(A) identify and explain a problem in his/her own words and propose a task and solution for the problem such as lack of water in a habitat;		
(B) make predictions based on observable patterns; and		
(C) identify what a scientist is and explore what different scientists do.	1	Edit SE to read: (C) identify what a scientist is and explore what different scientists do in connection with Grade 2 science concepts. Rationale: it is important not just to explore what scientists do, but to intentionally connect it with the science the students are learning.
(4) Scientific investigation and reasoning. The student uses age-appropriate tools and models to investigate the natural world. The student is expected to:		
(A) collect, record, and compare information using tools, including cameras; computers; hand lenses; rulers; weather instruments such as thermometers and rain gauges; primary balances; plastic beakers; timing devices, including clocks and stopwatches; magnets; collecting nets; notebooks; materials to support observations of habitats of organisms such as terrariums and aquariums; and safety goggles; and	157	Replace SE with: collect, record, and compare information using tools including cameras, hand lenses, rulers, thermometers, wind vanes, primary balances, plastic beakers, notebooks, and safety goggles; (Rationale: terrariums and aquariums are too expensive; give specific weather instruments used that are aligned; clocks are not taught to minute until third grade; collection nets not developmentally appropriate).
(B) measure and compare organisms and objects using non-standard units that approximate metric units.		
(5) Matter and energy. The student knows that matter has physical properties and those properties determine how it is described, classified, changed, and used. The student is expected to:		

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(A) classify matter by physical properties, including shape, relative mass, relative temperature, texture, flexibility, and whether material is a solid or liquid;	10	Students by 2nd grade are using standard measurement. "Relative" should be removed. Magnetism should be added to the physical properties here. Gas should be added as it is a state of matter and students do know what air is and need to have correct science vocabulary for air.
	260	Replace SE with: classify matter by physical properties including shape, mass (heavier or lighter), temperature, texture, flexibility, and whether the material is a solid or liquid; (Rationale: more appropriate to define mass in second grade vocabulary).
(B) compare changes in materials caused by heating and cooling;	10	For Scientific correctness heating and cooling should read the addition or reduction of heat.
(C) demonstrate that things can be done to materials to change their physical properties such as cutting, folding, sanding, and melting; and		
(D) combine materials that when put together can do things that they cannot do by themselves such as building a tower or a bridge and justify the selection of those materials based on their physical properties.	260	Delete: "... and justify the selection of those materials based on their physical properties" (Rationale: not developmentally appropriate).
(6) Force, motion, and energy. The student knows that forces cause change and energy exists in many forms. The student is expected to:		
(A) investigate the effects on an object by increasing or decreasing amounts of light, heat, and sound energy such as how the color of an object appears different in dimmer light or how heat melts butter;	10	Replace SE with: demonstrate that everyday objects can use or produce light, heat, or sound energy.
	1	SE not developmentally appropriate.
	1	Language unclear.
(B) observe and identify how magnets are used in everyday life;	10	Delete SE and add magnetism to 2.5 A.
	1	Repeats magnets. Scaffolding is appropriate; repeating content is not.
(C) trace the changes in the position of an object over time such as a cup rolling on the floor and a car rolling down a ramp; and	2	TEKS needs more clarification.
	10	Add language to SE as follows: trace the changes in the position relative to a frame of reference of an object....
(D) compare patterns of movement of objects such as sliding, rolling, and spinning.	5	Edit SE to read: Compare patterns of movement of objects such as sliding, rolling, spinning, and balancing. (Rationale: Add balancing as part of equilibrium as recommended in the national standards.)

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(7) Earth and space. The student knows that the natural world includes earth materials. The student is expected to:		
(A) observe and describe the various sizes of rock such as boulders and gravel;	260	Replace SE with: observe and describe rocks by size, texture, and color. Rationale: align better between grade levels.)
	1	SE has limited practicality—how will the average 2nd grader really “observe” a boulder to compare it to rocks?
(B) identify and compare the properties of natural sources of freshwater and saltwater; and		
(C) distinguish between natural and manmade resources.	260	Delete SE.
(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:		
(A) measure, record, and graph weather information, including temperature, wind conditions, precipitation, and cloud coverage, in order to identify patterns in the data;	260	Replace SE with: measure, record, and graph weather information including temperature, wind conditions, and cloud cover in order to identify patterns in the data; (Rationale: aligned between grades and matches appropriate math skills).
(B) identify the importance of weather and seasonal information to make choices in clothing, activities, and transportation;		
(C) explore the processes in the water cycle, including evaporation, condensation, and precipitation, as connected to weather conditions; and		
(D) observe, describe, and record patterns caused by objects in the sky, including shadows and the appearance of the Moon.	1	The wording, “observe, describe, and record patterns caused by objects in the sky, including shadows and the appearance of the moon” may lead to the misconception that the phases of the moon are caused by the Earth’s shadow on the moon. Clarify.
	10	Vague. Would prefer a more clear explanation of how the shadows should be interpreted as phases of the moon.
	260	Replace SE with: observe, describe, and record patterns caused by objects in the sky including the appearance of the moon (Rationale: shadows not developmentally appropriate at second grade).

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(9) Organisms and environments. The student knows that living organisms have basic needs that must be met for them to survive within their environment. The student is expected to:		
(A) identify the basic needs of plants and animals;		
(B) identify factors in the environment, including temperature and precipitation, that affect growth and behavior such as migration, hibernation, and dormancy of living things; and	261	Replace SE with: identify factors in the environment including temperature that affect growth of living things (migration, hibernation and dormancy vocabulary is not developmentally appropriate).
(C) compare and give examples of the ways living organisms depend on each other and on their environments such as food chains within a garden, park, beach, lake, and wooded area.		
(10) Organisms and environments. The student knows that organisms resemble their parents and have structures and processes that help them survive within their environments. The student is expected to:	8	Replace KS with: The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. (Rationale: same text as Grade 3).
	1	Section on how organisms resemble parents should remain.
(A) observe, record, and compare how the physical characteristics and behaviors of animals help them meet their basic needs such as fins help fish move and balance in the water;		
(B) observe, record, and compare how the physical characteristics of plants help them meet their basic needs such as stems carry water throughout the plant; and		
(C) investigate and record some of the unique stages that insects undergo during their life cycle.	260	Delete: “unique” (Rationale: vocabulary not developmentally appropriate).

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Science, Grade 3, Beginning with School Year 2010-2011		
(a) Introduction.	1	The recurring themes are patterns, relationships, and cycles. There is still no systems (explicitly) mentioned.
(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."		
(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.		
(3) The study of elementary science includes planning and safely implementing classroom and outdoor investigations using scientific methods, analyzing information, making informed decisions, and using tools to collect and record information while addressing the content and vocabulary in physical, earth, and life sciences. Districts are encouraged to facilitate classroom and outdoor investigations for at least 60% of instructional time.	42	Revise to read: Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time.
	11	Replace (3) with: Scientific investigations are conducted in different ways using different types of scientific research designs. However, all investigations require a well-designed research question or hypothesis, careful observations, data gathering and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of pond organisms or measuring the abiotic component of a habitat. Descriptive statistics include frequency, mean, median, and mode. No hypothesis and no dependent and independent variables are used in this type of investigation.
	11	Shift numbers to allow time statement to stand alone. (4): Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time. Vary percentage as appropriate for grade level. Renumber subsequent paragraphs.
(4) In Grade 3, students learn that the study of science uses appropriate tools and safe practices in planning and implementing investigations, asking and answering questions, collecting data by observing and measuring, and by using models to support scientific inquiry about the natural world.		
(A) Students recognize that patterns, relationships, and cycles exist in matter. Students will investigate the physical properties of matter and will learn that changes occur. They explore mixtures and investigate light, sound, and heat/thermal energy in everyday life. Students manipulate objects by pushing and pulling to demonstrate changes in motion and position.		

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(B) Students investigate how the surface of Earth changes and provides resources that humans use. As students explore objects in the sky, they describe how relationships affect patterns and cycles on Earth. Students will construct models to demonstrate Sun, Earth, and Moon system relationships and will describe the Sun's role in the water cycle.		
(C) Students explore patterns, systems, and cycles within environments by investigating characteristics of organisms, life cycles, and interactions among all components of the natural environment. Students examine how the environment plays a key role in survival. Students know that when changes in the environment occur organisms may thrive, become ill, or perish.		
(b) Knowledge and skills.		
(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following school and home safety procedures and environmentally appropriate practices. The student is expected to:	1	Edit KS to read: (1) Scientific investigation and reasoning. The student for at least 60% of instructional time conducts investigations in classrooms and outdoors following school and home safety procedures and environmentally appropriate practices.
(A) demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations, including observing a schoolyard habitat; and		
(B) make informed choices in the use and conservation of natural resources by recycling or reusing materials such as paper, aluminum cans, and plastics.		
(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations. The student is expected to:		
(A) plan and implement descriptive investigations, including asking and answering questions, making inferences, and selecting and using equipment or technology needed, to solve a specific problem in the natural world;	11	Insert: “well-defined” questions....
(B) collect data by observing and measuring using the metric system and recognize differences between observed and measured data;		
(C) construct maps, graphic organizers, simple tables, charts, and bar graphs using tools and current technology to organize, examine, and evaluate measured data;	253	Replace SE with: construct graphic organizers, simple tables, charts, and bar graphs using tools and current technology to organize, examine and evaluate measured data; (Rationale: dropped maps, not aligned with TEKS at 3rd; maps at 4th grade).

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(D) analyze and interpret patterns in data to construct reasonable explanations based on evidence from investigations;		
(E) demonstrate that repeated investigations may increase the reliability of results; and		
(F) communicate valid conclusions supported by data in writing, by drawing pictures, and through verbal discussion.		
(3) Scientific investigation and reasoning. The student knows that information, critical thinking, scientific problem solving, and the contributions of scientists are used in making decisions. The student is expected to:		
(A) justify an explanation, argument, or conclusion using student-generated data;		
(B) draw inferences and evaluate accuracy of product claims found in advertisements and labels such as for toys and food;		
(C) represent the natural world using models such as volcanoes or Sun, Earth, and Moon system and identify their limitations, including size, properties, and materials; and		
(D) connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists.		
(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to:		
(A) collect, record, and analyze information using tools, including microscopes; cameras; computers; hand lenses; metric rulers; Celsius thermometers; pan balances; graduated cylinders; beakers; hot plates; meter sticks; compasses; timing devices, including clocks and stopwatches; magnets; collecting nets; notebooks; sound recorders; Sun, Earth, and Moon system models; and materials to support observation of habitats of organisms such as terrariums and aquariums; and	252	Replace SE with: collect, record, and analyze information using tools including microscopes, camera, computers, hand lenses, metric rulers, Celsius thermometers, pan balances, graduated cylinders, beakers, spring scales, meter sticks, compasses, timing devices including clocks and stop watches, magnets, collecting nets, notebooks, Sun/Earth/Moon system models; and (Rationale: hot plates not safe for 3rd grade; added spring scales to measure force; sound recorders no longer used, terrariums, and aquariums too expensive).
(B) use safety equipment as appropriate, including safety goggles and gloves.	252	Delete “gloves” (Rationale: not needed since there are no hot plates).

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(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:		
(A) measure, test, and record physical properties of matter, including temperature, mass, magnetism, and the ability to sink or float;		
(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;		
(C) predict, observe, and record changes in the state of matter caused by heating or cooling; and	10	For scientific correctness heating and cooling should read the addition or reduction of heat.
(D) explore and recognize that a mixture is created when two materials are combined such as gravel and sand and metal and plastic paper clips.		
(6) Force, motion, and energy. The student knows that forces cause change and that energy exists in many forms. The student is expected to:		
(A) explore different forms of energy, including light, sound, and heat/thermal in everyday life;	1 252	Vibrations producing sound is not represented anywhere in elementary TEKS. Replace SE with: explore different forms of energy including mechanical, light, sound, and heat/thermal in everyday life.
(B) demonstrate and observe that position and motion can be changed by pushing and pulling objects such as swings, cars, and balls; and	252 13	Replace SE with: demonstrate and observe that position and motion can be changed by pushing and pulling objects to show work being done such as pulleys, swings, and wagons; and (Rationale: to fix gaps in force TEKS). Add: "...position relative to frame of reference..."
(C) observe forces such as magnetism and gravity acting on objects.	1	Take magnetism out, it is already in 3.5A. Add "push or pull, equilibrium, electricity" as recommended in national standards.
(7) Earth and space. The student knows that Earth consists of natural resources and its surface is constantly changing. The student is expected to:		
(A) explore and record how soils are formed by weathering of rock and the decomposition of plant and animal remains;	1	Formation of soil by weathered rock and decomposing organic matter is very abstract.
(B) investigate rapid changes in Earth's surface such as volcanic eruptions, earthquakes, and landslides;		

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(C) identify and compare different landforms, including mountains, hills, valleys, and plains; and		
(D) explore the characteristics of natural resources that make them useful in products and materials such as clothing and furniture and how resources may be conserved.		
(8) Earth and space. The student knows there are recognizable patterns in the natural world and in the Sun, Earth, and Moon system. The student is expected to:		
(A) observe, measure, record, and compare day-to-day weather changes in different locations at the same time that include air temperature, wind direction, and precipitation;		
(B) describe and illustrate the Sun as a star composed of gases that provides light and heat energy for the water cycle; and		
(C) construct models that demonstrate the relationship of the Sun, Earth, and Moon, including orbits and positions.	252	Replace SE with: use models that demonstrate the characteristics and relationship of the planets and the Sun, Earth and Moon system including orbit and position; (Rationale: align astronomy concepts).
(9) Organisms and environments. The student knows that organisms have characteristics that help them survive and can describe patterns, cycles, systems, and relationships within the environments. The student is expected to:	1	Are third graders cognitively ready to comprehend the Earth/Moon/Sun system?
(A) observe and describe the physical characteristics of environments and how they support populations and communities within an ecosystem;		
(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; and		
(C) describe environmental changes such as floods and droughts where some organisms thrive and others perish or move to new locations.		

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(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. The student is expected to:	1	Insert in KS: “organisms resemble their parents” (Rationale: the genetic connection is an important concept).
(A) explore how structures and functions of plants and animals allow them to survive in a particular environment;		
(B) explore that some characteristics of organisms are inherited such as the number of limbs on an animal or flower color and recognize that some behaviors are learned from the environment such as animals using tools to get food; and	252	Delete SE (Rationale: not developmentally appropriate).
(C) investigate and compare how animals and plants undergo a series of orderly changes in their diverse life cycles such as tomato plants, mealworms, and lady bugs.	253	Replace SE with: investigate and compare how animals and plants undergo a series of orderly changes in their diverse life cycles, such as tomato plants, frogs, and lady bugs.

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Science, Grade 4, Beginning with School Year 2010-2011		
(a) Introduction.	1	The focus stated in the introductory paragraphs now seems to be earth science with some life science. A new emphasis is placed on the use of models to understand systems which is very helpful.
(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."	1	Edit (1) to read: Science is a way of describing and making testable predictions about the natural world. Scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions become theories. Scientific theories are based on natural and physical phenomena and capable of being tested by multiple, independent researchers. Students should know that scientific theories, unlike hypotheses, are well-established and highly reliable, but they may still be subject to change as new information and new technologies are developed. This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.
(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.		
(3) The study of elementary science includes planning and safely implementing classroom and outdoor investigations using scientific processes, including inquiry methods, analyzing information, making informed decisions, and using tools to collect and record information, while addressing the major concepts and vocabulary, in the context of physical, earth, and life sciences. Districts are encouraged to facilitate classroom and outdoor investigations for at least 50% of instructional time.	42	Revise last sentence to read: Districts are encourage to facilitate classroom and outdoor investigations for at least 80% of instructional time.
	11	Replace (3) with: Scientific investigations are conducted in different ways using different types of scientific research designs. However, all investigations require a well-designed research question or hypothesis, careful observations, data gathering and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of pond organisms or measuring the abiotic component of a habitat. Descriptive statistics include frequency, mean, median, and mode. No hypothesis and no dependent and independent variables are used in this type of investigation.
	11	Shift numbers to allow time statement to stand alone (4): Districts are encouraged to facilitate classroom and outdoor investigations for at least 80% of instructional time. Vary percentage as appropriate for grade level. Renumber

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(4) In Grade 4, investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.		subsequent paragraphs.
(A) Within the natural environment, students know that earth materials have properties that are constantly changing due to Earth's forces. The students learn that the natural world consists of resources, including renewable and nonrenewable, and their responsibility to conserve our natural resources for future generations. They will also explore Sun, Earth, and Moon relationships. The students will recognize that our major source of energy is the Sun.	4	The original paragraph (A) was deleted and needs to be restored. All other grade levels address the physical, natural, and living environments. Add this new (A) Within the physical environment, students learn to measure physical properties of matter and to compare and contrast a variety of mixtures and solutions. The students explore different forms of energy. The students will design an experiment to test the effect of force on objects. Renumber subsequent paragraphs (B) Within the natural environment... and (C) Within the living environment.
(B) Within the living environment, students know and understand that living organisms within an ecosystem interact with one another and with their environment. The students will recognize that plants and animals have basic needs, and they are met through a flow of energy known as food webs. Students will explore how all living organisms go through a life cycle and that adaptations enable organisms to survive in their ecosystem.	11	Delete this sentence from original paragraph (A): The students will design an experiment to test the effect of force on objects.

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(b) Knowledge and skills.		
(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations, following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to:	1	Edit KS to read: The student for at least 50% of instructional time, conducts investigations in the classroom ...
(A) demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations; and		
(B) make informed choices in the use and conservation of natural resources and reusing and recycling of materials such as paper, aluminum, glass, cans, and plastic.		
(2) Scientific investigation and reasoning. The student uses scientific inquiry methods during laboratory and outdoor investigations. The student is expected to:		
(A) plan and implement descriptive investigations, including asking well-defined questions, making inferences, and selecting and using appropriate equipment or technology to answer his/her questions;		
(B) collect and record data by observing and measuring, using the metric system, and using descriptive words and numerals such as labeled drawings, writing, and concept maps;		
(C) construct simple tables, charts, bar graphs, and maps using tools and current technology to organize, examine, and evaluate data;		
(D) analyze data and interpret patterns to construct reasonable explanations from data that can be observed and measured;		
(E) perform repeated investigations to increase the reliability of results; and	1	“Repeated investigations” is ideal but not well aligned with the math as averaging doesn’t occur until middle school.
(F) communicate valid, oral, and written results supported by data.		
(3) Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:		
(A) justify explanations, arguments, or conclusions using student-generated data;		
(B) draw inferences and evaluate accuracy of services and product claims found in advertisements and labels such as for toys, food, and sunscreen;	10	Draw inferences and evaluate accuracy of services and product claims found in advertisements and labels, such as for toys, food, and sunscreen. (How can you be accurate with labels? Do you want some type of experiment here?)

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(C) represent the natural world using models such as rivers, stream tables, or fossils and identify their limitations, including accuracy and size; and	1	A “stream table” is alarming, however, that in spite of the opening statements focusing the educator on earth and life science, whose TEKS have been increased to include weathering, erosion, deposition, and natural resources, we also see an increase in the physical science TEKS.
(D) connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists.		
(4) Scientific investigation and reasoning. The student knows how to use a variety of tools, materials, equipment, and models to conduct science inquiry. The student is expected to:		
(A) collect, record, and analyze information using tools, including calculators; microscopes; cameras; computers; hand lenses; metric rulers; Celsius thermometers; mirrors; pan balances; triple beam balances; graduated cylinders; beakers; hot plates; meter sticks; compasses; timing devices, including clocks and stopwatches; magnets; collecting nets; notebooks; and materials to support observation of habitats of organisms such as terrariums and aquariums; and	261	Replace SE with: collect, record and analyze information using tools, including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, mirrors, spring scales, pan balances, triple beam balances, graduated cylinders, beakers, meter sticks, compasses, timing devices (clocks and stop watches), magnets, collecting nets, and notebooks; (Rationale: hot plates are not safe for 4th grade; added in spring scale to measure force; terrariums and aquariums too expensive.
(B) use safety equipment as appropriate, including safety goggles and gloves.	261	Delete gloves (Rationale: no need for gloves when there are no hot plates).
(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:		
(A) measure, compare, and contrast physical properties of matter, including size, mass, volume, states (solid, liquid, gas), temperature, magnetism, and the ability to sink or float;		
(B) predict the changes caused by heating and cooling such as ice becoming liquid water and condensation forming on the outside of a glass of ice water; and	5	For scientific correctness heating and cooling should read the addition or reduction of heat.
(C) compare and contrast a variety of mixtures and solutions such as rocks in sand, sand in water, or sugar in water.	5 1	TEKS are not specific. Add a “such as.” Mixtures, solutions, insulators, and conductors are all terms that 5th graders struggle with so how ready are 4th graders for these concepts?

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(6) Force, motion, and energy. The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems. The student is expected to:	15	Replace KS with: The student knows that energy exists in many forms and can be observed in cycles, patterns, and systems.
(A) differentiate among forms of energy, including sound, electricity, light, and heat/thermal;	2 11 261 1	Replace SE with: differentiate among forms of energy and how they travel... Differentiate in what ways? Replace SE with: differentiate among forms of energy including mechanical, sound, electricity, light, and heat/thermal; (Rationale: add mechanical to align grade levels). Replace SE with: explore the uses of energy including light, thermal, electrical, and sound energy.
(B) differentiate between conductors and insulators;		
(C) demonstrate that electricity travels in a closed path, creating an electrical circuit, and explore an electromagnetic field; and	13	Replace SE with: investigate the flow of electricity in a circuit.
(D) design an experiment to test the effect of force of an object.	1 2 1 261	Delete SE. Clarify SE with examples. Edit SE to read: Replace last part with "effect of force on an object." Replace SE with: observe an experiment to test the effect of force on an object such as a push or a pull, gravity, friction, or magnetism; (Rationale: close gaps in force TEKS).
(7) Earth and space. The students know that Earth consists of useful resources and its surface is constantly changing. The student is expected to:		
(A) examine properties of soils, including color and texture, capacity to retain water, and ability to support the growth of plants;		
(B) observe and identify slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice; and		
(C) identify and classify Earth's renewable resources, including air, plants, water, and animals; and nonrenewable resources, including coal, oil, and natural gas; and the importance of conservation.		

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(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:		
(A) identify changes in living organisms that occur over the seasons;	10	Why is changes in living organisms in Earth science since it has to do with living organisms adapting?
	13	Replace SE with: identify seasonal weather patterns that result from changes in air temperature, wind patterns, and precipitation.
	261	Replace SE with: measure and record changes in weather and make predictions using weather maps; (Rationale: align with 4.2.C and other grade levels on weather TEKS).
(B) 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	261	Replace SE with: explain the role of the sun as a major source of energy for Earth and understand its role in the creation of the wind and in the water cycle; (Rationale: more appropriate wording and concepts for alignment).
(C) collect and analyze data to identify sequences and predict patterns of change in shadows, in the reflection of sunlight, and in the observable appearance of the Moon over time.	10	Be specific about what appearance of the moon and about what patterns of change in shadows.
	1	Delete: phases of moon.
	261	Replace SE with: collect and analyze data to identify sequences and predict patterns of change in the Sun, Earth and Moon including reflection of sunlight, tides, and in the observable appearance of the Moon over time. (Rationale: gaps in concepts and alignments).
	1	If “reflection of sunlight” refers to albedo, it is developmentally inappropriate.
(9) 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:		
(A) investigate that most plants need sunlight, water, and carbon dioxide to make their own food, while animals are dependent on other organisms for food, producers, and consumers; and	13	Edit SE to read: investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food, producers, and consumers.
(B) describe the flow of energy through food webs, beginning with the Sun, and predict how changes in the ecosystem affect the food web such as a fire in a forest.	13	Add new SE (C): predict how changes in the ecosystem affect the food web such as a fire in a forest. (Rationale: separated out content in B to align with other grades).

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(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environment. The student is expected to:	2	Insert in KS: “organisms resemble their parents” (Rationale: the genetic connection is an important concept).
(A) explore how adaptations enable organisms to survive in their environment such as comparing birds' beaks and leaves on plants;	1	Edit to align with 3rd and 5th. 4th grade needs to change to be more aligned with 3rd and 5th grade which will help the students learn the structures and functions in a deeper manner.
(B) demonstrate that some likenesses between parents and offspring are inherited, passed from generation to generation such as eye color in humans or shapes of leaves in plants. Other likenesses are learned such as table manners or reading a book and seals balancing balls on their noses; and	1	Food webs have been added to the life science strand and adaptations are pushed up from 3rd grade.
(C) explore, illustrate, and compare life cycles in living organisms such as butterflies, beetles, radishes, or lima beans.	263	Replace SE with: explore, illustrate and compare life cycles in living organisms, such as butterflies, beetles, mealworms, radishes or lima beans. (Rationale: added mealworms with beetles to introduce different life cycles for metamorphosis to align with 5th grade).

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Science, Grade 5, Beginning with School Year 2010-2011		
(a) Introduction.	1	We now seem to have just three “environments” in which investigations occur.
(1) Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."	2	Edit to read: 1) Science is a way of describing and making testable predictions about the natural world. Scientific hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions become theories. Scientific theories are based on natural and physical phenomena and capable of being tested by multiple, independent researchers. Students should know that scientific theories, unlike hypotheses, are well-established and highly reliable, but they may still be subject to change as new information and new technologies are developed. This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not scientifically testable.
(2) Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.		
(3) The study of elementary science includes planning and safely implementing classroom and outdoor investigations using scientific processes, including inquiry methods, analyzing information, making informed decisions, and using tools to collect and record information, while addressing the major concepts and vocabulary, in the context of physical, earth, and life sciences. Districts are encouraged to facilitate classroom and outdoor investigations for at least 50% of instructional time.	42 15	Revise last sentence to read: Districts are encourage to facilitate classroom and outdoor investigations for at least 80% of instructional time. Edit to read: The study of elementary science includes planning and safely implementing classroom and outdoor descriptive, comparative and simple experimental investigations using scientific processes, including inquiry methods, analyzing information, making informed decisions, and using tools to collect and record information, while addressing the major concepts and vocabulary, in the context of physical, earth, and life sciences. Scientific investigations are conducted in different ways using different types of scientific research designs. However, all investigations require a well-designed research question or hypothesis, careful observations, data gathering and analysis of the data to identify the patterns that will explain the findings. Descriptive investigations are used to explore new phenomena such as conducting surveys of pond organisms or measuring the abiotic component of a habitat. Descriptive statistics include frequency, mean, median, and mode. No hypothesis and no dependent and independent variables are used in this type of investigation.

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	15	<p>Comparative investigations are used when conditions can be kept constant in order to focus on a single variable. Comparative analysis is used to compare the strength of a relationship between two variables. The investigator selects the independent variable (IV) recording the responses of the dependent (responding) variable (DV). No control group is used for this type of investigation. Conditions other than IV or DV are held constant or at least they are the same for all test groups. Statistics used in the Comparative method include some type of comparison of the means between the various DVs. However, when it is possible to have a control, the Experimental investigations can be used to determine causation. Students in grades 5-12 should experience all three types of investigations and understand that different scientific research questions require different research designs.</p> <p>Shift numbers to allow time statement to stand alone. (4) Districts are encouraged to facilitate classroom and outdoor investigations for at least 50% of instructional time.</p>
(4) In Grade 5, investigations are used to learn about the natural world. Students should understand that certain types of questions can be answered by investigations and that methods, models, and conclusions built from these investigations change as new observations are made. Models of objects and events are tools for understanding the natural world and can show how systems work. They have limitations and based on new discoveries are constantly being modified to more closely reflect the natural world.		
(A) Within the physical environment, students learn about the physical properties of matter, including magnetism, physical states of matter, relative density, solubility in water, and the ability to conduct or insulate electrical and heat energy. Students explore the uses of light, thermal, electrical, and sound energies.		
(B) Within the natural environment, students learn how changes occur on Earth's surface and that predictable patterns occur in the sky. Students learn that the natural world consists of resources, including nonrenewable, renewable, and alternative energy sources.		
(C) Within the living environment, students learn that structure and function of organisms can improve the survival of members of a species. Students learn to differentiate between inherited traits and learned		

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behaviors. Students learn that life cycles occur in animals and plants and that the carbon dioxide-oxygen cycle occurs naturally to support the living environment.		
(b) Knowledge and skills.		
(1) Scientific investigation and reasoning. The student conducts classroom and outdoor investigations following home and school safety procedures and environmentally appropriate and ethical practices. The student is expected to:	1	Edit KS to read: The student for at least 80% of instructional time, conducts investigations in the classroom ...
(A) demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations; and		
(B) make informed choices in the conservation, disposal, and recycling of materials.		
(2) Scientific investigation and reasoning. The student uses scientific methods during laboratory and outdoor investigations. The student is expected to:		
(A) describe, plan, and implement simple experimental investigations testing one variable;	15	Replace SE with: describe, plan and implement descriptive investigations asking well-defined questions, and selecting and using appropriate equipment and technology.

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(B) ask well-defined questions, formulate testable hypotheses, and select and use appropriate equipment and technology;	15	Replace SE with: (B) describe, plan and implement comparative investigations asking well-defined questions, formulating testable hypotheses, and selecting and using appropriate equipment and technology. and implement simple experimental investigations testing one variable, asking well-defined questions, formulating testable hypotheses and selecting and using appropriate equipment and technology.
	16	Expand and revise A and B into A, B, and C: (A) describe, plan and implement descriptive investigations asking well-defined questions, and selecting and using appropriate equipment and technology (B) describe, plan and implement comparative investigations asking well-defined questions, formulating testable hypotheses, and selecting and using appropriate equipment and technology (C) describe, plan, and implement simple experimental investigations testing one variable, asking well-defined questions, formulating testable hypotheses and selecting and using appropriate equipment and technology.
(C) collect information by detailed observations and accurate measuring;		
(D) analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence;		
(E) demonstrate that repeated investigations may increase the reliability of results;		
(F) communicate valid conclusions in both written and verbal forms; and		
(G) construct appropriate simple graphs, tables, maps, and charts using technology, including computers, to organize, examine, and evaluate information.	2	Edit SE to read: "draw conclusions" from simple graphs, tables...
(3) Scientific investigation and reasoning. The student uses critical thinking and scientific problem solving to make informed decisions. The student is expected to:		
(A) use scientific evidence to develop and evaluate scientific explanations;		
(B) evaluate the accuracy of the information related to promotional materials for products and services such as nutritional labels;		

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(C) draw or develop a model that represents how something works or looks that cannot be seen such as how a soda dispensing machine works; and	1	Edit SE to read: "evaluate" models...
	1	How is that supposed to be taught? That is a ridiculous example.
	250	Replace SE with: represent the natural world using models and identify their limitations; (Rationale: new is not a good example, old wording is better).
	1	SE presumes a lot regarding the child's readiness to turn concrete objects into abstract representations and most children this age should not be expected to visualize the mechanisms of technologies they cannot concretely explore.
(D) connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists.	1	Specific scientists should be listed, focusing on classroom study.
(4) Scientific investigation and reasoning. The student knows how to use a variety of tools and methods to conduct science inquiry. The student is expected to:		
(A) collect, record, and analyze information using tools, including calculators; microscopes; cameras; computers; hand lenses; metric rulers; Celsius thermometers; prisms; mirrors; pan balances; triple beam balances; graduated cylinders; beakers; hot plates; meter sticks; timing devices, including clocks and stopwatches; magnets; collecting nets; notebooks; and materials to support observations of habitats or organisms such as terrariums and aquariums; and	250	Replace SE with: collect, record, and analyze information using tools including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, prisms, mirrors, pan balances, triple beam balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, stopwatches, magnets, collecting nets, and notebooks; and (Rationale: added spring scale to measure force; use stop watches in fifth; terrariums and aquariums too expensive).
(B) use safety equipment, including safety goggles and gloves.		
(5) Matter and energy. The student knows that matter has measurable physical properties and those properties determine how matter is classified, changed, and used. The student is expected to:		
(A) classify matter based on physical properties, including mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating), solubility in water, and the ability to conduct or insulate thermal energy or electric energy;		
(B) identify the boiling and freezing/melting points of water on the Celsius scale;		
(C) demonstrate that some mixtures maintain physical properties of their ingredients such as iron filings and sand; and		

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(D) identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water.		
(6) Force, motion, and energy. The student knows that energy occurs in many forms and can be observed in cycles, patterns, and systems. The student is expected to:	14	Edit KS to read: "... energy exists in many forms ..."
(A) explore the uses of energy, including light, thermal, electrical, and sound energy;	254	Replace SE with: explore energy including mechanical, light, thermal electrical, and sound energy; (Rationale: align with other grade levels).
	14	Insert: differentiate and explore among ...
(B) demonstrate that the flow of electricity in circuits requires a complete path through which an electric current can pass and can produce light, heat, and sound; and		
(C) demonstrate that light travels in a straight line until it strikes an object or travels through one medium to another and demonstrate that light can be reflected such as the use of mirrors or other shiny surfaces and refracted such as the appearance of an object when observed through water.	14	Replace SE with: demonstrate that light travels in a straight line until it strikes an object and is reflected or travels from one medium to another and it refracted.
	250	Insert new SE: design an experiment that tests the effect of force on an object (Rationale: to close gap in force TEKS).
(7) Earth and space. The student knows Earth's surface is constantly changing and consists of useful resources. The student is expected to:		
(A) explore the processes that led to the formation of sedimentary rocks and fossil fuels;		
(B) recognize how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, and ice;		
(C) identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and biofuels; and		
(D) identify fossils as evidence of past living organisms and the nature of the environments at the time using models.		

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(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:	14	Edit KS to read: The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system and the solar system.
	2	Make sure to include the planets in the solar system and relation to Sun.
(A) differentiate between weather and climate;	1	Topic should be taught at Grade 4
(B) explain how the Sun and the ocean interact in the water cycle; and	250	Replace SE with: explain how the Sun and the ocean interact in the water cycle and in weather patterns; and (Rationale: aligns with other TEKS and closes gaps).
(C) demonstrate that Earth rotates on its axis once approximately every 24 hours causing the day/night cycle and the apparent movement of the Sun across the sky.	14	Delete "approximately every 24 hours..."
	250	Replace SE with: demonstrate that the Earth rotates on its axis once approximately every 24 hours causing the day/night cycle and revolves around the Sun every 365 days; and (Rationale: alignment and closes gaps in astronomy).
	251	Insert new SE ((D): identify and compare the physical characteristics of the Sun, Earth and Moon; and (Rationale: gaps in astronomy concepts).
	14	Insert new SE: identify the planets in our solar system and their position in relation to the Sun.
(9) Organisms and environments. The student knows that there are relationships, systems, and cycles within environments. The student is expected to:		
(A) observe the way organisms live and survive in their ecosystem by interacting with the living and non-living elements;	1	Delete SE from Grade 5 which is overcrowded.
(B) describe how the flow of energy derived from the Sun, used by producers to create their own food, is transferred through a food chain and food web to consumers and decomposers;	1	Delete SE from Grade 5 which is overcrowded.
(C) predict the effects of changes in ecosystems caused by living organisms, including humans, such as the overpopulation of grazers or the building of highways; and	1	Delete SE from Grade 5 which is overcrowded.
(D) identify the significance of the carbon dioxide-oxygen cycle to the survival of plants and animals.		

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(10) Organisms and environments. The student knows that organisms undergo similar life processes and have structures that help them survive within their environments. The student is expected to:	1	Insert in KS: “organisms resemble their parents” (Rationale: the genetic connection is an important concept).
(A) compare the structures and functions of different species that help them live and survive such as hooves on prairie animals or webbed feet in aquatic animals;		
(B) differentiate between inherited traits of plants and animals such as spines on a cactus or shape of a beak and learned behaviors such as an animal learning tricks or a child riding a bicycle; and		
(C) describe the differences between complete and incomplete metamorphosis of insects.		