

### Earthquake P-wave and S-wave Travel Time Worksheet

1. Convert the following out of scientific notation:

a.  $4 \times 10^3$

b.  $3.2 \times 10^3$

2. Convert the following into scientific notation:

a. 5,600

b. 10,000

3. Fill in the chart below

P-wave travel time	Distance from the Epicenter
	2,000 km
11 min 20 sec	
	6,800 km
8 min 40 sec	

S-wave travel time	Distance from the Epicenter
12 min 40 sec	
	1,000 km
12 min 20 sec	
	7,600 km

4. The difference (lag time) between the P-wave and S-wave arrival time is given below. Find the distance to the epicenter.

Difference in arrival times	Distance to epicenter
3 min 20 sec	
5 min 40 sec	
7min 00 sec	
9 min 50sec	

5. The distance to the epicenter is given below. Find the difference in arrival time of the P-wave and S-wave.

Distance to epicenter	Difference in arrival times
2,000 km	
4,800 km	
7,200 km	
9,400 km	

6. Find the origin time or the arrival time for the following scenarios

Type of Wave	Distance to Epicenter	Arrival time of wave	Origin time of earthquake	Show ALL work
P	1,000 km	03:10:30 PM		
S	6,600 km		01:02:58 PM	
P	5,200 km		05:55:45 PM	
S	3,800 km	05:05:45 PM		

7. Find the distance to the epicenter for the following scenarios.

Type of Wave	Distance to Epicenter	Arrival time of wave	Origin time of earthquake	Show ALL work
P		03:40:55 AM	03:35:20 AM	
S		07:20:40 PM	07:18:55 PM	
P		10:15:38 PM	10:09:49 PM	
S		02:02:38 PM	01:58:02 PM	

8. How many seismic stations are needed to locate the epicenter?

9. What can you determine if you know the arrival time of the P-wave and S-wave at a seismic station?

10. Are earthquakes cyclic?