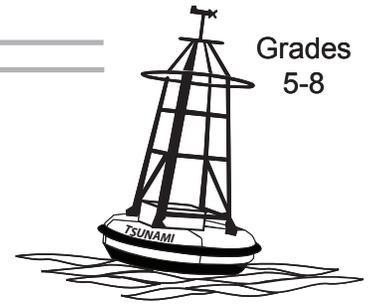


Earth's Layers

Grades
5-8



Overview:

During this lesson, students learn about Earth's layers by making a clay model. As a result of this activity, students develop an understanding of the structure of Earth's layers, particularly in relation to thickness and solid or molten state.

Targeted Alaska Grade Level Expectations:

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).

Objectives:

The student will:

- create a model illustrating the relative size and thickness of each layer of Earth;
- identify Earth's layers, including the inner core, outer core, mantle, and crust;
- identify Earth's inner core as solid due to tremendous pressure; and
- identify Earth's outer core as molten, existing in a "liquid" state.

Materials:

- Clay in the colors and amounts described in the activity procedure
- Marbles (25 mm in diameter) for each student
- Sharp knife
- Ruler
- STUDENT WORKSHEET: "Clay Model Earth"
- VISUAL AID: "Earth's Layers"

Science Basics:

Earth is made up of layers. Each layer has unique characteristics.

CRUST: The crust is the outermost layer of Earth. This layer, on which life exists, is covered with soil, rock, and water. Relative to the thickness of Earth's other layers, Earth's crust can be compared in thickness to the shell of an egg or the skin of an apple. The crust is thickest under the continents and thinnest under the oceans.

Thickness: 5 to 64 kilometers (varies depending on which type of crust)

State: Solid

MANTLE: The mantle is Earth's thickest layer. About 80% of the volume of Earth is contained in Earth's mantle, which extends from the base of the crust to the liquid outer core. The mantle is generally considered to exist in a solid state, although high temperatures and pressure can cause some of this solid rock to flow like an extremely thick liquid.

Thickness: About 2900 kilometers

State: Considered solid, but has the quality of plasticity, which means the solid rock in this layer can flow like a thick liquid

OUTER CORE: Most of the rock in Earth's outer core is molten, which means that it acts like a hot liquid. The outer core begins about 2900 kilometers below Earth's surface.

Thickness: About 2250 kilometers

State: Molten liquid

INNER CORE: Earth's inner core is incredibly dense, because it is under so much pressure. The inner core begins at a depth of about 5150 kilometers below Earth's surface.

Thickness: Radius is about 1300 kilometers

State: Solid

Activity Procedure:

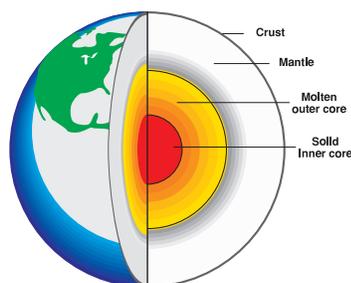
1. Give a 25 millimeters marble and the following amounts of each color clay to each student:
 - One stick of blue clay for Earth's crust
 - Two sticks of yellow clay for Earth's outer core
 - Six sticks of red clay for Earth's mantle(NOTE: Substitute other colors of clay as necessary. Clay colors supplied for this activity may not match colors depicted in the Visual Aid for this lesson.)
2. Show VISUAL AID: "Earth's Layers." Using the Science Basics section of this lesson plan, describe Earth's crust, mantle, outer core, and inner core. Emphasize the thickness of layers, and describe each layer as solid or liquid.
3. Inner Core: Help students build a clay model Earth by first explaining that the marble represents Earth's inner core. The radius of the inner core is 1300 kilometers; it is solid because it is under a great deal of pressure. Explain each student will use a marble to represent Earth's core. The marbles will be pushed into the center of the clay models after they have been cut in half.
4. Outer Core: Ask students to roll orange clay into a ball about 72 millimeters in diameter. Explain the yellow clay represents the outer core, which is about 2250 kilometers thick. Most of the rock in the outer core is molten, which means it is so hot that it melts and acts like a liquid.
5. Mantle: Around the outer core, wrap red clay for the mantle. Earth's mantle, which is about 2900 kilometers thick, is Earth's thickest layer. The mantle contains solid rock, although high temperature and pressure can cause some of this solid rock to flow slowly like an extremely thick liquid.
6. Crust: Around the mantle, spread a thin layer of blue clay for the crust. Earth's crust, which is 5 to 64 kilometers thick, is the part of Earth on which we live. The crust is thickest under the continents and thinnest under the oceans.
7. When the clay Earth model is complete, cut it in half using a sharp knife. Ask students to push a marble into the center of the yellow clay to represent Earth's inner core. Remind students Earth's inner core is solid, while Earth's outer core is molten and acts like a liquid.
8. Distribute the STUDENT WORKSHEET: "Clay Model Earth." Help students answer the questions. Complete the critical thinking activity.

Critical Thinking:

Venn Diagram Method: Ask students to work in groups or as a class to create a Venn Diagram illustrating the similarities and differences between Earth and the clay model. Discuss student work.

Answers:

1. See diagram at right
2. outer core
3. mantle
4. crust
5. inner core

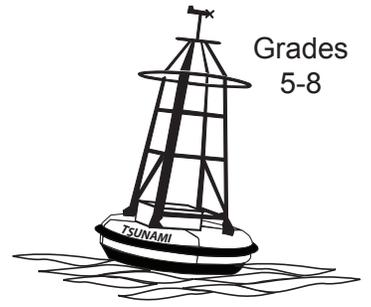


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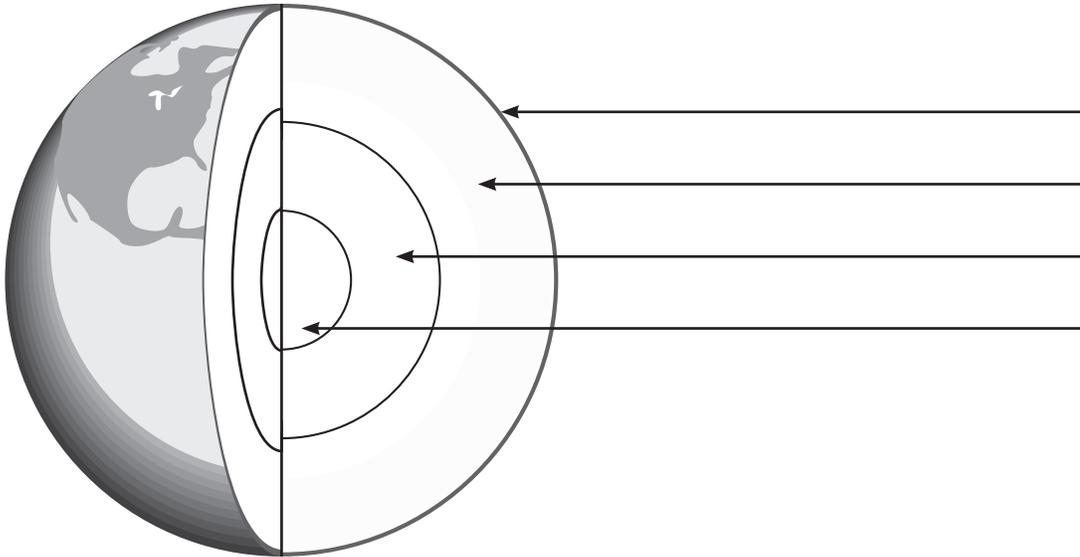
Student Worksheet

Clay Model Earth

Grades
5-8



1. Label Earth's layers on the diagram below.



2. Name the layer of Earth that contains mostly liquid rock. _____

3. Name Earth's thickest layer. High temperatures can soften this layer and cause it to change shape.

4. Name Earth's thinnest layer. _____

5. Which layer of Earth is solid due to tremendous pressure? _____