

Earth Layers

Modeling

Introduction: Uses several different models to illustrate different characteristics of the crust. It also encourages students to critique models for their strengths and weaknesses and to introduce the idea of using indirect evidence.

Objectives: Using four different models of the earth, students will identify the "layers" and evaluate the strengths and weaknesses of the models.

Materials:

- 1 raw egg
- 1 hard boiled egg for each student (or pair of students)
- 1 black pointy marker per hard-boiled egg
- 1 clear drinking straws for each hard-boiled egg, cut into 3 short pieces
- 1 plastic knife per student or pair of students
- 1 mini snack size milky way bar for each student
- 1 apple for each pair of students
- 1 kiwi for each pair of students
- paper towels

Directions:

1. Crack a raw egg into a glass bowl and place it on an overhead projector. **STUDENT QUICKWRITE:** How is this egg like the earth? How is it different? Students can make lists of words or write in journal format.
2. Discuss their ideas and introduce the idea of a model. What is the purpose of a model? If you have a manufactured model of the earth's layers, discuss the ways that it is like the earth and the ways it is different.

3. Introduce the 4 models: hard-boiled egg, milky way, kiwi, apple. For each model, students will identify the parts that correspond to the earth's layers and write how the model demonstrates characteristics of these parts.
4. After all 4 models are examined, students should, in pairs or groups, evaluate the strengths and weaknesses of each model and choose which model they think is most appropriate.

Hard-boiled egg:

- First, have students make cracks in the shell of the egg by rolling it in their hands or on the desk. Students then trace the lines of the cracks on the surface with the marker. This can be compared to the crust of the earth with plates.
- How can we find out what is inside the egg without opening it? Students can use the straws to take "core samples" of the egg. What information can scientists find out from taking core samples of the earth? What are the limitations on taking core samples of the earth?
- Finally, cut the egg in half and identify the layers/compare the representation of the layers to what we know about earth's layers (solid, liquid, etc.)

Apple:

- Cut in half, identify the parts

Milky Way:

- Students unwrap the candy bar and use their fingernails to carefully make a few cracks across the top. What does this model? (Earth's crust, lithosphere)
- Holding the candy bar on either end, slowly pull apart the candy until the caramel is visible. What does this represent? (magma, mantle)
- Push the bar back together. The chocolate may crumble or form "mountains". What does this represent?
- Students can experiment with pushing and pulling the bar to get an idea of what happens with the plates.
- Cut the candy bar in half to examine the layers - what layers are represented?

Kiwi

- Cut in half, identify the parts.

Models for the Earth's Interior

Model	Strengths	Weaknesses
Milky Way		
Kiwi		
Apple		
Hard-boiled Egg		

Conclusion: Of the four models of the earth, which is the best? Why?