

# Do Rocks Absorb Water?

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<b>Strand</b>	Earth Patterns, Cycles, and Change
<b>Topic</b>	Investigating the physical properties of rocks
<b>Primary SOL</b>	5.7 The student will investigate and understand how Earth’s surface is constantly changing. Key concepts include a) identification of rock types.
<b>Related SOL</b>	5.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which b) estimates are made and accurate measurements of length, mass, volume, and temperature are made in metric units using proper tools; c) estimates are made and accurate measurements of elapsed time are made using proper tools; d) hypotheses are formed from testable questions; e) independent and dependent variables are identified; g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements; h) predictions are made using patterns from data collected, and simple graphical data are generated.

## Background Information

Rocks have properties that can be observed, tested, and described. Composition, grain size and textural features, color, and the presence of fossils help with identification. Classification keys can aid this process.

## Materials

- A variety of rocks, including more porous rocks, such as sandstone, pumice, and mudstone (These rocks can come out of an existing rock collection to ensure a wide variety, or students can bring in their own rocks.)
- Graduated cylinders or beakers (mL)
- Bowls
- Balance
- Copies of Rock Chart
- Tape measures
- Plastic wrap

## Vocabulary

*absorption*

## **Student/Teacher Actions (what students and teachers should be doing to facilitate learning)**

### *Introduction*

1. Review what students already know about rocks, brainstorming a list of rock facts.
2. Ask the students whether they believe that rocks can absorb water, and have them write their predictions and the reasons for them.
3. Have students share their ideas in a class discussion, but if there is disagreement about the question, do not give them the answer.
4. Explain to students that they will be carrying out an investigation to find out whether rocks absorb water.

### *Procedure*

1. Place balances and rocks in a central location.
2. Have students get into pairs or small groups, depending on how many rocks are available.
3. Students can either use a rock classification key to determine what kind of rock they have or they can use rocks that are pre-labeled.
4. Once they have determined what kind of rock they have, students will first predict and record what they think the mass of the rock is (in grams) and how long and wide it is (in millimeters). Then the students will take careful measurements of the rock's mass, length at the longest part, and width around the widest part, again recording all measurements on the data sheet.
5. Have students fill a millimeter beaker with as much water as they think it will take to cover the rock completely when it is placed inside the beaker. Record this amount. For rocks that are too large to fit into a beaker, have students use a bowl that will not absorb the water and carefully measure, using a beaker, enough water to cover the rock.
6. Have students place rocks into the water and cover their beakers or bowls with plastic wrap to prevent evaporation. Set the submerged rocks aside.
7. Each day for about 7 days, have students take the measurements of the rocks including mass, length, and width. The measurements may change by only a few millimeters, so ensure that students will measure exactly and note changes in millimeters. The amount of water left in the beaker should also be recorded. If the rocks are placed on a sheet of plastic, any water that is dripped can be carefully placed back in the beaker. Tell students to be very careful not to spill water and to make careful and accurate measurements, or their results may not be accurate.

### *Conclusion*

1. On Day 7, have students look at their charts. Ask them to make a conclusion about the differences in the size of the rock as well as the amount of water that was left. Have them discuss their conclusions with a neighbor.
2. Once students realize that their results are different from neighbors (depending on the type of rock), ask students to infer why the differences occurred. Ask students to identify the types of rock that did absorb water and the types that did not to help them record their conclusions at the bottom of their charts.

## Assessment

- **Questions**
  - Did any of the rocks float? Explain using your observations.
  - What kinds of rocks float?
  - Why did the water decrease in the graduated cylinder or the bowl?
- **Journal/writing prompts**
  - Have students summarize in their science journals what they did during the investigation, what they found out through the investigation, and their conclusions based on their observations
- **Other**
  - Assess the students' graphs and charts of the data.
  - Have students write a story about the life of a rock that is found in the northeastern United States, where the seasons change. It should include the changes that take place in the rock as the seasons change.

## Extensions and Connections (for all students)

- Take several samples of small rocks that absorbed water and some that did not absorb water, and place them in the freezer overnight in a container. Have students observe what happens to the rocks when they freeze.
- Place a porous rock in some out-of-the-way location on the school grounds, and after securing necessary permission, have students mark the location of the rock by flagging it with a little ground marker. Have the students observe the rock through the school year, taking data at the beginning of the year and at regular intervals throughout the year. Have the class keep a rock journal, recording the changes the rock goes through, including temperature changes, the changes in the environment around the rock, and the precipitation to which it is subjected.

## Strategies for Differentiation

- Provide students with an outline of the process of the experiment/observation. (Use a story rope with the process in sequence by picture and have the students physically touch each picture on the rope as each step is being worked on.)
- Provide students with a model for journal entries.
- Allow students to draw their observations in their journals or use another form of media to convey the same message.
- Have students create an experiment that compares porous rocks with other porous materials to show similarities and differences. Use a graphic organizer to document conclusions in this experiment.

# Rock Chart

Names: \_\_\_\_\_ Date: \_\_\_\_\_

*Prediction:*

I think that a rock does / does not absorb water.

My type of rock is: \_\_\_\_\_.

I covered my rock with \_\_\_\_\_ mL of water.

Day	Rock Predictions in mL			Rock Actual Measurement in mL			Water n the Graduated Cylinder/Bowl in mL
	Mass	Length	Width	Mass	Length	Width	
Day 1: (pre-water)							
Day 2:							
Day 3:							
Day 4:							
Day 5:							
Day 6:							
Day 7:							

*Conclusion:*

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