Earth Science

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

PREREQUISITES: Middle school Earth Science, or equivalent

COURSE LENGTH: Two Semesters

REQUIRED TEXT: Earth Science: A Reference Guide

MATERIALS LIST: No required materials for this course

COURSE OUTLINE:

Semester 1

Unit 1: Earth Science and Systems

- Semester Introduction
- Why Study Earth Science?
- Spheres as Earth Systems
- Review: Why Study Earth Science and Earth Systems
- Laboratory: Topographical Maps
- Earth Systems and Interactions
- Review: 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

- Review: Plate Tectonics
- Where Earthquakes and Volcanoes Occur
- Review: Earthquakes and Volcanoes Occur
- Structure of Earth's Interior
- Review: Structure of Earth's Interior
- Laboratory: Hawaiian Island Chain
- How Earthquakes Happen
- Review: How Earthquakes Happen
- Locating Earthquakes
- Laboratory: Earthquake Epicenter
- How Volcanoes Form
- Review: Earthquakes and Volcanoes
- Mountain Building
- Review: Mountain Building

Unit 3: Composition of the Earth

- Minerals on Earth
- Mineral Properties
- Review: Minerals
- Rocks and Their Mineral Composition
- Review: Rocks and Their Mineral Composition
- Three Kinds of Rocks
- Review: Three Kinds of Rocks
- Laboratory: Rocks and Minerals 1
- Laboratory: Rocks and Minerals 1
- The Rock Cycle
- Review: The Rock Cycle

Unit 4: Geological History

- Earth's History
- The Fossil Record
- Review: History and Fossil Record
- Age of Geologic Features
- Earth's History Written in Rocks

- Review: Geological Features and Earth's History
- 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
- Review: Atmosphere
- Laboratory: Barometer 1
- Laboratory: Barometer 2
- The Sun and Energy
- Solar Radiation
- Review: Sun and Solar Radiation
- Temperature and Air Pressure
- Review: Temperature and Air Pressure
- Air Circulation Patterns 1
- Air Circulation Patterns 2
- Review: Air Circulation
- Laboratory: Energy Absorption/Reflection 1
- Laboratory: Energy Absorption/Reflection 2

Unit 6: Weather 1

- What Makes the Weather?
- Review: What Makes the Weather?
- Gathering Weather Data
- Weather Maps
- Review: Weather Maps and Data
- Laboratory: Weather Map Interpretation 1
- Laboratory: Weather Map Interpretation 2
- Cloud Formation
- How Storms Develop
- Review: Clouds and Storms

Unit 7: Semester Review and Test

- Semester Review
- Semester Test

Semester 2

Unit 1: Weather 2

- Semester Introduction
- Climate vs. Weather
- What Influences the Weather?
- Review: Climate and Weather Influences
- Laboratory: Cloud Formation
- Laboratory: Relative Humidity
- The Greenhouse Effect
- Greenhouse Effect Analyses
- Review: Greenhouse Effect
- Climate Change
- Patterns of Climate Change
- Review: Climate Change
- Laboratory: Temperature of Water and Soil 1
- Laboratory: Temperature of Water and Soil 2

Unit 2: Oceans

- Oceans of the World
- Chemistry of the Oceans
- Review: Oceans and Chemistry
- Physical Properties of Seawater
- Review: Physical Properties of Seawater
- Laboratory: Ocean Water Density 1
- Laboratory: Ocean Water Density 2
- Ocean Currents
- Review: Ocean Currents
- Ocean Conditions and Life
- Review: Ocean Conditions and Life
- Laboratory: Ocean Floor Sediments 1
- Laboratory: Ocean Floor Sediments 2

Unit 3: Cycles on Earth

- Biogeochemical Cycles
- Review: Biogeochemical Cycles
- Carbon Cycle
- Life and the Carbon Cycle
- Review: Carbon Cycle
- Laboratory: Dissolved Oxygen 1
- Laboratory: Dissolved Oxygen 2
- Water Cycle
- Review: Water Cycle

Unit 4: Astronomy

- The Sun
- The Earth–Moon–Sun System
- Review: Sun and The Earth–Moon–Sun System
- Laboratory: Solar Energy
- The Moon's Influence
- Review: The Moon's Influence
- Earth Movement and Seasons
- Review: Earth Movement and Seasons
- Laboratory: Earth, Moon, Sun Motion
- Laboratory: Sunrise and Sunset
- Origin of the Solar System
- Features of the Solar System
- Review: Origin and Features of the Solar System
- The Planets
- Review: The Planets
- Electromagnetic Spectrum
- Light: A Tool for Astronomy
- Review: Electromagnetic Spectrum and Light
- Distances in Space
- Review: Distances in Space
- Life Cycle of a Star

- Review: Life Cycle of a Star
- What's a Galaxy?
- The Big Bang Theory
- Review: Galaxies and Life Cycle of a Star

Unit 5: Earth's Resources

- Earth's Natural Resources
- Renewable vs. Nonrenewable Resources
- Review: Resources
- Environmental Issues
- Review: Environmental Issues
- Laboratory: Air Pollution Watch
- Water Resources
- Review: Water Resources
- Humans and the Environment
- Conservation
- Review: Humans and Conservation

Unit 6: Semester Review and Test

- Semester Review
- Semester Test