

ESS 110: Introduction to Geology Dr. Woltemade U.S. volcanoes	Name: _____ Section (circle): 8:00 AM 9:30 AM 11:00 AM
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Instructions

Use your textbook and some basic math to answer the following questions.

1. Hawaii: Plate tectonic calculations. The Big Island of Hawaii is the location of a “hot spot” above a mantle plume, explaining the nearly continuous volcanic eruptions occurring there. As you move to the northwest, the other islands are increasingly older features that were volcanically active in the past when they were situated over the hot spot.

If the island of Oahu (where Honolulu is located) is approximately 2.7 million years old and is 140 miles from the hot spot, what rate of plate movement (in inches per year) does that suggest?

Solve: $[(140 \text{ miles}) (5280 \text{ ft / mile}) (12 \text{ in / 1 foot})] / (2.7 \text{ million years}) = \underline{\hspace{2cm}}$ inches/year

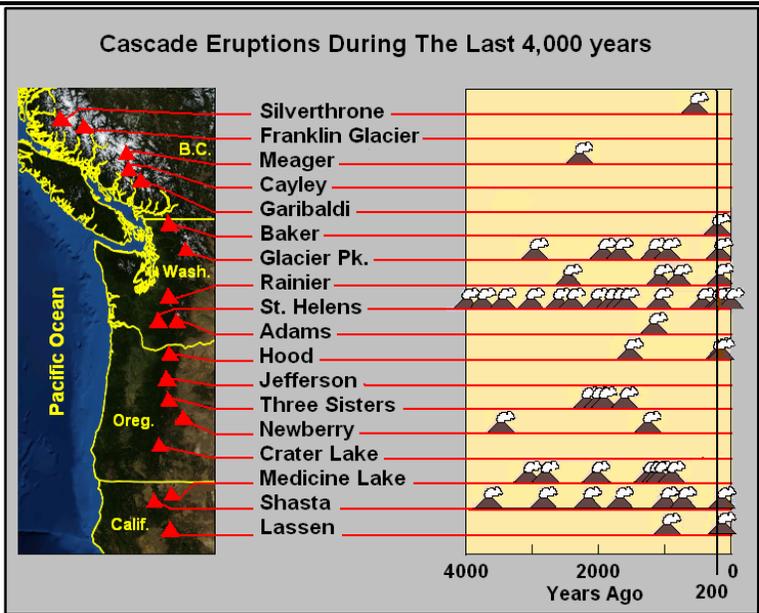
If the entire Pacific Plate is approximately 4,200 miles across and is moving at that rate to the northwest, how many years will it take for all of the currently existing plate to be consumed by subduction zones in the northwest part of the ocean basin?

[Solve this using a similar approach to the first question: Convert from miles to inches, then divide by the rate you calculated in the first question to generate a number of years.]

2. What are the main differences between shield volcanoes and cinder cones? Refer to your text and/or examine photos of: [Haleakala shield volcano, Maui, Hawaii](#)
[Small cinder cones within the crater of Haleakala](#)

Characteristic	Shield Volcano	Cinder Cone
Size		
Shape (steepness of slopes)		
Geologic material		

3. Mt. St. Helens, WA and Mt. Shasta, CA. Using the map graphic and your class notes, describe the likelihood of future eruptions in general terms (no math required).



History	Mt. St. Helens, WA	Mt. Shasta, CA
How frequent are recent eruptions?		
Describe the chance of an eruption in your lifetime.		

4. Plate tectonics of the Cascade volcanoes.

Type of plate tectonic boundary: _____

Specific plates involved: _____

What type of volcanoes are Mt. Rainier (WA), Mt. St. Helens (WA) and Mt. Shasta (CA)? [Photos.](#) _____

5. What are the main differences between shield volcanoes and composite cones? (Refer to your text.)

Characteristic	Shield Volcano	Composite Cone
Size		
Shape (steepness of slopes)		
Geologic material		