PRESTON PUBLIC SCHOOLS
Science Curriculum Revision to Align with NGSS
Unit Plan Organizer
6th Grade

Grade Level	Unit Name	Unit Theme/Description	NGS Standards Included
6	Sun-Earth-Moon System	Students will build models of the moon to model and predict sequences in the lunar cycle. Students will create a model with the Earth, Sun, and Moon to demonstrate and describe eclipses of the Sun and Moon. Students will create a model to demonstrate and describe what causes Earth to go through seasons. Students will use data to demonstrate how Earth's rotation causes day and night. Students will also use data to show how Earth revolves around the Sun causing changes in the seasons. • Students will first model the effects of mass on the gravity of an object. Then they will create a graph about planets and their moons to see the relationship between mass and gravity in space. • Students first hypothesize about the distances of the planets from the Sun. They will then make a paper model. Additionally, students will analyze data and calculate the distance of the planets from the Sun. • Then, they will calculate the diameters of each planet to help them understand why scientists need to create scaled	MS-ESS1-1 Develop and use a model of the Earth-Sun-Moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons; MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system; MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system. Science & Engineering Practices: --Develop, use and revise models to describe, test, and predict more abstract phenomena and design systems; --Develop and use a model to describe phenomena; --Develop and use a model to describe phenomena; --Analyze and interpret data to determine similarities and differences in findings. Cross-cutting Concepts: --Patterns can be used to identify cause-and-effect relationships; --Models can be used to represent systems and their interactions; --Time, space, and energy phenomena can be observed at various scales using models to

		drawings of the solar system. Project Lunar Base - Students will research the essential needs of living on the moon. They will construct a lunar base which has a perimeter no greater than 32 meters and a height no greater than 3 meters. It has to contain an airlock as well as a plan for exploration, water, air and food for two astronauts to live there for four years.	study systems that are too large or too small.
6	Weather	Students will learn the 4 main types of fronts: cold front, warm front, stationary front, occluded front. They will be able to describe the weather at each front boundary and be able to determine weather in US cities by reading a weather map. Students will learn about low and high air pressure and how it can determine the weather. Students will also learn how to read air pressure from a weather map, including isobars. Students will learn about how the sun directly impacts the currents in the oceans and in the atmosphere. Students will also learn about convection currents. Student led stations lab - students will use a beaker, water, ice cubes, hot plate, and clear dish to make the connection between rain and/or the water cycle then write a paragraph explaining evaporation, condensation, and precipitation as it relates to the model. Students will learn about how ecosystems are impacted after a natural disaster such as a flood, hurricane, tornado, earthquake, meteor, or wildfire. Students will learn about the main ingredients	MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions; MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates; MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity; MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. Science & Engineering Practices: --Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions; --Develop and use a model to describe phenomena; --Develop a model to describe unobservable mechanisms; --Analyze and interpret data to determine similarities and differences in findings. Cross-cutting Concepts:

		necessary in hurricane formation including warm ocean water, convection currents, rotation of the Earth, low pressure, and low wind sheer. Project Hurricane Defender- The students will design a house which can withstand hurricane force winds and still be appealing to buyers. The students will stay within a construction budget.	--Cause and effect relationships may be used to predict phenomena in natural or designed systems; --Models can be used to represent systems and their interactions--such as inputs, processes and outputs--and energy, matter, and information flows within systems; --Within a natural or designed system, the transfer of energy drives the modern and/or cycling of matter; --Graphs, charts, and images can be used to identify patterns in data.
6	Ecosystems	Students will investigate beak variation in a species of birds. They will understand that populations naturally contain variation of traits and that some variations can either be beneficial or detrimental to the survival of organisms within the population. Students will be able to determine the impact that humans have had on Earth through a cookie mining activity. They will use an Internet site to answer questions on human's impact on the environment. Students will analyze the biodiversity around their own school using a line transect. This will allow students to count the number of organism types present in their own environment and have a discussion about the importance of biodiversity. Students will classify and compare abiotic and biotic factors from two different biomes: the hot desert of Death Valley National Park and the deciduous temperate forest of Harpers Ferry, WV. They will "build" one or both biomes from resource tiles then use continuous line transects to identify the abiotic and biotic factors. They will compare their results with	MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively; MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms; MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem; MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems; MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem; MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect population; MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services; MS-ESS3-3 Earth and Human Activity

		other groups. They will also identify differences in the balance of abiotic-to biotic factors between extreme and non-extreme environments. In this lab, students will create an energy pyramid to describe the cycling of matter and flow of energy between biotic and abiotic parts of the ecosystem. Students will analyze data from an Arctic ecosystem in the form of a graph. Then they will play a game to emphasize the relationship between resources. The Independent level will also research data from the Arctic Region. They will then analyze and interpret that data to provide evidence of how resources have affected organisms and populations from the Arctic ecosystem. Project Save the Ocean: The numbers are staggering: There are 5.25 trillion pieces of plastic debris in the ocean. Of that mass, 269,000 tons float on the surface, while some four billion plastic microfibers per square kilometer litter the deep sea. How can we begin to solve this problem without harming the marine life in the process? You are an engineer who also happens to have a love for marine biology. You're ready to take on the challenge of this massive problem. In order to move forward with this project, you have decided to build a prototype of a machine or device that can help solve the ocean trash problems. Are you going to focus on the surface trash or the trash that is found deep within our oceans? How is your solution going to impact marine life in a non-invasive way? How can you scale your solution to have the greatest impact around the globe? Good luck. The entire planet is counting on you!	Apply scientific principles to develop a method for monitoring and minimizing a human impact on the environment; MS-ESS3-4: Construct an argument supported by evidence of how increases in human population and per capita consumption of natural resources impact Earth's systems. Science & Engineering Practices: --Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution; --Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future; --Analyze and interpret data to provide evidence for phenomena; --Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena; --Develop a model to describe phenomena; --Evaluate competing design solutions based on jointly developed and agreed upon criteria; --Apply scientific principles to design and object, tool, process or system. Cross-cutting Practices: --Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability; --Cause and effect relationships may be used to predict phenomena in natural or designed systems; --Patterns can be used to identify cause and

		Project Birdman: Students will develop a set of bird beaks that will overcome the following feeding behaviors: tearing, cracking, sipping, drilling, picking, probing, striking, straining, and scooping. Students will be challenged to use their best adapted bird beak for a series of unknown scenarios. Students will play a game to reinforce the concept that biodiversity creates a more robust ecosystem than monoculture. Then they will be given a fictional map of land donated to federal government and will evaluate possible designs for its use. Project Wind and Air: According to the current literature somewhere between 140,000 and 328,000 birds die each year from collisions with wind turbines. The public is demanding a better solution to this form of energy. As the lead engineer for a major wind turbine manufacturer you have been challenged to decrease the bird fatalities by 20% with new windmill design. What is already being done to prevent bird collisions? How can you improve the design? Does every solution have to include changing the basic design of the wind turbine? Can your solution be retrofitted to existing turbines? A prototype needs to be developed and submitted to the CEO for approval. You've wanted to make an impact your entire life. The opportunity is now! Good luck.	effect relationships; --The transfer of energy can be tracked as energy flows through a natural system; --Small changes in one part of a system might cause large changes in another part; --Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.
6	The Changing Land	Students will test and compare various rock samples for classification. They will be challenged to think about why the structure of each sample matches its classification and what process created their formation and complete their rock classification chart. Students will explore artifacts supporting	MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process; MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old-history; MS-ESS2-2 Construct an explanation based on

		Continental Drift Theory then model continental drift with shaving cream. Students will learn about the stalactites and stalagmites found at Natural Bridge Caverns near San Antonio, Texas. Students will set up a demonstration showing the formation of both stalactites and stalagmites then analyze how erosion and deposition played a part in the formation. Students will construct a model showing the compositional layers of Earth and identify where the mechanical layers begin and end. Students will create tectonic plates and observe the results of each activity. They will be asked why the location of the activity affects the types of formations found. Students will use their inductive reasoning skills to analyze evidence gathered by paleontologists. Students will develop and support their own inferences about dinosaur behavior based upon this evidence from the fossil record. Pangaea Plate Movement Lab - students will be able to make a connection between the distribution of fossils and how they provide evidence that Earth's plates are moving.	evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales; MS-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions; MS-ESS3-1: Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. Science & Engineering Practices: --Develop and use a model to describe phenomena; --Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the student's own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future; --Analyze and interpret data to provide evidence of phenomena. Cross-cutting Concepts: --Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scale; --Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small; --Patterns in rates of change and other numerical relationships can provide information about natural systems.