

Discovering Plate Boundaries

Four Map Version

Student Handout

You have been (or will be) assigned to one of four Scientific Specialties and to one of ten Plates or Plate Groupings.

The Scientific Specialties are:

- A. Seismology
- B. Volcanology
- C. Geography
- D. Geochronology

The Plates or Plate Groupings are:

- 1. North American Plate
- 2. Pacific Plate
- 3. African Plate
- 4. South American Plate
- 5. Eurasian Plate
- 6. Cocos/Nazca/Caribbean Plates
- 7. Australian Plate
- 8. Antarctic Plate
- 9. Indian Plate
- 10. Arabian Plate

Each Scientific Specialty group has been provided a world map showing data relevant to locating plate boundaries and understanding plate boundary processes. Each student will be provided two Plate Boundary Maps. You will mark these as described below and turn them in at the end of the exercise. There are a number of colored pencils available in the room for your use.

Period 1: Assemble in your Scientific Specialty groups with your group's map

Task 1. Look at your group's map and talk about what you see. What you look for will vary with data type. For the point data (volcanoes and earthquakes) you are looking for distribution patterns. For surface data (topography and seafloor age) you are looking for where the surface is high and where it is low, where it is old and where it is young. Work as a group. Let everyone talk about what they see. During this period concentrate on the whole world, not just your assigned plate (if you know what it is).

Task 2 . Now focus your attention on the plate boundaries. Identify the nature of your data near the plate boundaries. Is it high or low, symmetric or asymmetric, missing or not missing, varying along the boundary or constant along the boundary, and etc. As a group, classify the plate boundaries based on your observations of your group's data. Restrict yourselves to about 4-5 boundary types. At this point, do not try to explain the data; just observe!

Task 3 . Assign a colored pencil color to each boundary type in your classification scheme. Color your first Plate Boundary Map to locate your group's boundary types. If the data are asymmetric at a particular boundary type, devise a way of indicating that on your plate boundary map. Each person should mark the boundary types identified by the group on their own map. Each person should write down descriptions of the group's plate boundary classifications on the back of their map. These maps and descriptions will be turned in at the end of the exercise.

Period 2: Assemble in your Plate groups

Task 1. Each person should make a brief presentation to the rest of their group about their Scientific Specialty's data and classification scheme. Your group may move to each map in turn while doing this or you may have smaller maps for each group to use.

Task 2. Compare the classifications of boundary type for your plate based on each type of data. Are there common extents (along the boundaries) between the different classifications? Can your plate group come up with a new classification scheme that now includes data from all four Scientific Specialties? As above, assign a color to each of your plate boundary types. If a boundary is asymmetric, be sure to devise a way to represent the asymmetry. Mark the boundaries of your plate or plate grouping using your color scheme on your second Plate Boundary Map. Also write a description of the plate boundary classes you have used. The map and description should be turned in at the end of the exercise.

Period 3: Whole Class Discussion

One student from each Plate Group should make a presentation to the class. They should talk about their group's plate boundary classification scheme and how they classify the boundaries of their plate. You will be given an overhead transparency of the Plate Boundary Map and some transparency markers to prepare for the presentation.

The instructor will conclude the exercise by summarizing the students' observations and placing them in the context of accepted plate boundary types and plate boundary processes.

To be turned in by each student after Period 3

1. Plate Boundary Map with classified using data from your assigned scientific specialty. Descriptions of the plate boundary classifications devised by your specialty group should be on the back of the map.
2. Map with your assigned plate's boundaries classified using data from all four scientific specialties. Descriptions of the plate boundary classifications devised by your plate group should be on the back of the map.