

7th Grade Science Overview 2022 - 2023

This document is designed to 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.

7.1(A) demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency-approved safety standards.

7.1(B) practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials.

7.2(A) plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology.

7.2(B) design and implement experimental investigations by making observations, asking well defined questions, formulating testable hypotheses, and using appropriate equipment and technology.

7.2(C) collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.

7.2(D) construct tables and graphs, using repeated trials and means, to organize data and identify patterns.

7.2(E) analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.

7.3(A) analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing so as to encourage critical thinking by the student.

7.3(B) use models to represent aspects of the natural world such as human body systems and plant and animal cells.

7.3(C) identify advantages and limitations of models such as size, scale, and properties, and materials.

7.3(D) relate the impact of research on scientific thought and society, including the history of science and contributions of scientists as related to the content.

7.4(A) use appropriate tools, including life science models, hand lenses, stereoscopes, microscopes, beakers, Petri dishes, microscope slides, graduated cylinders, test tubes, meter sticks, metric rulers, metric tape measures, timing devices, hot plates, balances, thermometers, calculators, water test kits, computers, temperature and pH probes,

collecting nets, insect traps, globes, digital cameras, journals/notebooks and other necessary equipment to collect, record, and analyze information.

7.4(B) use preventative safety equipment, including chemical splash goggles, aprons, and gloves, and be prepared to use emergency safety equipment, including an eye/face wash, a fire blanket, and a fire extinguisher.

Grading Period 1

Unit 1: Cell Structure and Function

Estimated Date Range: Aug. 10 – Sept. 26

Estimated Time Frame: 32 days

Unit Overview:

Students will learn how to explain the components of the scientific theory of cells: all organisms are composed of cells, all cells come from pre-existing cells, and cell are the basic unit of life. Students will learn the levels of organization to understand that the cell is the smallest unit in living organisms such as plant and animals. Finally, students will learn how to describe the structure and function of cell walls, vacuoles, chloroplasts and other cell organelles, and distinguish between plant and animal cell. Students will also review lab safety. Students will come to 7th grade with understanding of the difference between prokaryotic and eukaryotic cells, with the basic knowledge that the nucleus is the brain of the cell.

At home connections:

- Ask student what is a scientist and what do they do? Have students create a digital or paper interactive science notebooks where they identify and describe common laboratory tools such as microscope, tongs, safety goggles, balance, beaker, etc...
- Discuss the definition of the cell with students and work to explain the importance of cells to living organisms. Explain to students that we have cells on the inside and outside of our bodies. Adults and students can learn more about an introduction to cells at the Annenberg Learner link: [What is Life? A Closer Look](#).

Concepts within Unit #1 Link to TEA Middle School Science TEKS	Success Criteria for this concept
Concept #1: Safety 7.1A, 7.4B	<ul style="list-style-type: none"> • List and describe all the general safety rules regarding conduct, clothing, accidents, glassware, heating/fire, animals, etc. • Follow appropriate safety rules during laboratory/field investigations • Describe consequences of improper use of equipment and violation of the safety rules.
Concept #2: Cell Structure and Function 7.12C, 7.12D, 7.12D Competency 1- Scientific Investigations and Explanations Competency 2- Cell Structure and Function	<ul style="list-style-type: none"> • Identify and describe the organelles that make up plant and animal cells. (cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole). • Explain the function of the cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole • Describe the structure of the cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole

Unit 2: Heredity

Estimated Date Range: Sept. 27 – Oct. 7

Estimated Time Frame: 9 days

Unit Overview:

The students will compare offspring that is are produced asexually or sexually. The students will come away with the understanding that the heredity of traits passed on from one generation to the next are delivered through genetic material found in the chromosomes which are found in the nucleus. Prior to 7th grade, students have had instruction on inherited traits in 4th and 5th grade; a basic understanding that traits are passed from parent to offspring.

At home connections:

- Talk about animal traits with students. Different types of traits include wings, eye color, hair color, beaks, etc.. The type of trait is dependent upon the animal. If the family has a pet, you can discuss the traits of that animal. If the family does not have a pet, research can be done on the internet to locate pictures of animals. National Geographic Kids have information that highlights weird animal facts: [Weird, but True Animal Facts](#).

Concepts within Unit # 2 Link to TEA Middle School Science TEKS	Success Criteria for this concept
Concept #1: Asexual/Sexual Reproduction 7.14A, 7.14B Competency 1- Scientific Investigations and Explanations	<ul style="list-style-type: none"> • Explain the purpose of asexual reproduction. • Explain the purpose of sexual reproduction. • Describe how asexual reproduction results in uniform offspring. • Identify the advantages of asexual and sexual reproduction. • Compare the offspring of sexual and asexual reproduction. • Describe how traits are inherited from generation to generation.

Grading Period 2

Unit 2: Heredity (continued)

Estimated Date Range: Oct. 11 – Oct. 28

Estimated Time Frame: 12 days

Concepts within Unit # 2 Link to TEA Middle School Science TEKS	Success Criteria for this concept
Concept #2: Heredity 7.14A, 7.14B Competency 1- Scientific Investigations and Explanations Competency 3- Heredity	<ul style="list-style-type: none"> • Identify inherited traits that determine the appearance in organisms. (ex: earlobes, widow’s peak, hitchhiker’s thumb, rolling tongue, etc.) • Describe how traits are inherited from generation to generation. • Define heredity as the passage of genetic instruction from one generation to the next generation.

Unit 3: Human Body Systems

Estimated Date Range: Nov. 1 – Dec. 16

Estimated Time Frame: 29 days

Unit Overview:

Students will learn the structures and functions of the human body systems, and how organisms respond to external and internal stimuli. Classroom activities and laboratory experiences will help students make connections between the different systems and their interactions together, forces that affect the circulation of blood, and the functions of a cell compared to the functions of an organism.

At home connections:

- Ask students how many body systems they can name. Then begin a conversation about the main function of each body system. Examples can include the Respiratory system and how its responsible for helping people and animals breathe (*have students inhale and exhale at different rates*), the Circulatory system is responsible for transporting oxygen, nutrients, and blood away from and towards the heart (*discuss leg cramps*), and the Muscular/Skeletal system and how it provides the body with support, stability and movement (*show students where they have muscles in the body, have them tighten their biceps and triceps, or explain where bones are located in the body*).

<p>Concepts within Unit # 3 Link to TEA Middle School Science TEKS</p>	<p>Success Criteria for this concept</p>
<p>Concept: #1: Body Systems 7.6A, 7.7A, 7.7B, 7.12B, 7.12E, 7.13A, 7.13B</p> <p>Competency 1- Scientific Investigations and Explanations Competency 4- Human Body Systems</p>	<ul style="list-style-type: none"> • Specify the correct order for the levels of organization. • Given a scenario, I will identify the body system, or the main function being described. • Compare the similarities between cell organelles and organ systems • Investigate the different responses of organisms to an external stimulus in a lab setting.

Grading Period 3

Unit 4: Natural Selection and Adaptations

Estimated Date Range: Jan. 5 – Feb. 6

Estimated Time Frame: 22 days

Unit Overview:

Students will learn the processes of how traits change through generations, understand how structural changes can be caused by their environments, and learn how organisms respond to internal and external stimuli to maintain balance. They will use a dichotomous key to examine and identify an organism. Students will learn that living conditions in microhabitats and biomes vary, and that the organisms who live there have external and internal adaptations and behaviors that enhance their survival, under those conditions.

Students will also identify some changes in genetic traits that have occurred over several generations through natural selection. In previous grades students explored how adaptations enable organisms to survive in the environment such as comparing birds' beaks and leaves on plants. Students observed the way organisms live and survive in their ecosystem by interacting with the living and non-living elements and compared 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. Students learned the foundation for understanding dichotomous keys in 6th grade when they recognize that the broadest taxonomic classification of living organisms is divided into currently recognized Domains.

At home connections:

- Adults and students can discuss farming and different types of crops produced to help understand natural selection and adaptations. Certain plants can live in tropical areas such as banana plants. Whereas, there are plants that thrive in the desert such as cacti. Take time to check out books on plants, beans, or snakes from a local library to read about their different habitats and what adaptations they must exist for them to live in different climates or locations. Or, search animals and plants on the internet.

Concepts within Unit # 4 Link to TEA Middle School Science TEKS	Success Criteria for this concept
Concept #1: Adaptations 7.11A, 7.11B, 7.11C, 7.12C Competency 1- Scientific Investigations and Explanations Competency 5- Natural Selection	<ul style="list-style-type: none"> • Provide examples of mutations that are harmful and some that are beneficial. • Describe observations that Darwin made in the Galapagos Islands. • Differentiate between natural selection and selective breeding.
Concept #2: Response to Stimuli 7.13A, 7.13B Competency 1- Scientific Investigations and Explanations	<ul style="list-style-type: none"> • Define external stimulus. • Explain how an organism responds to external stimuli. • Describe types of responses to external stimuli. • Describe responses of organisms to external stimuli due to the environment.

Unit 5: Biodiversity

Estimated Date Range: Feb. 7 – Mar. 10

Estimated Time Frame: 22 days

Unit Overview:

Students will learn how biodiversity supports sustainability due to variations within populations, and study how the process of ecological success creates a new ecosystem or restores an ecosystem after a disturbance or significant change. In 5th grade students were introduced to the concept of living organisms effecting the environment but did not see this concept in 6th grade. Succession will be a new concept; however, the student is familiar with basic weathering, erosion, and deposition from previous grades.

At home connections:

- Locate a safe area outdoors, away from moving cars and other potential dangers. Use a hula hoop or object of similar size. A piece of string that is long enough to mark a section of the ground would work also. Help students set up the safe area outdoors to observe animals in a specified area. Have the student create a data table to record what is seen in the identified area. Observations can made on types of grass, dirt, animals, insects, etc... Take pictures of the identified area at varies times can also be done and added as data. National Geographic Kids has an activity which outlines how to conduct this type of Biodiversity observation with explanations, pictures of the set up, and possible materials: [Try This! Hula-Hoop Observation](#).

<p>Concepts within Unit # 5 Link to TEA Middle School Science TEKS</p>	<p>Success Criteria for this concept</p>
<p>Concept #1: Organisms in the Environment 7.10A, 7.10B</p> <p>Competency 1- Scientific Investigations and Explanations Competency 6- Biodiversity</p>	<ul style="list-style-type: none"> • Describe characteristics of a stable ecosystem. • Compare the sustainability of two different ecosystems based on their levels of biodiversity. • Explain how biodiversity impacts the sustainability of an ecosystem.
<p>Concept #2: Ecological Succession 7.10C</p> <p>Competency 1- Scientific Investigations and Explanations Competency 7- Ecological Succession</p>	<ul style="list-style-type: none"> • Compare the difference between primary and secondary succession. • Describe and provide real world examples of situation where ecological succession has occurred. • Describe the changes over time in a microhabitat (ex. front yard).

Grading Period 4

Unit 6: Space Exploration and Ecology

Estimated Date Range: Mar. 20 – Apr.24

Estimated Time Frame: 24 days

Unit Overview:

Students will describe how energy is transformed from one form to another through photosynthesis. In addition, student will work to diagram and explain the flow of energy through food chains, food webs, and energy pyramids. Students will analyze and identify characteristics in space that allow life to exist and what accommodations needed for manned space exploration.

At home connections:

- Adults and students can an interactive journey through Space by visiting the Exploratorium website’s link that includes interactive content on people with significant contributions to Space travel, tools used to understand activity outside of our universe, the location of the Hubble Telescope and ideas scientists have for future space explorations. The site also has live webcasts from the Hubble Telescope where one can manipulate the different types of magnifications: [HUBBLE: a view to the edge of science](#).
- Ask students to explain the difference between a predator and a prey. After hearing the student’s, explanation, work to clear up any misconceptions and begin to identify predator / prey relationships that exist in the environment near the home. Expand a bit further and talk about predator / prey relationships with animals and organisms within Texas and possibly consider the interaction among animals in the wild such as a dessert, jungle, or mountain area. Talk to students about why it is important to consume food and gain energy. Food chains and food webs can be assembled (using pictures) or reviewed online to determine energy flow in an ecosystem.

Concepts within Unit # 6 Link to TEA Middle School Science TEKS	Success Criteria for this concept
Concept #1: Space Exploration 7.9A, 7.9B	<ul style="list-style-type: none"> • Explain how water, the sun, and atmosphere play a role in allowing life to exist. • Identify the accommodations that allow for manned space exploration.
Concept #2: Ecology 7.5B Competency 1- Scientific Investigations and Explanations Competency 8- Flow of Energy	<ul style="list-style-type: none"> • Identify producer and consumers in any given food chain or pyramid. • Use the 10% rule to determine the energy at the next trophic level. • Illustrate food chains, food webs, and energy pyramids. • Explain the flow of energy through food chains, food webs, and energy pyramids.
Concept #3: Energy Transformations 7.5A Competency 1- Scientific Investigations and Explanations	<ul style="list-style-type: none"> • Explain how radiant energy transforms to chemical energy through photosynthesis. • Identify where radiant energy comes from. • Describe the process of photosynthesis.

Unit 7: Natural and Human Events

Estimated Date Range: Apr. 25 – May 25

Estimated Time Frame: 23 days

Unit Overview:

Students will understand that the Earth, especially its surface, is constantly changing because of a variety of forces. Students should be exposed to various catastrophic events such as but not limited to hurricane, tornado, earthquakes, fires, drought, flood, volcanoes, tsunami, and their effect on an ecosystem. Catastrophic events can also shape and restructure the environment through the force and motion evident in them. Events include weather events, geological events, and the impacts of events on ecosystems. Students will be able to make predictions using information or data from, but not limited to local and national weather information, weather apps, newspaper, and television reports. Since our state has a wide variety of eco-regions, students should know how different kinds of forces affect our state--hurricanes and flooding in the Gulf region, tornadoes in the panhandle, droughts in West Texas, etc. Students should also know that human activity can affect ground and surface water.

At home connections:

- Have student gather with you to watch local news channel when they are reporting on the weather. Discuss any storms that have been reported that may come close to your area. Have the students do research on the types of catastrophic events that occur in or near your area in the past 5 years. Ask the student what happens to the community, buildings, and ecosystems when catastrophic events occur?

<p>Concepts within Unit # 7 Link to TEA Middle School Science TEKS</p>	<p>Success Criteria for this concept</p>
<p>Concept #1: Impact of Natural Events on Ecosystems 7.8A, 7.8B</p> <p>Competency 1- Scientific Investigations and Explanations Competency 9- Impact of Catastrophic events</p>	<ul style="list-style-type: none"> • Describe different types of catastrophic events. • Predict the impact of a catastrophic event on the Earth. • Describe real world catastrophic event that impact my local surrounding.
<p>Concept #2: Human Impact of Ground Water 7.8C</p> <p>Competency 1- Scientific Investigations and Explanations</p>	<ul style="list-style-type: none"> • Identify ground water and surface water in a watershed. • Construct a model of a watershed. • Model how humans affect our water supply.

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.

Learning Progression- A learning progression is comprised of four proficiency levels (developing, progressing, proficient, and advanced). Each proficiency level in the progression defines the knowledge and skills that students will master on their pathway to proficiency. Teachers will report student’s current level of understanding of the competencies using the Learning Progressions.

Proficient- A mark of Proficient (PF) means the student meets the grade-level expectations for the competency.

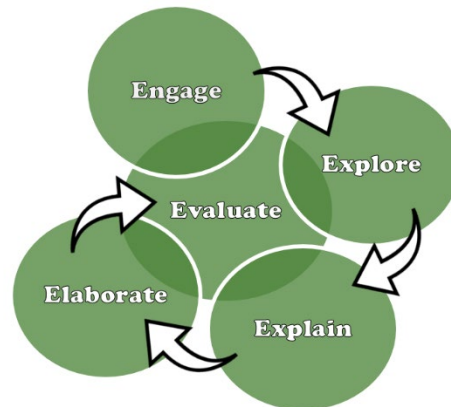
Parent Resources

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

Resource	How it supports parent and students
https://www.fortbendisd.com/Page/92908	This is the state adopted textbook for grade 7 science. Click on the link for directions on accessing the textbook.
Khan Academy	This resource contains practice exercises, instructional videos, and a personalized learning dashboard where students can learn and study at their own pace.
Texas Gateways	This online resource contains lessons, videos, and interactive activities for various science concepts.
NSTA – Science Resources for Parents	This online resource has science activities for middle school students and their families to help support learning at home.
National Geographic Kids	This resource is a fact-filled, magazine created especially for ages 6 – 14. The students go on an amazing adventures in science, nature, culture, archaeology, and space.

Instructional Model

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



- It is based on the constructivist learning theory, which states that learners build or construct new ideas based on their experiences.
- It represents a recursive cycle of cognitive stages in inquiry-based learning.
- Stages are intended to be completed sequentially; however, you may revisit a stage more than once during the 5E process.
- It capitalizes on hands-on activities, students' curiosity, and academic discussion among students.
- Typically, **NOT** all five stages would be experienced in a single classroom period, but all five would certainly be embedded in a series of lessons that would develop a particular concept, lasting days or weeks.
- It should be used to develop conceptual understanding over time with each stage building on the previous stage, rather than serve as a series of activities.
- It should be used in conjunction with other instructional strategies such as writing in science, graphing, graphic organizers, collaboration, etc.