

Unit Summary

The hands-on activities in Frey's Inquiry Investigations™ *Earth's Resources Module* link to core science concepts, making them an excellent complement to existing curricula. Students investigate igneous, sedimentary, and metamorphic rocks, rock formation and the rock cycle, mineral formation, mineral streak, luster, hardness, and specific gravity, cleavage and fracture, fossils, geologic time scale, chemical and mechanical weathering, continental drift, soil structure, and soil horizons.

The Inquiry Investigations™ *Earth's Resources Module* consists of five investigative units featuring twenty-five hands-on laboratory activities. Each unit begins with a thorough introduction of the science skills and concepts presented in the lab activities that follow. The lab investigations can be performed in sequence (see pacing chart) or separately based upon the time available.

Suggested *Going Further* investigations allow students to design and carry out their own investigations, expanding their knowledge and understanding of Earth's structure and resources.

Unit 1: Exploring Rocks

Lab 1: The Rock Cycle

In **Activity 1**, students identify the stages in the rock cycle. They also examine the physical properties of rock samples and identify how they are formed.

In **Activity 2**, students simulate the processes involved in the formation of a sedimentary rock.

In **Activity 3**, students model the effects of heat and pressure on the layers of Earth's crust.

In **Activity 4**, students discover the connection between how fast a liquid evaporates and the size of crystals that form.

Suggested *Going Further* investigations encourage students to create posters that illustrate the processes involved in the rock cycle.

Lab 2: Rock Formation and Identification

In **Activity 1**, students examine the physical characteristics of igneous rock samples. They correlate rock sample cooling rates to grain formation.

In **Activity 2**, students examine rock samples and classify them as chemical, clastic, or organic sedimentary rocks.

In **Activity 3**, students examine the physical characteristics of metamorphic rock samples.

Suggested *Going Further* investigations ask students to design their own experiment to explore and investigate the following topics: (1) how the cooling of crystals formed from Epsom salts affects their size; (2) how various types of rock respond to being heated in an oven to simulate thermal metamorphism.

Unit 2: Exploring Minerals

Lab 3: Mineral Formation and Identification

In **Activity 1**, students make observations about the color of different mineral samples.

In **Activity 2**, students identify the luster of mineral samples.

In **Activity 3**, students determine the color of the streak of a mineral and compare it with the mineral color.

In **Activity 4**, students use the Mohs Scale of Hardness to determine the hardness of each mineral sample.

In **Activity 5**, students identify cleavage and fracture shown in each mineral sample.

In **Activity 6**, students determine the specific gravity of their mineral samples.

Suggested *Going Further* investigations prompt students to explore magnetizing objects (such as a pin) to see how the magnetized pin is attracted by different minerals.

Lab 4: How Minerals Get Their Color

In **Activity 1**, students learn how minerals get their color and identify samples as idiochromatic or allochromatic.

In **Activity 2**, students use a flame test to determine the flame color produced by various salt samples that occur naturally in many minerals.

In **Activity 3**, students identify unknown mineral samples by examining their physical characteristics and analyzing their chemical composition using a flame test.

Suggested *Going Further* investigations ask students to create their own palette of paints using a basic white latex paint for a base and mixing in finely ground mineral samples such as malachite, hematite, and azurite to create the colored paints.

Unit 3: Hunting for Fossils

Lab 5: Fossil Formation and Identification

In **Activity 1**, students learn about the geologic time scale.

In **Activity 2**, students identify fossil samples and their associated geologic eras and periods.

In **Activity 3**, students model making molds and casts.

Suggested *Going Further* investigations encourage students to hunt for fossils in the field, visit a natural history museum, or design their own lab to determine which body part of a dead insect is most likely to fossilize.

Unit 4: Earth's Processes

Lab 6: Weathering

In **Activity 1**, students explore how rocks are mechanically weathered. They also learn how the hardness of a rock or mineral affects how easily it is weathered.

In **Activity 2**, students learn about chemical weathering.

Suggested *Going Further* investigations let students design an experiment to test how rocks are affected by the freezing and thawing that occurs throughout the year.

Lab 7: Soils

In **Activity 1**, students explore the physical characteristics and identity of various types of soil samples.

In **Activity 2**, students collect a soil sample and observe and compare its physical characteristics and soil horizon to a standard.

Suggested *Going Further* investigations ask students to investigate how soil development is dramatically influenced by biological activity; they study different approaches used to prevent soil erosion.

Lab 8: Continental Drift

In **Activity 1**, students model sea floor spreading and compare the location of today's land masses with their locations approximately 200 MYA.

Suggested *Going Further* investigations encourage students to investigate earthquakes and volcanoes to see how they reinforce the concept of plate tectonics.

Unit 5: Comprehensive Inquiry Investigation

Lab 9: Culminating Lab

In **Activity 1**, students unearth unknown rock, mineral, gem, and fossil samples and identify them using the knowledge and various tests that they have learned from previous activities.

Suggested *Going Further* investigations ask students to collect local rock, mineral, and fossil specimens for a display of the types of geology specimens found in their area.