

## Plate Boundaries and Patterns of Activity

**Introduction:** The Earth's crust is divided into several "plates". Some plates consist of mainly ocean crust, some are mostly continental crust, and some plates are made up of both ocean and continental crust. The plates, which together make up Earth's lithosphere, "float" on top of the mantle and move due to convection cells in the mantle. Movement of these plates causes earthquakes, volcanoes, and the building of mountain ranges. In this lab you will investigate patterns of earthquakes, volcanoes, and mountain ranges and determine the type of motion that takes place between earth's plates.

### Materials

- Access to the World Wide Web to obtain data and maps at the sites listed below.
- Answer sheet ([click here to download](#))
- **ESRT Map** to plot earthquakes and volcanoes ([click here to download pdf](#))

### Crustal Activity Patterns

#### **Directions:**

1. Obtain the latitude and longitude coordinates of the 10 most recent earthquake epicenters in the world that are greater than magnitude 4.0 at: [http://earthquake.usgs.gov/recenteqsww/Quakes/quakes\\_all.html](http://earthquake.usgs.gov/recenteqsww/Quakes/quakes_all.html). Using your **ESRT Map** that you downloaded, and the lat/long of the earthquake from the web, determine the place the earthquake occurred, the nearest plate or plate boundary, the boundary type and its depth. If the depth of the quake was less than or equal to 70 km record the plot in **RED**; if the quake depth was greater than 71km but less than 350 km. plot it in **BLUE**, and if the quake depth was greater than 350 km, plot it in **YELLOW**.
2. Obtain the latitude and longitude coordinates of the 10 most recent volcanic eruptions in the world at [http://volcano.und.nodak.edu/vwdocs/current\\_volcs/current.html](http://volcano.und.nodak.edu/vwdocs/current_volcs/current.html) Using your **ESRT Map** plot the volcano's position in **GREEN**. On your report sheet, record the nearest plate or plate boundary that the volcano is near, the boundary type and volcano type.
3. Observe the World Seismicity Map at <http://wwwneic.cr.usgs.gov/neis/general/seismicity/world.html>. How does the information on this map correlate with your boundary map on page 5 of your ESRT's?
4. Is there a relationship between the depth of the earthquake and the boundary it is near? (e.g. shallow earthquakes usually are found at \_\_\_\_\_. Deep focus earthquakes are usually found at \_\_\_\_\_)
5. Observe the world volcano map at [CVO Website - Plate Tectonics, Hot Spots, and Ring of Fire - World Map](http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html) ([http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map\\_plate\\_tectonics\\_world.html](http://vulcan.wr.usgs.gov/Glossary/PlateTectonics/Maps/map_plate_tectonics_world.html)) or ring of fire map at: <http://pubs.usgs.gov/publications/text/fire.html> At what type of boundary do the majority of volcanoes occur?
6. Is there a relationship between the volcano type and the boundary it is near?
7. Observe a world relief map to locate the main mountain ranges of the world, including ocean mountain ranges. Along which boundaries do the mountains seem to fall with respect to the ESRT map on page 5?
8. What can you conclude about the patterns of earthquakes and volcanoes and plate boundaries?
9. Why are most of the world's earthquakes and volcanic mountains located along plate boundaries?





