

4th Grade Science Overview 2022 - 2023

This document is designed provide parents/guardians/community an overview of the curriculum taught in the FBISD classroom. This document supports families in understanding the learning goals for the course, and how students will demonstrate what they know and are able to do. The overview offers suggestions or possibilities to reinforce learning at home.

Included at the end of this document, you will find:

- A [glossary](#) of curriculum components
- The content area [instructional model](#)
- [Parent resources](#) for this content area

To advance to a particular grading period, click on a link below.

- [Grading Period 1](#)
- [Grading Period 2](#)
- [Grading Period 3](#)
- [Grading Period 4](#)

Process Standards

The process standards describe ways in which students are expected to engage in the content. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use knowledge learned efficiently and effectively in daily life.

- 4.1A Demonstrate safe practices and the use of safety equipment as described in Texas Education Agency-approved safety standards during classroom and outdoor investigations using safety equipment, including safety goggles or chemical splash goggles, as appropriate, and gloves, as appropriate
- 4.1B 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.
- 4.2A 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.
- 4.2B 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.
- 4.2C Construct simple tables, charts, bar graphs, and maps using tools and current technology to organize, examine, and evaluate data.
- 4.2D Analyze data and interpret patterns to construct reasonable explanations from data that can be observed and measured.
- 4.2E Perform repeated investigations to increase the reliability of results.
- 4.2F Communicate valid oral and written results supported by data.
- 4.3A Analyze, evaluate, and critique scientific explanations by using evidence, logical reasoning, and experimental and observational testing.
- 4.3B Represent the natural world using models such as the water cycle and stream tables and identify their limitations, including accuracy and size.
- 4.3C Connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists.
- 4.4A Collect, record, and analyze information using tools, including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, mirrors, spring scales, balances, graduated cylinders, beakers, hot plates, meter sticks, magnets, collecting nets, and notebooks; timing devices; and materials to support observation of habitats of organisms such as terrariums and aquariums.

Grading Period 1

Unit 1: Matter

Estimated Date Range: 8/10/22 – 9/30/22

Estimated Time Frame: 39 Days

Unit Overview:

In this unit, students will compare and contrast that matter by its observable, measurable, and testable physical properties. Using descriptive investigations, students will understand that physical properties can be measured using a variety of tools, such as rulers, balances, and thermometers. Students have described matter by temperature, mass, magnetism, and the ability to sink and float in previous grades; however, it is the first time students will use volume as property of matter. Students will need to measure, record, compare, and contrast matter by using volume along with all the other properties previously mentioned. In addition, students will compare and contrast a variety of mixtures, including solutions. In third grade, students studied mixtures; however, mixtures that are solutions are going to be studied for the first time in fourth grade. Measuring, recording, testing, and describing matter by its physical properties is a prerequisite to develop students' understanding about mixtures. Students will use their knowledge of physical properties to determine if combining materials result in a mixture or a mixture that is a solution.

At home connections:

- Discuss ways that students can be safe during science time. Emphasize the points discussed in the Science Safety Contract your child's teacher will send home. Discuss the importance of following the safety rules and wearing safety equipment.
- Conduct simple investigations with your child at home following Scientific Practices studied in class. Help your child select a good topic to conduct an investigation about. Guide your child to create a good question, perform multiple trials when collecting data, record data, and write conclusions that include a claim, evidence, and reasoning. For ideas about possible investigations to conduct, click [here](#).
- Use objects from home to compare and contrast matter according to physical properties of matter. The physical properties include observable properties such as color, shape, texture, and state of matter; measurable properties such as mass, volume, and temperature; and testable properties such as magnetism and ability to sink or float.
- Conduct investigations at home about mixtures by using common objects and substances from home. Help your child understand that solutions are types of mixtures. In a mixture that is not a solution, the physical properties of the ingredients do not change after the ingredients have been combined. In mixtures that are solutions, the physical properties of the ingredients change after they have been combined.

Concepts within Unit #1 Link to TEKS	Success Criteria for this Concept
Concept #1: Safety 4.1A	<ul style="list-style-type: none"> • Determine what safety practices must be followed and what safety equipment must be used in different situations.
Concept #2: Scientific Practices 4.2A, 4.2B, 4.2C, 4.2E	<ul style="list-style-type: none"> • Create a well-defined question for a scientific investigation. • Perform multiple trials when conducting a scientific investigation. • Record the results of the investigation on a data table. • Describe how the scientific practices were used in an investigation.
Concept #3: Scientific Explanations 4.2D, 4.2F	<ul style="list-style-type: none"> • Make an accurate claim based on data. • Identify pieces of evidence that support the claim. • Create reasoning by connecting the claim and evidence to explain a scientific concept.
Concept #4: Physical Properties of Matter 4.5A	<ul style="list-style-type: none"> • Measures mass by using triple beam balances, temperature by using thermometers, and volume by using graduated cylinders, and beakers. • Records mass, temperature, volume using the Metric System. Mass in Kilograms (Kg) or grams (g); temperature is Celsius (°C); volume in Liters (L) or milliliters (mL). • Compares and contrasts matter based on color, shape, texture, mass, temperature, volume, and physical state (solid, liquid, and gas).

	<ul style="list-style-type: none"> • Tests matter to determine if it is magnetic or nonmagnetic. • Tests matter to determine if it sinks or floats. • Compares and contrasts matter based on the property of magnetism and the ability to sink or float.
Concept #5: Mixtures 4.5B	<ul style="list-style-type: none"> • Compares and contrasts mixtures, including solutions by describing the physical properties of the ingredients. • Explains that the physical properties of the ingredients in most mixtures do not change when they are combined. • Explain that in special mixtures called solutions, the physical properties of the ingredients change after the ingredients are combined.
<p>Unit 2: Force, Motion, and Energy Estimated Date Range: 10/3/22 – 10/7/22 Estimated Time Frame: 5 Days</p>	
<p>Unit Overview: In the unit, students will learn that energy exists in many forms and can be observed in cycles, patterns, and systems. In 4th Grade, students will be introduced to the concept of electrical energy. Students will be expected to build circuits and determine if there is a flow of electricity when a circuit is opened or closed. This unit will be continued in the second grading period.</p> <p>At home connections:</p> <ul style="list-style-type: none"> • Help your child create virtual circuits here. Engage in discussions about what makes the circuit work. 	
<p>Concepts within Unit #2 Link to TEKS</p>	<p>Success Criteria for this Concept</p>
Concept #1: Electricity (Introduction) 4.6B, 4.6C	<ul style="list-style-type: none"> • Explains that electricity travels in a closed path, creating an electrical circuit.

Grading Period 2

Unit 2: Force, Motion, and Energy (Continued)

Estimated Date Range: 10/11/22 – 11/18/22

Estimated Time Frame: 23 Days

Unit Overview:

In this continuation of unit 2 from the first grading period, students will continue their studies about electricity. Students will also determine which materials are conductors or insulators of electrical or thermal energy. In addition, students will differentiate between types of energy, including mechanical, light, thermal, electrical, and sound energy. Towards the end of the unit, students will deepen their understanding about common forces such as, push or pull, gravity, friction, and magnetism by designing an investigation. Students will independently design a descriptive investigation to test the effects these various forces on objects.

At home connections:

- Investigate what materials conduct and insulate thermal or electrical energy by testing different materials. For example, help your child add warm water to plastic cup and a foam cup. Compare how the cups feel from outside to determine what material is the best insulator of thermal energy.
- Encourage your child to find house items such a TV, microwave, lamp, etc. and discuss the type of energy the item uses.
- When studying forces, students are learning about the effects of friction, gravity, and magnetism. Help your child design an investigation that can test the effects of those forces on objects by using ramps and surfaces of different textures.

Concepts within Unit #2 Link to TEKS	Success Criteria for this Concept
Concept #1: Electricity (Continued) 4.6B, 4.6C	<ul style="list-style-type: none"> • Explains that electricity travels in a closed path, creating an electrical circuit.
Concept #2: Conductors and Insulators 4.6B	<ul style="list-style-type: none"> • Differentiates between conductors and insulators of electrical energy. • Differentiates between conductors and insulators of thermal energy.
Concept #3: Forms of Energy 4.6A	<ul style="list-style-type: none"> • Differentiates among forms of energy, including mechanical, sound, electrical, light, and thermal.
Concept #4: Forces 4.6D	<ul style="list-style-type: none"> • Designs a descriptive investigation to test the effect of force on an object such as a push or a pull, gravity, friction, or magnetism. • Describes the effects of pushes, pulls, gravity, friction, and magnetism on objects.

Unit 3: Earth's Surface

Estimated Date Range: 11/28/22 – 12/16/22

Estimated Time Frame: 15 Days

Unit Overview:

In this unit, students will know that the Earth consists of valuable resources and is constantly changing. Students will examine the properties of soil and how different soil types are useful for different purposes. In addition, students will review natural resources and practice classifying resources as renewable or nonrenewable. This unit will continue in the third grading period.

At home connections:

- With parental supervision, ask your child to collect a sample of soil from your backyard or garden. Observe it to determine if it has sand, clay, or potting soil. Add some drops of water to see how much water it retains.
- Play a game with your child to determine who can name the most renewable and nonrenewable resources. Take the opportunity to discuss that the renewable resources are those that can be replaced in a human lifetime such as plants, animals. Non-renewable resources cannot be replaced in a human lifetime, for example, natural gas and fossil fuels.

Concepts within Unit #3 Link to TEKS	Success Criteria for this Concept
Concept #1: Soil 4.7A	<ul style="list-style-type: none"> • Describes soil by the properties of color, particle size, and texture. • Calculates the soil's capacity to retain water • Explains the relationship between the texture and their ability to retain water of soil. • Explains why soil support the growth plants.
Concept #2: Natural Resources 4.7C	<ul style="list-style-type: none"> • Classifies Earth's natural resources into renewable resources and nonrenewable resources. • Explains the importance of conserving Earth's natural resources.

Grading Period 3

Unit 3: Earth's Surface (Continued)

Estimated Date Range: 1/5/23 – 1/18/23

Estimated Time Frame: 9 Days

Unit Overview:

In this continuation of unit 3 from the second grading period, students will investigate slow changes to Earth's surface due to wind, water, and ice through weathering, erosion, and deposition. Students will construct models to understand these processes and will be able to analyze them to study their limitations.

At home connections:

- With parental supervision, students can go outside and find evidence of weathering, erosion, and deposition on the ground. Students can create illustrations that describe the processes of weathering, erosion, and deposition and explain how those processes change the Earth's surface.

Concepts within Unit #3

[Link to TEKS](#)

Success Criteria for this Concept

Concept #3: Slow Changes to the Earth's Surface

4.7B

- Identifies slow changes to Earth's surface caused by weathering, erosion, and deposition from water, wind, and ice.

Unit 4: Patterns in the Natural World

Estimated Date Range: 1/19/23 – 2/28/23

Estimated Time Frame: 27 Days

Unit Overview:

In this unit, students will learn that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. Student will study the concepts of weather and the water cycle. When exploring weather, students will measure, record, and predict observable changes in weather. In previous years, students studied the main four weather components and the weather tools that are helpful to gather weather information. In 4th grade, students will use the knowledge acquired in previous years to make predictions about weather data. When exploring the water cycle, students will create models to identify each part of the water cycle. This is the first year in elementary students will be studying the concept of the water cycle. In previous years, students have learned that water evaporates and condenses as a physical change of water. In addition, in this unit, students will explore different cycles on Earth, including the seasons, changes in shadows, and the appearance of the Moon. Students are expected to collect and analyze data to identify sequences and predict patterns. Students in 4th grade will need to analyze models and data to make predictions based on repetitive patterns of the Sun, Earth, and Moon.

At home connections:

- Together with your child, watch the weather in the news or in a weather website such as Weather Underground. Ask your child questions about the temperature, precipitation, wind speed, wind direction, etc. Watch the weather forecast shown in the news or website and discuss if there is a cold front or a warm front that is causing changes in the weather.
- Help your child construct a simple model that represents the water cycle. For example, set up water in a container outside and inside. Measure the amount of water evaporated. Discuss the role of the sun in the evaporation process. Discuss where the water goes after being evaporated by the energy from the Sun.
- Help your child track the apparent movement of the Sun in the sky by constructing a sun dial. Discuss how the Earth's rotation is responsible for the day/night cycle and the apparent movement of the Sun in the sky.

Concepts within Unit #4

[Link to TEKS](#)

Success Criteria for this Concept

Concept #1: Weather

4.8A

- Measures the weather components of air temperature, wind direction, wind speed, and precipitation by using scientific tools.

	<ul style="list-style-type: none"> Records changes in weather components of air temperature, wind direction, wind speed, cloud cover, and precipitation from direct observations and digital sources. Predicts changes in weather components of air temperature, wind direction, wind speed, cloud cover, and precipitation based on data.
Concept #2: Water Cycle 4.8B	<ul style="list-style-type: none"> Illustrates and describes the continuous movement of water through the processes of evaporation, condensation, precipitation, runoff, and accumulation. Explains the role of the Sun in the water cycle.
Concept #3: Earth's Cycles 4.8C	<ul style="list-style-type: none"> Identifies and predicts patterns of change in shadows, seasons, and the Moon by using data.
<p>Unit 5: Ecosystems Estimated Date Range: 3/1/23– 3/10/23 Estimated Time Frame: 8 Days</p>	
<p>Unit Overview: In this unit, students will learn that living organisms within an ecosystem interact with one another and with their environment. Students will study how producers need sunlight, water, and carbon dioxide to produce their own food. Consumers depend on other organisms for food to survive. This unit will continue in fourth grading period.</p> <p>At home connections:</p> <ul style="list-style-type: none"> Encourage your child to read nonfiction books about animals or plants. Challenge your child to find evidence in the book that suggests that the animal or plant is a producer or a consumer. Discuss that producers are those organisms that get their energy by making their own food while consumers are organisms that get their energy by eating other organisms. 	
<p>Concepts within Unit #5 Link to TEKS</p>	<p>Success Criteria for this Concept</p>
Concept #1: Producers/Consumers (Introduction) 4.9A	<ul style="list-style-type: none"> Explains that producers make their own food through the process of photosynthesis. Explains that consumers depend on other organisms for food and can be herbivores, carnivores, or omnivores.

Grading Period 4

Unit 5: Ecosystems (Continued)

Estimated Date Range: 3/20/23 – 4/4/23

Estimated Time Frame: 12 Days

Unit Overview:

In this continuation of unit 5 from the third grading period, students will complete their studies about producers and consumers. In addition, students will learn how the flow of energy in an ecosystem begins with the Sun and is transferred from organism to organism in chains and food webs. Students will study how environmental changes caused by natural disasters such as wildfires and droughts affect the food chains and food webs in an ecosystem. Based on evidence, students will learn how to predict possible effects that these environmental changes will have on ecosystems.

At home connections:

- Encourage your child to think about the food chains and food webs that can be formed with the animals and plants that live in an environment. Review that the flow of energy in a diagram of the food chain or food web is always pointing at the organism receiving the energy.
- Discuss with your child the effects that a change in the environment such as wildfires and droughts could have on food chains and food webs. For example, if a pond environment is affected by a drought, frogs that live in the environment could perish or move away if the water in the ponds dries up. If the frogs are not part of the food chain of the pond anymore, the ecosystem could suffer an overpopulation of mosquitos because frogs are no longer in the ecosystem to eat them.

Concepts within Unit #5 Link to TEKS	Success Criteria for this Concept
Concept #1: Producers/ Consumers (Continued) 4.9A	<ul style="list-style-type: none"> • Explains that producers make their own food through the process of photosynthesis. • Explains that consumers depend on other organisms for food and can be herbivores, carnivores, or omnivores.
Concept #2: Food Webs 4.9B	<ul style="list-style-type: none"> • Describes the flow of energy through food webs. • Predicts how changes in the ecosystem affect food webs.

Unit 6: Organisms

Estimated Date Range: 4/5/23 – 5/19/23

Estimated Time Frame: 32 Days

Unit Overview:

In this unit, students will learn that organisms undergo similar life processes and have structures and behaviors that help them survive within their environment. Students will study how the structures and functions of plants and animals include physical characteristics that allow them to survive in their environment. Students will also explore examples of the qualities that are passed from parents to offspring (inherited traits) and the behaviors that are learned. In addition, students will learn how organisms undergo observable changes during their life cycle and compare the life cycles of different organisms, including animals, plants, and insects.

At home connections:

- Students need to be able to explore the structures (parts of the body) and functions (what the body parts do) of different animals and plants. With adult supervision, encourage your child to find pictures of different birds. Examine the structures of the birds such as their beak, feathers, feet, etc. Discuss what they do (function). Repeat this with other animals and plants.
- Play a game with your child to list inherited traits (features that are pass on from parents to offspring such as hair color, eye color, and animal fur) and learned behaviors (behaviors that organisms exhibit after learning them such a dog playing fetch or humans reading and writing). During the game, each participant has to list the most inherited traits they

can think of. Then, participants will list all the learned behaviors they can think of. The winner is the participant with the most correct answers.

- Encourage your child to read nonfiction books about animals or plants. Challenge your child to find evidence in the book that suggests how the animal or plant grows and develops over their lifetime. Students can create diagrams to represent the stages of the life cycles of different organisms.

Concepts within Unit #6 Link to TEKS	Success Criteria for this Concept
Concept #1: Structures and Functions 4.10A	<ul style="list-style-type: none"> • Describes the structures and functions that are best suited for survival in specific environments.
Concept #2: Inherited Traits and Learned Behaviors 4.10B	<ul style="list-style-type: none"> • Provides and explains examples of inherited traits of animals and plants. • Provides and explains examples of learned behaviors of animals.
Concept #3: Life Cycles 4.10C	<ul style="list-style-type: none"> • Illustrate and compare life cycles of living organisms.

Unit 7: STEM

Estimated Date Range: 5/22/23 – 5/25/23

Estimated Time Frame: 4 Days

Unit Overview:

In this unit, students will explore the engineering process to solve real-world problems. Students will have opportunities to follow the engineering design cycle to analyze a problem, brainstorm solutions, design a product, test, and re-design a product to find the best solution.

At home connections:

- STEM activities require problem solving skills and critical thinking to be solved. Engage with your child in solving some of these challenges together to apply the science concepts learned throughout the year. For ideas on STEM activities, click [here](#).

Concepts within Unit #7 Link to TEKS	Success Criteria for this Concept
Concept #1: STEM 4.1A, 4.1B, 4.2A, 4.2B, 4.2C, 4.2D, 4.2E, 4.2F, 4.3A, 4.3B, 4.3C, 4.4A	<ul style="list-style-type: none"> • Uses critical thinking and scientific problem solving to make informed decisions. • Analyzes, evaluates, and critiques scientific explanations by using evidence, logical reasoning, and experimental and observational testing.

Glossary of Curriculum Components

Overview— The content in this document provides an overview of the pacing and concepts covered in a subject for the year.

TEKS – Texas Essential Knowledge and Skills (TEKS) are the state standards for what students should know and be able to do.

Unit Overview – The unit overview provides a brief description of the concepts covered in each unit.

Concept – A subtopic of the main topic of the unit.

Success Criteria—a description of what it looks like to be successful in this concept.

Competency—Standards-Based Grading communicates students’ understanding of the Texas Essentials Knowledge and Skills (TEKS). Using the TEKS, teachers developed grade-level competencies to communicate student progress in the Standards-Based gradebook. The competencies are the same for each grade-level content area (i.e. 1st grade math) across the district. Teachers report students’ progress on the competencies using learning progressions.

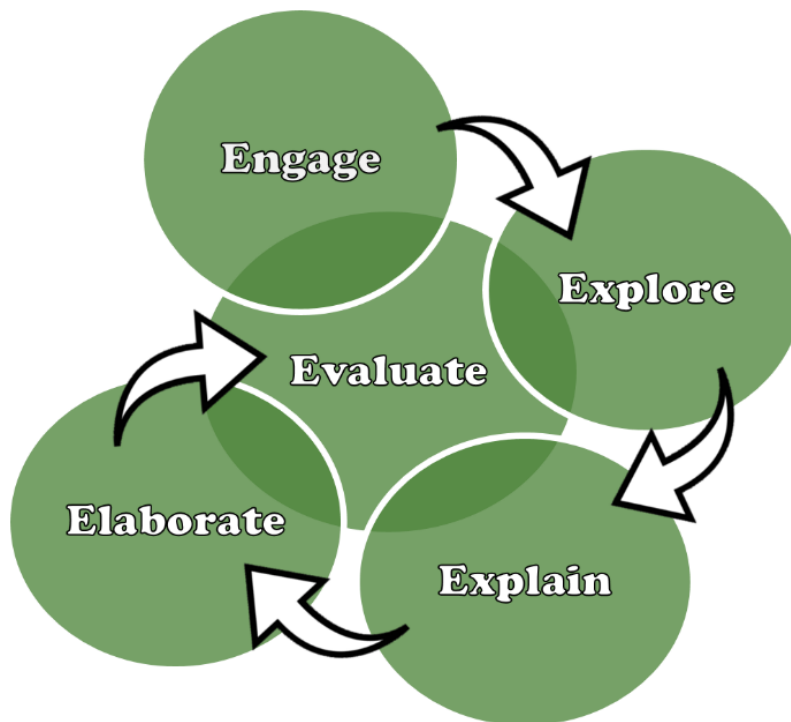
Parent Resources

The following resources provide parents with ideas to support students’ understanding. For sites that are password protected, your child will receive log-in information through their campus.

Resource	How it supports parents and students
Pebble Go	This resource provides access to books for reading and learning more about concepts in the science content.
Brainpop	This resource provides access to videos and games.
Britannica School	This is an information resource for elementary students. It has encyclopedia articles, multimedia, primary sources, games, and other learning resources that support student learning.
Ebsco Host	This online reference system serves all content areas.
World Book	World Book contains thousands of informational articles with stunning illustrations, videos, interactive maps, and activities.
National Geographic Kids	This resource is a fact-filled, fast-paced magazine created especially for ages 6 and up. It has an award-winning combination of photos, facts, and fun.

Instructional Model

The structures, guidelines or model in which students engage in a particular content that ensures understanding of that content.



The 5E Model is an inquiry-based approach to teaching and learning science concepts over time. It is research-based and emphasizes that children build conceptual understanding and make meaning through experiences. Each “E” represents a stage in a learning cycle.

- **Engage**: The engage phase sparks student curiosity and assesses prerequisite knowledge or misconceptions.
- **Explore**: Students begin to interact with the content through hands-on explorations and investigations.
- **Explain**: The explain phase connects the hands-on experience to the instruction of the concept using grade level appropriate definitions and labels.
- **Elaborate**: Elaboration applies the concept in a new context through problem solving or an additional hands-on experience.
- **Evaluate**: Evaluation of student understanding and progress occurs throughout the learning cycle.