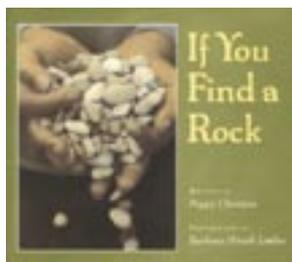


Rock Solid Science

By Karen Ansberry
and Emily Morgan

Children are naturally curious about the world around them, including the rocks beneath their feet. By observing, describing, and sorting a variety of rocks, students can discover that rocks have certain physical properties by which they can be classified. This month's article takes a fun approach to learning about the properties, uses, and formation of rocks. Students in grades K–3 explore the properties and uses of their own “pet rock,” while students in grades 4–6 investigate “rock stories.”

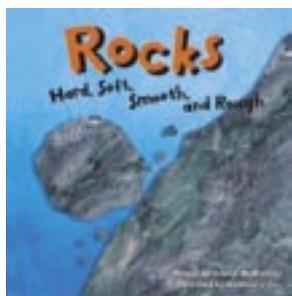
This Month's Trade Books



If You Find a Rock
By Peggy Christian.
Harcourt. 2000.
ISBN 0152393390.
Grades K–4

Synopsis

Poetic text and soft, hand-tinted photographs combine to explore the variety of rocks that can be found, including skipping rocks, chalk rocks, and splashing rocks.



Rocks: Hard, Soft, Smooth, and Rough
By Natalie M. Rosinsky.
Picture Window Books. 2003.
ISBN 1404800158.
Grades K–4

Synopsis

Simple text and cartoon-like illustrations provide information about igneous, sedimentary, and metamorphic rocks.

Curricular Connections

The *National Science Education Standards* state that students in grades K–4 should understand that earth materials include solid rocks and soils, and that these materials have different physical and chemical properties that make them useful in different ways. The *Standards* also suggest that young children be encouraged to closely observe the objects and materials in their environment, note their properties, and distinguish them from one another.

Following these suggestions, the K–3 lesson focuses primarily on recognizing properties of rocks (i.e., shape, size, color, texture, and luster), understanding how properties of rocks can be used to sort them, and exploring how a rock's properties and its uses are related. The *Standards* advise that for grades K–4, the study of rocks not be extended to the changes in the solid earth known as the “rock cycle,” because this concept has little meaning to young children. The *Standards* do suggest that students in grades 5–8 develop an understanding of the process by which old rocks at the Earth's surface weather, forming sediments that are buried, then compacted, heated, and often recrystallized into new rock. Eventually, those new rocks may be brought to the surface and the rock cycle continues. The 4–6 lesson is based on the idea that every rock has a “story” that can be uncovered through observation and research. Students observe different rock samples, discover that rocks are composed of minerals, and learn that rocks can be classified as igneous, sedimentary, or metamorphic depending upon how they are formed. They form “rock groups” to do research on a particular rock, and then create a picture book to tell the story of that rock.

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For Grades K–3: Pet Rocks

Engage: Introduce the book *If You Find a Rock*. Build connections to the author by telling students that the author is a “rock hound” (a person who loves to collect rocks), and ask if any of them would consider themselves to be a rock hound. Explain that while you are reading the book aloud, you want them to think about what some of the rocks are used for and what properties, or characteristics, make them suited for that use. After reading, discuss the various uses and properties of the rocks in the book. For example, a skipping rock is used for skipping across water. The properties that make it suited for that purpose are its flat and rounded shape and its small size. Shape and size are properties of rocks. A chalk rock is used to make pictures on the pavement. The properties that make it suited for that purpose are its white color and its soft, dusty texture. Color and texture are also properties of rocks. Another property of rocks is luster, or how the minerals in rocks reflect light. Words that describe a rock’s luster include shiny, dull, and sparkly.

Explore/Explain: Ask students if they have ever heard of a “Pet Rock.” Explain that way back in 1975, a businessman in California came up with the idea of selling rocks as pets. The Pet Rock became a huge hit. Tell students that they are going to be “rock hounds” on the hunt for their own pet rock. They can go home and search for a rock with adult supervision, or select a rock from their own collection. Discuss these rules: Your pet rock must *be smaller than a tennis ball*. You are not allowed to throw your pet rock. The next day, give students rulers and hand lenses to observe their pet rock’s properties, including shape, size, color, texture, and luster. Discuss how observations such as big or small are not scientific observations because they are not exact. Using measurements to describe the size of a rock is more scientific. Demonstrate how to determine the length of a rock by measuring its longest side in centimeters. Have students choose three properties of their rock and write each property on a separate sticky note. Next, make a Properties Chart on the board with six columns labeled, Shape, Size, Color, Texture, Luster, and Other. Model how to use the chart by having one student share a sticky-note observation and then place it in the appropriate column on the chart (e.g., smooth goes in the

texture column). Then have small groups of students take turns placing all of their sticky notes in the appropriate columns on the chart. Some students may need help in determining which observations go in which column.

Elaborate: Have all the students stand, holding their pet rocks. Choose one sticky-note observation from the Properties Chart, e.g., smooth. Students will then determine whether or not their rocks are smooth, and form two groups in the room: “smooth” and “not smooth.” Have them compare their rock to the others within their group, and then switch groups if they wish. Repeat this sorting and classifying process using several more observations from the Properties Chart. Explain that scientists use properties like color and texture to help them classify rocks.

Evaluate: Younger primary students can draw a detailed picture of their rock, listing as many properties as they can. For older primary students, explain that the original Pet Rock was packaged in a box that looked like a pet carrying case. The Pet Rock inventor used creative advertisement to help sell his product.

Have students create advertisements for their pet rocks. The ads should show what they have learned about properties of rocks, including:

- A description of the rock’s shape, size (including measurements), color, texture, luster, and any other properties
- Suggested uses for the rock based upon its properties
- A labeled drawing of the rock highlighting its unique features

For fun, ads can also include:

- A drawing of the rock’s packaging (crate, box, bag, etc.).
- Training tips for the pet rock
- Commercials, slogans, or jingles

Afterward, have students share their advertisements with the rest of the class.

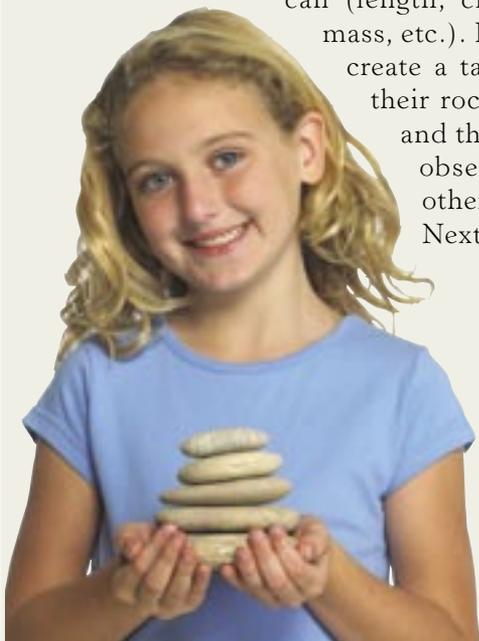


Keyword: Rocks
at www.scilinks.org
Enter code: SC120601

For Grades 4–6: Rock Stories

Engage: With a rock hidden in your hand, announce that you are holding something that is older than them, older than the school building, even older than you...something that could even be millions of years old! Have students guess what it is. Reveal the rock, and then tell students that a rock is probably the oldest thing that they will ever touch. Explain that every rock has a “story” that they can uncover through careful observation and research...a story about how it formed, what it is made of, and how it can be used.

Explore/Explain: Give each student a hand lens, centimeter ruler, and one of the following rocks: obsidian, granite, sandstone, limestone, and marble. Tell them that in order to uncover their rock’s story, they can begin by observing physical properties including shape, size, color, texture, and luster. Model how to make good qualitative and quantitative observations of a rock’s properties, such as: My rock is irregular in shape, has a mass of 56 g, and is 8 cm long. It is reddish brown, with a dull luster and rough texture. It has grains the size of sand. They should measure their rock in as many ways as they can (length, circumference, mass, etc.). Have students create a table to record their rock’s properties and then share their observations with others. Next, tell students



Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996):

Content Standards

Standard D: Earth and Space Science

- Properties of earth materials (K–4)
- Structure of the earth system (5–8)

that the picture book *Rocks: Hard, Soft, Smooth, and Rough* can give them more clues about their rock’s story. Each one of the rocks they have been observing is described in the book. Have them signal when they hear a description that matches their rock as you read the book aloud. After reading, discuss why properties such as color, texture, and luster might be better ways to identify rocks than size or shape. Then have students use hand lenses to look for specks, crystals, grains, or stripes in their rock samples. These are the minerals that make up their rocks. Some rocks are made of a single mineral, but most are made of several minerals.

Elaborate/Evaluate: After all students have identified their rocks, have them form “rock groups” with other students that have the same rock. These groups can use books and websites to research their rock’s story in order to create a picture book. The book should include the name of the rock, its properties, the minerals it is composed of, the rock group to which it belongs (igneous, metamorphic, or sedimentary), an explanation of how it formed, and some possible uses. For fun, they can even write a “rock song”! Students can learn more about the three rock groups, including examples and photographs at <http://sln.fi.edu/fellows/payton/rocks/create/index.html>. Have each group share their picture book with the rest of the class or with younger students.

Resource

National Research Council (NRC). 1996. *National science education standards*. Washington, D.C.: National Academy Press.

bringing science innovation into medical care. Key tips included finding a project that you care about, recognizing how much hard work the journey entails, and being prepared for setbacks and failures. Dean Lloyd Minor, MD, welcomed the two groups by discussing how important startups are for connecting transformative science from academic institutions like Stanford into products that can improve patient health. "You have to ask yourself is your lab data rock solid?"