

Google Earth Plate Boundaries Activity

Materials:

Computer with Internet connection and Google Earth installed (download for free at earth.google.com)

Files to load in google earth:

Earth's_Tectonic_Plates.kmz - USGS file of plate boundaries

plate_boundaries.kml - Plate boundaries as drawn by several researchers

global_topo_1min_V13.1_terra.kmz - Global sea-floor topography curt. of D. Sandwell

Copies of Google Earth Plate Boundaries Handout

Prep:

Have Google Earth ready with kmz files already loaded. It's a good idea to test-run before class. The sea-floor topography kml file is also very nice, but slow. It is optional. See beginner and advanced tutorials on the Google Earth website (earth.google.com). You can adjust resolution for clearer images and adjust vertical exaggerations to make mountains look more pronounced when you zoom in.

Context: This activity is meant to help students understand real life examples of plate boundaries. They should learn to recognize what geological formations are found at each boundary type. A lecture on plate boundaries should be given before this activity. Students should have learned the three boundary types and also what sorts of geologic features are associated with each one.

Activity Instructions:

1. Start by finding your city or school in Google Earth, to introduce Google Earth to those who have not seen it before.
2. Fly to the first stop on the 'Plate Boundary Tourist Tour' listed below. You can get there by typing in the latitude and longitude, or many times by typing in the name of the feature. The teacher may wish to have student volunteers be the 'tour guide' at each stop to keep students engaged. At each stop: (1) ask students 'what do we see?' and look for answers such as 'mountains' or 'deep water', and guide them in the observations when necessary with the information below (2) ask students if they can guess what type of boundary it is (it says on their handout...). It is sometimes helpful to turn the plate boundaries 'off' to make observations, then turn them 'on' after students first try to guess the boundary type. Make sure to zoom way in to see the geologic features such as mountains, then zoom way out to see the big picture of the plates.
3. Next, tell students to label on their handout map the place they just visited on Google Earth by marking the number of the location in the appropriate circle on the map.
4. Move on to the next stop on the list and repeat.

Wrap-up: If there is time, ask students what other places they want to visit. Google Earth recognizes the names of many volcanoes and other features, so you can fly to many without knowing the latitude/longitude.

Plate Boundary Tourist Tour

1. Ocean-Continent Convergent Boundary: 2010 Chile 8.8 Earthquake location, 35.909°S, 72.733°W. Subduction Zone. Notice the trench and volcanic mountain range.
2. Continent-Continent Convergent Boundary: Mt. Everest, 27.988°N 86.925°E. Highest point on Earth. Part of Himalaya Mountains, which is created from the ongoing continent-continent collision. The collision is still occurring and the mountains are still growing.
3. Ocean-Ocean Convergent Boundary: 2011 Japan 9.0 Earthquake location, 38.322°N 142.369°E. Subduction zone. Trench and Island Arc. Lots of active volcanoes on Japan, and many big earthquakes.
4. Transform Boundary: San Andreas Fault, 35.900°N 120.433°W. Pacific Ocean Plate sliding by North American Continental Plate, producing a lot of Earthquakes and some mountains. No lithosphere created or destroyed at transform boundaries
5. Ocean-Ocean Divergent Boundary: Mid-Atlantic Ridge, 0.00°N 20.00°W. A sea-floor spreading center, where new ocean floor is forming.
6. Continental Divergent Boundary: Mt. Kilimanjaro (East African Rift) 3.07583°S 37.35333°E: An inactive volcano, but many other volcanoes along the East African Rift are active. The African continental plate is ripping apart into two plates. The Arabian plate is already rifted off, creating the Red Sea. **This boundary is not marked in the USGS provide Plate Boundary file, but is in the plate_boundaries.kml made by various researchers.
7. Extra #1 – Another Ocean-Continent Convergent Boundary: Mt. St. Helens 46.191°N 122.194°W. Volcano related to subduction. Well known active volcano in North America.
8. Extra #2 – Another Ocean-Ocean Convergent Boundary: Challenger Deep in the Mariana Trench, 11.329°N, 142.206°E. Deepest point on Earth (deeper down than Mt. Everest is high). Trench is again typical of a subduction zone.