Geoenvironmental Challenges Middle School Earth Science Activities

Standards

MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

Time: approx. 60 min. for all three activities.

Credits:

Undergradute pre-service teachers involved in the Summer 2014 *Geoenvironmental Challenges* Research Experience for Undergraduates (REU) and MTSU Geosciences professor Dr. Mark Abolins adapted *Oreo Plate Models* from an activity on Pinterest and *Plate Motion* from *Voyage Through Time* by Larry Braile and Sheryl Braile (http://web.ics.purdue.edu/~braile/edumod/flipbook/flipbook.pdf).

Pre-service teachers: Brandi Bomar, Indya Evans, Sarah VanGoor, Michelle Lebkuecher, Darrius Shaw, and Brandi Goss.

A Fanciful Earth Science Cartoon (a bell ringer)

Learning outcomes

- Students describe the interior of the Earth.
- Students describe typical rates of plate motion.
- Students distinguish between science and science fantasy.

Watch the following: https://www.youtube.com/watch?v=q_IYQdKkWsU . (1 min., 39 sec.)

Work individually. After you and your neighbor have completed your individual work, compare your answers, resolve differences, and add to your individual answers if necessary.

1) How fast do you think continental drift occurs? Why do you or don't you believe it occurred as fast as shown in the clip?

2) Draw four concentric circles. Label the mantle, inner core, crust, and other core. Draw a star on any of the four parts which is mostly iron-nickel alloy. Draw a triangle on any of the four parts which is mostly liquid.

3) If Scrat were real, would he survive his elevator ride to the core? Why or why not?

4) What was the name of the supercontinent that existed approximately 250 m.y. ago?

5) What do you believe to be true about the clip? What do you believe to be false? Make a list.

Oreo Plate Models

Materials needed: 4 oreos/student pair

Learning outcomes

- Students describe three different kinds of plate boundaries.
- Students distinguish between lithosphere and asthenosphere.

Work in pairs. Make Oreo plate models. Label each picture below. Circle the one that does not depict a plate boundary. Place the models below as appropriate, and I will circulate around the room and check that you have completed them. Work in pairs or groups of three.

Choices for labels: divergent plate boundary, sliding plate over asthenosphere, transform plate boundary, convergent plate boundary.

1) What does the upper oreo represent?

2) What does the cream represent?

Plate Motion

Materials needed: p. 9-13 of *Voyage Through Time* by Larry and Sheryl Braile (http://web.ics.purdue.edu/~braile/edumod/flipbook/flipbook.pdf).

Learning outcome

- Students describe the movement of the Indian subcontinent over time.
- Students describe changes in local climate associated with plate motion.

Shade India on each of the maps. Use the scale to plot the motion of India on the graph.

1) Approximately how far north of the Equator is India currently located?

2) How has the location of India changed over time? (Describe how India has moved and also describe the amount of time over which it has moved.)

3) How has India's climate likely changed over time?