

Race of the Waves

Name _____

Date _____

Hour _____

Introduction

If an earthquake occurs in Washington D.C. (USA), will you feel the shock waves? If you are too far away, you will not be able to feel the ground shaking. However, a good seismograph will detect the earthquake. In fact, seismographs all over the world will measure the waves from this earthquake. How much time will these waves need to get from Washington to San Francisco, Moscow or to you? The following charts tell you.

Chart 1

Washington to San Francisco	P (primary) waves in minutes	S (secondary) waves in minutes
1 st Kansas City	3.5	6.3
2 nd Salt Lake City	4.75	9.4
San Francisco	7	12.7

Chart 2

Washington to Moscow	P (primary) waves in minutes	S (secondary) waves in minutes
1 st Paris	6.5	11.9
2 nd Berlin	7.75	13.9
Moscow	11.3	20.7

At the moment the earthquake occurs, 'Primary' (P) waves and 'Secondary' (S) waves begin racing away from the epicenter in all directions. Since the P waves are faster, they reach cities around the world before the S waves get there. For example, according to the chart, P waves will travel from Washington to San Francisco in 7.0 minutes, but the S waves will travel from Washington to San Francisco in 12.7 minutes. The S waves arrive 5.7 minutes later than the P waves (12.7-7.0). Which waves arrive first in Moscow: the P waves or the S waves? You can easily guess: The P waves are first to reach Moscow (11.3 minutes), and then the S waves finally show up at 20.7 minutes (9.4 minutes later than the P waves)

Now it is your turn to be the geologist:

Graph the Data (on the graph paper provided)

1. Make two graphs displaying the data above. (one graph for chart 1 and one for chart2) The horizontal axis (sideways) should be the cities. While the vertical axis (up and down) should be the travel time (minutes).
2. Plot the P and S waves on your graphs. Be sure to use different colors for your P and S waves. For example P waves could be blue and S waves yellow. (Make a key)
3. Connect the P wave points and separately connect the S wave points. You should end up with two curved lines on each graph.