

## Phet Plate Tectonics Lab

Using a computer, google "[Phet Plate Tectonics](#)." Click the first link and then click the download button. You should be prompted to save it, click "save." Now click on the downloaded file. If a "Run" button/dialogue box opens, click on the "Run" button.

At the bottom right corner of the simulation you will see a "view" box. Select the "both" options and check mark the "Show Labels" box.

There are three variables you can play with: Temperature, Composition, and Thickness.

**1. How many variables should you change at any given time?**

**2. Describe the word "density."**

Using the zoom tool, zoom all the way in. Grab the "Density" meter and slowly drag it over the 3 different types of crust.

**3. Compare and contrast the density of the three sections of crust.**

Place a "Density" meter onto the middle portion of the crust. Using the three variable sliders, discover what happens to the density of the crust as you change the sliders.

**4. Temperature as you change it from cold to warm.**

**5. Why do you think that is?**

**6. Composition as you change it from more iron to more silica.**

**7. What does this tell you about iron vs. silica?**

**8. Thickness as you change it from thin to thick.**

**9. Why do you think that is?**

Click on the "Plate Motion" tab at the top. Make sure you have the Automatic Mode on. At the bottom in the "View" box, make sure the "Both" is selected and the "Show Labels" and "Show Seawater" are both checked. Here you can place different types of crust. Make sure you select the correct options when working in each section, convergent, divergent and transform.

**Convergent Boundaries**

Left Side Crust	Right Side Crust	Which Crust is Denser?	Which Crust Subducts?	Do non-volcanic Mountains Form?	Does a Trench Form?	On Which Crust Do Volcanoes Form?
Continental	Continental					
Continental	Old Ocean					
Continental	Young Ocean					
Old Ocean	Young Ocean					

**Divergent Boundaries**

Now let's take a quick look at divergent boundaries. In the simulation under the plate motion tab, create a scenario where you have two chunks of continental crust. Select the automatic mode and then choose the divergent option. Go ahead and run your simulation.

**10. If two continental plates separate, what begins to be formed?**

**11. What is found in the middle of this new water body?**

**12. What force causes divergent plate movement?**

**Transform Boundaries**

Finally let's take a look at transform boundaries. Again set up a scenario where two continental crusts are involved. Make sure it's on automatic mode and select the transform option.

**13. What's formed at the edges of each plate?**

**14. What two forces are involved during the movement of transform boundaries?**

# Plate Tectonics Lab Answer Key

1. How many variables should you change at any given time?

Two

2. Describe the word “density.”

Mass per unit volume

3. Compare and contrast the density of the three sections of crust.

Oceanic crust is the most dense, continental crust is the least dense, and young oceanic crust is in between.

4. Temperature as you change it from cold to warm.

Increases

5. Why do you think that is?

As temperature increases, the volume of the material expands, decreasing its density.

6. Composition as you change it from more iron to more silica.

Increases

7. What does this tell you about iron vs. silica?

Iron is denser than silica.

8. Thickness as you change it from thin to thick.

Increases

9. Why do you think that is?

As thickness increases, the volume of the material increases, increasing its density.

Left Side Crust	Right Side Crust	Which Crust is Denser?	Which Crust Subducts?	Do non-volcanic Mountains Form?	Does a Trench Form?	On Which Crust Do Volcanoes Form?
Continental	Continental	Continental	Continental	Continental	Continental	Continental
Continental	Old Ocean	Old Ocean	Old Ocean	Old Ocean	Old Ocean	Old Ocean
Continental	Young Ocean	Young Ocean	Young Ocean	Young Ocean	Young Ocean	Continental
Old Ocean	Young Ocean	Young Ocean	Young Ocean	Young Ocean	Young Ocean	Young Ocean

10. If two continental plates separate, what begins to be formed?

A basin

11. What is found in the middle of this new water body?

A basin

12. What force causes divergent plate movement?

A basin

13. What is formed at the edges of each plate?

A basin

14. What two forces are involved during the movement of transform boundaries?

A basin

## Teacher Reflection and Procedure

- First off this lab will only work if you have java enabled on your computers. I hear that this doesn't work on Macs either.
- I have my students read and we discuss the first part of <http://earthscience.xyz/PlateTectonics>
- I have them divide up into partners or allow them to work by themselves. This lab isn't the best with more than two people, but if you have limited computers then you can make larger groups or even do this as a whole group watching you do the lab on the projector. Partnerships tend to work the best.
- The lab is self explanatory.
- When we are finished with the assignment I go over this as a whole group so that the groups can compare notes and we can discuss the "Why" questions.