Course Description:

In the second semester of Science 7, study zeros in closer to home: Earth science. The coursework is uniquely integrated and applied to disciplines of study outside of Earth science. Starting with the Earth's interior students study rocks and minerals, volcanoes, earthquakes, undersea ridges, trenches and mountains and how the study of Earth's geologic history helps explain these phenomena. On the Earth's surface students study weathering, soil and erosion as well as water in all its forms the water cycle, oceans and ocean currents. Above the Earth they will study the atmosphere: its composition, air pressure and air movement. This knowledge is then applied to lessons on how human populations are affected by natural resources, renewable and non-renewable, both on and inside the Earth. These lessons are integrated with lessons that discuss how humans and living organisms are affected by air and water pollution, acid rain, changes in the ozone layer and how these conditions influence biodiversity, habitat loss and species survival. The course is capped off by lessons that take an in-depth look at the process of technology design giving students a look at how scientists and technical designers work together to achieve common goals. Lastly, students are taught about the kinds of professions that currently exist in the science and technology fields and learn about the necessary academic preparation needed to gain employment in these branches of study.

Module	Lesson Title	Objectives
Earth's Materials	The Structure of the Earth	● Distinguish between the layers of the Earth.
	Composition of Earth's Crust	● Describe the composition of the Earth's Crust ● Differentiate between elements, compounds, minerals, and rocks.
	Types of Rock	● Distinguish between the three types of rocks.
	The Rock Cycle	● Understand the steps of the rock cycle. ● Understand how rock moves through the rock cycle.

	Resources in the Earth's Crust	• Identify the most common metal resources found in Earth's crust and their characteristics. • Identify the most common mineral resources found in Earth's crust and their characteristics.
	Fossils	• Explain the nature of paleontology. • Describe three types of fossils. • Explain how fossils are formed.
	Geologic History	• Differentiate between carbon dating and radiometric dating. • Identify how rocks give scientists information about Earth's history.
	The Geologic Time Scale	• Understand the geologic time scale and the relationship of major and minor categories of time. • Know when key events happened on the geologic time scale.
	History of Earth's Life Forms	• Categorize the three eras in the Phanerozoic Eon according to the types of life forms that existed in each. • Describe how mass extinctions mark the beginning and end of each era in the Phanerozoic Eon.
Earth's Features and Processes	The Theory of Plate Tectonics	• Describe the continental drift theory and the evidence that proves it. • Describe the theory of plate tectonics.
	Types of Tectonic Plate Boundaries	• Explain the three types of plate movement: convergent, divergent, and transform. • Explain the geological activity that occurs with each type of plate movement.
	Mountains	• Explain how mountains are formed and the relationship of their formation to plate tectonics. • Describe how folded, fault-block, and volcano mountains are formed.
	Volcanoes	• Explain the connection between plate tectonics and volcanic landform formation. • Describe the 3 major types of volcanoes, and identify volcanoes as active, inactive, or extinct.
	Earthquakes	• Explain what causes earthquakes. • Describe how seismic waves move on Earth's surface and interior. • Explain how an earthquake's magnitude is measured.

	Ocean Ridges and Trenches	• Describe how ocean ridges and trenches are formed. • Explain what geological processes create new ocean floor and destroy old ocean floor.
	Physical Weathering	• Explain how weathering breaks down rocks and minerals on the Earth's crust. • Describe the processes involved in physical weathering.
	Chemical Weathering	• Identify the types of chemical and biological weathering. • Differentiate between chemical and mechanical weathering. • Differentiate between chemical biological and mechanical biological weathering.
	Soil	• Identify and distinguish between the different layers of soil and their composition.
	Erosion	• Describe the process of wind, water, and glacial erosion. • Identify how the force of gravity is a part of erosion.
The Atmosphere	Earth's Atmosphere	• Compare and contrast the layers of the atmosphere, including their compositions. • Evaluate the effects of altitude, temperature and humidity on atmospheric pressure. • Describe atmospheric pressure, including the units of measurement.
	Carbon Cycle	• Describe the gases that are found in Earth's atmosphere. • Understand how carbon moves through Earth's spheres.
	Oxygen Cycle	• Understand how the oxygen cycle maintains a balance of atmospheric oxygen and carbon dioxide. • Understand what caused the Great Oxidation Event and how it changed life on Earth.

	Nitrogen Cycle	• Understand how the nitrogen cycle functions and its relationship to plant growth and the food cycle for animal life.
	Climate	• Learn the factors that cause different kinds of climate. • Know how the greenhouse effect operates to warm the atmosphere. • Understand how mountain ranges affect weather on the windward and lee sides of ranges.
	Climate History	• Describe how deforestation can affect the climate. • Describe how scientists study past climates and climate change.
	Wind	• Discuss why the wind blows. • Explain the relationship between air pressure and global winds. • Describe the Coriolis effect.
	Air Masses and Fronts	• Explain the relationship between air masses and weather. • Understand how warm fronts and cold fronts interact with air masses. • Know what types of clouds and weather cold fronts and warm fronts cause.
	Weather Forecasting	• Make accurate weather observations. • Define several methods of weather forecasting. • Describe what basic instruments are used at weather stations and what they measure.
Water	Water	• Define hydrology and hydrologist. • Differentiate between the three physical states of water. • Describe the unique properties of water.

	Water on Earth	• Identify the places where water is found on Earth. • Distinguish between saltwater and freshwater.
	The Water Cycle	• Understand what the water table is and its relationship to groundwater and aquifers. • Know how the water cycle functions as a process.
	Oceans	• Identify what oceanographers study. • Describe the importance of the oceans.
	Properties of Ocean Water	• Describe the properties of ocean water at different ocean depths. • Explain how and why temperature in the ocean varies.
	Ocean Geography and Exploration	• Describe the physical features of the ocean floor. • Explain how researchers study the ocean floor.
	Ocean Movements	• Understand how the Coriolis effect influences winds and ocean currents. • Know the cause of major ocean gyres and how the Coriolis effect influences them. • Understand how tides affect ocean movement.
	Ocean Currents	• Understand the forces that create the ocean conveyor belt. • Explain how salinity and temperature affect ocean water density.
Earth's Resources and Pollution	Non-renewable Resources	• Distinguish between renewable and nonrenewable resources. • List the various kinds of nonrenewable fuels humans use for energy. • Explain some of the environmental issues connected with various energy sources.
	Renewable Resources	• Identify various renewable resources. • List the various kinds of renewable fuels humans use for energy. • List the pros and cons of using renewable resources.
	Human Energy Consumption	• Learn about the distribution of energy from different sources. • Learn about various types of renewable sources of energy used. • Understand the distribution of renewable power generation sources in the U.S. and the world.

	Water Pollution	• Describe the causes of water pollution. • Identify water sources that are susceptible to pollution. • Describe impacts of water pollution.
	Human Water Supply	• Identify ways to protect the human water supply.
	Air Pollution	• Describe the causes and effects of air pollution. • Identify the greenhouse gases and their effect on the global climate.
	Acid Rain and Ozone	• Explain the cause of the depletion of the ozone layer. • Describe the conditions that cause acid rain. • Describe the environmental concerns regarding acid rain and how it can be prevented.
	Global Climate Change	• Describe how human activities are affecting the global climate.
Human Impact on Earth	Human Impact on Biodiversity	• Explain the term biodiversity. • Explain why biodiversity is important to the health of life on Earth. • Describe how energy cycles through Earth's spheres.
	Human Impact on Earth's Oceans	• Identify how humans are changing the ocean environment. • Describe the impacts humans are having on coral reefs.
	Habitat Loss	• Describe how humans are impacting ecosystems. • Identify how habitat loss affects species.
	Species Survival	• Distinguish between when species become threatened, endangered, and extinct. • Describe how humans are impacting other species on Earth.

	Human Impact on Humans	● Describe how climate change is impacting human life. ● Describe how spreading disease impacts human
	The Living Earth	● Identify and describe the interrelated systems of Earth.