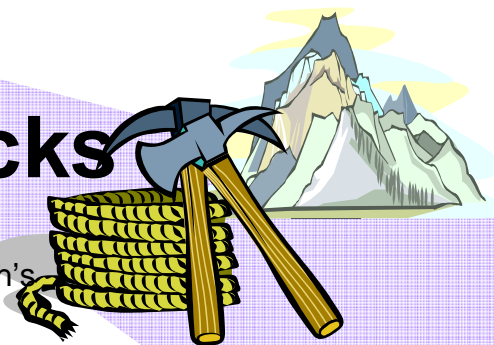


Tectonic Snacks



QUESTION: What features form at the boundaries of Earth's tectonic plates?

MATERIALS:

frosting - $\frac{1}{2}$ cup
fruit roll ups - 2 (3" squares)
graham crackers - 2 squares

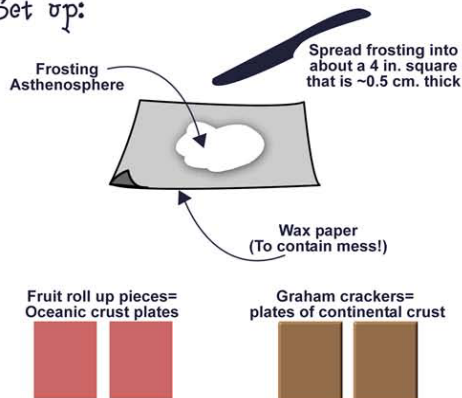
plastic knife
water - 1 cup
sheet of waxed paper (8" x 11")

PROCEDURE: (Refer to picture provided on next page.)

1. Use the knife to spread the frosting into a layer about 0.5 cm thick. In this model, the frosting represents the asthenosphere, the viscous layer on which Earth's plates ride. The plates in this model are represented by the fruit roll ups (oceanic crust which is thin and dense) and graham crackers (continental crust which is thick but less dense).
2. Make a divergent plate boundary. Place the two squares of fruit roll up (oceanic plates) onto the frosting right next to each other. Press down slowly on the fruit roll ups (because they are dense and will sink a bit into the asthenosphere) as you slowly push them apart about half a cm. Observe what happens to the frosting where the plates are separated. In the data section, draw a cross-section diagram to show what the divergent plate boundary looks like.
3. Make a continental-oceanic convergent boundary. Remove one of the fruit roll ups from the frosting (you can eat this if you want). Place one of the graham cracker halves lightly onto the frosting asthenosphere next to the remaining fruit roll up piece. The graham cracker represents the continental crust, which is thicker and less dense than oceanic crust (fruit roll up). It floats high on the asthenosphere so don't push it down.
4. Gently push the continent (graham cracker) towards the ocean plate (fruit roll up) until the two overlap and the graham cracker is on top. The oceanic plate is subducted below the continental one. In the data section, draw a cross-section diagram to show what this continental-oceanic convergent boundary looks like.
5. Make a continental-continental convergent boundary. Remove both the cracker and fruit roll up from the frosting asthenosphere (you can eat or discard the fruit roll up). Place one edge of both crackers into the glass of water for just a few seconds. Place the crackers on the frosting with the wet edges next to each other. Slowly push the graham crackers towards each other. Observe the edges of the graham crackers where they are colliding. In the data section, draw a cross-section diagram to show what this continental-continental convergent boundary looks like.
6. Make a transform plate boundary. Pick the two crackers up off the frosting and turn them around so that two dry edges are next to each other. Push one cracker past the other to simulate a transform plate boundary. In the data section, draw a cross-section diagram to show what the transform boundary looks like.

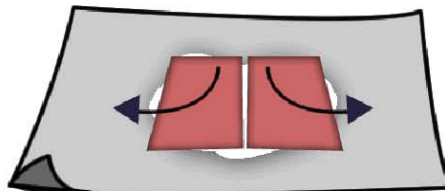
ES – Activity #26

Set up:



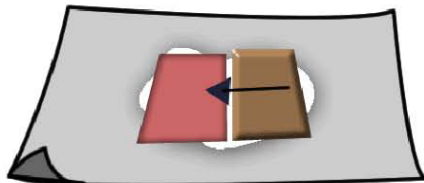
Divergent plate boundary

1. Place the two plates of oceanic crust (fruit roll up pieces) side by side lightly on the frosting asthenosphere.
2. Press down slowly on the oceanic plates (because they are dense and will sink a bit into the asthenosphere) as you slowly push them apart about half a cm.



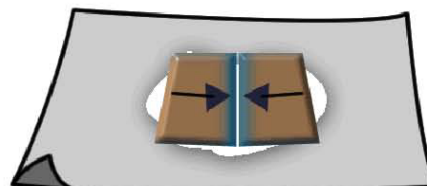
Continental-oceanic collision

1. Remove one of the fruit roll ups from the frosting.
2. Place one graham cracker lightly onto the frosting asthenosphere next to the remaining fruit roll up. Continental crust is less dense than oceanic crust. It floats high on the asthenosphere so don't push it down.
3. Gently push the continent (graham cracker) towards the ocean plate (fruit roll up) until the two overlap and the graham cracker is on top. The oceanic plate has been subducted!



Continent-continent collision

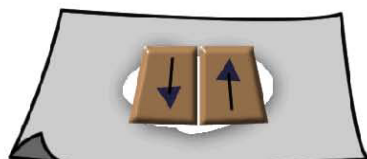
1. Remove both the cracker and fruit roll up from the frosting asthenosphere.
2. Place one edge of both crackers into the glass of water for just a few seconds.
3. Place the crackers onto the frosting with wet edges next to each other.
4. Slowly push the graham crackers towards each other.



Transform plate boundaries

1. Pick the two crackers up off the frosting and turn them around so that two dry edges are next to each other.
2. Push one cracker past the other to simulate a transform plate boundary like the San Andreas fault!

Final step: Eat all remaining model materials (except, of course, wax paper and plastic utensils!)



ES – Activity #26

DATA:

TYPE OF PLATE BOUNDARY	CROSS-SECTION DIAGRAM	GEOLOGIC FEATURES
Divergent boundary		
Convergent boundary oceanic - continental		
Convergent boundary continental - continental		
Transform boundary		

ES – Activity #26

QUESTIONS:

1. In your model you used your fingers to push the squares of fruit roll up apart to simulate a divergent boundary. In reality, what forces the oceanic plates apart at the mid-ocean ridges?
2. Where is it possible to see a divergent boundary without having to go to the mid-ocean ridges?
3. What evidence do scientists have that verify that indeed the Earth's plates are spreading at the mid-ocean ridge?
4. In general, where on Earth are the subduction zones located?
5. Where there are subduction zones, oceanic plate is being added into the magma of the mantle. What happens to the excess magma that is created?
6. What happens when the oceanic plate and the continental plate collide? Why does this happen?
7. What happens when two continental plates collide?
8. Along the western edge of California is a transform fault called the San Andreas fault. Look at the diagram of this feature below and explain what will eventually happen in relation to points A and B on the map.

