Course Description: Science 7B begins with an exploration of Earth's materials, including the rock cycle, fossils, and geologic time. Students examine Earth's internal structure, the theory of plate tectonics, and the forces that shape landforms through earthquakes, volcanoes, and erosion. They then explore living organisms, focusing on the structure and classification of invertebrates and vertebrates, and how body systems and reproduction vary across species.

Students also investigate Earth's atmosphere and climate systems, including the cycling of carbon, oxygen, and nitrogen, as well as the factors that influence wind, weather, and climate change. The course concludes with a study of Earth's water systems—from the properties of water and the water cycle to the structure, movement, and importance of the oceans.

The course assignments are designed to engage students in applying science and engineering practices (SEPs) to build understanding of disciplinary core ideas (DCIs) through crosscutting concepts (CCs). Capstone assignments encourage students to explain real-world phenomena and design solutions to problems using science and engineering practices.

Module	Lesson Title	Objectives
Module 7: Earth's Materials	7.1: Structure of the Earth	• Distinguish between the layers of the Earth.
	7.2: Composition of Earth's Crust	• Describe the composition of the Earth's Crust • Differentiate between elements, compounds, minerals, and rocks.
	7.3: Types of Rock	• Distinguish between the three types of rocks.
	7.4: The Rock Cycle	• Understand the steps of the rock cycle. • Understand how rock moves through the rock cycle.
	7.5: 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.

Module	Lesson Title	Objectives
	7.6: Fossils	• Explain the nature of paleontology. • Describe three types of fossils. • Explain how fossils are formed.
	7.7: Geologic History	• Differentiate between carbon dating and radiometric dating. • Identify how rocks give scientists information about Earth's history.
	7.8: 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.
	7.9: 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.
Module 8: Earth's Features and Processes	8.1: The Theory of Plate Tectonics	• Describe the continental drift theory and the evidence that proves it. • Describe the theory of plate tectonics.
	8.2: 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.
	8.3: 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.
	8.4: 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.
	8.5: Earthquakes	• Explain what causes earthquakes. • Describe how seismic waves move on Earth's surface and interior. • Explain how an earthquake's magnitude is measured.

Module	Lesson Title	Objectives
	8.6: 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.
	8.7: Physical Weathering	• Explain how weathering breaks down rocks and minerals on the Earth's crust. • Describe the processes involved in physical weathering.
	8.8: Chemical Weathering	• Identify the types of chemical and biological weathering. • Differentiate between chemical and mechanical weathering. • Differentiate between chemical biological and mechanical biological weathering.
	8.9: Soil	• Identify and distinguish between the different layers of soil and their composition.
	8.10: Erosion	• Describe the process of wind, water, and glacial erosion. • Understand how weathering and gravity are involved in erosion. • Evaluate technology used to manage erosion.
Module 9: Invertebrates	9.1: Sponges	• Identify the characteristics of sponges.
	9.2: Cnidaria	• Describe the characteristics of Cnidaria. • Compare Cnidarian species based on characteristics.
	9.3: Worms	• Identify different cell organelles.
	9.4: Mollusks	• Classify animals as mollusks by their characteristics. • Differentiate between bivalves, gastropods, and cephalopods.
	9.5: Arthropods	• Classify arthropods based on characteristics.
	9.6: Echinoderms	• Define and describe the basics of sexual reproduction in most animals and some plants.

Module	Lesson Title	Objectives
Module 10: Vertebrates	10.1: Chordates	• Differentiate between vertebrates and invertebrates. • Identify the characteristics of chordates.
	10.2: Fish	• Describe the characteristics of fish. • Identify the parts of a fish.
	10.3: Amphibians	• Identify the characteristics of all amphibians. • Distinguish between the three types of amphibians. • Describe the life cycle of amphibians.
	10.4: Reptiles	• Identify characteristics of reptiles. • Differentiate between reptiles and amphibians. • Define extinct and endangered.
	10.5: Birds	• Identify characteristics of birds. • Differentiate between birds and other vertebrates.
	10.6: Mammals	• Identify the characteristics of mammals. • Distinguish between the three groups of mammals. • Differentiate between mammals and other vertebrates.
Module 11: The Atmosphere	11.1: 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.
	11.2: Carbon Cycle	• Describe the gases that are found in Earth's atmosphere. • Understand how carbon moves through Earth's spheres.
	11.3: 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.

Module	Lesson Title	Objectives
	11.4: Nitrogen Cycle	• Understand how the nitrogen cycle functions and its relationship to plant growth and the food cycle for animal life.
	11.5: 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.
	11.6: Climate History	• Describe how deforestation can affect the climate. • Describe how scientists study past climates and climate change.
	11.7: Wind	• Discuss why the wind blows. • Explain the relationship between air pressure and global winds. • Describe the Coriolis effect.
	11.8: 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.
	11.9: 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.
Module 12: Water	12.1: Water	• Define hydrology and hydrologist. • Differentiate between the three physical states of water. • Describe the unique properties of water.
	12.2: Water on Earth	• Identify the places where water is found on Earth. • Distinguish between saltwater and freshwater.
	12.3: Water Cycle	• Understand what the water table is and its relationship to groundwater and aquifers. • Know how the water cycle functions as a process.

Module	Lesson Title	Objectives
	12.4: Oceans	• Identify what oceanographers study. • Describe the importance of the oceans.
	12.5: Properties of Ocean Water	• Describe the properties of ocean water at different ocean depths. • Explain how and why temperature in the ocean varies.
	12.6: Ocean Geography and Exploration	• Describe the physical features of the ocean floor. • Explain how researchers study the ocean floor.
	12.7: 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.
	12.8: Ocean Currents	• Understand the forces that create the ocean conveyor belt. • Explain how salinity and temperature affect ocean water density.