

## Answer Sheet

1. Find the East Pacific Rise on the Plate-Tectonic Map of the Circum-Pacific Region.
  - (a) What type of plate boundary is this?

Divergent boundary

- (b) What type of volcanic rock is produced here?

Basalt

- (c) Is the topography higher or lower at this plate margin compared to the surrounding ocean basin?

Higher

- (d) Do the nearly symmetrical 'stripes' reinforce the idea that the plates are moving apart? What causes these 'stripes'?

Yes they are moving apart, these lines represent the magnetic poles that are moving

- (e) What could be a possible explanation for the asymmetry in these stripes? the plates.

A different latitude means theres a different polarity thats why the stripes are asymmetric.

2. Find the west coast of South America on the Plate-Tectonic Map of the Circum-Pacific Region.

- (a) What type of plate boundary is this?

Continental Boundary

- (b) What type of volcanic rock is produced here?

Andesite

- (c) What topographic feature is produced on the continent by this plate motion?

The Andes Mountain Range

3. Find the Juan de Fuca plate off the coast of Washington State on the Plate-Tectonic Map of the Circum-Pacific Region.

- (a) How fast is the Juan de Fuca plate moving, and in what direction?

Subducting (Northeast) at 1.6 centimeters per year

- (b) How fast is the North American plate moving, and in what direction?

Southwest at 2.4 millimeters per year

- (c) What will eventually happen to the Juan de Fuca plate?

It will subduct under the North American plate

- (d) Calculate when "c" will happen (remember that velocity equals distance divided by time) Show your calculations.

$$v = \frac{d}{t} \quad \frac{2.4 \text{ cm} \times 17,000,000 \text{ cm}}{1 \text{ cm}} = 49,200,000 \text{ cm} = 12,300,000 \text{ years}$$

- (e) What will happen to the Cascade volcanoes when the answer to "c" happens?

They Cascade volcanoes will continue to grow. No! will become dormant!

4. From data table in question 4 above.

- (b) Use a ruler to draw a best-fit straight line through the data. What does the graph indicate about the general relation between age and distance from Kilauea?

The age and distance both increase

## Lab 2: Plate Tectonics

- (c) Calculate the average rate of plate movement in centimeters per year (divide the distance by the time interval over which the travel took place). Show your calculations. (1 km = 100,000 cm)

$$\frac{14060 - 64}{64.7 - 0.375} = 74.7 \text{ km/million years} \times \frac{100,000 \text{ cm}}{1,000,000} = 7.47 \text{ cm/year}$$

- (d) The chain of seamounts bends where the Hawaiian and Emperor chains meet. When did the change in direction in the chain occur? Explain how you arrived at your answer.

$$C = 2400 \text{ km} \div 11.5 \text{ million years} = 208.7 \text{ km/million years} \times 11.5 \text{ million years} = 2400 \text{ km}$$

- (e) Assuming the hotspot has remained stationary, what could have caused the chain to change directions?

**Vector.**

Rock Specimen	Igneous, Sedimentary, or Metamorphic	Reason for classification
A	Igneous	Crystallized
B	Sedimentary	weathering
C	Metamorphic	texture

6. Each type of rock has a particular tectonic setting with which it is commonly associated. For each of the tectonic settings indicate which type of rock is likely to be formed. Use an I for igneous, S for sedimentary, and M for metamorphic. Remember that the crust of earth is complicated, and some setting may contain more than one type of rock.

(a) Mountain chain above where an oceanic plate is being subducted under a continental plate: **M, S, I**

(b) A passive margin, such as the east coast of North America: **S**

(c) A convergent margin where two continental plates are colliding: **M, S**

(d) A divergent margin, below sea level: **S**

(e) An island chain above where one ocean plate is subducting under another ocean plate: **I, S**

(f) Mid-continent, maybe like Wyoming: **S**

7. Which are the data: the rocks or the model of plate tectonics? Why?

The rocks, because they are physical evidence.

8. In your opinion, do the data support the interpretation? Why?

yes, because for example you can see the weathering on sedimentary rock B.

9. As a group, try to come up with some explanations (in addition to plate tectonics) that explain why Earth's surface is not perfectly flat. You should also explain why there are things like metamorphic rocks at the surface, and sedimentary rocks on top of the Rocky Mountains.

The earth is not completely flat because of weathering. Sedimentary rocks form by the accumulation and consolidation of material from other rocks. These rocks form by the uplifting of plate tectonics. Metamorphic rocks form at the surface because they have mineralogically altered from other rocks.

10. Why might it be difficult to convince people that the continents actually are moving, especially if you were a geologist in the early 1900s?

Since continents move so slowly it's hard for geologists, especially in the 1900's who didn't have a lot of technology, to see the continents moving. It takes millions and millions of years for continents to move a foot and since people can't see this change it's hard to believe it's actually happening.



