

**2021 Introduction**

**2017 Introduction**

- (1) In Kindergarten through Grade 5 Science, content is organized into recurring strands. The concepts within each grade level build on prior knowledge, prepare students for the next grade level, and establish a foundation in science. In Kindergarten, the following concepts will be addressed in each strand.
- (A) Scientific and engineering practices. Scientific inquiry is the planned and deliberate investigation of the natural world using scientific and engineering practices. Scientific methods of investigation are descriptive, comparative, or experimental. The method chosen should be appropriate to the grade level and question being asked. Student learning for different types of investigations include descriptive investigations, which involve collecting data and recording observations without making comparisons; comparative investigations, which involve collecting data with variables that are manipulated to compare results; and experimental investigations, which involve processes similar to comparative investigations but in which a control is identified.
- (i) Scientific practices. Students ask questions, plan and conduct investigations to answer questions, and explain phenomena using appropriate tools and models.
- (ii) Engineering practices. Students identify problems and design solutions using appropriate tools and models.
- (iii) To support instruction in the science content standards, it is recommended that districts integrate scientific and engineering practices through classroom and outdoor investigations for at least 80% of instructional time.
- (B) Matter and its properties. Students build their knowledge of the natural world using their senses. The students focus on observable properties and patterns of objects, including shape, color, texture, and material.
- (C) Force, motion, and energy. Students explore the location, motion, and position of objects and investigate the importance of light energy as it relates to the students' everyday lives. Students focus on demonstrating light energy sources and their effect on objects.
- (D) Earth and space. Patterns are recognizable in the natural world and among objects in the sky. Students understand that weather, seasons of the year, and day and night are repeated patterns. Materials found on Earth can be used and classified.
- (E) Organisms and environments. All living organisms satisfy basic needs through interactions with nonliving things and living organisms, and they have structures and functions that help them survive within their environments. Students investigate the life cycle of plants and identify likenesses between parents and young.

- (1) *In Kindergarten, students observe and describe the natural world using their senses. Students do science as inquiry in order to develop and enrich their abilities to understand scientific concepts and processes. Students develop vocabulary through their experiences investigating properties of common objects, earth materials, and organisms.*
- (A) *A central theme throughout the study of scientific investigation and reasoning; matter and energy; force, motion, and energy; Earth and space; and organisms and environment is active engagement in asking questions, creating a method to answer those questions, answering those questions, communicating ideas, and exploring with scientific tools. Scientific investigation and reasoning involves practicing safe procedures, asking questions about the natural world, and seeking answers to those questions through simple observations used in descriptive investigations.*
- (B) *Matter is described in terms of its physical properties, including relative size, weight, shape, color, and texture. The importance of light, thermal, 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.*
- (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.*
- (2) *Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process."*
- (3) *Recurring themes are pervasive in sciences, mathematics, and technology. These ideas transcend disciplinary boundaries and include patterns, cycles, systems, models, and change and constancy.*
- (4) *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.*
- (5) *Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.*

2021 Introduction ( <i>continued</i> )	2017 Introduction
<p>(2) Nature of science. Science, as defined by the National Academy of Sciences, is the "use of evidence to construct testable explanations and predictions of natural phenomena, as well as the knowledge generated through this process." This vast body of changing and increasing knowledge is described by physical, mathematical, and conceptual models. Students should know that some questions are outside the realm of science because they deal with phenomena that are not currently scientifically testable.</p> <p>(3) Scientific hypotheses and theories. Students are expected to know that:</p> <p>(A) hypotheses are tentative and testable statements that must be capable of being supported or not supported by observational evidence. Hypotheses of durable explanatory power that have been tested over a wide variety of conditions are incorporated into theories; and</p> <p>(B) scientific theories are based on natural and physical phenomena and are capable of being tested by multiple independent researchers. Unlike hypotheses, scientific theories are well established and highly reliable explanations, but they may be subject to change as new areas of science and new technologies are developed.</p> <p>(4) Science and social ethics. Scientific decision making is a way of answering questions about the natural world involving its own set of ethical standards about how the process of science should be carried out. Students distinguish between scientific decision-making practices and ethical and social decisions that involve science.</p> <p>(5) Recurring themes and concepts. Science consists of recurring themes and making connections between overarching concepts. Recurring themes include structure and function, systems, models, and patterns. All systems have basic properties that can be described in space, time, energy, and matter. Change and constancy occur in systems as patterns and can be observed, measured, and modeled. Models have limitations but provide a tool for understanding the ideas presented. Students analyze a system in terms of its components and how these components relate to each other, to the whole, and to the external environment.</p> <p>(6) Statements containing the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.</p>	

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Scientific and Engineering Practices	
<b>(1) The student asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to:</b>	
(A) ask questions and define problems based on observations or information from text, phenomena, models, or investigations;	<i>(2)(A) ask questions about organisms, objects, and events observed in the natural world</i>
(B) use scientific practices to plan and conduct simple descriptive investigations and use engineering practices to design solutions to problems;	<i>(2)(B) plan and conduct simple descriptive investigations</i>
(C) identify, describe, and demonstrate safe practices during classroom and field investigations as outlined in Texas Education Agency-approved safety standards;	<i>(1)(A) identify, discuss, and demonstrate safe and healthy practices as outlined in Texas Education Agency-approved safety standards during classroom and outdoor investigations, including wearing safety goggles or chemical splash goggles, as appropriate, washing hands, and using materials appropriately</i>
(D) use tools, including hand lenses, goggles, trays, cups, bowls, sieves or sifters, notebooks, terrariums, aquariums, samples (rocks, sand, soil, loam, gravel, clay, seeds, and plants), windsock, demonstration thermometer, rain gauge, straws, ribbons, non-standard measuring items, blocks or cubes, tuning fork, various flashlights, small paper cups, items that roll, noise makers, hot plate, opaque objects, transparent objects, foil pie pans, foil muffin cups, wax paper, Sun-Moon-Earth model, and plant life cycle model to observe, measure, test, and compare;	<i>(4)(A) collect information using tools, including computing devices, hand lenses, primary balances, cups, bowls, magnets, collecting nets, and notebooks; timing devices; non-standard measuring items; weather instruments such as demonstration thermometers; and materials to support observations of habitats of organisms such as terrariums and aquariums</i>
(E) collect observations and measurements as evidence;	<i>(2)(C) collect data and make observations using simple tools</i>
(F) record and organize data using pictures, numbers, words, symbols, and simple graphs; and	<i>(2)(D) record and organize data and observations using pictures, numbers, and words</i>
(G) develop and use models to represent phenomena, objects, and processes or design a prototype for a solution to a problem.	<i>(3)(A) identify and explain a problem such as the impact of littering and propose a solution</i>
	<b>REMOVED</b> <i>(1)(B) demonstrate how to use, conserve, and dispose of natural resources and materials such as conserving water and reusing or recycling paper, plastic, and metal (FOUND IN KINDER INTRO (1)(D-Earth and Space))</i>

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<b>(2) The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:</b>	
(A) identify basic advantages and limitations of models such as their size, properties, and materials;	<b>NEW (Referred to in Kinder Intro (5))</b>
(B) analyze data by identifying significant features and patterns;	(3)(B) <i>make predictions based on observable patterns in nature</i> (4)(B) <i>use the senses as a tool of observation to identify properties and patterns of organisms, objects, and events in the environment</i>
(C) use mathematical concepts to compare two objects with common attributes; and	<b>NEW</b>
(D) evaluate a design or object using criteria to determine if it works as intended.	<b>NEW</b>
<b>(3) The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:</b>	
(A) develop explanations and propose solutions supported by data and models;	<b>NEW</b>
(B) communicate explanations and solutions individually and collaboratively in a variety of settings and formats; and	(2)(E) <i>communicate observations about simple descriptive investigations</i>
(C) listen actively to others' explanations to identify important evidence and engage respectfully in scientific discussion.	<b>NEW</b>
<b>(4) The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:</b>	
(A) explain how science or an innovation can help others; and	<b>NEW</b>
(B) identify scientists and engineers such as Isaac Newton, Mae Jemison, and Ynes Mexia and explore what different scientists and engineers do.	(3)(C) <i>explore that scientists investigate different things in the natural world and use tools to help in their investigations</i>

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<b>Recurring Themes and Concepts</b>	
<b>(5) The student uses recurring themes and concepts to make connections across disciplines. The student is expected to:</b>	
(A) identify and use patterns to describe phenomena or design solutions;	<b>NEW</b>
(B) investigate and predict cause-and-effect relationships in science;	<b>NEW</b>
(C) describe the properties of objects in terms of relative size (scale) and relative quantity;	<b>NEW</b>
(D) examine the parts of a whole to define or model a system;	<b>NEW</b>
(E) identify forms of energy and properties of matter;	<b>NEW</b>
(F) describe the relationship between the structure and function of objects, organisms, and systems; and	<b>NEW</b>
(G) describe how factors or conditions can cause objects, organisms, and systems to either change or stay the same.	<b>NEW</b>

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Matter and Its Properties	
(6) The student knows that objects have physical properties that determine how they are described and classified. The student is expected to identify and record observable physical properties of objects, including shape, color, texture, and material, and generate ways to classify objects.	(5)(A) <i>observe and record properties of objects, including bigger or smaller, heavier or lighter, shape, color, and texture</i>
	<b>REMOVED</b> (5)(B) <i>observe, record, and discuss how materials can be changed by heating and cooling</i>

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Force, Motion, and Energy	
(7) The student knows that forces cause changes in motion and position in everyday life. The student is expected to describe and predict how a magnet interacts with various materials and how magnets can be used to push or pull.	(6)(B) <i>explore interactions between magnets and various materials</i>  (1)(6)(B) <i>predict and describe how a magnet can be used to push or pull an object (MOVED FROM GRADE 1)</i>  (6)(C) <i>observe and describe the location of an object in relation to another such as above, below, behind, in front of, and beside</i>  (6)(D) <i>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</i>
(8) The student knows that energy is everywhere and can be observed in everyday life. The student is expected to:	
(A) communicate the idea 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	(6)(A) <i>use the senses to explore different forms of energy such as light, <del>thermal</del>, and sound (LIGHT ONLY)</i>
(B) demonstrate and explain that light travels through some objects and is blocked by other objects, creating shadows.	(6)(A) <i>use the senses to explore different forms of energy such as light, <del>thermal</del>, and sound (LIGHT ONLY)</i>

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<b>Earth and Space</b>	
<b>(9) The student knows that there are recognizable patterns in the natural world and among objects in the sky. The student is expected to:</b>	
(A) identify, describe, and predict the patterns of day and night and their observable characteristics; and	(8)(B) <i>identify events that have repeating patterns, including <del>seasons of the year</del> and day and night</i>
(B) observe, describe, and illustrate the Sun, Moon, stars, and objects in the sky such as clouds.	(8)(C) <i>observe, describe, and illustrate objects in the sky such as the clouds, Moon, and stars, including the Sun</i>
<b>(10) The student knows that the natural world includes earth materials and systems that can be observed. The student is expected to:</b>	
(A) describe and classify rocks by the observable properties of size, shape, color, and texture;	(7)(A) <i>observe, describe, and sort rocks by size, shape, color, and texture</i>
(B) observe and describe weather changes from day to day and over seasons; and	(8)(A) <i>observe and describe weather changes from day to day and over seasons</i>
(C) identify evidence that supports the idea that air is all around us and demonstrate that wind is moving air using items such as a windsock, pinwheel, or ribbon.	(1)(8)(D) <i>demonstrate that air is all around us and observe that wind is moving air (MOVED FROM GRADE 1)</i>
<b>(11) The student knows that earth materials are important to everyday life. The student is expected to observe and generate examples of practical uses for rocks, soil, and water.</b>	(7)(C) <i>give examples of ways rocks, soil, and water are useful</i>
	<b>MOVED TO FIRST GRADE</b> (7)(B) <i>observe and describe physical properties of natural sources of water, including color and clarity</i>

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<b>Organisms and Environments</b>	
<b>(12) The student knows that plants and animals depend on the environment to meet their basic needs for survival. The student is expected to:</b>	
(A) observe and identify the dependence of plants on air, sunlight, water, nutrients in the soil, and space to grow; and	(9)(B) <i>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</i>
(B) observe and identify the dependence of animals on air, water, food, space, and shelter.	(9)(B) <i>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</i>
<b>(13) The student knows that organisms resemble their parents and have structures and undergo processes that help them interact and survive within their environments. The student is expected to:</b>	
(A) identify the structures of plants, including roots, stems, leaves, flowers, and fruits;	(10)(A) <i>sort plants and animals into groups based on physical characteristics such as color, size, body covering, or leaf shape</i> (10)(B) <i>identify basic parts of plants and animals</i>
(B) identify the different structures that animals have that allow them to interact with their environment such as seeing, hearing, moving, and grasping objects;	(10)(A) <i>sort plants and animals into groups based on physical characteristics such as color, size, body covering, or leaf shape</i> (10)(B) <i>identify basic parts of plants and animals</i>
(C) identify and record the changes from seed, seedling, plant, flower, and fruit in a simple plant life cycle; and	(10)(D) <i>observe changes that are part of a simple life cycle of a plant: seed, seedling, plant, flower, and fruit</i>
(D) identify ways that young plants resemble the parent plant.	(10)(C) <i>identify ways that young plants resemble the parent plant</i>
	<b>REMOVED</b> (9)(A) <i>differentiate between living and nonliving things based upon whether they have basic needs and produce offspring</i>