Unit	Topic	Lesson	Lesson Objectives
The Planet Earth			
	Introduction to Earth Science		
		What Is Science?	
			Differentiate between a scientific theory and a scientific law.
			Explain what scientific inquiry involves.
			Identify the skills and attitudes that scientists use to learn about the world.
		The Study of Earth Science	
			Explain the big ideas, or main concepts of Earth Science.
			Explain what a model is in science and why models are important in Earth Science.
			Identify the branches of Earth Science.
		Measurement	
			Determine appropriate units to use for particular measurements.
			Explain the importance of the International System of Units.
	Mapping the Earth		
		Landforms	
			Describe folded, upwarped, fault-block, and volcanic mountains.
			Discuss differences between plains and plateaus.
		You Are Here	
			Compare latitude and longitude.
			Explain how a magnetic compass can be used to find directions on Earth.
			Explain how latitude and longitude are used to locate places on Earth.
			Explain the difference between true north and magnetic north.
		Topographical Maps	
			Explain how contour lines show elevation and landforms on a map.
			Explain how the relief of an area determines the contour interval used on a map.
			List the rules of contour lines.
		Maps and Computers	
			Describe the types of data that are used for making computer maps.
			Explain how computer mapping differs from earlier methods of making maps.
	Minerals		
		Properties of Minerals	
			Define a mineral.
			Explain how minerals are identified.

Unit	Topic	Lesson	Lesson Objectives
		How Minerals Form	
			Explain how minerals form from magma and lava.
			Explain how minerals form from water solutions.
		Uses of Minerals	
			Describe characteristics of gems that make them more valuable than other minerals.
			Identify useful elements that are contained in minerals.
	Rocks		
		The Rock Cycle	
			Describe four processes that shape Earth's features.
			Describe how each type of rock changes into another type as it moves through the rock cycle.
			Describe two ways rocks have been used by humans.
			List two characteristics of rock that are used to help classify it.
		Igneous Rocks	
			Contrast granitic and basaltic igneous rocks.
			Contrast the formation of intrusive and extrusive igneous rocks.
			Recognize magma and lava as the materials that cool to form igneous rocks.
		Metamorphic Rocks	
			Classify metamorphic rocks as foliated or nonfoliated.
			Describe the conditions in Earth that cause metamorphic rocks to form.
		Sedimentary Rocks	
			Classify sedimentary rocks as detrital, chemical, or organic in origin.
			Explain how sedimentary rocks form from sediments.
			Summarize the rock cycle.
		Rocks from Reefs	
			Describe the formation of coral reefs.
			Explain how limestone deposits from coral reefs provide information about Earth's history.
	Earth's Energy Resources		
		Nonrenewable Energy Resources	
			Describe the advantages and disadvantages of using fossil fuels.
			Explain the advantages and disadvantages of using nuclear energy.
			Identify examples of nonrenewable energy resources.
		Renewable Energy Resources	
			Compare and contrast inexhaustible and renewable energy resources.
			Explain why inexhaustible and renewable resources are used less than nonrenewable resources.

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		Nuclear Energy	
			Describe what happens during a nuclear fission reaction.
			Describe what takes place in a nuclear fusion reaction.
			Explain how a nuclear power plant produces electricity.
		Energy Conservation	
			What are two ways to preserve our current energy sources?
Changing Earth			
	Plate Tectonics		
		Earth's Interior	
			Explain how geologists learn about Earth's inner structures.
			Identify the characteristics of Earth's crust, mantle, and core.
		Convection and Mantle	
			Describe convection currents in Earth's mantle.
			Explain how heat is transferred.
			Identify what causes convection currents.
		Restless Continents	
			Describe how new oceanic lithosphere forms at mid-ocean ridges.
			Describe Wegner's hypothesis of continental drift.
			Explain how magnetic reversals provide evidence for sea-floor spreading.
			Explain how sea-floor spreading provides a way for continents to move.
		Theory of Plate Tectonics	
			Compare and contrast different types of plate boundaries.
			Explain how heat inside Earth causes plate tectonics.
			Recognize features caused by plate tectonics.
		Deforming the Earth's Crust	
			Describe three major types of folds.
			Describe two types of stress that deform rocks.
			Explain the difference between uplift and subsidence.
			Explain the differences between the three major types of faults.
			Identify the most common types of mountains.

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	Earthquakes		
		Forces in Earth's Crust	
			Describe where faults are usually found and why they form.
			Explain how stress in the crust changes Earth's surface.
			Identify the land features that result from plate movement.
		Earthquakes and Seismic Waves	
			Describe how the energy of an earthquake travels through Earth.
			Explain how scientists locate the epicenter of an earthquake.
			Identify the scales used to measure the strength of an earthquake.
		Monitoring Earthquakes	
			Describe how geologists monitor faults.
			Explain how seismographic data are used.
			Explain how seismographs work.
		Earthquake Safety	
			Explain how geologists determine earthquake risk.
			Identify the kinds of damage an earthquake can cause.
			Provide suggestions to increase earthquake safety and reduce earthquake damage.
	Volcanoes		
		Volcanoes and Plate Tectonics	
			Explain how hot spot volcanoes form.
			Identify where Earth's volcanic regions are located and explain why they are found there.
		Properties of Magma	
			Explain what factors determine the viscosity of magma.
			Explain why some liquids flow more easily than others.
			Identify some physical and chemical properties of matter.
		Volcanic Eruptions	
			Describe the two types of volcanic eruptions.
			Explain what happens when a volcano erupts.
			Identify a volcano's stages of activity.
		Volcanic Landforms	
			Explain how the magma that hardens beneath Earth's surface creates landforms.
			Identify other distinct features that occur in volcanic areas.
			List the landforms that lava and ash create.

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	Weathering and Soil Formation		
		Weathering	
			Describe how weathering affects Earth's surface.
			Explain how climate affects weathering.
			Explain how mechanical weathering and chemical weathering differ.
		Rates of Weathering	
			Describe how a rock's total surface area affects the rate at which the rock weathers.
			Describe how differences in elevation and climate affect the rate of weathering.
			Explain how the composition of rock affects the rate of weathering.
		The Nature of Soil	
			Describe factors that affect the development of soil.
			Describe soil characteristics.
			Explain how soil forms.
		Soil Erosion	
			Describe ways to reduce soil erosion.
			Evaluate ways that human activity has affected Earth's soil.
			Explain why soil is important.
		Soil Conservation	
			Explain why soil is a valuable resource.
			Identify ways that soil can be conserved.
			List ways that soil can lose its value.
	Erosion and Deposition		
		Changing the Earth's Surface	
			Describe the processes that wear down and build up Earth's surface.
			Identify the causes of the different types of mass movement.
		Water Erosion	
			Describe some of the land features that are formed by water erosion and deposition.
			Describe the cause of groundwater erosion.
			Explain how water erosion is mainly responsible for shaping the surface of the land.
		The Force of Moving Water	
			Describe how water is able to do work.
			Explain how sediment enters rivers and streams.
			List the factors that affect a river's ability to erode and carry sediment.

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		Glaciers	
			Describe how a valley glacier forms and moves.
			Explain how glaciers cause erosion and deposition.
			Identify the two kinds of glaciers.
		Waves	
			Describe how ocean waves erode a coast.
			Identify features that result from deposition by waves.
			Identify what gives ocean waves their energy.
		Wind	
			Explain how wind causes erosion.
			Identify features resulting from deposition by wind.
	A Trip Through Geologic Time		
		Fossils	
			Describe several processes of fossil formation.
			Determine how fossils can be used to explain changes in Earth's surface, life forms, and environments.
			Explain how fossil correlation is used to determine rock ages.
			List the conditions necessary for fossils to form.
		Relative Ages of Rocks	
			Describe methods used to assign relative ages to rock layers.
			Give an example of how rock layers can be correlated with other rock layers.
			Interpret gaps in the rock record.
		Absolute Ages of Rocks	
			Describe how the half-lives of isotopes are used to determine a rock's age.
			Identify how absolute age differs from relative age.
		Life and Geologic Time	
			Describe how plate tectonics affects species.
			Explain how geologic time can be divided into units.
			Relate changes of Earth's organisms to divisions on the geologic time scale.
		Early Earth History	
			Describe changes in Earth and its life-forms at the end of the Paleozoic Era.
			Draw conclusions about how species adapted to changing environments in Precambrian time and the Paleozoic Era.
			Identify characteristic Precambrian and Paleozoic life-forms.

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		Middle and Recent Earth History	
			Compare and contrast characteristic life-forms in the Mesozoic and Cenozoic Eras.
			Explain how changes caused by plate tectonics affected organisms during the Mesozoic Era.
			Identify when humans first appeared on Earth.
Earth's Waters			
	Fresh Water		
		Water on Earth	
			Describe how Earth's water is distributed.
			Explain how Earth's water moves through the water cycle.
		Surface Water	
			Describe the characteristics of ponds and lakes.
			List three types of wetlands and explain why wetlands are important.
			Tell what a river system is.
		Water Underground	
			Describe how water moves through underground layers of soil and rock.
			Explain how people obtain water from an aquifer.
		Using Freshwater Resources	
			Describe some ways to conserve available fresh water.
			Discuss how scientists classify sources of water pollution.
			Identify ways that people use water.
		Water to Drink	
			Explain why drinking water is often treated before people drink it.
			Identify factors that affect water quality.
	Ocean Motions		
		Currents	
			Describe deep currents.
			Describe surface currents.
			Identify the three factors that form deep currents.
			List the three factors that control surface currents.
		Currents and Climate	
			Describe the effects of El Nino.
			Explain how currents affect climate.
			Explain how scientists study and predict the pattern of El Nino.

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		Waves	
			Classify types of waves.
			Describe how ocean waves form and move.
			Explain how the parts of a wave relate to wave movement.
			Identify the parts of a wave.
		Tides	
			Analyze the relationship between tides and coastal land.
			Describe four different types of tides.
			Explain tides and their relationship with the Earth, sun, and moon.
		Ocean Water Chemistry	
			Describe how conditions in the ocean change with depth.
			Describe the salinity of ocean water.
			Explain how the temperature and gas content of ocean water varies.
	Ocean Zones		
		Earth's Oceans	
			Describe the history of Earth's oceans.
			Describe the interactions between the ocean and the atmosphere.
			Identify the properties of ocean water.
			List the major divisions of the global ocean.
		The Seafloor	
			Describe a mid-ocean ridge, an abyssal plain, and an ocean trench.
			Differentiate between a continental shelf and a continental slope.
			Identify the mineral resources found on the continental shelf and in the deep ocean.
		Ocean Habitats	
			Describe how marine organisms are classified.
			Describe the conditions in the neritic zone.
			Describe the conditions in the open ocean.
			Describe the conditions that organisms in the intertidal zone must tolerate.
		Resources from the Ocean	
			Describe the ocean's energy resources.
			Identify three nonliving resources in the ocean.
			List two ways of harvesting the ocean's living resources.

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		Ocean Pollution	
			Describe what is being done to control ocean pollution.
			Explain the difference between point-source pollution and nonpoint-source pollution.
			Identify three different types of point-source ocean pollution.
Weather and Climate			
	The Atmosphere		
		Earth's Atmosphere	
			Describe the structures of Earth's atmosphere.
			Explain what causes air pressure.
			Identify the gases in Earth's atmosphere.
		Energy Transfer in the Atmosphere	
			Compare and contrast radiation, conduction, and convection.
			Describe what happens to the energy Earth receives from the Sun.
			Explain the water cycle and its effect on weather patterns and climate.
		Air Movement	
			Describe the coriolis effect.
			Explain how land and water surfaces affect the overlying air.
			Explain why different latitudes on Earth receive different amounts of solar energy.
		Air Quality	
			Describe what can be done to improve air quality.
			Identify the major sources of air pollution.
			Identify what causes smog and acid rain.
	Understanding Weather		
		Water in the Air	
			Describe how relative humidity is affected by temperature and levels of water vapor.
			Describe the relationship between dew point and condensation.
			Explain how water moves through the water cycle.
			Identify four kinds of precipitation.
			List three types of cloud forms.
		Air Masses and Fronts	
			Describe the four major types of fronts.
			Explain how cyclones and anticyclones affect the weather.
			Explain how fronts cause weather changes.
			Identify the four kinds of air masses that influence weather in the United States.

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		Severe Weather	
			Describe how lightning forms.
			Describe the characteristics of thunderstorms, tornadoes, and hurricanes.
			Describe the formation of thunderstorms, tornadoes, and hurricanes.
			Explain how to stay safe during severe weather.
		Forecasting the Weather	
			Describe the different types of instruments used to take weather measurements.
			Explain how radar and weather satellites help meteorologists forecast the weather.
			Explain how to interpret a weather map.
	Climate		
		What Causes Climate?	
			Explain what causes the seasons.
			Identify factors that influence temperature and precipitation.
		Climate Regions	
			Describe the six main climate regions.
			Identify factors used to define climates.
		Long-term Changes in Climate	
			Describe the changes that occur on Earth's surface during an ice age.
			Explain the principle that scientists follow in studying ancient climates.
			Identify factors that can cause climate change.
Astronomy			
	Earth, Sun, and Moon		
		Earth in Space	
			Demonstrate how Earth moves in space.
			Explain what causes the cycle of seasons on Earth.
		Gravity and Motion	
			Describe two factors that keep the moon and Earth in orbit.
			Identify what determines the strength of the force of gravity between two objects.
		Phases, Eclipses, and Tides	
			Describe solar and lunar eclipses.
			Explain what causes the phases of the moon.
			Identify what causes tides.

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		Earth's Moon	
			Describe features found on the moon's surface.
			Explain how the moon formed.
			Identify some characteristics of the moon.
		Traveling Into Space	
			Compare and contrast the roles of space shuttles, space stations, and space probes in space exploration.
			Demonstrate how a rocket works.
			Describe the space race, and discuss the major events in the exploration of the moon.
			Identify the main advantage of a multistage rocket.
	The Solar System		
		The Solar System	
			Compare the Earth-centered and Sun-centered models of the solar system.
			Explain that gravity holds the planets in their orbits around the Sun.
		The Inner Planets	
			Compare and contrast Venus and Earth.
			Describe each inner planet.
			List the inner planets in order from the Sun.
		The Outer Planets	
			Describe the characteristics of Jupiter, Saturn, Uranus, and Neptune.
			Explain how Pluto differs from the other outer planets.
		Other Objects in the Solar System	
			Describe how comets change when they approach the Sun.
			Distinguish among comets, meteoroids, and asteroids.
			Explain that objects from space sometimes impact Earth.
	Stars and Galaxies		
		Stars	
			Distinguish between absolute magnitude and apparent magnitude.
			Explain why some constellations are visible only during certain seasons.
		The Sun	
			Describe sunspots, prominences, and solar flares.
			Describe the structure of the Sun.
			Explain that the Sun is the closest star to Earth.

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		Evolution of Stars	
			Compare the Sun to other types of stars on the H-R diagram.
			Describe how stars are classified.
			Describe how stars evolve.
		Galaxies and the Universe	
			Describe the Sun's position in the Milky Way Galaxy.
			Explain that the same natural laws that apply to our solar system also apply in other galaxies.