

BROKEN EGG

Science Concept:

The four layers of Earth are the inner core, outer core, mantle and crust.

Objectives:

The student will:

- write a story about what it would be like to travel to the center of Earth;
- identify the layers of Earth; and
- describe the characteristics of each layer.

GLEs Addressed:

Science

[6] SD2.2 The student demonstrates an understanding of the forces that shape Earth by identifying and describing its layers (i.e., crust, mantle, core).

[6] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.

Writing

[6] W2.2.2 The student writes for a variety of purposes and audiences by writing in a variety of nonfiction forms using appropriate information and structure (i.e., step-by-step directions, descriptions, observations, or report writing).

Vocabulary:

brittle - having hardness and rigidity but little tensile strength; breaking readily with a comparatively smooth fracture, as glass

crust - the solid, outermost layer of Earth

inner core - the innermost layer of Earth. Consists of solid iron and nickel

layers - thickness of some material laid on or spread over a surface

mantle - the layer of Earth below the crust and above the core. The uppermost part of the mantle is rigid, and along with the crust, forms the 'plates' of plate tectonics. The mantle is made up of dense, iron and magnesium rich rock such as dunite and peridotite

outer core - the liquid outer layer of the core that lies directly beneath the mantle

plate - a slab of rigid lithosphere (crust and uppermost mantle) that moves over the asthenosphere

Materials:

- Hard-boiled egg (one per student)
- Black felt-tip, nontoxic, marker (one per student)
- Plastic knives (one per student)
- Toothpicks (four per group)
- Small labels or flags
- Modeling clay in four colors, red, white, yellow, and blue
- Science journals
- STUDENT INFORMATION SHEET: "Earth's Layers"
- OVERHEAD: "Earth's Plate"

Activity Preparation:

Make a model of Earth using modeling clay. If using Model Magic™, ¼ pack of red for the inner core, ½ pack of blue for the outer core, one pack of yellow for the mantle, and ½ pack of white for the crust. Cut the model in half so as to see the middle.

Activity Procedure:

Please refer to the assessment task and scoring rubric located at the end of these instructions. Discuss the assessment descriptors with the class before teaching this lesson.

Gear Up**Process Skills: describing, observing, and communicating**

1. Guide students through an exploration of Earth's layers.
 - a. Distribute an egg, STUDENT INFORMATION SHEET: "Earth's Layers," plastic knife, and marker to each student. Tell students that the Earth's crust is much like an egg shell, thin and brittle.
 - b. Instruct students to crack the shell all around the edge by lightly tapping it on a table. They should not peel off the shell.
 - c. Ask students to notice how the shell is broken and that some pieces overlap others.
 - d. Ask students to use a felt-tip pen to carefully outline the edge of the cracked pieces.
 - e. Explain this is like Earth's crust. Show OVERHEAD: "Earth's Layers." Explain these sections of Earth's crust are referred to as plates.
 - f. Instruct students to cut the eggs in half and place a black dot about the size of a pea into the center of the yoke to represent the core.
2. Ask students to record their observations in their science journals.
3. Ask students how many layers they see. Ask if the layers are the same size. Ask what color each layer is. List student responses on the board.
4. Use this as an opportunity to discuss models and their limitations and benefits.

Explore**Process Skills: describing, observing, making generalizations, and communicating**

5. Divide students into small groups. Distribute modeling clay, toothpicks, and flags to each group. Show students the model of Earth (see Activity Preparation). Explain they will build their own model.
6. Instruct groups to build a model of Earth. They should include proportionate sizes and thicknesses and label each layer. Students should record how many layers they see, whether the layers are the same size, and what color each layers is.
7. Instruct students to describe the layers of Earth in their science journals.

Generalize**Process Skills: asking questions, predicting, describing, classifying, observing, making generalizations, and communicating**

8. Ask the following questions and discuss as a class:
 - a. How many layers did you notice?
 - b. How would you describe each layer? (e.g., hard, soft, thick, thin, etc.)
 - c. What do you think the temperature of each layer is? (e.g., hot, cold, etc.)
 - d. Why is each layer different?

Apply**Process Skill: describing, making generalizations, and communicating**

9. Instruct students to, in their science journals, explain what fruit you could use to make a model of Earth and why you would choose that fruit.

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RUBRIC

Assessment Task:

Write a story telling about a journey to the center of Earth. Identify each layer by name and order and describe the characteristics of each layer including thickness, function and temperature.

Rubric:

Objective	GLE	Below Proficient	Proficient	Above Proficient
The student identifies the layers Earth.	[6] SD2.2	The student may identify two or fewer of Earth's layers and/or can't put the layers in correct order from the core to the crust.	The student identifies the core, mantle, and crust in correctly order from the core to the crust.	The student identifies the inner core, outer core, mantle, and crust in the correct order and makes references to the layers of the egg to represent Earth's layers.
The student writes a story about what it would be like to travel to the center of Earth.	[6] W2.2.2	The student may write a story, but the story does not have a focused topic and tells about the journey through three or fewer layers of Earth.	The student writes a story with a focused topic that contains appropriate information.	The student writes a story with a focused topic that contains appropriate information and structure.
The student describes the characteristics of each layer.	[6] SA1.1	The student may describe two or less characteristics of each layer.	The student describes three characteristics of each layer.	The student describes four or more characteristics of each layer.