

What "Seis" Shake?

By Trista L. Pollard

¹ Keeping track of the earth as it rotates, revolves, shakes, erupts, and erodes is a tough job. So when there is rumbling and rolling below the earth's surface, you don't just call any earth scientist. You need the experts. This is when a voice must call out, "Is there a **seismologist** near the plates?"



² First of all, **seismology** is the study of earthquakes and their causes. Seismologists are responsible for monitoring earthquakes and other **seismic** activity. In case you are curious, **seismo** is the Greek word for earthquakes. Now keep in mind, seismologists may not be near the actual plates when they monitor seismic activity. However, they have the tools to help them locate earthquakes and fault zones. They also have the data from these tools or instruments to build models of fault zones to predict where and when future quakes will occur.

³ These scientists use **seismographs**, which are instruments that record and measure **seismic waves** and vibrations. When these waves travel through the earth or along the earth's surface, the seismograph records a "zigzag" line called a **seismogram**. The lines on the seismogram show the changing intensity (power) of the vibrations as the ground surface is moving beneath the seismograph. Seismologists use the measurements to determine the time, the **epicenter**, the **focus**, and type of fault where the earthquake is occurring. Scientists can also estimate the amount of energy being released by the earthquake and the speed of the seismic waves. Let's roll away from the "seises" for a moment and get more acquainted with the waves.

⁴ An earthquake's epicenter is the point on the surface of the earth directly above the focus. The earthquake's focus is its origin underground or where the earthquake first begins. Once a quake begins, it sends out one of two types of vibrations called **surface waves** and **body waves**. Surface waves (traveling along the earth's surface) tend to cause the most damage because they usually have the strongest vibrations. Body waves travel through the earth's interior from the focus of the quake to distant points on the surface. These waves are classified as either **compressional** or **shear** waves. Compressional waves are the only type of body waves that travel through the earth's molten core. The waves travel at very fast speeds and usually reach the earth's surface first. This is why compressional waves are also called **primary** or **P waves**. As P waves travel, they push tiny particles of earth ahead or directly behind their line of travel.

⁵ Shear waves travel a little slower through the crust and mantle towards their destination. Since these waves reach the surface later than P waves, they are **secondary** or **S waves**. S waves push earth material out of their way at right angles to their line of travel as they travel to the surface. These waves are also known as **transverse waves** due to the way they displace the earth as they travel. S waves do not travel through liquids. This important piece of information has helped scientists to understand the material in the earth's crust, mantle, and core. For example, when seismologists monitor S waves and notice they disappear below 1,800 miles (2,900 kilometers), the scientists infer that the earth's outer core is not made of liquid.

⁶ Seismologists may spend many hours monitoring the earth's many shakes and rolls. However, they use the data they acquire to prepare **seismic risk maps** for earthquake-prone countries. These maps help to show the degree of danger or risk for an earthquake in that area. Seismologists also use earthquake information to locate plate boundaries and active faults. So if you want to know what "seis" shake the earth has, just remember to ask for a seismologist!

What "Seis" Shake?

<p>1. Surface waves tend to cause _____.</p> <p><input type="radio"/> A No damage</p> <p><input type="radio"/> B The same amount of damage as body waves</p> <p><input type="radio"/> C The least damage</p> <p><input type="radio"/> D The most damage</p>	<p>2. Seismology is the study of earthquakes, faults, and causes for seismic activity.</p> <p><input type="radio"/> A False</p> <p><input type="radio"/> B True</p>
<p>3. Seismogram lines show the changing _____ of vibrations.</p> <p><input type="radio"/> A Intensity</p> <p><input type="radio"/> B Source</p> <p><input type="radio"/> C Location</p> <p><input type="radio"/> D Direction</p>	<p>4. How are compressional waves different from shear waves?</p> <p>_____</p> <p>_____</p>
<p>5. The Greek word <i>seismo</i> means calm and peaceful dirt.</p> <p><input type="radio"/> A False</p> <p><input type="radio"/> B True</p>	<p>6. Data from seismograms and seismographs can be used to _____.</p> <p><input type="radio"/> A Map out high risk areas for earthquakes</p> <p><input type="radio"/> B Locate fault boundaries</p> <p><input type="radio"/> C Predict weather occurrences around the world</p> <p><input type="radio"/> D Both A and B</p>
<p>7. Why are S waves also called transverse waves?</p> <p>_____</p> <p>_____</p>	<p>8. What are the focus and epicenter of an earthquake?</p> <p>_____</p> <p>_____</p>

