Wyoming Department of Education Required Virtual Education Course Syllabus

2201001 - Washakie County School District No. 1

Program Name	Washakie #1 Online	Content Area	SC
Course ID	WOL-SC6ESF1	Grade Level	6
Course Name	WOL-Science 6	# of Credits	NA
SCED Code	NA	Curriculum Type	K12 Fuel Education

COURSE DESCRIPTION

SCI06 MS: EARTH SCIENCE

The Earth Science curriculum builds on the natural curiosity of students. By connecting them to the beauty of geological history, the amazing landforms around the globe, the nature of the sea and air, and the newest discoveries about our universe, the curriculum gives students an opportunity to relate to their everyday world. Students will explore topics such as the fundamentals of geology, oceanography, meteorology, and astronomy; Earth's minerals and rocks; Earth's interior; plate tectonics, earthquakes, volcanoes, and the movements of continents; geology and the fossil record; the oceans and the atmosphere; and the solar system and the universe.

WYOMING CONTENT AND PERFORMANCE STANDARDS

STANDARD#	BENCHMARK_(Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
MS-PS1-4	Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
MS-PS2-4	Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
MS-PS4-1	Use mathematical representations to describe a simple model for waves, which includes how the amplitude of a wave is related to the energy in a wave.
MS-PS4-2	Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-LS1-5	Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
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-LS4-1	Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
MS-LS4-2	Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
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.

WYOMING CONTENT AND PERFORMANCE STANDARDS	
STANDARD#	BENCHMARK (Standard/Indicator) Use the Standards and Benchmarks as Spreadsheets
MS-ESS1-4	Construct a scientific explanation based on evidence from rocks and rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
MS-ESS2-1	Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2	Construct an explanation based on 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-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-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-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.
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.
MS-ESS3-3	Apply scientific principles to design a method for monitoring, evaluating, and managing a human impact on the environment.
MS-ESS3-4	Construct an argument supported by evidence for how changes in human population and per-capita consumption of natural resources impact Earth's systems.
MS-ESS3-5	Ask questions to clarify evidence of the factors that have caused changes in global temperatures over time.
MS-ETS1-1	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
MS-ETS1-2	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4	Develop a model for a proposed object, tool or process and then use an iterative process to test the model, collect data, and generate modification ideas trending toward an optimal design.
MS-ETS2-2	Develop a model defining and prioritizing the impacts of human activity on a particular aspect of the environment, identifying positive and negative consequences of the activity, both short and long-term, and investigate and explain how the ethics and integrity of scientists and engineers and respect for individual property rights might constrain future development.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
Earth's Surface **Unit 1: Earth's Surface Summary** Every day you feel the ground beneath you, breathe the air around you, and drink water you need to survive. Today you are starting a trip around and into planet Earth. Your trip will include journeys from the Earth's surface deep into its hot core, through its oceans, into its atmosphere, and far beyond. **Lesson 1: Introduction to Earth Science** **Lesson 2: Spheres of the Earth** **Lesson 3: Mapping the Earth** **Lesson 4: Mapping Earth's Physical Features** **Lesson 5: Weathering** **Lesson 6: Erosion** **Lesson 7: Soils of the Earth** **Lesson 8: Soil Profiles** **Lesson 9: Lab: Desertification** **Lesson 10: Your Choice** **Lesson 11: Earth's Surface Unit Review** **Lesson 12: Earth's Surface Unit Assessment**	MS-ESS2-2 MS-ESS2-3 MS-ESS2-4 MS-ESS1-4	Explore concepts to be addressed during the year in Earth Science. Define the biosphere as the zone of life on Earth that includes all living things. Describe features of the layers, or spheres, that make up the earth system (atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere). Explain that the earth is made up of layers (internally and on the surface). Use latitude and longitude to locate places on a map. Determine the scale of a map. Interpret maps using scale, directional indicators, keys, and symbols to locate physical features. Define topography as the physical features of an area of land, including mountains, valleys, plains, and bodies of water. Identify a topographic map as a representation of the earth's surface. Analyze topographic maps. Define weathering. Explain that weathering produces sediments that contribute to soil formation (sand, silt, clay). Give examples of how climate differences influence the rate of weathering. Describe major causes, processes, and consequences of erosion. Identify surface structures that show the effects of erosion. Define erosion. Explain how soil is formed. Relate soil types to climate. Describe the three major soil types: sand, silt, and clay. Explain how plants use various components of soils (organic and inorganic). Describe a soil profile, including soil horizons. Investigate and identify the composition of different soils. Record scientific data using charts, graphs, and/or written descriptions. Explain how sand dunes are formed and recognize that they have two sides: leeward and windward. Conduct an experiment to determine the most effective method for reducing the advancement of sand dunes and deposition of sand in populated areas. Record scientific data using charts, graphs, and/or written descriptions. Practice skills and reinforce concepts taught in this course. Describe the major processes that break apart and move material around on the earth's surface to form soil from rock and organic material and to change the shape of the surface. Describe specific uses of topographic maps. Describe the basic components of the Earth's physical systems: the atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere. Describe major agents of mechanical weathering and of chemical weathering, how the agents cause each kind of weathering, and how mechanical weathering and chemical weathering interact to enhance each other's effects. Explain latitude and longitude and recognize them as providing a primary coordinate system for reference to places on the earth. Describe features on maps such as coordinate systems, scales, directional indicators, keys, symbols, and contour lines.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
		Describe major types of soil in terms of porosity, permeability, and climates in which they are found.
Rocks and Minerals **Unit 2: Rocks and Minerals Summary** Think of the role that rocks play in our daily lives. Rocks are used to construct buildings and pave our roads. They contain many important natural resources, including oil, coal, iron, and salt. Look deeper into rocks, and you will see that almost all of them are made of minerals. In this unit, you will learn how to identify different rocks and minerals, explain how they form, and describe how they are used in everyday life. Lesson 1: Identifying Minerals and Crystals Lesson 2: Lab: Mineral Identification Lesson 3: Igneous Rocks Lesson 4: Sedimentary Rocks Lesson 5: Metamorphic Rocks Lesson 6: Your Choice Lesson 7: The Rock Cycle Lesson 8: Lab: Rock Cycle Lesson 9: Unit Review Lesson 10: Unit Assessment	MS-ESS1-4 MS-ESS1-4 MS-ESS2-2	Distinguish rocks from minerals. Describe how geologists classify rocks and minerals. Give examples of observable properties used to identify minerals. Record scientific data using charts, graphs, and/or written descriptions. Identify minerals based on color, streak, hardness, and unique properties. Record scientific data using charts, graphs, and/or written descriptions. Explain how igneous rocks are formed. Compare and contrast magma and lava. Explain how sediment is formed. Describe features in sedimentary rocks that help geologists determine the environments in which the rocks formed. Describe the processes by which sediment becomes sedimentary rock. Explain how metamorphic rocks are formed. Give examples of metamorphic rocks and describe how they formed. Practice skills and reinforce concepts taught in this course. Summarize how the earth's surface materials are constantly formed, reformed, and transformed from one type of rock into another through the processes of the rock cycle. Describe the arrangement of rocks in rock layers. Relate the rock cycle to the formation of layers of rock. Identify sources of information used in scientific research. Distinguish rocks from minerals. Give examples of observable properties used to identify minerals. State the defining characteristics of a mineral. Recognize that physical and chemical properties of minerals are a result of the types and arrangements of their atoms. Explain how sedimentary rocks are formed and identify features that help determine the type of environment in which they formed. Explain how metamorphic rocks are formed. Explain how properties of minerals can be used in their identification. Define rocks as composed of minerals and recognize that they are classified as igneous, sedimentary, or metamorphic based on how they were formed. Explain how igneous rocks form and recognize how physical properties of an igneous rock reveal its origin. Summarize the processes called the rock cycle.
Geologic History **Unit 3: Geologic History Summary** Long before you were here, they were here: the many organisms that left traces of themselves in the earth. Study ancient fossils and learn what they can teach you about earth's past. Learn how to "read" the clues in the walls of the Grand Canyon and find out how scientists know that the desert lands of Arizona were once covered with warm, tropical oceans. The past is still with us today, if you know how to look for it. Lesson 1: Your Choice Lesson 2: Linking Past and Present Lesson 3: Earth's Age Lesson 4: Fossils	MS-ESS1-4 MS-ESS2-2 MS-ESS2-3 MS-LS1-5 MS-LS4-1 MS-LS4-2 MS-ESS3-1	Practice skills and reinforce concepts taught in this course. Explain that the processes that have shaped the earth through geologic time are the same today as they were in the past. Summarize major findings of James Hutton and Charles Lyell. Summarize geologic evidence for estimating the age of the earth. Distinguish between absolute and relative dating techniques. Explain how geologists use radiometric dating to date rocks and fossils. Describe fossils as recognized remains or traces of preexisting life, which may exist in the form of shells, bones, or impressions of plant leaves and soft body parts. Explain that fossils provide evidence of changes on earth over time.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
Lesson 5: Records in Rocks Lesson 6: Lab: Index Fossils and Paleoenvironments Lesson 7: A Journey Through Geologic Time Lesson 8: Geologic History Unit Review Lesson 9: Geologic History Unit Assessment		Explain how scientists use rock layers to gain information about earth's geologic past. Investigate how fossil patterns in rock layers provide information about earth's geologic past. Interpret a diagram of geologic time scale, including eons, eras, periods, and the approximate time frame for these events. Recognize the major historic contributions to interpreting sedimentary rock layers made by James Hutton and Charles Lyell. Recognize how fossils can be interpreted as evidence of preexisting life. Recognize the principle of uniformitarianism and its importance in determining historical events based on geological information. Describe the geologic time scale and provide examples of major geological and biological events of each era. Recognize and explain methods by which scientists determine the sequence of geological events, and the life forms and environmental conditions that existed in past geologic eras.
Plate Tectonics **Unit 4: Plate Tectonics Summary** Explore earth's interior by peeling back each layer to discover what lies beneath. Find out what the layers are made of, how they move and alter our landscape, and how scientists have used seismographs like the one pictured here to uncover the mysteries of the planet's depths. Lesson 1: Your Choice Lesson 2: The Center of the Earth Lesson 3: Continental Drift Lesson 4: Seafloor Geography Lesson 5: Seafloor Spreading Lesson 6: Plate Tectonics Lesson 7: Energy of Convection Lesson 8: Plate Boundaries Lesson 9: Landforms Lesson 10: LAB: Plate Boundaries and Structural Geography Lesson 11: Your Choice Lesson 12: Earthquakes Lesson 13: LAB: Using Seismographs Lesson 14: Unit Review Lesson 15: Unit Assessment	MS-ESS2-3 MS-ESS1-4 MS-ESS3-1	Practice skills and reinforce concepts taught in this course. Compare temperature, pressure, and composition of earth's inner and outer cores. Interpret a diagram that depicts the structure of the earth's interior. Summarize continental drift as an example of a scientific theory that changed in response to new evidence. Define and explain Pangaea. Identify features of the ocean floor. Explain how ocean floor mapping led to information that advanced the theory of continental drift. Explain how magnetism in rocks was used as evidence to support the concept of seafloor spreading. Describe how seafloor spreading results in the formation of new crust. Summarize the theory of plate tectonics. Summarize major scientific evidence for continental drift. Summarize the role of convection and gravity in the movement of plates. Recognize that heat from the earth's interior reaches the surface through convection. Compare the properties of continental and oceanic crust. Describe the types of motion that occur at the boundaries of earth's plates. Interpret a map of plate boundaries on the earth. Identify the landforms that result from different types of motion at plate boundaries. Explain the relationship between geologic activity and plate motion. Compare convergent, divergent, and transform plate boundaries. Identify the landforms that result from different types of motion at plate boundaries. Practice skills and reinforce concepts taught in this course. Explain how scientists use seismic data to identify earthquake zones around the world. Explain how seismic data collected from earthquakes provide information about the earth's interior.

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UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
		Explain the relationship between the speed of released energy waves in an earthquake and the material through which the waves move. Explain causes of earthquakes. Analyze the importance of construction material and building shape in determining a building's performance and stability during an earthquake. Construct a seismograph and explain how this device can detect earthquakes and other movements in the lithosphere. Explain the historical development of the theory of continental drift. Describe key features of the theory of plate tectonics. Describe observations that the theory of plate tectonics explained what the theory of continental drift did not explain as well. Recognize that movements in the earth's crust create seismic waves that scientists study to learn about earth's interior. Relate motion at the boundaries of earth's plates to the formation of landforms and geologic events. Describe the names, locations, and main characteristics of the layers that make up earth's interior. Describe evidence that supported the theory of continental drift.
Air, Weather, and Climate **Unit 5: Air, Weather, and Climate Summary** Have you ever noticed how much everyday life is affected by the weather? Rain and sunshine can affect our moods. Snow and ice can cause cities to shut down. Worse yet - humidity can be disastrous for our hair! In this unit, you will explore the many factors involved in producing everyday weather. Learn how the atmosphere provides protection and explore climates all over the world. Lesson 1: Your Choice Lesson 2: Layers of the Atmosphere Lesson 3: Conduction, Convection, and Radiation Lesson 4: Daily Weather Lesson 5: Air Circulation Lesson 6: Air Masses Lesson 7: Weather Fronts Lesson 8: Meteorology Lesson 9: LAB: Working with Weather Lesson 10: Your Choice Lesson 11: Weather and Climate Lesson 12: Factors Affecting Climate Lesson 13: Lab: Global Warming Lesson 14: Unit Review Lesson 15: Unit Assessment	MS-ESS2-4 MS-ESS2-5 MS-ESS2-6 MS-PS1-4 MS-PS4-1	Practice skills and reinforce concepts taught in this course. Describe the major components that make up earth's atmosphere. Identify the layers of the atmosphere. Describe the interaction of altitude, air density, air pressure, and temperature in the atmosphere. Recognize that earth's heat energy (thermal energy) is distributed by convection, conduction, and radiation. Explain how heat energy is transferred from warmer to cooler places (in the air, water, and on land). Define weather as the physical conditions of the atmosphere at a given location and time, as described by temperature, wind, air pressure, and humidity. Recognize that air moves from areas of higher pressure to areas of lower pressure. Define wind as the horizontal movement of air. Describe the effect of earth's rotation on air circulation patterns. Define an air mass as a large body of air characterized by nearly uniform temperature, humidity, and ground-level pressure. Locate and describe air masses on a weather map. Describe how air masses interact at cold, warm, stationary, and occluded fronts. Describe typical weather details associated with cold, warm, stationary, and occluded fronts. Given weather data for a particular location, develop a weather forecast for that area. Interpret weather symbols and isobars on a weather map to describe the weather in a given location. Collect and use data to analyze the weather. Conduct investigations using weather measurement devices. Practice skills and reinforce concepts taught in this course. Contrast weather and climate. Describe and locate on a world map the main climate types (polar, temperate, and tropical). Explain the influence of latitude on climate conditions and patterns.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
		Define climate as the long-term average of atmospheric conditions for a given region as described by weather observations. Explain how mountain ranges and other major geographical features influence climate patterns. Analyze how the following factors affect climate: land elevation, geographic location, ocean currents, and proximity to bodies of water. Recognize the major influences of solar energy on wind, ocean currents, and the water cycle. Explain how the greenhouse effect and the amount of carbon dioxide in the atmosphere are thought to be connected to global warming. Describe two possible results of global warming. Define global warming as an increase in the average atmospheric temperature. Explain the main energy transfers in the earth system, explain the greenhouse effect, and recognize that relative constancy of the earth's climates requires that the amount of energy received from the sun roughly equals the amount reflected and radiated from earth into space. Name and locate on a world map the three main climate zones (polar, temperate, and tropical) and explain variation in climate in terms of intensity of solar energy, wind, landforms, and ocean currents. Describe how air masses interact at cold, warm, stationary, and occluded fronts and describe the clouds and weather they may produce. Compare the properties of low- and high-pressure areas in terms of air density, pressure, humidity, air motion, and types of associated weather. Name and describe the properties of the four main types of air masses that influence weather in North America, locate them on a map, and describe their typical influence on weather. Explain how uneven heating of the earth and the Coriolis effect result in the earth's prevailing winds. Explain how large lakes, mountains, and surface ocean currents such as the Gulf Stream can influence climate. Describe the three mechanisms of heat energy transfer to and among the land, ocean, and air.
Semester 1 Assessment **Unit 6: Semester 1 Assessment Summary** You are almost finished with your first semester of Earth Science. Let's review the key ideas and prepare to take the assessment. You have gone through a lot of material this semester, so let's get started. **Lesson 1: Semester 1 Review** **Lesson 2: Semester 1 Assessment**		Describe evidence that supported the theory of continental drift. Explain how sedimentary rocks are formed and identify features that help determine the type of environment in which they formed. Explain latitude and longitude and recognize them as providing a primary coordinate system for reference to places on the earth. Recognize that movements in the earth's crust create seismic waves, which scientists study to learn about earth's interior. Recognize and explain methods by which scientists determine the sequence of geological events, life forms present, and environmental conditions in the past geological eras. Compare the properties of low- and high-pressure areas in terms of air density, pressure, humidity, air motion, and types of associated weather. Describe major types of soil in terms of porosity, permeability, and climates in which they are found. Explain how uneven heating of the earth and the Coriolis effect create the earth's prevailing winds. State the defining characteristics of a mineral. Describe features on maps such as coordinate systems, scales, directional indicators, keys, symbols, and contour lines. Describe major agents of mechanical weathering and of chemical weathering, how the agents cause each kind of weathering, and how mechanical weathering and chemical weathering interact to enhance each other's effects. Explain how properties of minerals can be used in their identification. Recognize the principle of uniformitarianism and its importance in determining historical events based on geological information. Describe key features of the theory of plate tectonics.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
		Describe how air masses interact at cold, warm, stationary, and occluded fronts and describe the clouds and weather they may produce. Explain how igneous rocks form and recognize how physical properties of an igneous rock reveal its origin. Explain how metamorphic rocks are formed. Describe the geologic time scale and provide examples of major geological and biological events of each era. Name and locate on a world map the three main climate zones (polar, temperate, and tropical) and explain variation in climate in terms of intensity of solar energy, wind, landforms, and ocean currents. Describe the basic components of the earth's physical systems: atmosphere, biosphere, lithosphere, hydrosphere, and magnetosphere. Explain the main energy transfers of the earth's energy budget, explain the greenhouse effect, and recognize that relative constancy of the earth's climates requires that the amount of energy received from the sun equals the amount reflected and radiated from earth into space.
Water on Earth **Unit 7: Water on Earth Summary** It's a warm sunny day, a perfect day for the beach. While walking along the beach, you find a bottle that rides in on a wave. The bottle has a note in it written by someone in another country. How did this bottle travel so far? The bottle was carried in by a water current. How are water currents created? What effect do wind and temperature have on ocean currents and water? How do gravitational forces affect ocean tides? What is the chemical makeup of water? Let's discover more about the earth's water systems. Lesson 1: Your Choice Lesson 2: Water and the Water Cycle Lesson 3: Ocean Water Lesson 4: Ocean Currents Lesson 5: Ocean Waves Lesson 6: Ocean Tides Lesson 7: Unit Review Lesson 8: Unit Assessment	MS-ESS2-1 MS-ESS2-4 MS-PS1-4 MS-PS4-1 MS-PS4-2 MS-LS2-3	Practice skills and reinforce concepts taught in this course. Compare and contrast freshwater and salt water. Interpret a diagram of the hydrologic cycle. Explain the transfer of energy between the atmosphere and hydrosphere. Describe the distribution of water in the atmosphere, lithosphere, and hydrosphere. Identify factors that affect the salinity of ocean water. Describe the composition of ocean water. Recognize that the temperature of the ocean's surface water varies by geographic location. Explain how temperature and pressure vary at different depths in the ocean. Relate convection to the formation of deep-ocean currents. Describe the effect of earth's rotation on ocean currents. Explain that wind and forces between air and water cause surface currents. Distinguish surface currents from deep-ocean currents. Interpret a diagram that shows major ocean currents and prevailing winds. Describe wave motion in water as particles set in circular motion. Relate wind speed to the amount of energy transferred to waves. Define beaches as dynamic systems whereby rivers and ocean waves deliver sand that may alter coastal landforms. Explain the relationship between ocean tides and the gravitational interaction of the earth, moon, and sun. Identify positions of the earth, moon, and sun that result in a monthly cycle of spring tides and neap tides. Recognize factors influencing salinity of ocean water, explain how salinity and temperature of the water are related to its density, and explain how differences in these parameters result in major movements of deep-ocean water. Recognize that radiation from the sun warms the upper layer of ocean water, but cannot penetrate to great depths, resulting in two distinct layers of water - warm and cold - separated by a boundary layer known as the thermocline. Explain the hydrologic cycle. Explain how wind blowing on ocean water results in waves and surface currents. Explain how the gravitational interaction of the earth, moon, and sun causes tides.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
Energy and Earth's Resources **Unit 8: Energy and Earth's Resources Summary** You may not think about it that much, but you use energy all day, every day. You need energy to read this page. The machines you use need energy, too. Right now, the computer screen you are looking at is being powered by energy. Think about how much energy you use in a day, and you are just one person! There are over six billion people in the world who all use and depend on energy. Where does this energy come from, and how do we use it? This unit will help you explore, understand, and appreciate energy resources. Lesson 1: Your Choice Lesson 2: Energy Resources Lesson 3: Fossil Fuels Lesson 4: Consumption and Environmental Effects Lesson 5: Alternative Energy Sources Lesson 6: Resource Management Lesson 7: LAB: Power from Tides Lesson 8: Unit Review Lesson 9: Unit Assessment	MS-ESS1-1 MS-ESS2-1 MS-ESS3-1 MS-ESS3-2 MS-ESS3-3 MS-ESS3-4 MS-ESS3-5 MS-LS2-3 MS-ETS1-1 MS-ETS1-2 MS-ETS1-3 MS-ETS2-2	Practice skills and reinforce concepts taught in this course. Identify important renewable resources: solar energy, biomass, moving water, wind, and geothermal energy. Identify major nonrenewable energy resources: oil (petroleum), coal, natural gas, and nuclear fission fuel (uranium). Distinguish between renewable and nonrenewable energy resources. Compare and contrast the formation of fossil fuels. Recognize coal as the most abundant fossil fuel available in the United States. Recognize oil as the predominant source of energy consumed in the United States. Explain that the sun is the ultimate source of energy for nonrenewable resources such as fossil fuels (e.g., oil, coal, and natural gas). Interpret a graph that compares the amount of air pollution produced by burning different fossil fuels (coal, oil, and natural gas). Describe consequences of fossil fuel consumption, such as air pollution and environmental degradation. Analyze the economic and environmental costs and benefits of industrial growth. Explain how burning coal produces air pollution. Recognize that geothermal energy, derived from earth's internal heat, can be collected and used to make electricity. Identify biomass energy sources, including wood, manure, garbage, and agricultural waste. Describe how wind turbines and farms capture energy to generate electricity. Distinguish between solar thermal energy (for heat and hot water) and solar electric energy (for electricity). Define conservation as the preservation, management, and restoration of earth's resources. Explain how recycling can help preserve natural resources. Give examples of ways in which the use of earth's resources by human beings has changed. Explain the benefits and costs of using tides for energy. Use data to draw comparisons or relationships between variables. Evaluate the possibility of constructing a tidal power plant in a certain location based on data. Explain how power is generated from tides (barrage holds water during high tide, water is released, turns turbine, water is stored, turbine reverses during low tide letting stored water back out to sea). Define a fossil fuel and compare how the three fossil fuels (coal, oil, and natural gas) form. Define conservation as the preservation, management, and restoration of earth's resources. Explain how each of the major energy resources is used to generate electricity, heat, and other types of energy. Recognize and describe some of the ways that people use renewable and nonrenewable resources for energy production. Compare major energy resources in terms of safety, usage, abundance, pollution, waste disposal, and aesthetic considerations. Name and distinguish between renewable and nonrenewable resources. Describe examples of alternative energy sources and the costs and benefits associated with their use.
Our Place in the Universe **Unit 9: Our Place in the Universe Summary**	MS-ESS1-1 MS-ESS1-2 MS-ESS1-3	Practice skills and reinforce concepts taught in this course.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
Getting smarter means discovering more and more about what's around you. Babies are only aware of their cribs, young people are aware of their immediate surroundings and adults know more about the world. In this unit you will attempt to understand your place in the entire universe. Lesson 1: Your Choice Lesson 2: Origin of the Universe Lesson 3: Galaxies Lesson 4: Gravitational Forces Lesson 5: Rotation and Revolution Lesson 6: The Solar System Lesson 7: The Inner Planets Lesson 8: The Outer Planets Lesson 9: Earth's Seasons Lesson 10: Your Choice Lesson 11: Asteroids, Comets, and Meteoroids Lesson 12: The Moon Lesson 13: Moon Phases Lesson 14: Eclipses Lesson 15: Unmanned Space Exploration Lesson 16: Manned Space Exploration Lesson 17: Unit Review Lesson 18: Unit Assessment	MS-PS2-4	Summarize main points of, and major evidence offered by scientists for, the big bang theory. Describe the observations that galaxies are moving away from us as evidence that the universe is expanding as a result of the big bang. Recognize that the universe consists of many galaxies with billions of stars. Recognize that there are vast distances that separate these galaxies and stars from one another. Describe distances in space as measured in light-years. Define a light-year as the distance light travels in one earth year. Identify the shapes of different galaxies. Recognize that mass and distance determine the amount of gravitational force between any two objects. Explain that gravity holds groups of celestial bodies together, including stars and planets, asteroids, and other orbiting bodies. Explain that gravity is a force of attraction and that gravitational forces act on every mass in the universe. Define revolution as the period in which a planet makes one complete orbit around the sun. Recognize that the planets in the solar system revolve around the sun in elliptical orbits. Define rotation as the period in which a planet makes one complete turn on its axis. Distinguish objects inside the solar system from objects outside the solar system. Explain how the sun's gravity holds earth and the other planets in their orbits. Explain the currently accepted scientific account of the formation of the solar system. Describe the solar system as a system that includes the sun, earth, and other planets, moons, and other small objects, such as asteroids and comets. Compare the planets in terms of their relative size and distance from the sun. Identify the asteroid belt, located between the inner and outer planets. Identify and describe the inner planets (Mercury, Venus, Earth, Mars). Identify and describe the outer planets (Jupiter, Saturn, Uranus, Neptune). Compare the planets in terms of their relative size and distance from the sun. Define the summer and winter solstice and the spring and fall equinox. Demonstrate how the angle of sunlight striking the earth changes at different points during its revolution, due to the earth's rotational tilt. Explain that seasonal changes are caused by the earth's tilt on its axis. Explain that earth's rotation causes night and day. Practice skills and reinforce concepts taught in this course. Describe other objects in the solar system, such as asteroids, comets, and meteoroids. Explain the interaction of the sun and comets in the solar system. Recognize that the moon reflects light from the sun and has no light of its own. Describe the moon's surface features (e.g., craters, mare, terrae)

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
		Explain that the same side of the moon always faces the earth because the moon's rotational period is equal to its revolution around the earth. Identify and arrange pictures of lunar phases and explain why the moon appears to change shape. Demonstrate that the position of the moon, relative to the sun and earth, causes lunar phases. Explain that the same side of the moon always faces the earth because the moon's rotational period is equal to its revolution around the earth. Compare and contrast a solar eclipse with a lunar eclipse. Demonstrate the relative positions of the earth, sun, and moon during solar and lunar eclipses. Explain how an eclipse occurs. Describe the purpose of interplanetary space missions. Describe types of unmanned space exploration technology. Describe how space travel affects the human body. Describe types of manned space exploration technology. Describe the purpose and results of the Apollo space missions. Describe the main elements making up stars, including the sun; the relative locations of the orbits of the planets; a unique property of each planet; and the relative sizes and masses of the sun and the planets. State a date at or close to each of the summer and winter solstices and the spring and fall equinoxes, and demonstrate the position of the earth in its orbit at each of these times. Explain how the tilt of the earth's axis of rotation with respect to its orbit around the sun causes the seasons. Recognize that gravity holds together groups of celestial bodies, including stars with their planets, asteroids, and other orbiting bodies, stars grouped in galaxies, and galaxies grouped in clusters. Describe how the predominant view of the solar system and universe has changed over time. Recognize that Newton's universal law of gravitation explains the nature of the orbits of the planets and other objects in the solar system around the sun. Explain how the phases of the moon and how lunar and solar eclipses depend on the relative positions of the moon, earth, and sun. Describe the names and purposes of major events in the history of space exploration. Recognize the main features of the big bang theory, which most scientists accept as a description of the origin of the universe. Explain the most current, most widely accepted theory of the origin of the solar system. Recognize that the moon's rotational period is the same as its period of revolution around the earth, so that the same side of the moon continually faces the earth.
Semester 2 Assessment **Unit 10: Semester 2 Assessment Summary** This semester, you have studied earth's water in its different chemical and physical forms. You have explored oceans, waves, and currents and reached into the universe, to examine distant galaxies, our solar system, and planets. You have learned about earth's energy resources, and earth's seasons. Take some time to think back to the many topics you've investigated by completing the Semester 2 Review. After you take the Semester 2 Assessment, celebrate your accomplishments! **Lesson 1: Semester 2 Review**		Name and distinguish between renewable and non-renewable resources. Recognize factors influencing salinity of ocean water, explain how salinity and temperature of the water are related to its density, and explain how differences in these parameters result in major movements of deep ocean water. Recognize that the heating of surface water by the sun in large bodies of water often results in two relatively independent ocean layers. Describe the main elements making up stars and Earth's sun; the relative locations of the orbits of the planets; a unique property of each planet; and the relative sizes and masses of the sun and the planets. Recognize the main features of the big bang theory, which most scientists accept as a description of the origin of the universe. Define a fossil fuel and compare how the three fossil fuels (coal, oil, and natural gas) form.

SCOPE AND SEQUENCE		
UNIT OUTLINE	**STANDARD #**	**OUTCOMES OBJECTIVES/ STUDENT CENTERED GOALS**
Lesson 2: Semester 2 Assessment		Explain the most current, most widely accepted theory of the origin of the solar system. Explain how the tilt of the Earth's axis of rotation with respect to its orbit around the sun causes the seasons. Compare major energy resources in terms of safety, usage, abundance, pollution, waste disposal, and aesthetic considerations. Describe examples of alternative energy sources and the costs and benefits associated with their use.
Scientific Investigation **Unit 11: Scientific Investigation Summary** The earth formed 4.6 billion years ago. Gravity keeps our planet revolving around the sun. Earth's core is made of solid iron. Rainy weather is caused by colliding air masses. How do scientists figure out all of this stuff? Scientists work hard to learn all they can about our world, and they investigate the world around them to discover answers to their questions. In this unit, you will become a scientist and carry out your own scientific investigation. Lesson 1: Your Choice Lesson 2: Scientific Methods Lesson 3: Design and Set Up Your Experiment Lesson 4: Data Collection Lesson 5: Data Analysis Lesson 6: Reporting Conclusions Lesson 7: Create a Display Lesson 8: Oral Presentation	MS-ETS1-3 MS-ETS1-4	Practice skills and reinforce concepts taught in this course. Distinguish a scientific investigation from a demonstration. Describe a scientific investigation as observational or experimental. Pose a specific question that can be investigated with scientific experimentation. Recognize all handouts and notes for your science investigation should be kept in the Investigation Notebook. Identify sources of information used in scientific research. Design an investigation to test a hypothesis and gather information. Identify independent and dependent variables, constraints, and controls in your investigation. State the purpose of the experiment. Write a step-by-step procedure for the scientific investigation. Formulate a hypothesis based on available information. Recognize all handouts and notes for your science investigation should be kept in the Investigation Notebook. Measure, record, calculate, and report results, using metric units. Collect data during a scientific investigation. Design a data collection table to collect estimates, measurements, and results. Find the mean and mode for a data set. Recognize all handouts and notes for your science investigation should be kept in the Investigation Notebook. Determine appropriate ways to report data from an investigation. Use graphs and charts to share experimental data. Identify possible sources of error in the experiment and in the data collected. Draw conclusions based upon the results of an investigation. Identify sources of information used in scientific research. Summarize an investigation in a written report. Display scientific data using tables, charts, graphs, visuals, and written descriptions. Develop a plan for an oral presentation Communicate orally the background, methods, results, interpretation, and conclusions of an investigation.