What's on your Plate?

Grades K-4

Overview:

In this lesson, students learn about the composition of Earth through multimedia and by creating a model using a hard-boiled egg.

Targeted Alaska Grade Level Expectations:

Science

[3-4] 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.

[4] SD2.2 The student demonstrates an understanding of the forces that shape Earth by identifying causes (i.e., earthquakes, tsunamis, volcanoes, landslides, and avalanches) of rapid changes on the surface.

Math

[3] S&P-1 The student demonstrates an ability to classify and organize data by [designing an investigation and collecting, recording L], organizing, displaying, or explaining the classification of data in real-world problems (e.g., literature, self, or family) using bar graphs, and [Venn diagrams L] (M6.1.1, M6.1.2, & M6.1.5).

Writing

[3] 1.2.1 The student writes for a variety of purposes and audiences by choosing the appropriate organizational structure to match a purpose and audience (e.g., letters and notes, recounts, stories, and poems) (L).

[4] 2.2.2 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., personal letters, recounts, descriptions or observations.

Objectives:

The student will:

- distinguish among oceans, continents, and plates;
- compare and contrast the layers of Earth to an egg;
- associate plate boundaries with causes (earthquakes and volcanoes) of rapid change on Earth's surface; and
- summarize information on a Venn diagram.

Materials:

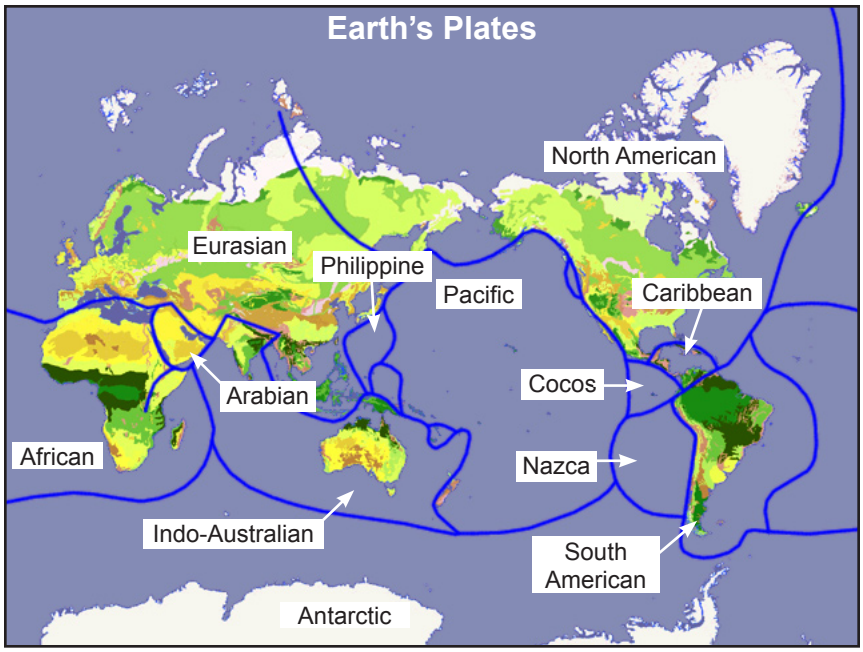
- Inflatable Globe
- Hard-boiled eggs
- Crayons
- Knife
- VIDEO FILES: "Earth's Layers" and "Plate Puzzle"
- STUDENT WORKSHEET: "Earth's Crust"

Science Basics:

The VIDEO FILE: "Earth's Layers" presents concepts used to explain Earth's interior. Earth is made of four layers. The outermost layer is the crust; of all the layers, this is the thinnest. Below the crust is the mantle; this layer is solid, but high temperatures soften it and cause it to change shape. Below the

mantle is the outer core, which is so hot it acts like a liquid. Finally, the hot inner core is squeezed into a solid ball by outside pressure.

Because Earth's crust is so thin, it is greatly influenced by the movement of liquid rock beneath it. The movement of liquid rock breaks the crust into plates. The plate boundaries separate oceanic and continental crust. The plate boundaries are areas where earthquakes and volcanoes are most likely to occur.



Activity Preparation:

1. Inflate globe.
2. Make one hard-boiled egg for each student.
3. Make a model of Earth using step 4 of the Activity Procedure. Do not crack the egg.

Activity Procedure:

1. Explain students will learn about the inside of Earth and what makes up Earth's surface.
2. As a review of continents and oceans, ask students to arrange themselves in a circle. Ask all students to hold up their right pointer finger. Explain you will toss around an inflatable globe. The person who catches the ball has to name where his or her index finger landed on the ball. Is it on a continent or an ocean? For older students, ask them to name the continent or ocean. Then have the student with the ball toss it to another student. Make sure all students catch the ball.
3. Access video files on the ATEP playlist (linked in the curricula description). Display the VIDEO FILE: "Earth's Layers," and discuss the layers. Click on the layers to highlight each layer. Emphasize how thin the crust is and that the movement of liquid rock in the layers below makes changes on Earth's surface.
4. Explain there are two types of crust, continental and oceanic. Write these words on the board. Continental crust makes up continents and oceanic crust makes up the sea floor, or the land under the ocean. Explain you will make a model of Earth. Distribute an egg and crayons to each student. Ask students to draw continents and oceans on their egg model of Earth using two crayons. Continents and oceans do not need to be the same as Earth's but should show the understanding that continents are large land masses and oceans are large masses of water. Ask students to share their models with a partner.
5. Explain because Earth's crust is so thin, the moving liquid rock beneath it moves the crust and causes it to crack. Demonstrate with your egg by making cracks on your egg model of Earth and explain that these cracks form plates on Earth's surface. Ask students to make cracks on their egg models of Earth. Ask students to hold up a "plate" from their egg. Ask them to show the plate to their partner and tell them what is on that plate, an ocean and/or a continent. Call on a few students to share what is on their plates, and emphasize that both oceanic crust and continental crust can make up a plate.

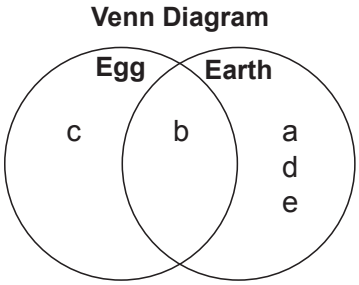
6. Cut your model in half and discuss how the inside of Earth is similar and different from the inside of the egg. They are similar because they both have layers. They are different because the egg only has three layers and Earth has four layers. Earth is also different from the egg because there is a liquid layer in Earth. The inside of Earth is also very hot, unlike the egg.
7. Access video files on the ATEP playlist (linked in the curricula description). Display the VIDEO FILE: "Plate Puzzle." Ask students to put the puzzle together to see where earthquakes and volcanoes commonly occur. Point out that they commonly occur along plate boundaries.
8. Distribute STUDENT WORKSHEET: "Earth's Crust" for third and fourth grade students to complete.

Extension Idea:

Read the following book: Gibbons, G. (1995). *Planet Earth, inside out*. New York: Morrow Junior Books.

Answers:

1. d. crust.
2. d. crust.
3. a. continental and oceanic.
4. c. plates.
5. c. continental and oceanic crust.
6. b. volcanoes and earthquakes.
7. see Venn diagram at right



8. Answers will vary but should state the information from the diagram in sentence form.

Lesson Information Source:

1. Gibbons, G. (1995). *Planet Earth, inside out*. New York: Morrow Junior Books.

Name:_____

Grades K-4

Earth's Crust

Student Worksheet (page 1 of 2)

1. The thinnest layer of Earth is the
   a. inner core.
   b. outer core.
   c. mantle.
   d. crust.

2. The outermost layer of Earth is
   a. inner core.
   b. outer core.
   c. mantle.
   d. crust.

3. The two types of crust on Earth are
   a. continental and oceanic.
   b. core and mantle.
   c. plate and continent.
   d. plate and ocean.

4. Earth's crust is broken into pieces called
   a. continents.
   b. oceans.
   c. plates.
   d. cores.

5. Plates are made of
   a. continental crust only.
   b. oceanic crust only.
   c. continental and oceanic crust.

6. Plate boundaries are common places for
   a. glaciers.
   b. volcanoes and earthquakes.
   c. storms.

Name:_____

Grades K-4

Earth's Crust

Student Worksheet (page 2 of 2)

7. Place the letter of each phrase in the best place within the Venn diagram below.

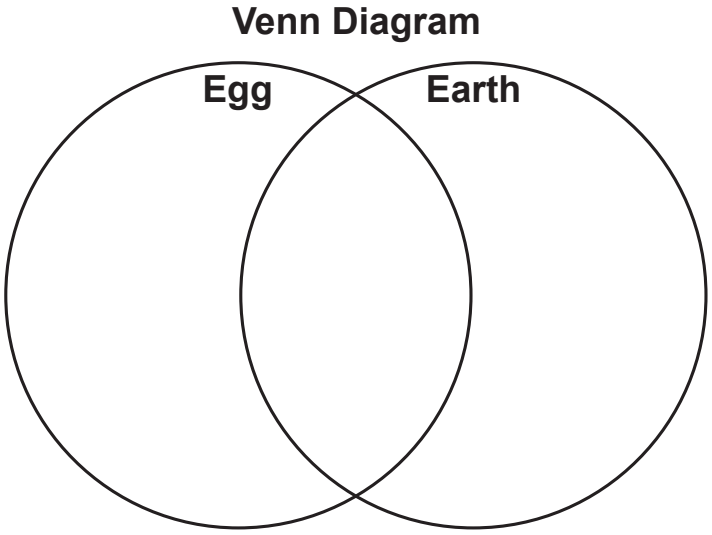
a. has a liquid layer

b. have layers

c. has three layers

d. has four layers

e. the inside is very hot



8. Write a summary of the Venn diagram.

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