

World Tectonic Mapping Activity

Activity by Bonnie Magura (Jackson Middle School, Portland OR) modified from Chris Hedeem (Oregon City High School, Oregon City, OR); background map courtesy of Scott Walker (Digital Cartography Specialist, Harvard College Library); graphics and tectonic overlay by Jenda Johnson (Volcano Video & Graphics)

Introduction

The Plate Tectonics Mapping Activity allows students to easily begin to identify basic tectonic processes on a global scale. As students become aware of plate movements, they begin to identify patterns that set the stage for deeper understanding of a very complex topic. The activity uses a simple “Where’s Waldo” approach to identify tectonic symbols on a laminated World Plate Tectonic map.

Objectives

- Learn where volcanoes and earthquakes occur
- Understand geography
- Use critical thinking to find plate boundaries
- Answer relevant discussion questions on worksheet

Procedure

Print the appropriate maps (see Materials) for use. Note that the maps in this document need to be printed on legal-size paper!!

Students work in pairs or small groups of 3 or 4 students using washable markers to circle tectonic features. This hands-on activity captures the interest of all ability levels. The process of exploring the map and drawing with colored markers captures student interest and creates curiosity to discover why particular features are located where they are. As students work through simple questions on the activity sheet, they are then able to start the more challenging process of understanding the patterns and process that make up the fundamental principles of Plate Tectonics.

The **Discussion Questions** below are provided as a resource for teachers to engage student’s growing understanding. The questions have been used in small groups, whole class discussion, research, as a writing assignment, and for evaluation.

Discussion Questions — below

Worksheets — next pages

Maps—in several formats for classroom use:

- Poster-size map (24 x 14”) requires large-format printer [DOWNLOAD](#) *or*
- Poster to be printed on **legal-size** paper then glued or taped together to create the poster-size image. [DOWNLOAD](#)
- Legal-size map without images along bottom for student worksheet. [PAGE 4](#)
- Legal-size map ***WITHOUT tectonic features*** to be used to see if physical features can be recognized. [Page 5](#)

Plastic cover: Poster-size map can be covered with clear shelving paper so it can be written on with washable felt-tip markers. Lamination is better (more rigid and clearer) but contact paper is less expensive.

To copy text from a PDF document in



Acrobat, use the tool that has the bracket:

Discussion Questions:

1. Do the locations of earthquakes and volcanoes show a pattern? If so, what tectonic process may be responsible?
2. Generally speaking, where are the oceanic ridges located with respect to the landmasses?
3. Where do you find the mountain ranges with respect to the oceanic ridges? Use examples.
4. Are there any places on Earth where the mid-oceanic ridges meet the continent?
5. What are seamounts?
6. Most of the Pacific Ocean is on what plate?
7. What is the compass orientation of the Hawaiian Islands and many of the other smaller ridges within the Pacific Ocean? Is this significant?
8. In what compass direction is the Pacific Plate moving?
9. Name the biggest and longest mountain range in the world. What is it?
10. Name an island chain that has been formed by a “hot spot”.
11. What island in the North Atlantic Ocean is splitting apart? What is causing the split?
12. Where is magma rising to the surface and forming ocean crust? Where is the oceanic crust sinking back into the mantle?
13. Some people have referred to the process in the above question as a cycle. Why would it be considered a cycle?
14. What are the attributes of a cycle? Can you describe another cycle that could compare with the example described above.
15. Why is it that the Pacific Ocean floor is no older than about 200 million years and yet the continents are much older?
16. The continental margins of the East and West Coast of the United States are very different. Describe the differences. Are there tectonic differences?

PLATE TECTONICS MAPPING ACTIVITY

1. Draw the symbol for each tectonic feature in the chart below

Divergent margins and spreading centers (draw in black)	
Convergent margins - subduction zone (draw in blue)	
Transform faults – strike-slip faults (draw in green)	
Hot Spot (draw in red)	

2. Use the correct color of washable marker to locate each tectonic feature on the map.

- a. Circle the Divergent margins and spreading centers in black. Number found _____
- b. Circle the Convergent margins in blue. Number found _____
- c. Circle the Transform faults in green. Number found _____
- d. Circle the Hot Spots in red. Number found _____

3. What is the name of the small crustal plate off the Oregon coast that is subducting beneath the North American plate? _____

4. Where are most of the earthquakes and volcanoes located?

Circle one: a. crustal plate margins b. interior of a crustal plate

Answer the following questions using the diagrams located on the poster map.

5. Divergent margins – spreading centers:

- a. New crust forms at plate margins as _____ rises creating ridges under oceans such as the _____ and the _____.
- b. Spreading centers found on continents rather than plate margins include the _____ in the US and the _____ in Africa.

Note: pages 2 and 3 can be printed on 8.5 x 11” page-size paper for homework. The maps print on legal size paper.

Or [CLICK HERE](#) to download a Word document of these pages.

6. Convergent margins – subduction zones:

Describe the land form (geomorphology) created at each type of Convergent Boundary

- a. Ocean-Ocean _____
- b. Ocean-Continent _____
- c. Continent-Continent _____

7. Transform faults – strike slip faults

- a. Sometimes tectonic plates shift past each other _____ at their boundary.
- b. One example of a strike slip fault near San Francisco is the _____.

8. Earthquakes:

- a. Most earthquakes occur near plate _____.
- b. _____ keeps the plate edges from sliding smoothly past each other.
- c. The longer the plates remain stuck, the more strain builds and the more violent the snap and resulting _____.

9. Volcanoes:

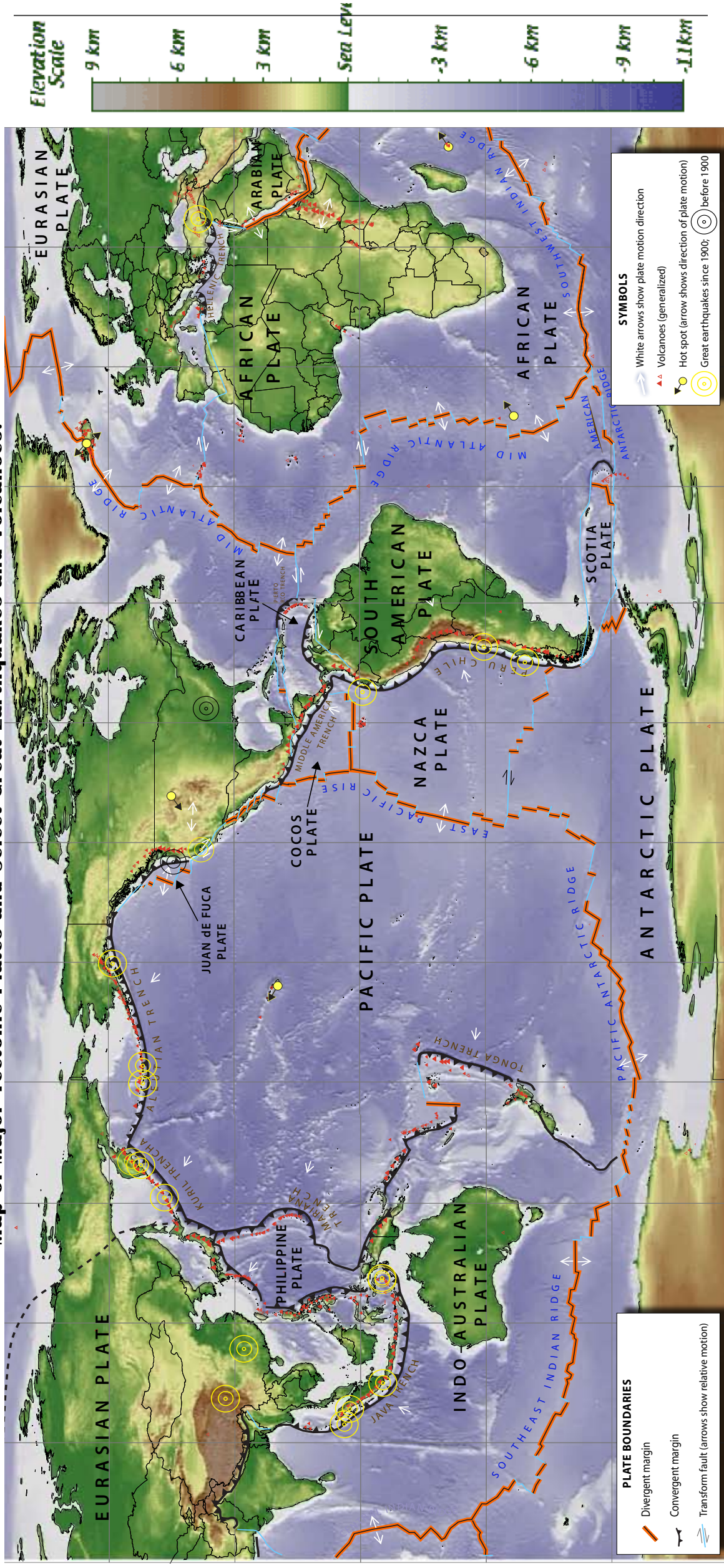
- a. Magma rises to the surface from inside the earth mainly at _____ and _____.
- b. Around the rim of the Pacific Ocean, the 40,000 km long _____ of _____ is especially active.

10. Hot Spots:

- a. In a few places _____ melts through a tectonic plate.
- b. Each hot spot likely marks the top of a plume of _____ rock that rises from deep in the earth.

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Map of Major Tectonic Plates and Select Great Earthquakes and Volcanoes.



NAME _____

