

Earth Science

COURSE DESCRIPTION:

This course begins with a discussion of the nature of science, the processes of science, and instruction on how to carry out scientific investigations in the lab and the field. The course then covers the properties of rocks and minerals and how to identify and classify them. Students will learn about geologic time, a history of life on Earth, and the development of the geologic time scale. The next parts of the course focus on Earth's tectonic, atmospheric, and ocean systems, including instruction on earthquakes, plate boundaries, properties of the atmosphere, properties of the oceans, and how human activities impact the atmosphere and the ocean. The second semester of the course begins with instruction in weathering and soils, followed by a discussion of river and groundwater systems, glaciers, shoreline features, and eolian systems. Students learn about the processes of weathering, how soils are natural resources, and the landscape features associated with rivers, glaciers, shorelines, and areas impacted by wind erosion. The course then covers mineral and energy resources, including fossil fuels, nuclear resources, and alternative energy sources. The course ends with a unit on the structure and composition of the solar system, with discussion of how Earth compares to other planets, the movements of asteroids and comets, and the life cycle of stars.

COURSE OBJECTIVES:

After completing this course, students will be able to:

1. Describe and demonstrate the nature of science, including laboratory skills and designing investigations.
2. Research and explain the unique features of Earth.
3. Describe properties of rocks and minerals, their development and significance as resources.
4. Analyze and use maps to describe geologic features and meteorological data.
5. Understand the historical development of Earth and describe dating principles.
6. Describe and discuss the theory of plate tectonics and its impact on landscape, earthquakes, and volcanoes.
7. Understand the Earth's atmosphere and oceans and how their movement drives weather and climate.
8. Describe the processes of water movement, weathering, and erosion.
9. Understand glaciation and its impact on the landscape.
10. Describe the origin and use of fossil fuels, nuclear power, and renewable energy sources including sustainability.
11. Discuss the impacts of human activity on the atmosphere, oceans, and other natural resources.
12. Describe the origin, structure, and composition of the solar system, stars, and the universe.

PREREQUISITES: None

COURSE LENGTH: Two Semesters

OPTIONAL MATERIALS: *Earth Science Laboratory Kit, Quality Science Labs, LLC;*
ISBN: 978-0-9818762-0-7

COURSE OUTLINE:**Unit I: The Study of Earth Science**

- Section A – The Nature of Science
- Section B – Laboratory Skills and Field Research
- Section C – Conducting a Scientific Investigation
- Section D – Planet Earth

Unit II: Rocks and Minerals

- Section A – Minerals
- Section B – Igneous Rocks
- Section C – Sedimentary Rocks
- Section D – Metamorphic Rocks
- Section E – Structural Properties of Rock Bodies

Unit III: Geologic History

- Section A – Relative Dating
- Section B – Absolute Dating
- Section C – The Geologic Time Scale
- Section D – A History of Life on Earth

Unit IV: Plate Tectonics

- Section A – The Theory of Plate Tectonics
- Section B – Earthquakes
- Section C – Convergent Plate Boundaries
- Section D – Divergent Plate Boundaries
- Section E – Transform Plate Boundaries
- Section F – Plate Tectonics and the Landscape

Unit V: The Atmosphere-Ocean System

- Section A – Properties of the Atmosphere
- Section B – Motion and Energy in the Atmosphere
- Section C – The Atmosphere and Human Activity
- Section D – Properties of the Oceans
- Section E – Energy and Motion in the Oceans
- Section F – Weather and Climate

Unit VI: Weathering and Soils

- Section A – Weathering
- Section B – Nature and Properties of Soils
- Section C – Soil as a Natural Resource
- Section D – Mass Movement

Unit VII: River and Groundwater Systems

- Section A – Characteristics of River Systems
- Section B – Processes of Stream Erosion and Deposition
- Section C – Floods
- Section D – Groundwater Systems
- Section E – Groundwater as a Natural Resource

Unit VIII: Landscape Features

- Section A – Glacial Features
- Section B – Karst Systems
- Section C – Shorelines
- Section D – Eolian Systems

Unit IX: Earth's Resources

- Section A – Mineral Resources
- Section B – Energy Resources: Fossil Fuels
- Section C – Energy Resources: Alternatives to Fossil Fuels
- Section D – Sustainability of Resources

Unit X: The Solar System

- Section A – Structure and Composition of the Universe
- Section B – Origin of the Solar System
- Section C – The Sun and the Inner Solar System
- Section D – The Outer Solar System
- Section E – The Life Cycle of Stars