Lab #4: *Geology 1* (Chapter 3)

Plate Tectonic Boundary Simulations

INTRODUCTION:

The objective of this laboratory is to help the students visualize the types of tectonic plate movement and infer the likely geologic effects of such movements.

MATERIALS

- Graham crackers (2 whole crackers)
- Spoonful of cool whip or frosting (per group)
- Knives or spoons
- Wax paper or paper plates
- Angel food cake or Foam Board
- Cup of water

METHODS/DISCUSSION/RESULTS

I. SIMULATION: DIVERGENT PLATE BOUNDARIES—SEA FLOOR SPREADING

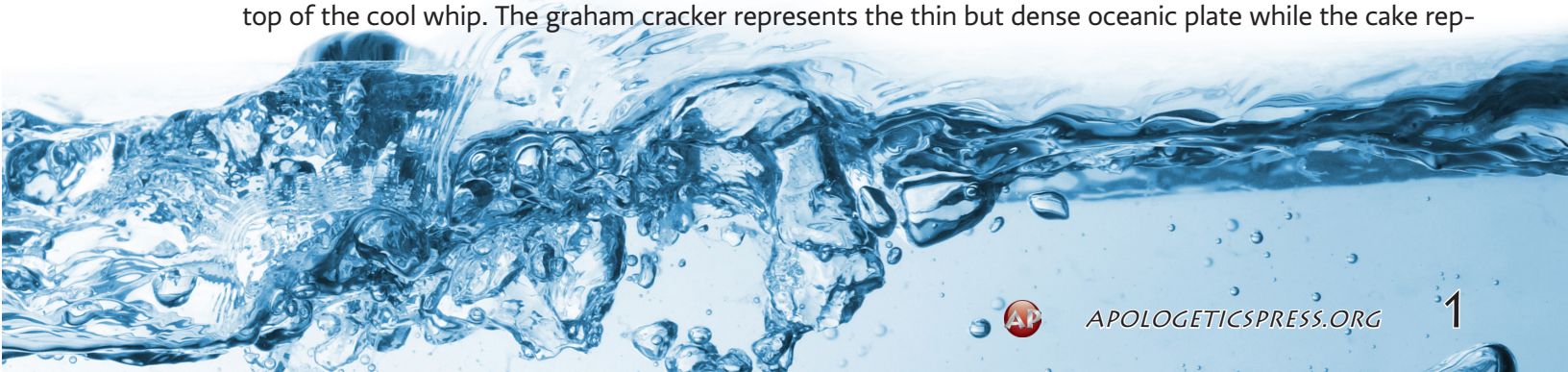
1. Break a whole graham cracker into two square pieces by following the perforations on the cracker.
2. Using the knives or spoons, spread a thick layer of cool whip in the center of the paper plate or wax paper.
3. Lay two pieces of the graham cracker side by side on top of the cool whip.
4. To imitate sea-floor spreading, press down lightly on the crackers as you slowly push down and apart in opposite directions. Do not push the crackers more than 1 centimeter apart!
5. Remove the graham crackers from the cool whip.

DISCUSSION (USE COMPLETE SENTENCES)

1. What happened to the cool whip between the crackers?
2. What do the graham crackers represent?
3. What does the cool whip represent?
4. What geologic feature does the rising cool whip represent?

II. SIMULATION: CONVERGENT PLATE BOUNDARIES—OCEANIC - CONTINENTAL

1. Now lay a WHOLE graham cracker and a piece of angel food cake end-to-end (against each other) on top of the cool whip. The graham cracker represents the thin but dense oceanic plate while the cake rep-



resents the thicker but less dense continental plate.

2. Push the two "plate" models slowly toward each other and observe which plate rides up over the other. On the actual surface of the earth, the lower and more dense plate is subducted.

DISCUSSION (USE COMPLETE SENTENCES)

1. Which plate is more dense: continental or oceanic?
2. Which plate (continental or oceanic) will subduct or sink under the other?
3. Why do you suppose oceanic crust is so dense and heavy?
4. What geologic feature was formed at the subduction boundary?

III. SIMULATION: CONVERGENT BOUNDARIES—CONTINENTAL - CONTINENTAL

1. Re-use the graham cracker used above for this activity. Break the graham cracker into four pieces- use only two and save the remaining two pieces of graham cracker for the next section. Each piece of graham cracker represents a continental plate.
2. Dip one end of each of the two graham crackers two centimeters into a cup of water. IMMEDIATELY remove the crackers and lay them end to end on the cool whip with the wet edges nearly touching.
3. Slowly push the two crackers together.

DISCUSSION (USE COMPLETE SENTENCES)

1. What happens to the wet ends of the graham crackers?
2. In what way do the wet crackers act more like the real crustal plates than the dry crackers?
3. When two continental plates collide in a convergent boundary, they squeeze together to form what?

IV. SIMULATION: TRANSFORM BOUNDARIES

1. Use the two remaining graham cracker pieces for this part of the lab. Fit the two pieces together side to side on top of the cool whip on the paper.
2. Place one hand on each of the cracker pieces and push them together by applying steady, moderate pressure. At the same time, also push one of the pieces away from you while pulling the other toward you. If you do this correctly, the cracker should hold while you increase the push-pull pressure, but will finally break from the opposite forces.

DISCUSSION (USE COMPLETE SENTENCES)

1. Why is this movement often described as "horizontal" sliding?
2. What natural disaster(s) occurs often near this type of boundary?

[This lab inspired/revised from: GrahamCrackerPlateTectonicsLab.docx.pdf (paulding.k12.ga.us)]