**Plate Tectonics and the Geography of our Planet**

Why are mountains located where they are? Why are oceans found where they are?? Why are there valleys in one location, and volcanoes in another??? Not surprisingly, the geographic features that are found on the Earth’s surface have been created over millions and millions of years by Plate Tectonics (the movements of the oceanic and continental plates on the Earth’s surface) and the Rock Cycle.

To understand how the Earth’s surface is created, go to the Annenberg Learner website called the Dynamic Earth:

<https://www.learner.org/series/interactive-dynamic-earth/>

Click on the “Earth’s Structure” tab, and do a quick review of the insides of the Earth. Remember that in our previous unit we learned about how the Earth’s insides cause the surface to move and change over time—think about Mantle Convection!

Click on the “Plate Tectonics” tab and complete the quick and easy interactives about how the continents have moved over time.

Move ahead to the section on “Plates and Plate Boundaries”. In the middle of the page are some demonstrations of convergent, divergent, and transform boundaries.

In the space below, show the motions of two plates at a **Convergent Boundary**:

In the space below, show the motions of two plates at a **Divergent Boundary**

In the space below, show the motions of two plates at a **Transform Boundary**

Using the interactive map at the bottom of the page, identify two locations on the Earth where there are:

Convergent Boundaries:

Divergent Boundaries:

Transform Boundaries:

Skip the “Plates and Boundaries” challenge and move ahead to the next section, “Slip, Slide, and Collide”. Go to the second page, “Convergent Boundaries- Colliding Plates”.

Convergent boundaries form when two different plates are moving towards each other so that they collide. Depending on the types of plates that are colliding, different things form at the Earth’s surface.

Oceanic Plate colliding with Continental Plate:

When an oceanic plate and a continental plate collide, the denser oceanic plate slides underneath the thicker and light continental crust. This is called a subduction zone. At a subduction zone, the oceanic crust slides down into the Mantle, and releases magma in the process. This magma rises to the surface of the Earth and forms volcanoes!! Sometimes enough volcanoes form that a whole mountain range gets created.

In the space below, draw a picture that shows a subduction zone. Show oceanic crust sliding under Continental crust, and show a volcano.

Q1—What type of rock (igneous, metamorphic, or sedimentary) is formed by a volcano?

Q2—Is this rock extrusive, or intrusive?

Q3-- Some of the rising magma cools and becomes solid before it reaches the volcano. Is this rock that forms below the Earth’s surface extrusive, or intrusive?

Oceanic Plate colliding with another Oceanic Plate:

Sometimes two pieces of oceanic crust smash into each other. When this happens, one of the pieces of oceanic crust will slide under the other piece of oceanic crust. Just like when oceanic crust subducts under continental crust, this sinking plate releases magma, causing volcanoes to form. Because these volcanoes form under the ocean, they can grow so big that they poke above the surface of the water, forming islands.

In the space below, draw a picture that shows a subduction zone in which one piece of oceanic crust slides under a different chunk of oceanic crust. Show how volcanoes form, and how those volcanoes can become islands.

Q4—What kind of rock (igneous, sedimentary, or metamorphic) usually forms on top of oceanic crust (the ocean floor)

Collision Zones: When two chunks of continental crust collide!

Sometimes two pieces of continental crust run into each other, and when this happens, neither plate will slide below the other. Instead, they smush together, pushing and squeezing to form large mountain ranges.

Q 5-- What kind of rock (igneous, sedimentary, or metamorphic) is formed when rocks are squeezed together and experience lots of Heat and Pressure?

In the space below, draw a picture that shows how mountain ranges form when two pieces of continental crust meet at a convergent boundary.

Q 6-- True or false: when two plates collide at a convergent boundary, there is so much force that rocks can sometimes be lifted 10 miles upwards.

**Divergent Boundaries**:

Divergent Boundaries in oceanic plates-- Sometimes a divergent boundary will occur at the bottom of the ocean. When this happens, “seafloor spreading” occurs. In the space below, make a sketch showing how oceanic plates move apart at a divergent boundary, and explain why a huge crack in the Earth isn’t created.

Q 7—What kind of rock (igneous, sedimentary, or metamorphic) is created at a divergent boundary at the bottom of the ocean?

Divergent Boundaries in continental crust-- Watch the animation that shows what happens on the Earth’s surface when a divergent boundary splits apart continental crust. Then draw a picture that shows a Rift Valley.

Q 8—What types of rock (igneous, sedimentary, or metamorphic) is created in a rift valley?

**Transform Boundaries**:

Transform boundaries are pretty boring in terms of the rock cycle (because no new rocks are created at them), but they can cause pretty major earthquakes. IN the space below, make a sketch that shows how plates move past each other at a transform boundary.

Take the Plate Interactions Challenge, and then write down your score here \_\_\_\_

**How plate boundaries shape the Earth’s surface**:

Follow the link to this cool interactive website that explores how plate tectonics creates the geographical features on the Earth’s surface.

<https://www.amnh.org/ology/features/plates/loader.swf>

On the map are 12 locations. Click on each dot, and explore what is happening at that location in terms of plate movements, and because of plate movements. Read the story, watch the Animation, and then read the stats. Then enter information into the table below.

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| Location | Event | Plate Boundary/Motion |
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