Ecology in Classrooms & Outdoors

ROCK PROPERTIES
TEACHER GUIDE

Introduction

In this lesson, students are introduced to a few ways that geologists investigate the unique characteristics of rocks. Investigating these characteristics, or properties, can help lead to a correct identification of the rock based on observations. Using water, light, and other common household tools, students will perform scientific tests on rocks that they have collected outdoors or from an existing rock collection. Finally, students are encouraged to share their findings as a group and compare their rock samples.

Materials

- 3 or more rock samples
- ECO instructional video: Rock Properties Investigations
- Rock Properties Test Descriptions sheet
- Rock Properties Investigation activity sheet
  - Option 1: lower elementary
  - Option 2: upper elementary/middle school
- Investigation materials:
  - Cup of water
  - Light source (flashlight or bright window)
  - Coin, nail, paperclip
  - Magnet or compass
  - Vinegar, eye dropper or spoon
- Pen or pencil
- Rocks and minerals field guide or internet browser (optional)

Lesson Length

30-45 min asynchronously or synchronously

Standards

NGSS

1-PS4-3 Waves and Their Applications in Technologies for Information Transfer
Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.

2-PS1-1 Matter and Its Interactions
Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

3-LS4-1 Biological Evolution: Unity and Diversity
Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.

5-PS1-3 Matter and Its Interactions
Make observations and measurements to identify materials based on their properties.

Lesson Procedure

1. COLLECT ROCK SAMPLES

Rocks are all around us. They are made up of minerals and come in many different shapes, sizes, colors, and textures. Begin by inviting students to go to a safe place outdoors to collect 3-5 small rock samples.

We recommend searching in a variety of natural areas, such as along the banks of a river or creek, on a local trail, or in a forested area, if possible.

Remind students the samples should fit in the palm of their hand, and if possible, should be different colors and textures. Students may also use an existing rock collection for this activity.

2. SHARE WITH THE GROUP, PART I

In person or using your digital classroom learning platform (Zoom, Google Classroom, etc), have students share their rocks and their observations of them.

Lesson Procedure, cont.

Ask guiding questions to assist students in making observations:

- Where did the rocks come from?
- How do the rocks feel?
- What do the rocks look like?
- What color(s) are the rocks?
- Are some rocks heavier or lighter in weight?

3. INVESTIGATE FURTHER

Explain that scientists who study earth materials including rocks are known as **geologists**. Geologists try to figure out what kind of rocks and minerals they are looking at by making observations and performing investigations or tests.

Ask students why it is important to make observations. Explain that by making observations we may become curious and have questions about something. By studying or doing investigations, we can try to figure out the answers to our questions.

Ask students what happens if we predict or make a guess about something and it's wrong? Is that bad? No! It's actually good, because either way we are learning and starting to understand how things work. This is what students will be doing during the investigative activity.

Using the **Rock Properties Test Descriptions sheet**, explain how to perform these tests on rock samples and what can be learned from them. Additionally, show students the **ECO instructional video on Rock Properties Investigations**.

For example, the scratch test can be done using various objects to determine the hardness of the rock. If the rock is scratched by an object such as a fingernail or a copper penny, it is on the softer side. If it can be scratched by a metal nail or paperclip, or does not scratch at all, it is on the harder side.

Soapstone is an example of a soft rock, while basalt is a hard rock. Discuss the other tests that geologists might perform to learn more about the rocks.

4. ACTIVITY: ROCK PROPERTIES INVESTIGATION

Download and print the **Rock Properties Test Descriptions sheet** and, depending on the students' grade level, one of the **Rock Properties Investigation activity sheets**.

The activity sheet for lower elementary students shows the various tests to perform on their rock samples with space to record their findings by checking boxes for each outcome.

The activity sheet for upper elementary and middle school students includes more space to write out hypotheses, methods, and the outcomes for their investigations. This will also encourage students to do additional research on their rocks using a field guide or the internet to identify their rock sample. Students should use one activity sheet per rock sample, for as many rock samples as they like.

5. SHARE WITH THE GROUP, PART II

Returning as a group, have students share their observations and test results.

Of course, there is so much more to the study of rocks. Rocks are a fascinating way to dive into topics in chemistry, physics, and ecology.

We recommend using this lesson as a jumping off point to get students interested in rocks and minerals, while becoming familiar with carrying out investigations and drawing conclusions.