



## Course Outline

### Earth's Surface

Our earth is right here under our feet, and a lot of knowledge can be gained from looking down at terra firma. This unit introduces the surface of our earth. Students learn about mapping the earth as it is, and then learn how the surface of the earth changes due to weathering and erosion. In a hands-on laboratory, students study earth's soils, comparing and contrasting them and examining how desertification takes place.

- Introduction to Earth Science
- Spheres of the Earth
- Mapping the Earth
- Weathering
- Erosion
- Soils of the Earth
- Soil Profiles
- Laboratory: Desertification

### Rocks and Minerals

The beauty of minerals and the earthiness of rocks form the basis for this unit. Students start by examining and defining crystals, with lots of hands-on activity. The three kinds of rocks are examined, and then students tackle the rock cycle, which shows the interrelationships between the various rock types. The rock cycle is an underlying, unifying feature, a "big idea" of geology.

- Identifying Minerals and Crystals
- Laboratory: Minerals and Crystals
- Laboratory: Mineral Identification
- Igneous Rocks
- Sedimentary Rocks
- Metamorphic Rocks
- The Rock Cycle
- Laboratory: Rock Cycle

### Geologic History

This unit deals with the changes that earth has undergone over time. What can we learn from fossils, how can we understand the lessons that are in rocks, and how can the layering of the earth tell us what might have happened in the past? Students see a broad picture of an earth that has changed over time and examine the evidence for it. Importantly, students understand that the processes that occurred in the past are the same that are still occurring on our earth.

- Linking Past to Present
- Earth's Age

- Fossils
- Records in Rocks
- Laboratory: Index Fossils
- Geologic Time

### Plate Tectonics

The overriding theory of geology is the theory of plate tectonics. This theory explains the drift of the continents, earthquakes, and volcanoes and thus unifies much of our experience under a single idea. This unit is a thorough explanation of plate tectonics, its processes and results. In a hands-on laboratory, students build their own seismograph—but more importantly, they understand the causes of earth movements as a direct result of the movement of earth's plates.

- Center of the Earth
- Continental Drift
- Seafloor Geography
- Seafloor Spreading
- Plate Tectonics
- Convection
- Plate Boundaries
- Landforms
- Laboratory: Plate Boundaries
- Earthquakes
- Laboratory: Seismographs

### Air, Weather, and Climate

Is it rainy, windy, or sunny with blue skies? Do you live in an area with lots of rain all year or a desert with limited rainfall? Weather and climate are phenomena familiar to all of us and both have a huge bearing on our lives. In this unit students will study weather, including air masses and patterns of air circulation. What is the difference between weather and climate and in what ways has climate changed over time?

- Layers of the Atmosphere
- Conduction, Convection, Radiation
- Daily Weather
- Air Circulation
- Air Masses
- Weather Fronts
- Meteorology
- Laboratory: Working with Weather
- Weather and Climate
- Factor Affecting
- Laboratory: Global Warming



## Water on Earth

So much of the earth is covered with water. Water is the basis of all life and the water cycle ensure that water is constantly being replenished on our earth. Of all the places that water resides none is more important than our oceans. Ocean water, tides, and currents affect all of our lives, and this unit lets students take a good look at the “water planet.”

- Water and the Water Cycle
- Ocean Water
- Ocean Currents
- Ocean Waves
- Ocean Tides

## Energy and Earth Resources

One of the most important issues facing us today is our use of energy. Whether it is our relationship to fossil fuels or our concern with nuclear energy, we need to understand and make wise decisions about our resources and the energy we can get from them. What are the issues and debates surrounding our consumption of natural resources? How can we ensure that the next generation will have enough resources to advance? In this unit students will study the science of resources, which will give them a basis to participate in one of our society’s most important debates.

- Energy Resources
- Fossil Fuels
- Consumption and Environmental Effects
- Alternative Energy Resources
- Resource Management
- Laboratory: Power from Tides

## Our Place in the Universe

We on earth are part of a solar system, which is part of a galaxy called the Milky Way, which is part of a universe of almost unfathomable size. Students in this unit get a chance to understand our place in the universe. Starting at the level of the universe and then narrowing focus, students learn about the planets of the solar system, about how the earth rotates, the seasons, and about phenomena involving the moon. This unit provides a broad picture of our earth in space and concludes with an examination of how we have sought over time to understand space through exploration.

- Origin of the Universe
- Galaxies
- Gravitation Forces
- Rotation and Revolution
- Solar System

- Inner Planets
- Outer Planets
- Earth’s Seasons
- Asteroids and Comets
- Moon
- Moon Phases
- Eclipses
- Space Exploration
- People in Space

## Scientific Investigation

In this unit students get a chance to do a personal scientific investigation. They will learn about and follow scientific methods to set up, conduct, analyze, and make conclusions based on a hands-on investigation. Students will create a display of their investigation and then they will prepare to give an oral report.

- Scientific Methods
- Set up an Experiment
- Data Collection
- Data Analysis
- Reporting Conclusions
- Create a Display
- Oral Presentation