Grade 6 Science Advanced Academics Course (AAC)
Overview
2024 – 2025

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.

The process standards describe ways in which students are expected to engage in the content. The Scientific and Engineering Practices (SEPs) describe practices that students need to do in the classroom in order to learn the content. The Recurring Themes and Concepts (RTCs) describe how students need to think about the content in order to learn it.

Scientific and Engineering Practices

6.1A Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.
6.1B Use scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems.
6.1C Use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards.
6.1D Use appropriate tools such as graduated cylinders, metric rulers, periodic tables, balances, scales, thermometers, temperature probes, laboratory ware, timing devices, pH indicators, hot plates, models, microscopes, slides, life science models, petri dishes, dissecting kits, magnets, spring scales or force sensors, tools that model wave behavior, satellite images, hand lenses, and lab notebooks or journals.
6.1E Collect quantitative data using the International System of Units (SI) and qualitative data as evidence.
6.1F Construct appropriate tables, graphs, maps, and charts using repeated trials and means to organize data.
6.1G Develop and use models to represent phenomena, systems, processes, or solutions to engineering problems.
6.1H Distinguish between scientific hypotheses, theories, and laws.
6.2A Identify advantages and limitations of models such as their size, properties, and materials.
6.2B Analyze data by identifying any significant descriptive statistical features, patterns, sources of error, or limitations.
6.2C Use mathematical calculations to assess quantitative relationships in data.
6.2D Evaluate experimental and engineering designs.
6.3A Develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories.
6.3B Communicate explanations and solutions individually and collaboratively in a variety of settings and formats.
6.3C Engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.
6.4A Relate the impact of past and current research on scientific thought and society, including the process of science, cost-benefit analysis, and contributions of diverse scientists as related to the content.
6.4B Make informed decisions by evaluating evidence from multiple appropriate sources to assess the credibility, accuracy, cost-effectiveness, and methods used.

6.4C Research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field to investigate STEM careers.

Recurring Themes and Concepts

6.5A Identify and apply patterns to understand and connect scientific phenomena or to design solutions.
6.5B Identify and investigate cause-and-effect relationships to explain scientific phenomena or analyze problems.
6.5C Analyze how differences in scale, proportion, or quantity affect a system's structure or performance.
6.5D Examine and model the parts of a system and their interdependence in the function of the system.
6.5E Analyze and explain how energy flows and matter cycles through systems and how energy and matter are conserved through a variety of systems.
6.5F Analyze and explain the complementary relationship between the structure and function of objects, organisms, and systems.
6.5G Analyze and explain how factors or conditions impact stability and change in objects, organisms, and systems.

Grading Period 1

Unit 1: Matter

Estimated Date Range: August 8 – September 11
Estimated Time Frame: 24 days

Unit Overview:

In this unit, students will learn to compare solids, liquids, and gases in terms of their structure, shape, volume, and the kinetic energy of their atoms and molecules. They will investigate how these states of matter differ and what causes these differences. Students will also explore the periodic table, identifying elements as metals, nonmetals, metalloids, and rare Earth elements based on their physical properties. They will understand the significance of these elements in modern life and how their unique properties make them essential for various applications. Additionally, students will compare the density of different substances relative to various fluids, deepening their understanding of how density affects buoyancy and other physical phenomena. Furthermore, students will investigate the physical properties of matter to distinguish between pure substances, homogeneous mixtures (solutions), and heterogeneous mixtures. They will learn to identify the formation of a new substance through evidence of chemical changes, such as gas production, changes in thermal energy, precipitate formation, and color change. Through hands-on experiments and interactive activities, students will gain a comprehensive understanding of matter's physical and chemical properties and how these properties are used to classify and identify different substances. This unit will provide a solid foundation in the principles of chemistry and physical science, preparing students for more advanced concepts in future studies.

At home connections:

- Compare Solids, Liquids, and Gases -
  - Freeze water to make ice cubes. Compare the rigid structure of the ice to the fluid water.
  - Pour water from one container to another. Observe how it takes the shape of the new container.
  - Inflate a balloon and notice how the gas inside takes the shape of the balloon and fills the space.

- Investigate the Physical Properties –
  - Dissolve sugar or salt in water and observe how it creates a solution where the solute is evenly distributed.
  - Mix sand and water and observe the different layers and separation of components.

- Identify Elements on the Periodic Table
  - Use kitchen utensils made of aluminum or copper and discuss their properties.
  - Use a piece of charcoal (carbon) and compare its properties to metals.
  - Discuss the use of silicon in electronics and its metalloid properties

- Density Relative to Various Fluids –
  - Use objects like a rock, a piece of wood, and a plastic toy. Observe which objects float or sink when placed in water.
  - Layer the liquids in a tall glass and observe how they separate into layers based on density.

- Evidence of a chemical change –
  - Mix baking soda and water and observe the bubbling and fizzing.

Concepts within Unit #1 Link to TEKS	Success Criteria for this concept *Students can…*
Concept #1: Safety (ongoing; embedded throughout the course) 6.1B	• locate and describe the use of safety equipment. • follow all the safety rules during laboratory/field investigations. • use laboratory equipment in an appropriate manner. • participate in the conservation and disposal of materials.
Concept #2: Physical Properties 6.6A, 6.6B, 6.6C, 6.6D	• describe the atomic structure of solids, liquids, and gases. • identify and compare the shape and volume of solids, liquids, and gases. • explain how kinetic energy varies among solids, liquids, and gases. • distinguish between pure substances, homogeneous mixtures, and heterogeneous mixtures based on their physical properties. • measure the densities of different fluids accurately. • identify patterns in the densities of various fluids. • explain how density differences affect the behavior and performance of a system. • use tools to test and describe the physical properties of elements. • correctly classify elements as metals, nonmetals, or metalloids based on their properties. • explain the importance of different elements, including rare earth elements, in modern life.
Concept #3: Evidence of Chemical Changes 6.6E	• interpret data to locate rare earth elements on the periodic table. • describe the unique properties of rare earth elements that determine their position on the periodic table. • explain the role and significance of rare earth elements in modern technology and industry using specific examples. • identify signs of a chemical change, such as gas production, temperature change, precipitate formation, or color change. • provide examples of chemical changes based on observed evidence. • use the observed signs to explain why a chemical change has occurred and distinguish it from a physical change.

Unit 2: Forces

Estimated Date Range: September 12 – October 9
Estimated Time Frame: 18 days

Unit Overview:
This unit focuses on understanding the various forces that act on objects and how these forces influence motion. Students will begin by exploring different types of forces, including gravity, friction, magnetism, applied forces, and normal forces. Through hands-on activities and real-world applications, such as observing how friction affects the movement of objects on different surfaces or how magnets attract and repel, students will develop a comprehensive understanding of how these forces operate. Additionally, the unit will cover the concept of net force, teaching students to calculate the total force acting on an object in both horizontal and vertical directions using diagrams. They will learn to distinguish between balanced forces, which result in no change in motion, and unbalanced forces, which cause objects to accelerate.

In the latter part of the unit, students will delve into Newton's Third Law of Motion, which states that for every action, there is an equal and opposite reaction. By identifying simultaneous force pairs in various scenarios, such as a rocket launch or a swimmer pushing off the wall, students will gain insight into the interactions between objects. These lessons will be reinforced through

practical activities and visual aids, ensuring that students can identify and explain the fundamental principles governing forces and motion. This integrated approach not only solidifies their understanding of physical science concepts but also enhances their problem-solving skills through the application of these principles in real-world contexts.

At home connections:

- Drop different objects (e.g., a feather, a coin, and a small ball) from the same height and observe how gravity pulls them toward the ground. Talk about how gravity affects everything around us, from keeping our feet on the ground to making the planets orbit the sun.
- Slide a toy car on different surfaces like carpet, tile, and sandpaper. Measure how far the car travels on each surface. Explain how friction works to slow down the car and how it differs on various surfaces.
- Use a magnet to pick up paper clips or other small metal objects. Experiment with moving the magnet closer and farther away to see how the magnetic force changes. Discuss how magnetism is used in everyday items, such as refrigerator magnets and electronic devices.
- Activity Materials: Use a ruler, string, and small weights or objects.
    - Create simple force diagrams at home. For example, tie a string to an object and pull it horizontally with a small weight hanging vertically. Draw the forces acting on the object and calculate the net force.
    - Balanced Forces: Show how the forces are equal and opposite, resulting in no movement (net force of zero).
    - Unbalanced Forces: Show how a stronger pull in one direction causes movement, resulting in a net force that is not zero.
- Inflate a balloon and release it without tying the end. Observe how the balloon flies in one direction while the air is expelled in the opposite direction. Explain that the force of the air escaping (action) and the force pushing the balloon forward (reaction) are equal and opposite.
- Sit on a wheeled chair and push off a wall or another person sitting on a wheeled chair. Observe how both move in opposite directions. Discuss how pushing against the wall or person results in an equal and opposite reaction, demonstrating Newton's Third Law.

Concepts within Unit # 2 **Link to TEKS**	**Success Criteria for this concept** *Students can…*
Concept #1: Forces 6.7A, 6.7B	• identify different types of forces such as gravity, friction, magnetism, applied forces, and normal forces. • explain how gravity pulls objects toward the Earth and give examples of its effects. • describe how friction works to slow down or stop moving objects on different surfaces. • demonstrate how magnets attract and repel certain objects and explain how magnetism works. • explain what applied forces are and give examples of how we use them in everyday life. • describe normal forces and explain how they support objects at rest. • draw force diagrams to show all the forces acting on an object. • calculate the net force acting on an object in both horizontal and vertical directions. • determine if the forces acting on an object are balanced or unbalanced by examining the net force. • predict the motion of an object based on whether the forces are balanced or unbalanced
Concept #2: Newton's Third Law of Motion 6.7C	• identify action-reaction force pairs in different scenarios, such as pushing a wall or a rocket launch. • explain how action and reaction forces are equal in magnitude and opposite in direction.

	• use real-world examples to demonstrate and explain Newton's Third Law of Motion.

Grading Period 2

Unit 3: Energy

Estimated Date Range: October 16 – November 22
Estimated Time Frame: 26 days

Unit Overview:
This unit focuses on the various forms of energy and the principles governing their behavior and transformation. Students will compare and contrast gravitational, elastic, and chemical potential energies with kinetic energy, understanding how energy is stored and utilized. By examining real-world examples such as a stretched rubber band (elastic potential energy), a raised object (gravitational potential energy), and stored energy in food (chemical potential energy), students will learn how these potential energies differ from kinetic energy, which is the energy of motion. This foundational knowledge will enable students to appreciate how energy powers the world around them, from simple machines to complex biological processes.

In addition, students will explore the conservation of energy and how it transfers and transforms within various systems. They will describe energy conservation in electrical circuits, how energy flows through food webs, the thrilling energy transformations in amusement park rides, and the energy conversion during photosynthesis. Understanding these concepts will help students grasp the fundamental law that energy cannot be created or destroyed, only transferred or transformed. Furthermore, students will delve into how energy is transferred through transverse and longitudinal waves, gaining insight into the mechanisms behind waves such as sound, light, and seismic activity. Through practical experiments and demonstrations, students will learn how these waves propagate and carry energy, deepening their understanding of energy transfer in different contexts.

At home connections:
- Drop a book from different heights. Explain how the higher the book is raised, the more gravitational potential energy it has. When it falls, this energy converts to kinetic energy.
- Stretch a rubber band and then release it. Discuss how stretching the rubber band stores elastic potential energy, which converts to kinetic energy when the band is released.
- Observe a burning candle. Explain how the wax in the candle stores chemical potential energy, which is released as light and heat (kinetic energy) when the candle burns.
- Roll a ball down a ramp. Discuss how the ball has kinetic energy as it moves down the ramp and how this energy increases with speed.
- Watch a video of a roller coaster ride. Explain how the roller coaster car has maximum gravitational potential energy at the top of the hill, which transforms into kinetic energy as it descends and changes back to potential energy as it climbs again.
- Create waves in a rope or slinky. Explain how the up-and-down motion of the rope creates transverse waves, where the wave travels perpendicular to the direction of the motion.
- Compress and release a slinky. Explain how the compression and rarefaction of the slinky creates longitudinal waves, where the wave travels in the same direction as the motion.
- Shine a flashlight through different materials (e.g., clear plastic, frosted glass). Explain how light waves are transverse waves that can transfer energy through different media, demonstrating the properties of light waves.

Concepts within Unit # 3 Link to TEKS	**Success Criteria for this concept** *Students can…*
Concept #1: Kinetic and Potential Energy 6.8A	• define and give examples of gravitational, elastic, and chemical potential energies. • explain how gravitational potential energy depends on the height and mass of an object. • describe how elastic potential energy is stored in stretched or compressed objects like rubber bands or springs. • identify chemical potential energy in substances like food or fuels and explain how it is released.

	• explain what kinetic energy is and how it relates to the motion of objects. • compare and contrast potential energy (gravitational, elastic, and chemical) with kinetic energy.
Concept #2: Energy Conservation 6.8B	• describe how energy is transferred and transformed in electrical circuits, such as converting electrical energy into light and heat. • explain how energy flows through a food web, starting from the sun and moving through plants, herbivores, and carnivores. • describe the energy transformations that occur in amusement park rides, such as the conversion between potential and kinetic energy. • explain how energy is captured and transformed in the process of photosynthesis in plants. • identify examples of the conservation of energy in various systems and describe how energy is neither created nor destroyed, only transformed, or transferred.
Concept #3: Waves 6.8C	• describe the characteristics of transverse waves and give examples, such as waves on a rope or light waves. • describe the characteristics of longitudinal waves and give examples, such as sound waves and compression waves in a slinky. • explain how energy is transferred through transverse waves, where the motion of the medium is perpendicular to the direction of the wave. • explain how energy is transferred through longitudinal waves, where the motion of the medium is parallel to the direction of the wave. • identify and explain examples of energy transfer through waves in everyday life, such as sound waves from musical instruments and light waves from a flashlight.

Unit 4: Seasons and Tides

Estimated Date Range: December 2 – December 20
Estimated Time Frame: 15 days

Unit Overview:

This unit explores the dynamic interactions between the Earth, Sun, and Moon, and how these relationships drive observable phenomena such as seasons and tides. Students will begin by modeling and illustrating the Earth's tilt and its revolution around the Sun, which leads to the changing seasons. Through hands-on activities and visual aids, students will learn how the tilt of the Earth's axis affects the angle and intensity of sunlight received at different times of the year, resulting in seasonal variations. They will also examine how the Earth's axial tilt and its orbit around the Sun cause variations in daylight hours and climate, reinforcing their understanding of why we experience different seasons.

The unit will then transition to describing and predicting the ocean tides caused by the gravitational forces exerted by the positions of the Earth, Sun, and Moon. Students will investigate daily tidal cycles as well as the more pronounced spring and neap tides that occur due to the alignment of these celestial bodies. By creating diagrams and simulations, students will visualize how the gravitational pull of the Moon and the Sun affects the Earth's oceans, leading to high and low tides. They will also learn to predict tidal patterns based on the lunar cycle and the relative positions of the Earth, Sun, and Moon. This comprehensive study will enable students to connect astronomical events with terrestrial phenomena, enhancing their understanding of the interconnectedness of Earth's systems.

At home connections:

Seasons

- Activity Materials: Lamp (Sun), a small ball (Earth), and markers to indicate the equator and poles.
- Mark the equator and poles on the ball. Tilt the ball at approximately 23.5 degrees. Place the ball at different points around the lamp to represent different positions in the Earth's orbit (spring, summer, autumn, and winter).
- Show how the tilt of the ball changes the intensity and angle of the light hitting different parts of the ball. Discuss how this relates to warmer and cooler seasons in different hemispheres.

Tides

- Activity Materials: Large shallow dish, water, small balls (Earth, Moon, and Sun).
- Fill the dish with water to represent the ocean. Use the balls to represent the Earth, Moon, and Sun. Position the Moon and Sun relative to the Earth to show how their gravitational pulls cause the water level to rise (high tide) and fall (low tide).
- Explain how the gravitational forces of the Moon and Sun create tides on Earth. Discuss how the alignment of the Earth, Moon, and Sun during full and new moons causes higher high tides (spring tides) and lower high tides during the first and third quarters of the moon (neap tides).

Concepts within Unit # 4 Link to TEKS	**Success Criteria for this concept** *Students can…*
Concept #1: Seasons 6.9A	• explain why the Earth is tilted on its axis and how this tilt affects the Earth's climate and seasons. • model the Earth's orbit around the Sun and demonstrate how the axial tilt leads to different seasons. • illustrate how the angle of sunlight changes during the year, causing temperature variations and changes in daylight hours. • describe how the Earth's position in its orbit corresponds to the different seasons in both the Northern and Southern Hemispheres. • use models or simulations to show how the Earth's tilt and orbit cause the seasons to change.
Concept #2: Tides 6.9B	• describe how the gravitational pull of the Moon and the Sun affects the Earth's oceans and creates tides. • explain the difference between high and low tides and how they occur daily. • describe how the alignment of the Earth, Sun, and Moon during full and new moons creates spring tides with higher high tides and lower low tides. • describe how the positions of the Earth, Sun, and Moon during the first and third quarters of the moon create neap tides with lower high tides and higher low tides. • predict when spring and neap tides will occur based on the phases of the moon and the relative positions of the Earth, Sun, and Moon. • use diagrams or models to illustrate how the positions of the Earth, Sun, and Moon affect tidal patterns.

Grading Period 3

Unit 5: The Earth

Estimated Date Range: January 9 – February 7
Estimated Time Frame: 21 days

Unit Overview:
In this unit, students will explore the different spheres of the Earth and their interactions, as well as the structure and composition of our planet. They will begin by differentiating between the biosphere, hydrosphere, atmosphere, and geosphere, identifying the unique components and characteristics of each system. Through engaging activities and visual aids, students will understand how these systems interact and support life on Earth. For example, they will study how water cycles through the hydrosphere, supports life in the biosphere, and interacts with the atmosphere and geosphere. By recognizing the interconnectedness of these systems, students will gain a holistic understanding of Earth's environment and the processes that sustain it.
Students will also delve into the structure of the Earth by modeling and describing its layers, including the inner core, outer core, mantle, and crust. They will examine the composition and properties of each layer, understanding how these layers contribute to Earth's geologic activity. This foundational knowledge will be further enriched by studying the rock cycle, where students will describe how metamorphic, igneous, and sedimentary rocks form and change through geologic processes such as cooling, erosion, and heat and pressure. This unit will provide students with a comprehensive understanding of Earth's systems and geological processes, highlighting the complexity and beauty of our planet's inner workings.

At home connections:
Water Cycle

- Activity Materials: Ziplock bag, water, blue food coloring, marker, tape
- Fill a Ziplock bag with a small amount of water and add a few drops of blue food coloring. Seal the bag and tape it to a sunny window. Watch how the water evaporates, condenses, and precipitates within the bag.
- Explain how this small-scale model demonstrates the interaction between the hydrosphere and atmosphere. Discuss how these processes affect the biosphere and geosphere.

Earth Model

- Activity Materials: Play-Doh in different colors
- Use different colors of Play-Doh to create a model of the Earth’s layers. Roll a small ball for the inner core, surround it with another color for the outer core, add a thicker layer for the mantle, and finish with a thin layer for the crust.
- Discuss the composition and characteristics of each layer. Talk about how the heat from the inner layers affects the movement of the mantle and the crust.

Rock Cycle

- Activity Materials: Crayons, grater, aluminum foil, iron
- Grate the crayons to represent sediments. Press the crayon shavings together to simulate sedimentary rock. Wrap the shavings in aluminum foil and apply heat and pressure with an iron to simulate metamorphic rock. Finally, melt the crayon shavings and allow them to cool to represent igneous rock.
- Use this activity to explain each step of the rock cycle and how rocks can transform from one type to another through various geological processes.

Concepts within Unit # 5 Link to TEKS	**Success Criteria for this concept** *Students can…*
Concept #1: Earth’s Spheres 6.10A	• define the biosphere, hydrosphere, atmosphere, and geosphere. • identify examples of each system in the natural environment (e.g., plants and animals for the biosphere, lakes, and rivers for the hydrosphere). • explain how these systems interact with each other (e.g., how water from the hydrosphere supports life in the biosphere).

	• describe the components and characteristics of each system. • use observations from nature or experiments to illustrate how the biosphere, hydrosphere, atmosphere, and geosphere are interconnected
Concept #2: Earth's Layers 6.10B	• name the four main layers of the Earth: inner core, outer core, mantle, and crust. • describe the characteristics and composition of each layer. • explain the role of each layer in Earth's structure and geologic activity. • create a model of the Earth's layers using various materials. • use the model to demonstrate and explain the properties and significance of each layer.
Concept #3: The Rock Cycle 6.10C	• define metamorphic, igneous, and sedimentary rocks. • describe the processes that form each type of rock (e.g., cooling of magma for igneous rocks, compression of sediments for sedimentary rocks, heat, and pressure for metamorphic rocks). • explain the rock cycle and how rocks can transform from one type to another. • identify examples of each type of rock and describe their characteristics. • use models or experiments to demonstrate the processes involved in the rock cycle.

Unit 6: Resource Management

Estimated Date Range: February 10 – March 7

Estimated Time Frame: 17 days

Unit Overview:

In this unit, students will investigate the critical importance of resource management in addressing global challenges such as energy consumption, poverty, malnutrition, and environmental pollution. They will conduct research and gather data to understand how effective management of natural resources can lead to significant improvements in these areas. Students will explore case studies and real-world examples to see how different countries and communities are implementing resource management strategies to enhance energy efficiency, reduce pollution, and improve living conditions. By analyzing these examples, students will gain insight into the interconnectedness of resource management and global well-being, understanding how sustainable practices can mitigate the adverse effects of resource depletion and environmental degradation.

Furthermore, the unit will delve into the roles of conservation, increased efficiency, and technological innovation in managing air, water, soil, and energy resources. Students will learn about various conservation techniques and how they can help preserve natural resources for future generations. They will explore the concept of increased efficiency in resource usage, including how simple changes in everyday activities can lead to substantial reductions in resource consumption. Additionally, students will investigate the role of technology in resource management, examining how advancements in renewable energy, waste treatment, and water purification can lead to more sustainable practices.

At home connections:

- Conduct an energy audit of your home by reviewing recent energy bills and identifying the main sources of energy consumption (e.g., heating, cooling, appliances, lighting). Make a list of appliances and estimate their energy usage. Discuss how reducing energy consumption at home can help decrease overall energy demand and lower pollution. Talk about how efficient use of energy resources can contribute to global efforts in reducing poverty and malnutrition by making energy more affordable and accessible. Explore ways to save energy, such as using energy-efficient appliances, turning off lights when not in use, and reducing heating and cooling needs.

- Track your household's water usage for a week. Use a timer to measure the length of showers and keep a log of other water-related activities such as watering plants, washing dishes, and doing laundry. Compare this to the water bills. Discuss how conserving water helps manage this critical resource, reducing strain on water supplies and lowering the risk of water scarcity. Talk about how access to clean water is vital for health and well-being, impacting global efforts to

reduce poverty and malnutrition. Challenge your family to reduce water usage by implementing water-saving techniques like shorter showers, fixing leaks, and using water-efficient appliances.

Concepts within Unit # 6 Link to TEKS	**Success Criteria for this concept** *Students can…*
Concept #1: Air and Water Resources 6.11A, 6.11B	• research and identify examples of resource management practices that help reduce air pollution. • research and identify examples of resource management practices that help reduce water pollution. • describe how reducing air and water pollution through resource management benefits the environment and human health. • provide real-world examples and case studies that show the positive impact of effective resource management on reducing air and water pollution. • define conservation and explain its importance in managing natural resources. • identify and explain ways to conserve air and water resources. • describe how increasing efficiency in resource use can reduce waste and pollution. • explain how technology can aid in the management of air resources. • explain how technology can aid in the management of water resources. • provide examples of how conservation, increased efficiency, and technology have successfully managed air and water resources in different communities or countries.
Concept #2: Soil and Energy Resources 6.11A, 6.11B	• research and identify examples of how resource management practices help reduce global energy consumption. • describe how effective resource management can reduce poverty by providing more efficient and affordable access to resources like energy and clean water. • research and explain how resource management can help combat malnutrition by ensuring sustainable agricultural practices and equitable food distribution. • provide real-world examples and case studies that show the positive impact of effective resource management on reducing global energy consumption, poverty, and malnutrition. • define conservation and explain its importance in managing soil and energy resources. • identify and explain ways to conserve soil resources. • describe how increasing efficiency in energy use can reduce waste and lower energy consumption. • explain how technology can aid in the management of soil resources. • explain how technology can aid in the management of energy resources. • provide examples of how conservation, increased efficiency, and technology have successfully managed soil and energy resources in different communities or countries.

Grading Period 4

Unit 7: Organisms – Living Things

Estimated Date Range: March 17 – May 6
Estimated Time Frame: 14 days

Unit Overview:
In this unit, students will explore the foundational concepts of cell theory and the basic characteristics of organisms, delving into how these principles define the building blocks of life. They will investigate the historical development of cell theory, tracing its evolution from early observations to modern discoveries. Students will learn that organisms are fundamentally composed of one or more cells, which are the smallest structural and functional units of life. Through interactive lessons and hands-on activities, students will examine the contributions of scientists such as Robert Hooke, Anton van Leeuwenhoek, and Theodor Schwann, among others, in shaping our understanding of cells and their significance in biology.
Furthermore, students will identify and compare the basic characteristics of organisms, including prokaryotic and eukaryotic distinctions, as well as the differences between unicellular and multicellular organisms. They will explore how these organisms vary in terms of their cellular structure, complexity, and modes of nutrition (autotrophic and heterotrophic). Through microscopy and virtual labs, students will observe and analyze cell structures and functions, distinguishing between different types of cells and understanding their roles in various organisms' biological processes. By the end of the unit, students will gain a comprehensive understanding of cell theory as the foundation of modern biology.

At home connections:
Cell Theory Timeline

- Research the key scientists involved in the development of cell theory, such as Robert Hooke, Anton van Leeuwenhoek, Matthias Schleiden, and Theodor Schwann.
- Create a timeline illustrating the major discoveries and contributions of each scientist to cell theory. Include dates, key findings (e.g., discovery of cells, cell structure observations), and any controversies or debates.
- Write brief descriptions or captions explaining each scientist's role in advancing cell theory and how their discoveries shaped our understanding of cells as the basic units of life.
- Present your timeline to family members or friends, discussing the significance of each discovery and how they collectively contributed to the development of modern cell biology.
- Reflect on how new technologies and tools continue to enhance our understanding of cell structure and function.

Organism Classification Scavenger Hunt

- Explore your backyard, local park, or nearby natural area to find examples of different organisms.
- Identify and classify organisms based on their basic characteristics, including prokaryotic vs. eukaryotic, unicellular vs. multicellular, and autotrophic vs. heterotrophic.
- Take notes or pictures of each organism you find, noting its characteristics and how it fits into each classification category.
- Create a list or table comparing the different types of organisms you identified, highlighting their similarities and differences in structure and function.
- Share your findings with family members or friends, discussing why each type of organism is classified as prokaryotic or eukaryotic, unicellular, or multicellular, and autotrophic or heterotrophic.

Concepts within Unit # 7 **Link to TEKS**	**Success Criteria for this concept** *Students can…*
Concept #1: Cell Theory 6.13A	• explain the contributions of key scientists (e.g., Robert Hooke, Anton van Leeuwenhoek, Matthias Schleiden, Theodor Schwann) to the development of cell theory. • create a timeline illustrating the chronological sequence of discoveries leading to the formulation of cell theory. • describe how cell theory states that organisms are composed of one or more cells, which come from pre-existing cells.

	• explain how cells are the basic unit of structure and function in living organisms. • identify and describe the basic components of a cell, including cell membrane, cytoplasm, and nucleus, and their functions.
Concept #2: Characteristics of Living Things 6.13B	• define and differentiate between prokaryotic and eukaryotic cells based on their structural characteristics. • classify organisms as unicellular or multicellular based on their organizational complexity. • explain the difference between autotrophic and heterotrophic organisms in terms of their nutritional requirements. • provide examples of prokaryotic organisms and describe their basic characteristics. • provide examples of eukaryotic organisms and describe their basic characteristics. • create a comparative chart or diagram illustrating the differences and similarities among prokaryotic and eukaryotic cells, unicellular and multicellular organisms, and autotrophic and heterotrophic organisms.

Unit 8: Interactions within an Ecosystem

Estimated Date Range: April 7 – May 29
Estimated Time Frame: 50 days

Unit Overview:
In this unit, students will explore the intricate relationships and dynamics within ecosystems, focusing on how organisms interact with both biotic and abiotic factors. They will investigate how organisms and populations depend on and compete for resources such as food, light, water, temperature range, and soil composition. Through hands-on investigations and research, students will learn about the interconnectedness of these factors and how they shape the distribution and abundance of organisms within ecosystems. They will analyze case studies and conduct experiments to understand how changes in biotic and abiotic factors can affect ecosystem health and stability.
Furthermore, students will delve into the hierarchical organization of ecosystems, from individual organisms to populations and communities. They will describe and give examples of different types of relationships between organisms, including predatory, competitive, and symbiotic relationships such as mutualism, parasitism, and commensalism. Through observations and simulations, students will explore how these relationships impact species survival, population dynamics, and the overall balance within ecosystems. They will also examine how variations within populations can provide advantages or disadvantages in adapting to environmental changes, emphasizing the role of natural selection and adaptation in ecosystem resilience and evolution. This unit will foster a deeper understanding of the complexity and interconnectedness of life within ecosystems.

At home connections:
Home Microhabitat Study

- Activity Materials: Notebook, pen, ruler or measuring tape, magnifying glass (optional)
- Choose a small area in your home or yard (e.g., a garden, a corner of a room near a window).
- Make detailed observations over several days or weeks of the organisms present and their interactions.
- Identify and document biotic factors (living organisms) such as plants, insects, and animals, and note their behaviors and interactions (e.g., competition for space or food).
- Observe abiotic factors (non-living elements) such as light availability, temperature variations, humidity, and soil composition.
- Reflect on how these factors influence the survival and interactions of the organisms in your chosen microhabitat.
- Discuss your findings with family or friends. Compare the similarities and differences in ecosystems observed in different microhabitats around your home.

- Relate your observations to the broader concept of how organisms depend on and compete for resources within larger ecosystems.

Organism relationships

- Watch a nature documentary or series that focuses on ecosystems and the relationships between organisms (e.g., predator-prey interactions, symbiotic relationships).
- Take notes on specific examples of predatory relationships (e.g., lion hunting prey), competitive interactions (e.g., animals competing for territory or food), and symbiotic relationships (e.g., mutualism between bees and flowers, parasitism between parasites and hosts).
- Pause the documentary to discuss each example, noting the roles and adaptations of each organism involved.
- Research further information on the species and relationships depicted to deepen your understanding.
- Reflect on how these relationships contribute to ecosystem stability and species survival.

Concepts within Unit # 8 **Link to TEKS**	**Success Criteria for this concept** *Students can…*
Concept #1: Ecosystem Organization 6.12C	• define and explain the concepts of organism, population, and community within an ecosystem. • provide examples of organisms and identify their roles within populations and communities. • describe how populations interact within a community and the roles they play in ecosystem dynamics. • create diagrams or models to illustrate the hierarchical organization of organisms, populations, and communities in different ecosystems. • explain how changes in populations or communities can impact the entire ecosystem.
Concept #2: Competition Among Organisms 6.12A	• define biotic and abiotic factors and provide examples from ecosystems. • research and describe how different organisms depend on biotic factors such as food sources and relationships with other organisms. • research and describe how organisms compete for limited resources such as availability of light, water, temperature ranges, and soil composition. • analyze data or observations to explain how changes in biotic and abiotic factors affect populations within ecosystems. • propose solutions or strategies to mitigate competition for resources within an ecosystem. • define biotic and abiotic factors and provide examples from ecosystems. • research and describe how different organisms depend on biotic factors such as food sources and relationships with other organisms. • research and describe how organisms compete for limited resources such as availability of light, water, temperature ranges, and soil composition. • analyze data or observations to explain how changes in biotic and abiotic factors affect populations within ecosystems. • propose solutions or strategies to mitigate competition for resources within an ecosystem.
Concept #3: Interactions within an Ecosystem 6.12B	• define and differentiate between predatory, competitive, and symbiotic relationships. • provide examples of predatory relationships (e.g., predator-prey interactions) and describe the roles of each organism involved.

	• provide examples of competitive relationships (e.g., competition for food or territory) and explain the impact on populations. • provide examples of symbiotic relationships (e.g., mutualism, parasitism, commensalism) and describe how each organism benefits or is affected. • create diagrams, charts, or illustrations to visually represent these relationships and their dynamics. • analyze case studies or scenarios to predict outcomes of these relationships under different environmental conditions.
Concept #4: Variations in Populations 6.13C	• define variation within a population and explain how it occurs. • provide examples of variations within populations (e.g., genetic variations, physical adaptations) and how they contribute to survival. • explain how variations can provide advantages in adapting to environmental changes (e.g., natural selection, genetic diversity). • explain how variations can present disadvantages in specific environmental conditions (e.g., vulnerability to predators, competition for resources). • analyze scenarios or case studies to illustrate how variations within populations have led to evolutionary adaptations over time. • propose strategies or solutions to preserve genetic diversity and adaptive potential within populations facing environmental challenges.

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.

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
Texas Experience Science Grade 6	This is the state adopted textbook for grade 6 science. Students sign in through their school account in Clever.
EduSmart	This resource provides hand-on and vocabulary activities that are great to review the concepts learned in the classroom. Students sign in through their school account in Clever.
Khan Academy	This resource contains practice exercises, instructional videos, and a personalized learning dashboard where students can learn and study at their own pace.
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 adventure in science, nature, culture, archaeology, and space.

Instructional Model

An instructional model is the structure in which students engage in a particular content that ensures understanding of that content. In science, the instructional model is the 5E Instructional Model.

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: Students interact with a phenomenon that sparks curiosity and assesses prerequisite knowledge or misconceptions.
- Explore: Students begin to interact with the content through hands-on investigations.
- Explain: Students connect the hands-on experience to the instruction of the concept using grade level appropriate academic vocabulary.
- Elaborate: Students apply the concept learned to a new context through problem solving or an additional hands-on experience.
- Evaluate: Evaluation of student understanding and progress occurs throughout the learning cycle.

As students learn each concept in the curriculum, they will have the opportunity to develop conceptual understanding as the teacher navigate the content as telling a story. The graphic below summarizes each component that occurs within each of the 5E stages.