

Unit	Lesson	Lesson Objectives
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Structure of the Universe**The Expanding Universe**

- Describe the big bang theory.
- Describe what astronomers predict about the future of the universe.
- Explain how the solar system formed.

Star Systems and Galaxies

- Describe star systems.
- Distinguish the major types of galaxies.

Stars

- Explain how a star forms.
- Explain how stars are classified.
- Explain what happens as a star runs out of fuel.
- Identify the physical properties of stars.

The Sun

- Describe the structure, composition, and physical properties of the Sun.
- Discuss the different types of solar activity and explain how each activity affects Earth.
- Explain how the Sun generates energy.
- Science Practice: Describe units used by astronomers to measure the distance between the Sun and Earth.

The Solar System

- Compare the geocentric and heliocentric models of the solar system.
- Explain how Copernicus, Galileo, and Kepler contributed to the acceptance of the heliocentric model.
- Identify objects that make up the solar system.

Planets

- Identify characteristics shared by the inner planets.
- Identify characteristics shared by the outer planets.
- Identify each planet in the solar system.

The Earth-Sun-Moon System

- Describe solar and lunar eclipses.
- Explain how Earth moves in space.
- Explain what causes the phases of the moon.
- Explain what causes tides.

Gravity and Motion

- Explain how Earth and the moon stay in orbit.
- Identify factors that influence the force of gravity between objects.

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Other Objects in the Solar System

- Describe the characteristics of dwarf planets.
- Distinguish between comets, asteroids, and meteoroids.
- Explain the difference between meteoroids, meteors, and meteorites.
- Science Practice: Examine how life may be affected when cosmic objects impact Earth.

Space Technology

- Describe the history and future of space exploration.
- Identify the role of technology in space exploration.

History of the Earth**Fossils**

- Differentiate types of fossils.
- Explain how fossils form.
- Explain how fossils show Earth's changes over time.

Relative Dating

- Describe the law of superposition.
- Explain how fossils are used to date rocks.
- Explain how geologists determine the relative age of rocks.

Absolute Dating

- Explain how geologists determine the absolute age of rocks.
- Explain what happens during radioactive decay.

Lab: Relative and Absolute Dating

- Apply the principles of rock dating to construct a geologic history of a region.
- Model radioactive decay.

Geologic Time

- Distinguish the units of the geologic time scale.
- Explain how Earth has evolved over geologic time.
- Explain why the geologic time scale is used to show Earth's history.

Spheres of Earth

- Distinguish the four major parts of the Earth system.
- Explain how Earth's four spheres interact.

Cycles of Matter

- Analyze the importance of the nitrogen cycle.
- Examine how carbon cycles through an ecosystem.
- Identify the processes involved in the water cycle.

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Earth's Structure and Plate Tectonics**Earth's Interior**

- Compare and contrast the three main layers of Earth.
- Explain how geologists learn about Earth's interior.

Continental Drift

- Describe evidence that supports continental drift.
- Explain continental drift.

Plate Tectonics

- Distinguish the three types of plate boundaries.
- Explain the theory of plate tectonics.
- Identify the major tectonic plates.
- Relate plate tectonics to the formation of landforms.

Forces in Earth's Crust

- Explain how stress in the crust affects Earth's surface.
- Explain why faults form in particular areas.
- Identify land features that result from plate movement.

Lab: Plate Boundaries and Movement

- Compare and contrast the plate movements that cause earthquakes and volcanic eruptions.
- Describe the role of mantle convection in plate movement.
- Differentiate between the major types of plate boundaries.
- Examine how plate movements cause changes in Earth's surface.

Landforms

- Identify the three main types of landforms.
- Identify what the topography of an area includes.

Models of Earth

- Describe the reference lines that are used to locate points on Earth.
- Explain how computers are used to map Earth's surface.
- Explain how maps and globes represent Earth's surface.
- Identify the three major map projections.

Topographic Maps

- Describe uses of topographic maps.
- Explain how elevation, relief, and slope are shown on topographic maps.
- Interpret topographic maps.

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		Earthquakes <ul style="list-style-type: none">Describe methods used to measure earthquakes.Describe the causes of an earthquake.Explain how geologists locate the epicenter of an earthquake.Explain how the energy of an earthquake travels.
		Volcanoes <ul style="list-style-type: none">Describe the three stages of volcanic activity.Distinguish the two types of volcanic eruption.Explain how volcanoes create various landforms.Explain what happens when a volcano erupts.Identify the reasons why Earth's volcanic regions are located in certain areas.
		Minerals and Rocks
		Minerals <ul style="list-style-type: none">Describe the properties used to identify minerals.Explain how minerals are formed.Identify uses of minerals.
		Rocks and the Rock Cycle <ul style="list-style-type: none">Describe the properties used to identify rocks.Identify the three main groups of rocks.Identify the ways in which rocks change as they move through the rock cycle.
		Igneous Rocks <ul style="list-style-type: none">Describe the characteristics used to classify igneous rocks.Identify the steps of igneous rock formation.
		Sedimentary Rocks <ul style="list-style-type: none">Distinguish the three types of sedimentary rocks.Identify ways in which sedimentary are formed.
		Metamorphic Rocks <ul style="list-style-type: none">Differentiate types of metamorphic rocks.Identify the steps of metamorphic rock formation.
		Lab: Mineral and Rock Classification <ul style="list-style-type: none">Classify minerals and rocks by their observable properties.Classify rocks by their process of formation.

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Weathering, Erosion, and Deposition		
Weathering and Soil		
Classify different types of soil.		
Describe the characteristics of soil.		
Distinguish between mechanical and chemical weathering.		
Explain how soil is formed.		
Identify factors that affect the rate of weathering.		
Erosion and Deposition		
Describe erosion and deposition.		
Differentiate types of mass movement.		
Water and Wind Erosion		
Describe the effects of wind erosion and deposition.		
Explain how glaciers and waves cause erosion and deposition.		
Identify causes of groundwater erosion.		
Identify features that are formed by water erosion and deposition.		
Lab: Modeling Water Erosion		
Identify factors that affect erosion and deposition by rivers.		
Model stream processes and observe stream behavior.		
Earth's Hydrosphere		
Surface Water		
Distinguish the three types of wetlands.		
Identify sources of fresh water.		
Identify the characteristics of ponds and lakes.		
Identify the components of a river system.		
Groundwater		
Differentiate major groundwater zones, including the saturated and unsaturated zones and the water table.		
Explain how groundwater is obtained.		
Explain how water moves underground.		
Virginia's Watershed Systems		
Identify major conservation, health, and safety issues associated with watersheds.		
Identify major watershed systems in Virginia.		
Ocean Water		
Describe the composition of ocean water.		
Distinguish the three main sections of the ocean's floor.		
Distinguish the three ocean zones.		
Locate Earth's five oceans.		

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Ocean Circulation

- Describe changes that affect ocean circulation.
- Describe tides as a source of energy.
- Identify causes of waves, currents, and tides.

Characteristics of the Seafloor

- Describe evidence that supports seafloor spreading.
- Describe the process of seafloor spreading.
- Explain what occurs at deep-ocean trenches.

Earth's Atmosphere**Structure and Composition of the Atmosphere**

- Describe the composition of Earth's atmosphere.
- Describe the importance of the atmosphere to living things.
- Distinguish the four main layers of the atmosphere.
- Explain how altitude affects air pressure and density.
- Identify properties of air, including pressure and density.

Energy in the Atmosphere

- Distinguish the three ways in which heat is transferred.
- Explain what happens when the Sun's energy reaches Earth.
- Identify the types of energy that travel from the Sun to Earth.

Lab: Energy Transfer

- Differentiate between the processes of conduction, convection, and radiation.
- Explain the role of heat transfer processes in the distribution of energy on Earth.

Winds

- Differentiate between local and global winds.
- Examine the processes that cause wind.
- Locate the major global wind belts.

Atmospheric Moisture and Precipitation

- Describe humidity and how it is measured.
- Distinguish the three main types of clouds.
- Explain how clouds form.
- Identify common types of precipitation.

Weather and Climate**Air Masses and Fronts**

- Differentiate the four main types of fronts.
- Explain how air masses move.
- Identify the major types of air masses.

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		<p>Storms</p> <ul style="list-style-type: none"> Describe the effects of various storms on humans and the environment. Explain how various storms form. Identify measures that can be taken to stay safe in a storm. <p>Weather Forecasting</p> <ul style="list-style-type: none"> Describe basic elements of meteorology. Describe what information can be gained from a weather map. <p>Lab: Weather Patterns</p> <ul style="list-style-type: none"> Examine the influence of atmospheric conditions on weather patterns. Identify weather systems and fronts utilizing a weather map. Utilize weather station data to analyze weather patterns. <p>Factors That Affect Climate</p> <ul style="list-style-type: none"> Explain how various factors affect weather and climate. Explain what causes seasons. <p>Lab: Absorption and Radiation by Land and Water</p> <ul style="list-style-type: none"> Compare and contrast the absorption of heat by land and water surfaces. Examine how the angle of sunlight affects heat absorption in the different climate regions. <p>Earth's Climate History</p> <ul style="list-style-type: none"> Explain how scientists study ancient climates. Identify factors that can cause long-term climate change. <p>Climate Change</p> <ul style="list-style-type: none"> Explain how human, biologic, and geologic activities can influence climate. Identify events that can cause short-term and global climate change.
		<p>Earth's Energy Resources</p> <p>Energy on Earth</p> <ul style="list-style-type: none"> Distinguish between renewable and nonrenewable resources. Identify advantages and disadvantages of various energy sources. Identify renewable and nonrenewable resources. <p>Land Resources</p> <ul style="list-style-type: none"> Describe land as a natural resource. Explain how land resources are managed. <p>Air Resources</p> <ul style="list-style-type: none"> Describe the atmosphere as a natural resource. Describe the importance of clean air.

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Water Resources

Describe the importance of water.

Explain how Earth's water is distributed and used.

Explain how water resources are managed.

Human Impact on Resources

Compare the costs and benefits of conservation policies.

Identify the negative impacts that human activity has had on Earth's resources.

Identify the positive impacts that human activity has had on Earth's resources.

Lab: Effects of Human Activity on Freshwater Resources

Identify sources of freshwater pollution.

Model the effect of pollutants on the quality of freshwater resources.

Predict the effect of human activity on the health of a freshwater ecosystem.