

Exploring Rocks

Grade Level: 3 - 4

Purpose and Goals: This lesson allows students to collect and examine rocks and record information about the rocks in their science notebooks. Students make comparisons and classify rocks according to properties. They discuss their findings with their classmates and record them on a class chart.

Targeted Objective: Explore the properties of rocks and classify them according to properties.

Background: Rocks are earth materials made up of minerals. Minerals are elements or compounds that occur naturally in the earth's crust. Geologists study rocks and minerals to help us learn about the formation of the earth. Geologists classify rocks according to their properties or characteristics that can be observed (hardness, color, shape, size, luster, texture, number of minerals).

Materials and Preparation:

For each student:

A rock (brought in by student or provided by teacher)

Science notebook

Rock Observation Sheet (Appendix 1)

Hand lens

Ziplock sandwich bag

Large label

For the class:

Chart tablet, set up with K-W-L chart

Marker

Procedure:

1. Distribute the Science notebooks. Ask students to write the date on the first page. Tell them to take a few minutes to write on this page all the things they already know about rocks. Have the students share these ideas and record them in the "Know" column of the K-W-L chart.
2. Have the students share any questions they have about rocks, or things they would like to learn about rocks. Record these in the "Want to Know" column of the K-W-L chart. NOTE: You may wish to introduce vocabulary words to help students build up a bank of words from which to draw for their observations.
3. Put the students in groups of three. Allow them time to explore their rocks and those of their partners. They should share their observations

with their group members. After about five minutes, distribute the Rock Observation Sheet and have the students write their observations of the three rocks. Brainstorm some words that might be used in the descriptions (size, shape, color, texture, and luster). Share as a class the information on the sheets. Add pertinent information to the “Learned” section of the K-W-L chart. NOTE: You could modify the Observation Sheet to include columns for the various descriptors

4. Ask the students to decide in their small groups on two or more ways to classify their rocks. Discuss the suggestions as a class and decide on the classifications for all of the class rocks.
5. Put all of the rocks on a table. Have student volunteers place the rocks into the suggested groups while the rest of the class monitors.
6. Visit the ISM Geology Online GeoGallery Web site. Match the class rocks with the rock samples on the site. Have students create a classroom exhibit using their rocks. Some of the samples the students bring in may not match the images in the GeoGallery. It would be good to have a couple of reference books that they could use with the images. Two good ones to have on hand are:
 - Mottant, A., R. Crispi, and G. Liborio. 1978. Simon & Schuster's Guide to Rocks & Minerals. New York: Simon & Schuster, Inc.
 - Pough, F. 1996. Peterson Field Guide Series: A Field Guide to Rocks and Minerals. Boston: Houghton Mifflin Company.

Each student should put his or her rock in a ziplock bag and create a label for it, listing the rock’s name, description, and where it was found.

Questions: Have the students answer these questions in their Science notebooks.

1. How are all of these rocks alike?
2. How are they different?
3. How can you tell that these rocks are made of more than one material?

Extensions:

1. Special needs students could draw their rocks and/or verbally describe them to other students, who can scribe for them.
2. Request a set of Illinois Rocks and Minerals from the State Geological Survey. Display these samples and labels with the classroom set of rocks. Comparisons can be made as lessons progress.

Assessment:

Student record sheets describing their rocks: Descriptions should be

detailed and include several properties observed.

Science notebooks: Are comparisons valid? Can students infer that differences in color, texture, etc., indicate the presence of different materials in the rocks? (minerals)

Observation Checklist (Appendix 2) during collaborative group work.

Resources:

McGraw Hill Science 2002, Grade 3, Earth Science, Unit C, p. C5

McGraw Hill Science Web site: <http://www.mhscience02.com>

ISM Geology Online GeoGallery Web site:

<http://geologyonline.museum.state.il.us/geogallery>

Science and Technology for Children: <http://www.si.edu/nsrc>

Classroom set of Illinois Rocks and Minerals and Guide to Rocks and Minerals of Illinois, distributed by the Illinois Geological Survey, Educational Extension Unit, Natural Resources Building, 615 East Peabody Drive, Champaign, Illinois, 61820. To order or for more information, phone 217-333-4747.

Lesson Specifics:

Skills: Exploring, observing, recording, comparing, analyzing, inferring, communicating.

Duration: Two or three class periods.

Group Size: Any.

Setting: Classroom.

Illinois State Board of Education Goals and Standards:

11A: Know and apply the concepts, principles, and processes of scientific inquiry.

12E: Know and apply concepts that describe features and processes of the Earth and its resources.

13A: Know and apply the accepted practices of science.

ADDITIONAL ONLINE RESOURCES

1. Online stores to purchase bagged rocks and minerals:
<http://www.rocksandminerals.com> <http://www.geoprime.com>
2. The Mineral Gallery: Web site with photos and information on mineral specimens, plus minerals to purchase: <http://mineral.galleries.com>
3. Free software download for MAC: Rocks! 1.0:
http://mac/tucows.fi/macteach_size.html
4. Rocks and Minerals links compiled by third grade at Arthur Elementary School: <http://arthur.k12.il.us/arthurgs/rocklile.htm>
5. Educational outreach program: Mineral and Rocks Box test:
<http://dnr.state.il.us/mines/education/kidzmarb.htm>
6. Wonderful web site covering all areas of rocks and minerals study, as well as tips for rock collecting. Good lesson plans for elementary teachers: Rock Hounds:
<http://www.fi.edu/fellow/payton/rocks/index2.html>
7. More lesson plans and units from the Mineral Information Institute:
<http://www.mii.org/lessons.php>
8. Geomysteries: Located at Indianapolis Children's Museum web site (click on Kids): <http://www.childrensmuseum.org>
9. This Planet Really Rocks: award winning child-created geology project with games, facts, jokes, activities: <http://library.thinkquest.org/J002289>

Name _____

Date _____

ROCK OBSERVATION SHEET

Rock 1:

Rock 2:

Rock 3:

Collaborative Work Skills: Science Group

Student Name _____

Date _____

| CATEGORY | 4 | 3 | 2 | 1 |
|----------------------------|---|--|---|---|
| Contributions | Routinely provides useful ideas when participating in the group and in classroom discussion. A definite leader who contributes a lot of effort. | Usually provides useful ideas when participating in the group and in classroom discussion. A strong group member who tries hard! | Sometimes provides useful ideas when participating in the group and in classroom discussion. A satisfactory group member who does what is required. | Rarely provides useful ideas when participating in the group and in classroom discussion. May refuse to participate. |
| Focus on the task | Consistently stays focused on the task and what needs to be done. Very self-directed. | Focuses on the task and what needs to be done most of the time. Other group members can count on this person. | Focuses on the task and what needs to be done some of the time. Other group members must sometimes nag, prod, and remind to keep this person on-task. | Rarely focuses on the task and what needs to be done. Lets others do the work. |
| Working with Others | Almost always listens to, shares with, and supports the efforts of others. Tries to keep people working well together. | Usually listens to, shares, with, and supports the efforts of others. Does not cause "waves" in the group. | Often listens to, shares with, and supports the efforts of others, but sometimes is not a good team member. | Rarely listens to, shares with, and supports the efforts of others. Often is not a good team player. |
| Attitude | Never is publicly critical of the project or the work of others. Always has a positive attitude about the task(s). | Rarely is publicly critical of the project or the work of others. Often has a positive attitude about the task(s). | Occasionally is publicly critical of the project or the work of other members of the group. Usually has a positive attitude about the task(s). | Often is publicly critical of the project or the work of other members of the group. Often has a positive attitude about the task(s). |

Collaborative Work Skills: Science Group

Student Name _____

Date _____

| CATEGORY | Excellent | Good | Satisfactory | Needs Improvement |
|--|--|---|--|--|
| Journal/Notebook | Clear, accurate, dated notes are taken regularly. | Dated, clear, accurate notes are taken occasionally | Dated, notes are taken occasionally, but accuracy might be questionable. | Notes rarely taken or of little use. |
| Spelling, Punctuation and Grammar | One or fewer errors in spelling, punctuation and grammar in each entry. | Two or three errors in spelling, punctuation and grammar in each entry. | Four errors in spelling, punctuation and grammar in each entry. | More than 4 errors in spelling, punctuation and grammar in each entry. |
| Summary | Summary describes the information learned and some connections made. | Summary describes the information learned and a possible connection made | Summary describes the information learned. | No summary is written. |
| Appearance/Organization | Entries are neatly written and use headings and subheadings to visually organize the material. | Entries are neatly written and some attempt is made to visually organize the material | Entries are neatly written, but formatting does not help visually organize the material. | Entries look sloppy with cross-outs, multiple erasures and/or tears and creases. |