

Plate Tectonic Travel

Earth Science

Mr. Traeger

Name: _____ Period: _____ Date: _____

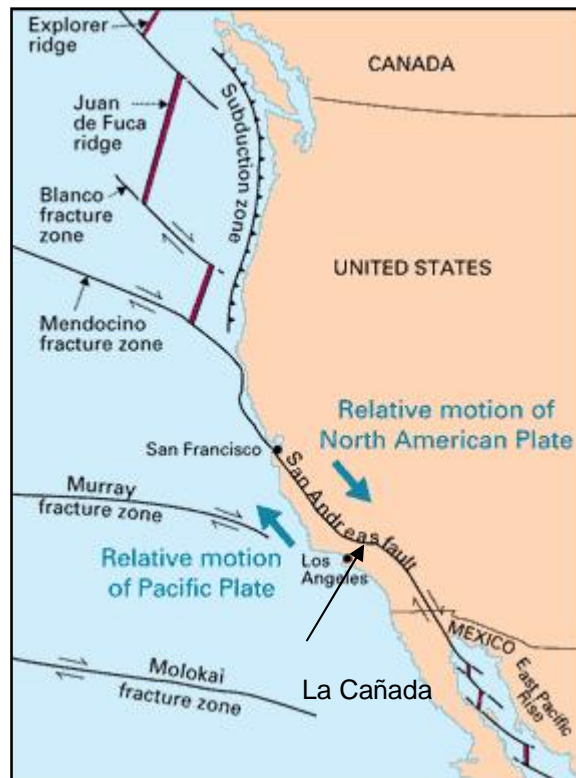
Background

The speed in which Earth's tectonic plates move is almost imperceptible within our lifetime. We know that the plates are moving because we can use satellites in space to detect the movement. This is called *geodesy*. We can also detect the movement by studying trends in the magnetic North-South orientation of rock cores at mid-ocean ridges.

The span of geologic time is so great that we must measure time in thousands or millions of years. Current estimates date the age of the earth to be 4.6 BILLION years old! If you wrote that number out, you would get 4,600,000,000. If you wrote it in scientific notation, you would get 4.6×10^9 years. You could think of this HUGE number also as 4 BILLION, 600 MILLION years old! This seems like an eternity compared to our average life span of around 65 years.

Your Task

Your task for this assignment is to calculate the movement of the Pacific Plate in relation to the North American Plate. You will do this by multiplying rate (or speed) times time to get distance. In equation form, this is $rate \times time = distance$.



(Map obtained from <http://pubs.usgs.gov/publications/text/understanding.html>)

Use the map above and the equation $rate \times time = distance$ to do the calculations on the reverse side.

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1) If the relative motion of the plates indicates that we (here in La Cañada) are moving toward San Francisco at a rate of 5 centimeters per year, how far would we move (in centimeters) over a time of: **(Make sure to show your work!)**

a) 65 years?

b) 1,000 years?

c) 1,000,000 (1.0×10^6) years?

d) 11,000,000 (1.1×10^7) years?

e) 4,600,000,000 (4.6×10^9) years? What significance does this number have?

2) Now, go back and convert the distances you found from centimeters into meters and then into kilometers. Remember your unit conversions from the first of the year. *Hint:* There are 100 centimeters in 1 meter and 1,000 meters in 1 kilometer.