



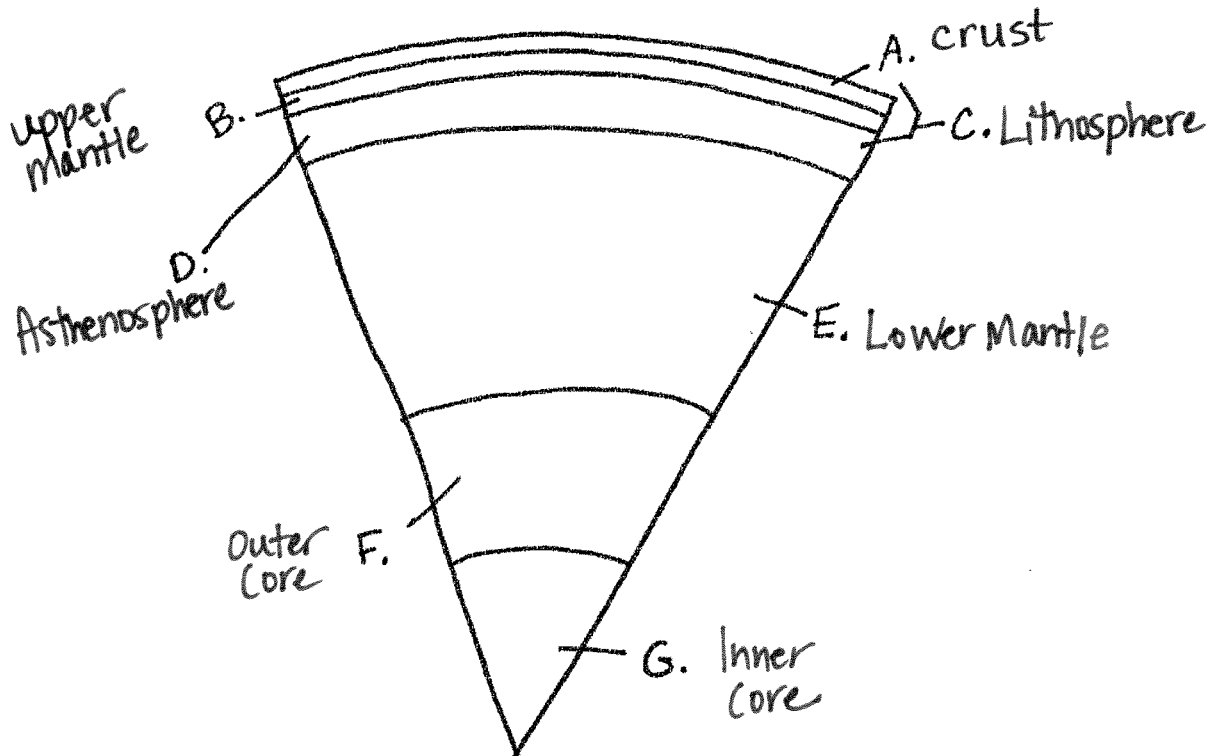
## PLATE TECTONICS STUDY GUIDE



*\* ANSWER KEY \**

*Write out your answers on a separate piece of paper to check for your understanding of this content.*

- Be able to label a cross-section of the Earth, showing its main layers: crust, upper mantle, lithosphere, asthenosphere, lower mantle, outer core, and inner core.


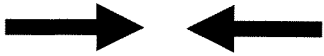
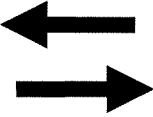


- Describe characteristics of each layer (ex. consistency, temperature, materials it is made out of...)
  - Focus on Inner core
    - **Temperature:** Can get up to 9,000 degrees Fahrenheit (the hottest part of the Earth)
    - **Solid or Liquid?** Solid because of the intense heat and pressure
    - **Material it is made out of:** Iron and Nickel – there are other metals too, but those are our focus.
  - **Lower Mantle** – Compared to Taffy. It is a Solid...moves due to heat and pressure

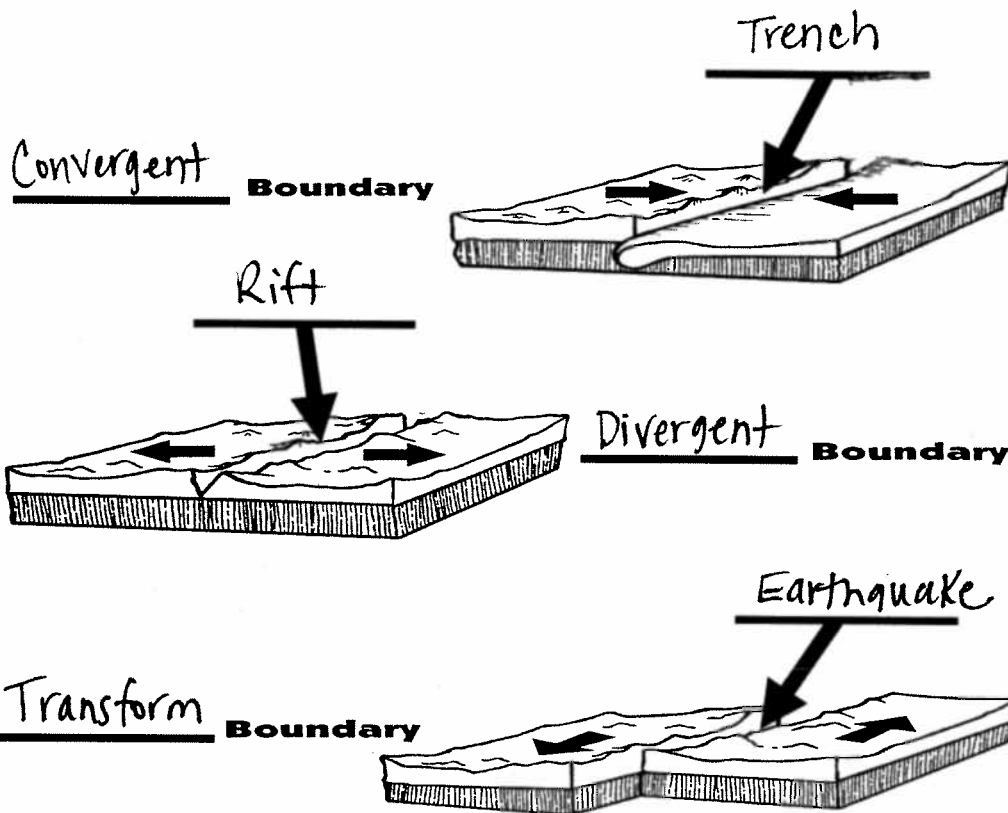
- **Consistency of the Lithosphere** (Crust and Upper Mantle) – Rigid, brittle rock – separated into large plates
- **Consistency of the Asthenosphere** – also compared to putty/taffy like texture.

## Boundary Definitions

- 1.) Please write out the definitions of the following boundaries, including where it can take place and what is formed from the interactions.

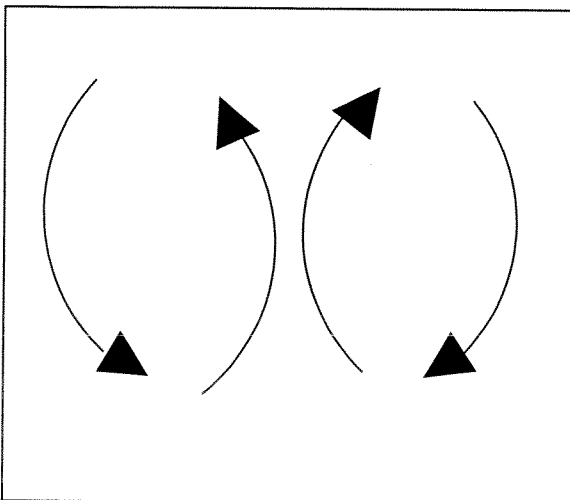
Type of Boundary	Draw arrows showing direction of plate movement	What Could Be Formed?
Divergent Boundary		Earthquake, Rift, Volcano
Convergent Boundary		Earthquake, Mountain, Volcano, Trench
Transform Boundary		Earthquake

- Label the three main types of plate boundaries (Convergent, Divergent, and Transform), and the following terms: rift, trench, and earthquake in the study prints below.



- Be able to explain how earthquakes, volcanoes, and mountains are related. Use evidence from the World Map we created in class.
  - The world map we created showed how earthquakes, volcanoes, mountains can all occur in the same locations, which are generally at or near plate boundaries. This provided us with evidence to conclude that earthquakes, volcanoes, and mountains usually occur at or near plate boundaries.
- Define the theory of plate tectonics.
  - The theory in which the lithosphere is divided into a number of large rocky plates, and the study of how the plates move and interact with one another.

- **Give at least three pieces of evidence that prove the continents used to be one large, single continent**
  - Ancient Mountain Chains (Connected between continents)
  - Breakup of Pangea (Direction of plate movements, and the idea of continental drift)
  - Fossils (Connected between continents)
  - Glaciers (glacial grooves)
- **What is the name of the scientist that originally came up with the theory of plate tectonics?**
  - Alfred Wegener (Make sure you can spell this correctly)
- **What was the name the “supercontinent” that could have existed 250 million years ago?**
  - Pangea (or Pangaea)
- **Define the theory of continental drift.**
  - A theory that proposes the continents’ positions on the globe are not fixed and that the continents have moved (and continue to move) during the course of geologic time.
- **Draw and explain the idea behind convection cells/currents in the Earth’s mantle (remember the oatmeal demonstration?)**



At the bottom of the lower mantle the heat (4,000°F) makes the rock expand, become less dense, and rise.

When the rock reaches the top of the lower mantle (1,600°F) it cools, contracts, becomes more dense, and falls. The cycle continues to repeat.

- **Be able to describe how the plates/continents are able to move.**
  - They are able to move because of the lower mantle moving, which then causes the taffy like Asthenosphere to move with in turn pushes the lithospheric plates. This occurs because of the intense heat and pressure from the inside of the Earth.
- **Know how much (on average) a lithospheric plate will move per year.**
  - On average about 3-5 centimeters per year.
- **Know what the word tsunami means.**
  - Harbor Wave
- **Know what happened on December 26, 2004, and be able to explain what caused the deadly tsunami in the Indian Ocean.**
  - At the bottom of the ocean there was a subduction zone between two plates. When the pressure couldn't handle it any longer the plate snapped back into place (an earthquake occurred), which caused an uplift of water, which in turn caused the tsunami. Over 280,000 people were killed from the tsunami that hit 12 different countries.



- **Be able to recognize the difference between a physical model and a conceptual model.**
  - **Physical Model** – is a structure that scientists build to represent something.
  - **Conceptual Model** – is a model that scientists develop in their minds.
- **Know why the continental crust doesn't subduct beneath the mantle.**
  - The continental crust is less dense than the mantle.