

## **Comprehensive Earth Science - Part A**

**COURSE DESCRIPTION:** This course provides students with a comprehensive earth science curriculum, focusing on geology, oceanography, astronomy, weather, and climate. The program consists of in-depth online lessons, an associated reference book, collaborative activities, virtual laboratories, and hands-on laboratories students can conduct at home. The course prepares students for further studies in geology, meteorology, oceanography, and astronomy courses, and gives them practical experience in implementing scientific methods.

**PREREQUISITES:** Middle school Life Science, or equivalent

**COURSE LENGTH:** One Semester

**REQUIRED TEXT:** Earth Science: A Reference Guide

**MATERIALS LIST:** No required materials for this course

### **COURSE OUTLINE:**

#### **Unit 1: Earth Science and Systems**

- Semester Introduction
- Why Study Earth Science?
- Historical Contributions in Earth Science 1
- Historical Contributions in Earth Science 2
- Spheres as Earth Systems
- Laboratory: Topographical Maps
- Earth Systems and Interactions
- Laboratory: Modeling Earth Science Processes 1
- Laboratory: Modeling Earth Science Processes 2

#### **Unit 2: Dynamic Earth**

- Introduction to Plate Tectonics
- Pangaea and Continental Drift
- Moving Plates
- Plate Boundaries 1

- Plate Boundaries 2
- Plate Tectonics: Historical Perspective
- Where Earthquakes and Volcanoes Occur
- Structure of Earth's Interior
- Laboratory: Island Chain Formation
- How Earthquakes Happen
- Locating Earthquakes
- Earthquakes and Waves
- Laboratory: Earthquake Epicenter
- How Volcanoes Form
- Volcanic Zones
- Mountain Building
- Impact of Geologic Events

### **Unit 3: Composition of the Earth**

- Minerals on Earth
- Mineral Properties
- Valuable Minerals
- Crystal Structures
- Rocks and Their Mineral Composition
- Three Kinds of Rocks
- Laboratory: Rocks and Minerals 1
- Laboratory: Rocks and Minerals 2
- Rock Origins 1
- Rock Origins 2
- The Rock Cycle
- Earth Materials Change
- Weathering and Erosion
- Land Use and Its Effects

### **Unit 4: Geological History**

- Earth's History
- Earth's History and Change
- The Fossil Record

- Age of Geologic Features
- Earth's History Written in Rocks
- Laboratory: Interpreting Geologic History, Day 1
- Laboratory: Interpreting Geologic History, Day 2

#### **Unit 5: Earth's Atmosphere**

- Layers in the Atmosphere
- Composition of the Atmosphere
- History of the Earth's Atmosphere
- Laboratory: Barometer 1
- Laboratory: Barometer 2
- The Sun and Energy
- Solar Radiation
- Temperature and Air Pressure
- Air Circulation Patterns 1
- Air Circulation Patterns 2
- Air Movement and Weather
- Wind and Human Activity
- Laboratory: Energy Absorption/Reflection 1
- Laboratory: Energy Absorption/Reflection 2

#### **Unit 6: Weather 1**

- Gathering Weather Data
- Weather Maps
- Laboratory: Weather Map Interpretation 1
- Laboratory: Weather Map Interpretation 2
- Cloud Formation
- How Storms Develop
- Determining Level of Risk
- Preparing for Severe Weather

#### **Unit 7: Semester Review and Test**

- Semester Review
- Semester Test