

Earthquakes: P and S Waves

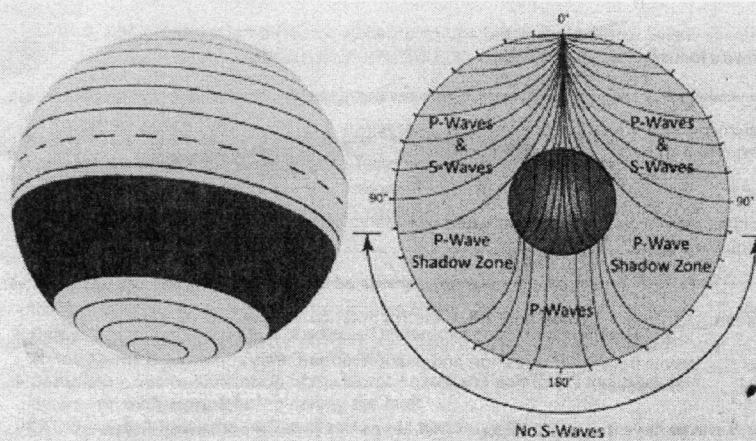


FIGURE 2-1

Earthquakes generate both P waves (primary) and S waves (secondary)—these are called *seismic waves*. Table 2-1 illustrates their relative motions as well as the mediums through which they travel. Scientists use these wave characteristics to infer Earth's internal structure.

	Motion	Travels Through
P waves	Compression and dilation	Solids, liquids, and gases
S waves	Shearing	Solids

TABLE 2-1

Figure 2-1 illustrates Earth from two perspectives. When an earthquake occurs, seismic waves radiate away from the earthquake's focus in concentric waves of increasing diameter, in all directions. As these waves travel, their signal is detected and recorded by instruments called *seismometers*. Notice that any earthquake's focus is 0° , and the point on Earth opposite to that focus is 180° .

Also notice these important points about Figure 2-1:

- The dashed line is 90° from any earthquake's focus.
- A shadow zone exists where no seismic waves are detected.
- Only one type of seismic wave reaches the point on Earth opposite to an earthquake's focus.

Using the figure above, answer these questions:

1. When an earthquake occurs, both P waves and S waves are detected by seismometers up to _____ degrees from the earthquake's focus (at 0°).
2. How many degrees wide is the P wave shadow zone? _____
3. When an earthquake occurs, S waves completely disappear _____ degrees from the earthquake's focus.
4. What seismic waves would be detected and recorded by a seismometer located 54 degrees from an earthquake focus?

5. What seismic waves would be detected and recorded by a seismometer located 163 degrees from an earthquake's focus?

6. P waves are _____ when they reach Earth's outer core.
7. Because _____ waves have a compression and dilation motion, they can travel through solids, _____, and gases.
8. Because S waves have a _____ motion, they can travel through solids but not through _____ or _____.
9. What do scientists infer about the state of Earth's outer core due to the fact that S waves completely disappear when they reach it? _____