Iowa Science Teachers Journal

Volume 21 | Number 2 Article 6

1984

Using an Egg to Understand the Three Types of Rocks

M. L. Schwartz
Western Washington University

USING AN EGG TO UNDERSTAND THE THREE TYPES OF ROCKS

M. L. Schwartz
Professor of Geology and of Education,
Western Washington University

Bernstein and Wong (1977) have presented an excellent earth science lesson by using the cross-section of a hard-boiled egg. The yolk, white and shell, respectively, represent a model of the earth's core, mantle and crust (Fig. 1).

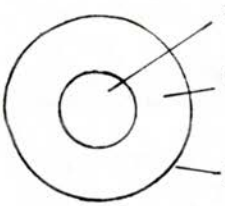

Figure 1
Cross-section of a hard-boiled egg as a model of the structure of the earth (after Bernstein and Wong, 1977).

Capitalizing on children's fondness for activities involving food (Schwartz, 1980a, 1980b, 1980c, 1980d) the same egg can be used to investigate the classification system of the three types of rocks.

To begin with, put on the chalkboard, or distribute on a handout, the names of each class of rock, together with an appropriate brief description. The list could look something like this:

1. SEDIMENTARY ROCKS — pieces stuck together.
2. METAMORPHIC ROCKS — flattened by heat and squeezing.
3. IGNEOUS ROCKS — melted, then cooled down to a solid.

Discuss the names of each type and just what the description means to the students. Encourage them to rephrase the descriptions, in their own words, until they are comfortable with how each rock type is formed and, roughly, what it must look like.

Now, distribute the halves of the hard-boiled eggs, cut in half through the round middle (Fig. 2); preferably, one for each student. It is also advisable, at this point, to have a small paper towel at each student's place. Ask students to carefully peel the shell off their eggs.

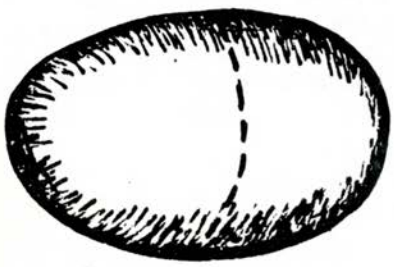

Figure 2
Cut the hard-boiled egg and shell in half, through the round middle, as shown by the dotted lines. Use a sharp, serrated knife.

Begin discussing the eggs. What were they like originally? How and why did they become changed to their present state? The students come quickly to the fact that the eggs were raw and liquid at first, but then became hard or solid after cooking and cooling down. At this point, ask them which type of rock on the list the hard-boiled egg represents. Students usually have no problem in classifying it as similar to an igneous rock.

After establishing that hard-boiled eggs are somewhat like igneous rocks, have the students place the half egg on the paper towel; flat, yolk side down, and rounded, white side up. Distribute salt shakers (and pepper shakers, if you wish) to each group, and instruct the students to liberally sprinkle salt (and pepper?) all over the white of the egg (Fig. 3). Discuss why the white surface of the egg is now rough, and ask which of the remaining types of rock the egg is like at this time. The answer, sedimentary rocks, is fairly easy and obvious.

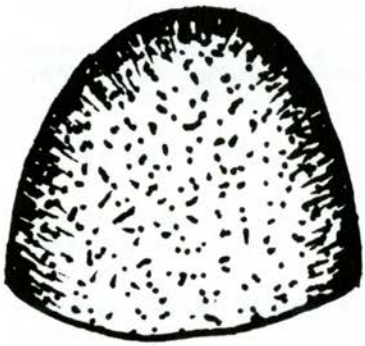

Figure 3
White dome of egg, liberally sprinkled with table salt (and pepper?), representing sedimentary rocks.

The fun begins when you next tell them to hold out one hand, palm up, and place the egg right in the middle of the palm. You might want to do this with them, holding half an egg that you saved for this purpose. By elimination, the students know that only metamorphic rocks are left; and that means "flattened by heat and squeezing"! As the idea of what they are probably going to be instructed to do next dawns on them, they will surely begin to laugh and show their disgust. It's up to you, the teacher, to dramatically shout "Now make a fist and squeeze hard," as you do it yourself. Encourage every student to do this with his or her egg. A discussion of the properties of the squashed egg, afterwards, lead to a comparison to the layered characteristics of metamorphic rocks (Fig. 4).

The students may, or may not, want to eat the mangled remains of the eggs. That should be left up to them and their individual tastes and appetites.

Figure 4
Squashed egg after being compressed in tight fist, much like a metamorphic rock formed by heat and pressure.

A summary application of this activity can be had by giving each group three rocks, one representing each of the rock classes; sedimentary (sandstone, conglomerate, or arkose), metamorphic (slate, gneiss, or schist), and igneous (granite, diorite, or gabbro). With some discussion among themselves, the students can usually place the three rocks in their proper groups.

References

Bernstein, L., and H. K. Wong. 1977. *Ideas and Investigations in Science-Earth Science,* Prentice-Hall, Englewood Cliffs, New Jersey.

Schwartz, M. L. 1980a. The rocky road fudge way to geology. *Teacher* 97:68-69.

_____. 1980b. The earth's crust; a lesson with breads and spreads. *Teacher* 97:54-57.

_____. 1980c. Classifying fudge and rocks, in V. Mayer, ed., *Activity Sourcebook for Earth Sciences,* Columbus, ERIC, 77-82.

_____. 1980d. Using a sandwich to understand superposition, in V. Mayer, ed., *Activity Sourcebook for Earth Science,* Columbus, ERIC, 123-128.

(Editorial note: Figures drawn by R. Christman.)

Reprinted from the *Washington Science Teachers' Journal,* Vol. 23(4), Fall 1983. Reprint permission granted by Robert Christman, Editor, *WSTJ,* Department of Geology, Western Washington University, Bellingham, WA 98225.