

All Sorts of Rocks

Standard II

Students will gain an understanding of Earth and Space Science through the study of earth materials, celestial movement, and weather.

Objective 1

Describe the characteristics of different rocks.

Intended Learning Outcomes

Knowing in Science: Understanding the nature of science.

Content Connections: Language Arts

Background Information

Children are excited to learn about rocks, especially when the learning is hands-on! Take this opportunity to have students collect and bring in rocks. The lessons will be more engaging if the students have been responsible for collecting the rocks.

In this lesson, students access their prior knowledge of sorting with a card sort and a book before being asked to apply their understanding of sorting to rocks. This will help the students prepare to think critically and remind them that there are many different ways to sort the same set of objects.

To be successful, the students will need to understand the concepts of hardness, texture, layering, and particle size as they relate to rocks. The literature shared in this lesson, and the rock adjective game will both help to facilitate this understanding.

Research Basis

Hanze, M., & Berger, R. (2007). Cooperative learning, motivational effects, and student characteristics: An experimental study comparing cooperative learning and direct instruction in 12th grade physics classes. *Learning and Instruction*, 17(1), 29-41.

Researchers compared student achievement in classrooms with cooperative learning instruction and traditional direct instruction. The method of instruction was found to interact with student's self-concept; students with low academic self-concept profited more from cooperative learning instruction than from direct instruction because they experienced a feeling of greater competency.

Mintz, E. & Calhoun, J. (2004). Project Notebook: Science notebooks emerge. *Science and Children*. 42(3), 30-34.

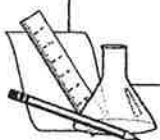
Teachers from South Carolina, attempting to meet the needs of their diverse student population, create a program implementing science notebooks. They believed that science could be used as a vehicle for increasing student achievement across the curriculum. Science notebooks, used in conjunction with an inquiry-based science curriculum, emerged as the natural vehicle for helping to create an effective science program.

Invitation to Learn

The teacher gives each student or team of students a deck of cards. Students are invited to sort their cards. Once finished they are asked to share with the class how they have sorted their cards. The teacher emphasizes that there are many different ways to sort the cards correctly.

Materials

- Deck of cards
- Dave's Down-to-Earth Rock Shop*
- A box of rocks
- Hand lenses
- Time Capsule Form*
- Rock Sorting Challenge*
- Time Capsule
- Rock Bingo*
- Bingo game pieces



Instructional Procedures

1. Ask students to share what they know about time capsules. Discuss how time capsules are usually buried and left alone for many, many years to show how much things have changed over time, but that with your special time capsule you can see how much things have changed over minutes instead of years. On their time capsule form have each student list as many ways as they can think of to sort rocks. Have the students place their lists in the time capsule.
2. Read *Dave's Down-to-Earth Rock Shop* to the class.
3. Encourage students to make text-to-text, text-to-self, and text-to-world connections.
4. Give each group of students a box of rocks and some hand lenses. Ask the students to examine the rocks closely and work together as a group to compile a list of adjectives, that describe their rocks.
5. Discuss group results and compile a class list on the board. Use this opportunity to reinforce vocabulary and concepts such as hardness, texture, particle size, and layering.
6. Have the students fill in the *Bingo* blackline master with the adjectives on the board.
7. Play *Bingo* with their cards and the terms in your class list. As each adjective is called out ask the students to review the

rocks on their desk and hold up any that are described by the adjective.

8. As a class, discuss the different ways that rocks were sorted in the book *Dave's Down-to-Earth Rock Shop*. Invite the students to work in groups to find different ways to sort the rocks on their table.
9. Circulate among the groups to informally assess their understanding.
10. Hand out a *Rock Sorting Challenge* to each group and ask them to discuss how they will sort their rocks and what materials they will need to organize their sort. Meet with each group to scaffold and facilitate their plans.
11. Have each group read their *Rock Sorting Challenge* to the class and show their rock collection.
12. Display their collections in the classroom.
13. Have each student create a new list of all the ways they can think of to sort rocks on the *Time Capsule form*.
14. Open your time capsule and have the students compare their old and new lists to see how many new ways of sorting they have come up with.

Assessment Suggestions

- Informally assess their responses to the Bingo game and their ability to match adjectives with their rocks.
- Assess the rock collections created by the class groups and their verbal explanations to the class.
- Review student responses on their final *Time Capsule form*.
- Invite students to create and sort a rock collection at home and present it to the class.

Curriculum Extensions/Adaptations/ Integration

- Invite students to select a rock. Ask them to measure and record as much information about their rock as they can. Have them imagine that a rich man has offered to give them \$1000 if they can find their exact rock in a field of rocks using the information that they record.

- Take two samples of granite and tap both with a hammer to demonstrate how strong they are. Take one sample and repeatedly bake and plunge in ice water. This speeds up the erosion process that naturally occurs during the winter and summer seasons. After ten cycles of freezing and thawing tap the sample again with the hammer. The sample will crumble into its three component pieces. Invite students to sort the particles by color.
- Advanced learners can be introduced to Moh's Scale of Hardness and given the appropriate tools for determining rock hardness more accurately.
- Rock Field Guides may be introduced to advanced learners.
- Review academic language using pictures and other appropriate graphic organizers for ESL students.

Family Connections

- Invite the students to collect appropriately sized rocks at home to use for the sort. This needs to be done up to a week before beginning the lesson.
- Encourage families to go rock hunting and sort their rocks by color, hardness, texture, layering or particle size. Invite them to share and display their collections in your classroom.

Additional Resources

Books

Dave's Down-to-Earth Rock Shop, by Stuart J. Murphy; ISBN 0064467295

Let's Go Rock Collecting, by Roma Gans; ISBN 0064451704

Rocks and Minerals, by DK Publishing; ISBN 0789497604

Smithsonian Handbooks: Rocks & Minerals, by Chris Pellant; ISBN 0789491060

Web sites

<http://kids.si.edu/collecting/>

<http://rocksforkids.com/>

<http://www.fi.edu/tfi/units/rocks/rocks.html>

Name _____



Time Capsule



Date _____ Time _____

List all of the ways that you can think of to sort rocks.

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Rock Sorting Challenge

Sort your rocks by
COLOR

Sort your rocks by
HARDNESS

Sort your rocks by
TEXTURE

Sort your rocks by
PARTICLE SIZE

Sort your rocks by
LAYERING

Rock Bingo

		FREE		

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