Ganado Unified School District #20
(Science/4th)

PACING Guide SY 2022-2023

Time Line & Resources (Identify textbook, page number or website link & etc.)	AZ College and Career Readiness Standard	Essential Question (HESS Matrix)	Learning Goal	Vocabulary (Content/Academic)
First Quarter				
Science Fusion Teacher Edition **Science Fusion Teacher Planning Guide** **Science Fusion Teacher Chapter Planning Guides** **Science Fusion Assessment Guides** **Science Fusion Flip Boards** **Science Fusion Student Edition**	**4.L4U1.11** Analyze and interpret environmental Data to demonstrate that species Either adapt and survive, or go extinct over time. **Learning Progressions, Key Terms, and Crosscutting Concepts:** When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die. 4(p. 155) Fossils provide evidence about the types of organisms (both visible and microscopic) that lived long ago	**UNIT 1** 1. What do scientists do? 2. What skills do scientists use? 3. How do scientists collect and use data? 4. Why do scientists compare results? 5. What kinds of models do scientists use? 6. How can you model a school?	**UNIT 1** **Lesson 1** -I can describe that science focuses on the natural world only. -I can explain that scientists make observations, ask questions, conduct investigations, and produce evidence that guides scientific though and theory. -I can communicate that scientists conduct multiple types of investigations (traditional experiments involving fair testing, inventing, documenting, trail and error, etc). -I can recognize that scientific knowledge requires evidence.	**UNIT 1** **Lesson 1** Scientist Science Observation Investigation Hypothesis **Lesson 2** Inference **Lesson 3** Microscope Pan balance Spring scale Data **Lesson 5** Model Two-dimensional

	and also about the nature of their environments. Fossils can be compared with one another and to living organisms according to their similarities and differences. 4(P. 162) Changes in an organism's habitat are sometimes beneficial to it and sometimes harmful. For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. 4(p. 165) **Crosscutting Concepts: Patterns; cause and effect; systems and system models; energy and matter; stability and change.**		**Lesson 2** -I can explain that inquiry skills are used in daily life. -I can identify examples of skills used to carry out common tasks. **Lesson 3** -I can determine that scientists often conduct research as part of investigation. -I can identify different tools that scientists use to study objects and properties. -I can communicate that data gathered are based on measurement and observation, not inferences. -I can record data in appropriate tables and charts based on the purpose of the data. -I can describe that measurements and recording methods need to be accurate because data are used as evidence for scientific explanation. **Lesson 5** -I can communicate that scientists use different types of models depending upon the subject they are studying.	Model Three-dimensional model Computer model

			-I can identify differences between examples of models, such as a picture, replica, and animation. -I can determine that technology has helped scientists make more accurate models.	
		UNIT 2 1.What is an engineering? 2. How can you design a solution to a problem? 3. What is technology? 4. How do we use technology?	**UNIT 2** -I can describe how to use the design process to create a solution to a problem. -I can identify examples of tools that help people produce, shape, or build things. -I can identify needs that technology helps us meet. -I can identify technological products, processes, and systems. -I can describe how Technology has changed my community. -I can identify the benefits and risks of using technology.	**UNIT 2** **Lesson 1** Engineering Design Prototype **Lesson 3** Tool Technology
		UNIT 3 1.What are some plant structures? 2. How do plants reproduce?	**UNIT 3** **Lesson 1** -I can describe the structures of typical plants. -I can describe the process of photosynthesis.	**UNIT 3** **Lesson 1** Root Stem Leaf Photosynthesis

		3. How can we observe a plant's life cycle? 4. How do animals reproduce? 5. How are living things adapted to their environment? 6. Why do beaks differ?	**Lesson 2** -I can recognize that all seed-plant life cycles include germination, maturity, reproduction, and death. -I can identify the stages in the life cycle of a flowering plant. -I can identify the stages in the life cycle of a nonflowering, seed-bearing plant. -I can describe the role of pollination in the sexual reproduction of seed plants. -I can describe ways that plants are pollinated. -I can describe reproduction in seedless plants. **Lesson 4** -I can understand that some animals are born live, and some hatch from eggs. -I can understand that some animals go through metamorphosis as part of their life cycle. I can compare/contrast complete/incomplete metamorphosis with examples of animals that undergo each type. **Lesson 5**	Chlorophyll **Lesson 2** Germination Maturity Fertilization Pollination Spore **Lesson 4** Complete Metamorphosis Incomplete Metamorphosis Nymph **Lesson 5** Environment Adaptation Physical adaptation Behavioral adaptation Instinct

			-I can define and explain the terms of environment and adaptation. -I can define and explain physical and behavioral adaptations. -I can recognize physical and behavioral adaptations in plants and animals.	

Second Quarter				
	4.E1U1.5 Use models to explain seismic waves and their effect on the Earth. **4.E1U1.6** Plan and carry out an investigation to explore and explain the interactions between Earth's major systems and the impact on Earth's surface materials and processes. **4.E1U1.7** Develop and/or revise a model using various rock types, fossil location, and landforms to show evidence that Earth's surface has changed over time. **4.E1U1.8** Collect, analyze, and interpret data to explain weather and climate patterns. **4.E1U1.9** Construct and support an evidence-based argument about the availability of water and its impact on life. **4.E1U1.10** Define problem(s) and design solution(s) to minimize the effects of natural hazards. **Learning Progressions, Key Terms, and Crosscutting Concepts:**	**UNIT 4** **Lesson 1** What are populations, habitats, and niches? **Lesson 2** What are food chains? **Lesson 3** How can we model a food web? **Lesson 4** What are natural resources? **Lesson 5** How do people impact ecosystems? **Lesson 6** How do people affect their environment?	**UNIT 4** **Lesson 1** I can distinguish between Habitat and niche. I can distinguish between population and community. I can explain the organization of populations, communities, and ecosystems. I can describe an organism's niche at various stages of its life cycle. **Lesson 2** I can demonstrate that a food chain shows how energy moves from producers to consumers. I can recognize that energy for most food chains begins with energy from the sun. I can distinguish between, herbivores, carnivores, and omnivores. I can recognize that organisms higher in the food chain are affected by changes in the number of organisms lower in the food chain. I can explain why all animals depend on producers such as plants.	**UNIT 4** **Lesson 1** Ecosystem Community Population Habitat Niche Producer Consumer Decomposer **Lesson 2** Food chain Herbivore Carnivore Omnivore Food web **Lesson 4** Natural resource Renewable resource Nonrenewable Resource **Lesson 5** Endangered species Pollution Conservation

	Waves of the same type can differ in amplitude height of the wave) and wavelength (spacing between wave peaks). Waves can add or cancel one another as they cross, depending on their relative phase (i.e., relative position of peaks and troughs of the waves), but they emerge unaffected by each other. Earthquakes cause seismic waves, which are waves of motion in Earth's crust. Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosytems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather. Rainfall helps shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. Human activities Affect Earths systems and their Interactions at its surface. Earth has Changed over time. Understanding How landforms develop, are	**UNIT 5** 1.What is the water cycle? 2. What are types of weather? 3. How is weather predicted? 4. How can we observe weather patterns?	**Lesson 4** I can define and explain the terms natural resource. I can explain the importance of natural resources such as water, animals, and plants. I can explain the importance of energy sources. I can explain the importance of forests, soil. And land. **Lesson 5** I can define pollution and conservation. I can describe how human activity affect ecosystem. **UNIT 5** **Lesson 1** I can describe the water cycle And the role that evaporation, Condensation, and precipitation paly in it. I can explain how the sun provides energy for the water cycle. I can explain how the oceans And other bodies of water interact through the water cycle. I can describe the path of precipitation from cloud to ground to runoff to ground water.	**UNIT 5** **Lesson 1** Water cycle Atmosphere Evaporation Condensation Precipitation Runoff Groundwater **Lesson 2** Weather Humidity Air pressure **Lesson 3** Air mass Front

	Weathered (broken down into smaller pieces), and erode (get transported elsewhere) can help infer the history of the current landscape. Local, regional, and global patterns of rock formations reveal changes over time due to Earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. Weather is the minute-by-minute to day-by-day variation of the atmosphere's condition on a local scale. Scientists record the patterns Of the weather across different Times and areas so that they can Make predictions about what Kind of weather might happen Next. Climate describes the ranges of an area's typical weather Conditions and the extent to which those conditions vary over years to Centuries. Water is found almost Everywhere on Earth: as vapor; As fog or clouds in the atmosphere; as rain or snow falling from clouds; as ice, snow, and running water on Land and in the ocean; and as Groundwater beneath the surface. The downhill movement of water As it flows to the ocean shapes the Appearance of the land. Nearly all Of Earth's available water is in the ocean. Most freshwater is in glaciers	**UNIT 6** 1.How do the sun, Earth, and moon interact? 2. What are moon phases? 3. How does the moon move around Earth?	**Lesson 2** I can describe the composition of the atmosphere. I can identify factors that make up weather. I can explain how weather conditions are measured. I can explain how different types of precipitation form. I can describe some forms of severe weather. **Lesson 3** I can explain how air masses form. I can explain how fronts affect weather. I can explain how meteorologist obtain and analyze weather data. I can describe types of severe weather, such as hurricanes. **UNIT 6** **Lesson 1** I can describe the motions of Earth, the moon, and the sun in space. I can explain how the rotation of the earth causes day and night.	**UNIT 6** **Lesson 1** Rotate Axis Orbit Constellation **Lesson 2**

	Or underground; only a tiny fraction is in streams, lakes, wetlands, and The atmosphere. 4(p.185) A variety Of hazards result from natural Processes (e.g., earthquakes, Tsunamis, volcanic eruptions, severe weather, floods, coastal erosion). Humans cannot eliminate natural hazards but can take steps to reduce their impacts. **Crosscutting Concepts: cause and Effect; systems and system models; energy and matter; stability and change4.**	4. What are the planets in our solar system? 5. How can we model the sun and planets?	I can recognize that the seasons result from the tilt and orbit of the earth around the sun. I can identify the historical contributions to the understanding to the understanding of the Earth-moon-sun system. **Lesson 2** I can identify and predict changes in the appearance of the moon. **Lesson 4** I can identify the major components of the solar system. I can describe characteristics of planets in the solar system. I can compare and contrast the inner and outer planets.	Moon phases **Lesson 4** Solar system Planet

Third Quarter				
	4.P4U1.1 Develop and use a model to demonstrate how a system transfers energy from one object to another, even when the objects are not touching. **4.P4U1.2** Develop and use a model that explains how energy is moved from place to place through electric currents. **4.P4U1.3** Develop and use a model to demonstrate magnetic forces. **4.P4U1.4** Engage in argument from evidence on the use and impact of renewable and nonrenewable resources to generate electricity. **Learning Progressions.** **Key Terms, and** **Crosscutting Concepts** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. Light also transfers energy from place to place, for example, energy radiated from the	**UNIT 7** 1.What are physical properties of matter? 2. How are physical properties observed? 3. What is conservation of mass? 4. What are the states of water? **UNIT 8** 1.What are some physical changes? 2. How can we make a solution? 3. What are some chemical changes? 4. How can you tell when a new substance forms?	**UNIT 7** **Lesson 1** I can explain how physical properties can be used to identify matter. I can define matter, mass, density and volume. I can compare objects by their physical properties. **Lesson 4** I can describe the three states of water. I can explain how heating and cooling change the states of matter. I can explain that matter isn't lost or gained as it changes states. **UNIT 8** **Lesson 1** I can recognize that during a physical change, the composition of a substance does not change. I can identify examples of physical changes. **Lesson 3** I can recognize that after a chemical change, new	**UNIT 7** **Lesson 1** Matter Physical property Mass Volume Density **Lesson 4** States of matter Solid Liquid Gas Change of state Condensation Evaporation **UNIT 8** **Lesson 1** Physical change Mixture Solution **Lesson 3** Chemical property Chemical change Chemical reaction

	sun is transferred to Earth by light. When this light is absorbed, it warms Earth's land, air, and water and facilitates plant growth. Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy (e.g., moving water driving a spinning turbine which generates electric currents). The faster a given object is moving the more energy it possesses. Energy can be moved from place to place by moving objects or through sound or light. For example, energy radiated from the sun is transferred to Earth by light. When this light is absorbed, it warms Earth's land, air, and water and facilitates plant growth. The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use—for example, the stored energy of water behind a dam is released so that it flows downhill and drives a turbine generator to produce electricity. Food and fuel also release energy when they are digested or burned. When machines or animals "use" energy (e.g., to move around), most often the energy is transferred to heat the surrounding	**UNIT 9** 1.What are some forms of energy? 2. Where does energy come from? 3. What is heat? 4. How is heat produced? 5. What are conductors and insulators? 6. Which materials are conductors?	substances form with different characteristics. I can explain conservation of mass. I can describe examples of chemical changes. I can explain how chemical changes differ from physical changes. **UNIT 9** **Lesson 1** I can identify energy uses and their sources. I can describe the uses of chemical and mechanical energy can be changed to other forms of energy. I can differentiate between potential and kinetic energy. I can understand that sound is a form of energy produced through vibrations. **Lesson 3** I can define temperature and heat. I can describe three ways to transfer heat. I can identify sources of heat. **Lesson 5** I can identify materials that conduct heat well.	**UNIT 9** **Lesson 1** Energy Kinetic energy Potential energy Mechanical energy Chemical energy Electrical energy **Lesson 3** Heat Conduction Convection Radiation **Lesson 5** Conductor Insulator

	environment. The energy released by burning fuel or digesting food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (Boundary: The fact that plants capture energy from sunlight is introduced at this grade level, but details of photosynthesis are not.) It is important to be able to concentrate energy so that it is available for use where and when it is needed. For example, batteries are physically transportable energy storage devices, whereas electricity generated by power plants is transferred from place to place through distribution systems. **Crosscutting Concepts:** **Cause and effect; systems and system models; energy and matter.**		I can determine which Materials can be used to prevent the transfer of energy As heat.	

Fourth Quarter				
	4.P4U1.1 Develop and use a model to demonstrate how a system transfers energy from one object to another, even when the objects are not touching. **4.P4U1.2** Develop and use a model that explains how energy is moved from place to place through electric currents. **4.P4U1.3** Develop and use a model to demonstrate magnetic forces. **Learning Progressions.** **Key Terms, and Crosscutting Concepts** Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. Light also transfers energy from place to place, for example, energy radiated from the sun is transferred to Earth by light. When this light is absorbed, it warms Earth's land, air, and water and facilitates plant growth. Energy can also be transferred from place to place by electric currents, which can	**UNIT 10** 1.What is electricity? 2. How do electric charges interact? 3. What is an electric circuit? 4. What are electric circuits, conductors, and insulators? 5. How do we use electricity?	**UNIT 10** **Lesson 1** I can explain what causes static electricity. I can describe how charged particles interact with one another. I can relate electricity to magnetism. **Lesson 4** I can analyze circuits and explain how they work. I can identify elements in a circuit that transform electrical energy into heat, light, sound, and motion. I can identify conductors and insulators of electricity. **Lesson 5** I can identify ways in which electrical energy can be transformed into heat, light, sound, and motion. I can describe how electricity is generated. I can explain why energy conservation is important, and identify some ways to conserve electricity.	**UNIT 10** **Lesson 1** Static electricity Electric current **Lesson 4** Insulator Conductor Circuit Series circuit Parallel circuit **Lesson 5** Electric motor Magnet Electromagnet Generator

	then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy (e.g., moving water driving a spinning turbine which generates electric currents). The faster a given object is moving the more energy it possesses. Energy can be moved from place to place by moving objects or through sound or light. For example, energy radiated from the sun is transferred to Earth by light. When this light is absorbed, it warms Earth's land, air, and water and facilitates plant growth. The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use—for example, the stored energy of water behind a dam is released so that it flows downhill and drives a turbine generator to produce electricity. Food and fuel also release energy when they are digested or burned. When machines or animals "use" energy (e.g., to move around), most often the energy is transferred to heat the surrounding environment. The energy released by burning fuel or digesting food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).	**UNIT 11** 1.What is motion? 2. What is speed? 3. How are motion and speed similar and different?	**UNIT 11** **Lesson 1** I can observe and record changes of position. I can explain how to measure motion. I can compare the motion of various objects. I can describe how velocity and acceleration are related.	**UNIT 11** **Lesson 1** Position Motion Speed Velocity Force Acceleration

	(Boundary: The fact that plants capture energy from sunlight is introduced at this grade level, but details of photosynthesis are not.) It is important to be able to concentrate energy so that it is available for use where and when it is needed. For example, batteries are physically transportable energy storage devices, whereas electricity generated by power plants is transferred from place to place through distribution systems. **Crosscutting Concepts:** **Cause and effect; systems and system models; energy and matter.**			