

How can you tell rocks apart?

Teaching and Learning Focus

In this investigation, students will explore how to use the physical characteristics of rocks to group and identify the rocks.

Materials Needed

For each student group:

- rock samples with stick-on numbers from 1 - 6 (at least two sedimentary, igneous and metamorphic rocks; see the Digging Deeper section at the end of the investigation for specific examples)
- magnifiers for each student or pair of students
- pencils to record observations
- [Rock Data Table](#)
- [Rock Identification Sheets](#)

Safety

This investigation is considered generally safe to do with students. Please also review the investigation for your specific setting, materials, students, and conventional safety precautions.

Setting the Scene

Remind students of the rocks that they studied in their first investigation. What was the same about the rocks? What was different? What characteristics did they think would be useful in identifying their rocks? Make a list of their ideas to refer to during the investigation.

Presenting the Investigation Question

Introduce students to the investigation question: “*How can you tell rocks apart?*” Tell students that they will be investigating this question and at the end of their investigations they will be able to provide reliable answers.

Have students brainstorm ideas about how to investigate this question:

1. What materials would be needed?
2. What would you have to do?
3. What would be measured?
4. How long would the experiment take?

Assessing What Your Students Already Know

Here are some initial questions that students can discuss, in pairs, groups and as a whole class:

- What characteristics can you observe in rock samples?
- How can you tell different rocks apart?

Have students report out their ideas and make a list of them. Add to your class list called “Questions we have about rocks.” By the end of the investigation, more of these questions will probably be answered.

Exploring the Concept

1. If you have not already done so, divide the class into groups of four.
2. Before students begin, tell them how much time they will have to complete their investigation. (*Group learning strategies often call for appointing a group timekeeper who keeps the group on track.*)
3. Provide students with the tools for the investigation
4. Tell students that they will be examining their rocks, recording their observations about the rocks in their Rock Data Table. Circulate while they work to monitor progress and answer questions.
4. When they finish, ask students to use the data in their tables to make three groups of rocks. The rocks in each group should have similar characteristics. When they have done this, ask groups to volunteer to share their groupings and their reasons for them.
5. Give students copies of the Rock Identification Sheets, which they can use with their Rock Data Tables to identify the groups in which their rocks belong. If they feel confident about this, they can try to identify the specific names of the rock samples.
6. When students are finished, hold a whole class discussion about how it is possible to use the characteristics of rocks to group them. Make a list of their ideas on a flipchart for later.

Applying Students' Understanding

Give each group a new set of rocks (you can switch rocks from group to group) and ask the students to group the rocks based upon their characteristics. Ask them to give a reason for why they placed each rock in its group.

Revisiting Investigation Question 2

Complete this investigation by asking students to reflect on this question and how their answers may have changed as a result of this investigation. For example, sedimentary rocks typically have grains that one can see, whereas igneous rocks don't. Crystals in metamorphic rocks are often arranged in bands.

Digging Deeper

The following passage provides more detailed information related to this investigation that you may choose to explain to students.

There are three main categories of rocks, which are defined by how the rocks are formed.

Sedimentary Rocks

Sedimentary rock is often found in layers. One way to tell if a rock sample is sedimentary is to see if it is made from grains. Some samples of sedimentary rocks include limestone, sandstone, coal and shale.

Igneous Rocks

Igneous rocks form when magma from inside the Earth moves toward the surface, or is forced above the Earth's surface as lava and ash by a volcano. Here it cools and crystallizes into rock. Look for crystals in igneous rocks. Examples of igneous rocks are gabbro, granite, pumice and obsidian.

Metamorphic Rocks

Metamorphic rocks are rocks that have become changed by intense heat or pressure while forming. One way to tell if a rock sample is metamorphic is to see if the crystals within it are arranged in bands. Examples of metamorphic rocks are marble, schist, gneiss, and slate.





Rock Data Table

Rock Data Table





Sample Number	Observations	Rock Group (sedimentary, igneous or metamorphic)

Rock Identification Sheets





Rock Identification Sheet

Sedimentary Rocks	
Limestone	
Image from the Earth Science world Image Bank. Copyright © Society for Sedimentary Geology	
Sandstone	
Image from the Earth Science world Image Bank. Copyright © Dr. Richard Busch	
Shale	
Copyright © "Minerals and Materials Photo Gallery" on the website of the U.S House Subcommittee on Energy and Natural Resources	
Coal	
Copyright © "Minerals and Materials Photo Gallery" on the website of the U.S House Subcommittee on Energy and Natural Resources	

Rock Identification Sheet

Igneous Rocks	
Pumice	
<small>Image from: http://commons.wikimedia.org/wiki/Image:Pumeks2.JPG</small>	
Obsidian	
<small>Image from the Earth Science world Image Bank. Copyright © Dr. Richard Busch</small>	
Granite	
<small>Image from the Earth Science world Image Bank. Copyright © Dr. Richard Busch</small>	
Gabbro	
<small>Image from the Earth Science world Image Bank. Copyright © Dr. Richard Busch</small>	

Rock Identification Sheet

Metamorphic Rocks	
Marble	
<small>Image from the Earth Science world Image Bank. Copyright © Dr. Richard Busch</small>	
Slate	
<small>Copyright © "Minerals and Materials Photo Gallery" on the website of the U.S House Subcommittee on Energy and Natural Resources</small>	
Gneiss	
<small>Image from the Earth Science world Image Bank. Copyright © Dr. Richard Busch</small>	
Schist	
<small>Image from the Earth Science world Image Bank. Copyright © StoneTrust, Inc.</small>	