EARTH SCIENCE ACTIVITIES FOR
ELEMENTARY AND MIDDLE SCHOOL STUDENTS

A new book is out that will be of interest to teachers looking for hands-on activities to enrich their earth science classes. *ON THE ROCKS: Earth Science Activities for Grades 1 - 8* is a collection of over 50 demonstrations, activities, and investigations for students at the elementary and middle school grade levels. The activities were written and reviewed by geologists and educators across the United States, including many from Kansas.

The activities are arranged into the following categories: Rocks and Minerals; Earth Works; Water Works; Fossil Explorations; Maps, Maps, and More Maps!; Science Basics; and Geology, Society, and the Environment. They range from *Layer Cake Geology* to *Groundwater Flow in a Milk Box* to *Diets of Extinct Animals* to *Modeling an Active (!!) Explosive Volcano*. Some activities are novel, such as one in which students learn about trace fossils by making trackways with beetles, lizards, and other small animals. Others emphasize science and technology (*Geology in the News, The Energy Game*). *Dinosongs* combines science, art, and music, and *The Distance Between Us and Them: Sea Floor Spreading in the Atlantic Ocean* combines math and science, demonstrating that geology can be taught across the curriculum. Each activity includes suggested grade levels, time required, anticipated learning outcomes, and background information.

This book is a project by SEPM (The Society for Sedimentary Geology) to encourage more hands-on, interactive earth science labs in the schools. Towards that end, many people have generously contributed their time and expertise to keep the cost of the book minimal. *ON THE ROCKS: Earth Science Activities for Grades 1 - 8*, 1993, 204 pages, costs $9.00, plus $1.90 shipping and handling. To order, write to: SEPM, P.O. Box 4756, Tulsa, Oklahoma, 74159-0756, or call (918) 743-9765. *Trading in Gems* is one activity from the book.

**Trading in Gems**

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Level: Grades 4 - 8

Estimated Time Required: 45 minutes

Anticipated Learning Outcomes:
1. Students will become aware that most gemstones are minerals.
2. Students will understand how quality affects gemstone value.
3. Students will discover how desirability is a personal value.
4. Students will see how marketing and name recognition affect value.

Background:
The purpose of this activity is to demonstrate how individual subjective taste is a factor in value (in terms of cost) in gemstones, which have their origin in the natural realm of minerals. Gems are also an exciting and intriguing aspect to the study of minerals which can help to spur flagging interest and lead to deeper understanding of mineral and crystal formation.

Materials:
--Small plastic zipper bags or paper envelopes, one for each student in the class.
--A variety of tumble-polished stones of as many different types as possible, to make it interesting, at least 6 - 8 types. (Sources: Ward’s Scientific Inc.; the numerous ads for tumbled material in each issue of the Lapidary Journal; or contact local lapidary club for possible donations or low cost sources.)

Procedure:
1. Fill bags ahead of time with 3 or 4 samples for each student. Bags cannot be filled with the identical mix of stones. Variety is important for activity.
2. Discuss minerals in general. (This may be done in previous classes.)
3. Discuss gems—i.e. natural minerals that have been cut, shaped and polished for human adornment or use. To qualify as a gem, a mineral must possess beauty (of some kind), durability, and rarity.
4. Show bags to the students. Tell them that the stones are all genuine gemstones. Give them the conditions of the trading activity.
They should look at their own stones and decide which, if any, they like. They will then have an opportunity to trade with others. They will have 10 - 15 minutes to move around the room and see what they might like better. Any trade of stones that both parties agree to is OK. One-for-one, two for one, etc. is fine as long as both parties agree. Salesmanship may be an important part of getting others to agree to a trade. Don’t talk down your own stones and then expect someone else to want them. No other commodities other than the stones may change hands; trading involves only the stones.

At the end of the time, they may choose and keep one, and only one, of the stones that they have in their possession.

5. After these instructions, pass out the bags and allow the students time to move around and trade stones. Be prepared to have students ask what each stone is. I do not give out that information at this point. Many students will have at least heard the names before. What they hear will color their reaction and their judgement. For this part, it is better if they simply go by what they like.

6. When the trading activity seems to be slowing down, give them verbal warning that time is running out and then call for a return to their seats. Ask students about their trading activity. You might want to see how many have only one stone left and how many have parleyed their number up to six or more.

7. Have students choose the stone in their possession that they want to keep. That sounds easy; it is not! Be prepared for agonizing over the decision. They should put the one they want back in the bag. You may then go around and collect the rest.

Results and Discussion:

1. Take some time for discussion of their choices: what they chose and why.

2. At long last, name the various types of stones that were present in the samples. Groans and moans! All will want to know what the stones are worth as they hear names like amethyst, tigereye, garnet, agate, etc. As you will know, having purchased the material, almost all can be had for 10 - 25 cents apiece or less. This will also be a shock.

3. Discuss why these chips and pieces are not as expensive as they expected:
Beauty. What are the quality of these stones? Is the color intense and true, clean, uniform, or are there spots and bands of color and shadows of milky appearance? If they are supposed to be banded, as in some of the agates, maybe the bands are too wide and not sharply divided. Are there cracks and other kinds of flaws in the stones?

Style of stone. Irregular shape indicates tumble-polished stone—the quickest and easiest way of getting a polish on a stone. It doesn’t take a lot of human work and time to get a whole batch of stones polished in this fashion, as opposed to the cuts we see more often in expensive jewelry. Cabachons—dome-shaped stones, are a cut used most often for translucent or opaque stones to show off colors and patterns in the stone. Faceted stones—the "sparklers," have flat surfaces cut at precise angles to reflect the light and produce sparkle. This is the most labor-intensive cut to produce and is used for transparent stones.

Setting. When buying finished jewelry, the setting of gold or other precious metals adds to the price, sometimes costing more than the stone itself.

Related Activities

1. You may be able to arrange for someone from a local lapidary club to come in and provide demonstrations of tumbling and polishing stones or to talk about mineral collecting.

2. Collect jewelry ads from magazines and newspapers. Discuss marketing methods, etc.

3. Have students do reports on various gemstone types and their origins, or on the role of gemstones in history.

P.S. With careful observation of their students during the trading period, teachers can gain some interesting insights!

Recommended reading for teachers:


Recommended reading for students:


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