

LAB 4-2: Crustal Boundaries

INTRODUCTION: According to plate tectonic theory, Earth's surface is divided into moving plates. A plate is a large, mobile slab of rock that is part of Earth's rigid outer shell known as the lithosphere. This includes rocks of the crust and upper mantle.

The boundaries between plates are of three general types. The boundary between plates that are moving apart is termed **diverging** while a boundary between plates that are moving toward each other is called **converging**. A **transform** boundary is found where two plates are moving horizontally past one another.

OBJECTIVE: You will distinguish between diverging, converging and transform tectonic plate boundaries.

VOCABULARY:

lithosphere:

transform plate boundary:

diverging plate boundary:

subduction:

converging plate boundary:

Andes Mountains:

PROCEDURE A: Fill in the data chart below using the "Tectonic Plates" map in the Appendix. Place a check in the appropriate box identifying the type of plate boundary.

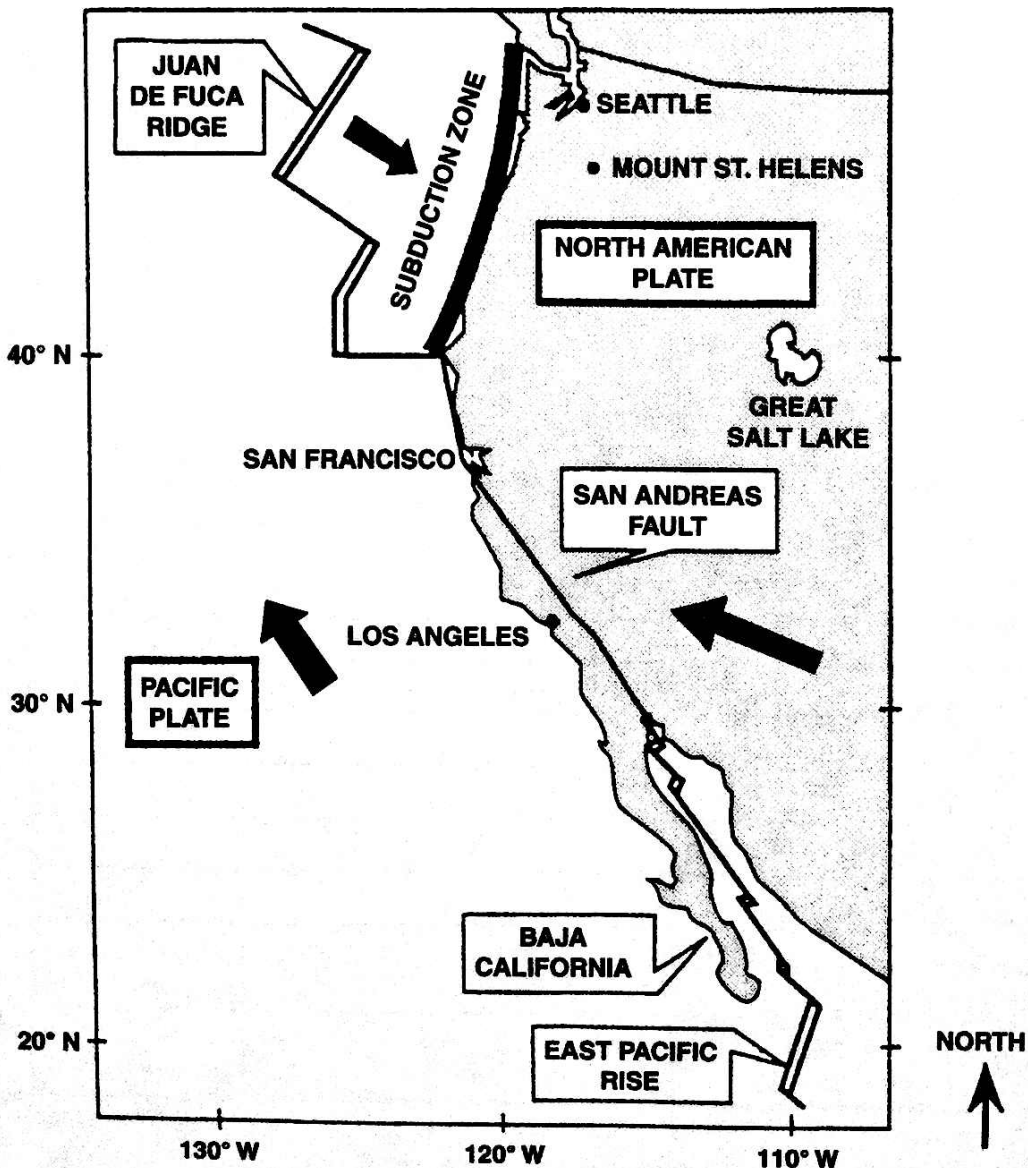
PLATE BOUNDARIES CHART

LOCATION	TYPE OF PLATE BOUNDARY		
	DIVERGENT	CONVERGENT	TRANSFORM
Mid-Atlantic Ridge			
Aleutian Trench			
W. Coast of South America			
Southeast-Indian Ridge			
Boundary between Pacific Plate and Australian Plate			
West Coast of Southern California			

PROCEDURE B:

1. On the graph provided, construct a cross-section along line AB on your map of South America to show the depth of earthquake foci.
2. After plotting the depth of earthquake foci, connect the points with a smooth line.
3. On your cross-section, copy the arrows that show the direction the crustal plates are moving.
4. Determine which side of the cross-section represents continental crust. Print the word "continental" in this location.
5. Determine which side of the cross-section represents oceanic crust. Print the word "oceanic" in this location.
6. Write in the average density of the continental crust and the oceanic crust on the cross-section. Refer to the "Inferred Properties of Earth's Interior" diagram in the Appendix.
7. On the cross-section, predict the direction of any movement where these two crustal plates meet. Draw arrows on the cross-section showing the direction of plate movements.

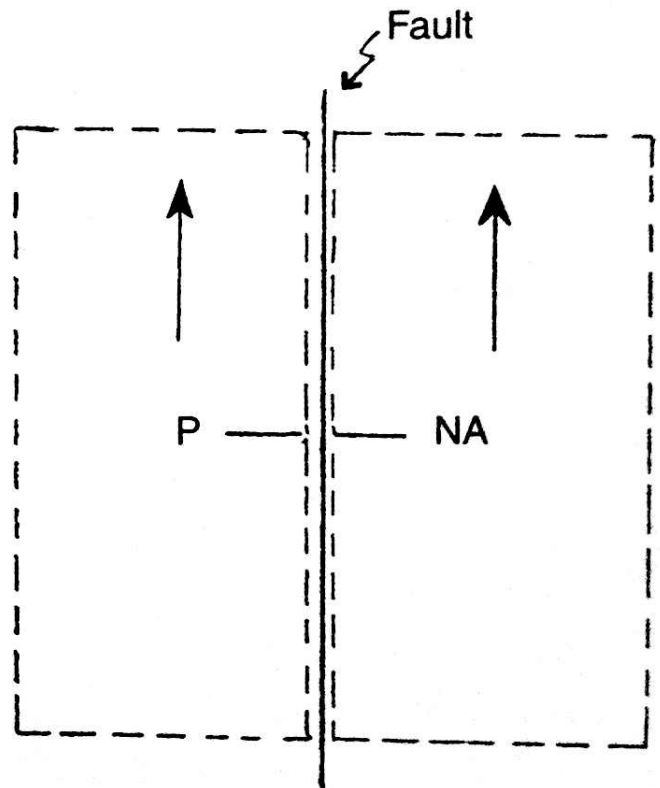
UNITED STATES PACIFIC COASTLINE MAP



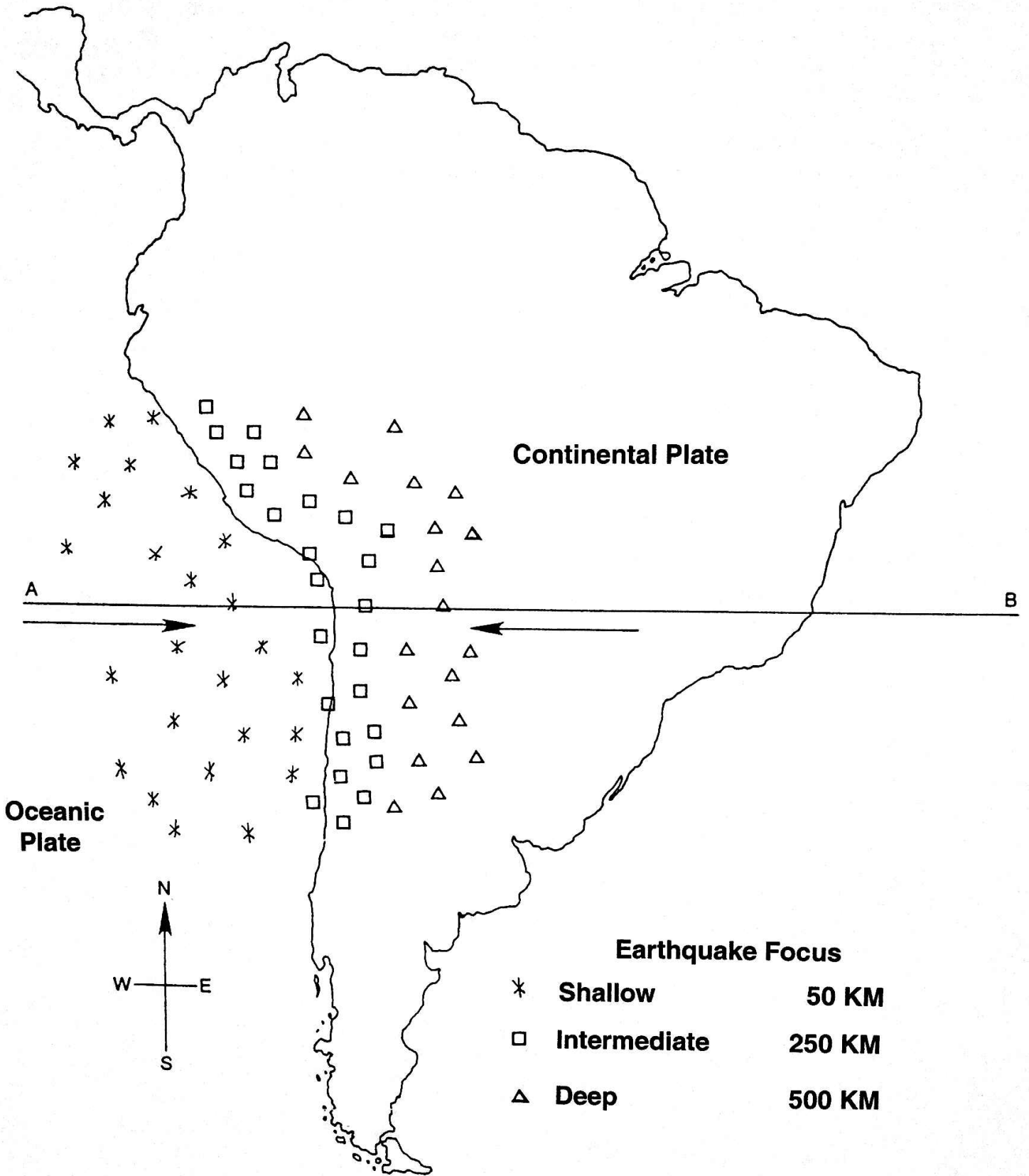
PROCEDURE C:

1. Note that on the "United States Pacific Coastline" map, thick arrows show the directions of tectonic plate movement. Show the relative movement of rocks along the San Andreas Fault by drawing arrows on the east and west sides of the fault. Refer to the "Tectonic Plates" map in the Appendix.
2. What is the relative movement of rocks on the west side of the San Andreas fault compared to the direction in which the North American Plate is moving?
3. Using separate paper, cut out two pieces of paper that are rectangles 3 cm x 6 cm.
4. The dashed lines in the diagram represent the rectangles.
5. Placing the two cutouts side by side, label each one as shown in the diagram.
6. Place the labeled cutouts side by side on the diagram with the fault at the boundary between them. The cutout on the left represents the Pacific Plate and the one on the right represents the North American Plate. Both are moving in the direction of the arrows.
7. By moving the cutout "plates" in the direction of the arrows, determine how their differing rates of movement are producing the displacement of rocks on either side of the San Andreas Fault. Write your conclusions in the space below.

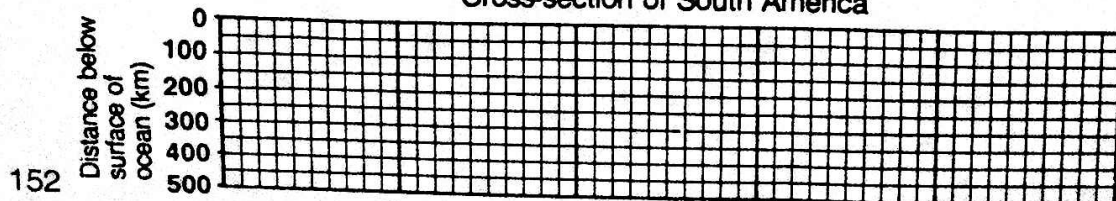
**DIAGRAM:
SAN ANDREAS FAULT**



SOUTH AMERICAN EARTHQUAKES



Cross-section of South America



DISCUSSION QUESTIONS: (*Answer in Complete Sentences*)

1. Using the cross-section of South America, describe the pattern of earthquake depth from west to east along line AB.
2. Based on your answer to Question 1, what appears to happen as the ocean plate to the west collides with the continental plate to the east?
3. Referring to a world map, what surface feature on the west coast of South America has apparently formed as a result of collision of the two crustal plates?
4. According to your Data Chart and the Tectonic Plates map, where are most divergent plate boundaries found?
5. Referring to Procedure C, what type of plate boundary is the San Andreas fault?
6. At which type of plate boundary would a subduction zone be found?
7. At which type of plate boundary is new oceanic crust created?
8. Oceanic trenches are associated with which type of plate boundary?

CONCLUSION: Describe the three types of plate boundaries.