MONDAY MORNING SCIENCE BLAST
Earth Egg - Earth Science - Structure of the Earth

What does a slinky, a door hinge, a tube of toothpaste, and a hard-cooked egg have in common? They can all be used as models in science. The slinky works well to illustrate the characteristics of energy waves. A hinge joint in the skeletal system can be illustrated by a door hinge. Peristaltic movement can be demonstrated by squeezing a tube of toothpaste. And finally, a hard-cooked egg can be used as a model for Earth's structure.

One of the facts of successful teaching is that for students, anything is easy to learn if they can assimilate it into their collection of models…what students can learn, and how they learn it, depends on what models they have available.

Within the scientific community, models are an important mechanism for advancing scientific understanding. This involves the construction, validation and application of scientific models. Science instruction should be designed to engage students in making and using models where possible. If scientists use models as "thinking tools," shouldn't students also use them?

Teachers can use models to help students make sense of their observations and understand abstract ideas through the visualization of objects that are too big, too small or positioned so it is difficult for them to be seen easily; e.g., an ecosystem, cell, heart, processes such as digestion that cannot easily be seen directly; and abstract ideas, e.g., nature of matter and the transfer of energy.

Scientific models (or consensus models) represent the widely accepted scientific view of a concept or idea, providing a representation or an explanation for a complex process. Teaching models are used to help a learner understand or visualize an idea, process or system; they are visual or physical representations which help to explain the abstract idea or invisible structure to the learner. Analogies as teaching models, usually illustrative rather than explanatory, are explanations or stories based on an object very familiar to students. In this lab, students will be identifying ways in which a hard-cooked egg can be a model for earth.

Before class starts, prepare enough brown hard-cooked eggs so that each student or student group has one. Instruct your students to examine their eggs carefully, using the magnifying lens to examine the structure of the shell up close. Have them describe what the egg shell looks like and record their observations in the Data Section, identifying what part of the Earth the egg shell represents; they are also to identify differences and similarities between their model and the similar structure on Earth.

Now have your students tap their egg lightly on all sides, breaking the shell, and instruct them to draw a picture of what the cracked egg shell looks like, in the appropriate Data Section. Direct them to identify what part of the Earth the broken sections of egg shell represent and identify differences and similarities between their models and the actual structures on Earth. They are to carefully and gently push sections of the egg shell together so they collide, then move them apart so they separate, entering in the Data Section, what processes on Earth are represented by moving the pieces of egg shell

around. Again, have them identify differences and similarities between their models and similar processes on Earth. Next, have your students look carefully between the cracks in the egg shell and identify in the Data Section what they, in addition identifying what part of the Earth is modeled by what they see.

Finally, instruct your students to peel their eggs, and using a knife, cut their eggs in half crosswise. In the Data Section, they are to draw a diagram of what they see, identifying what parts of the Earth are modeled by the cut egg and also the differences and similarities between their models and the corresponding structures on Earth.

A way of extending this activity is to use white hard cooked eggs instead of brown. After gently cracking the egg shell as is done in Step 3 of the Procedure, dye the egg with egg coloring dye. After removing the colored egg from the dye, dry the egg and carefully remove the shell. Have the students observe the “colored plate boundaries” that are created by the contact of the dye with the outer egg white that’s been exposed by the cracks in the egg shell. Have fun!

Earth Egg

Adapted from an activity created by Laurie Molnar, University of Pittsburgh at Jamestown

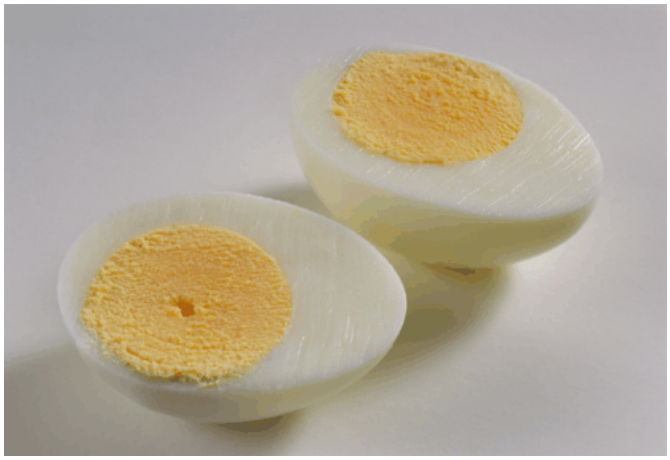
QUESTION: Can a hard-cooked egg be a model for Earth?

MATERIALS:

brown egg (hard-cooked)
magnifying lens
paper plate
paper towel
plastic knife

PROCEDURE:

1. Get a hard-cooked brown egg. Examine the egg carefully. For this lab you are going to use the egg as a model for the Earth.
2. Use the magnifying lens to examine the structure of the shell up close. Describe what the egg shell looks like. Record your observation in the Data Section and identify what part of the Earth the egg shell represents. Identify differences and similarities between your model and the similar structure on Earth.
3. Tap the egg lightly on all sides, breaking the shell. In the Data Section, draw a picture of what the cracked egg shell looks like. Identify what part of the Earth the broken sections of egg shell represent. Identify differences and similarities between your model and the actual structures on Earth.
4. Carefully and gently push sections of the egg shell together so they collide, or move them apart so they separate. In the Data Section, identify what processes on Earth are represented by moving the pieces of egg shell around. Identify differences and similarities between your model and similar processes on Earth.
5. Look carefully between the cracks in the egg shell and identify in the Data Section what you see. Identify what part of the Earth is modeled by what you see.
6. Peel the egg and use the knife to cut the egg in half crosswise. In the Data Section, draw a diagram of what you see. Identify what parts of the Earth are modeled by the cut egg. Identify differences and similarities between your model and the corresponding structures on Earth.



DATA:

Egg Shell

Observations	Earth's Structure	Similarities	Differences

Cracked Shell

Observations	Earth's Structure	Similarities	Differences

Movement of Shell Pieces

Observations	Earth's Structure	Similarities	Differences

Egg Cut in Half

Observations	Earth's Structure	Similarities	Differences

QUESTIONS:

1. Why do we use models in science?

2. What part of the Earth does each of the following represent . . .

   A. Egg shell

   B. Cracked egg shell

   C. The space (cracks) between the pieces of the shell

   D. The movement of the egg shell pieces

   F. The egg white

   G. The egg yolk

3. If you gently move one piece of the broken egg shell, what happens to the other pieces of the shell?

4. What is the name for the tectonic plate you live on?

5. What kinds of boundaries exist between Earth's tectonic plates?

6. Name some other common household objects that could be used as models for the Earth. Explain how each works as a model for Earth.