What would happen if this were a real earthquake?

- How would you react to the tremors?
- Would you scream in fear if there was falling debris?
- Where is your family? Your friends?
- What will you do when the shaking stops?
- How will you contact loved ones without working cell phone towers?
- Who will you try to find first?
- What would you do if everything were destroyed?

Would a significant earthquake here in South Carolina affect the Pacific Coast of the U.S.?

- Economy
- Agriculture
- Fishing
- Transportation
- Military operations
- Vacations

Would a significant earthquake here in South Carolina affect any other countries in the world?

Before we can begin our project, we need some background information about earthquakes.

What causes earthquakes?

The short answer is that earthquakes are caused when tension is released from the rocks in the Earth's crust and upper mantle.

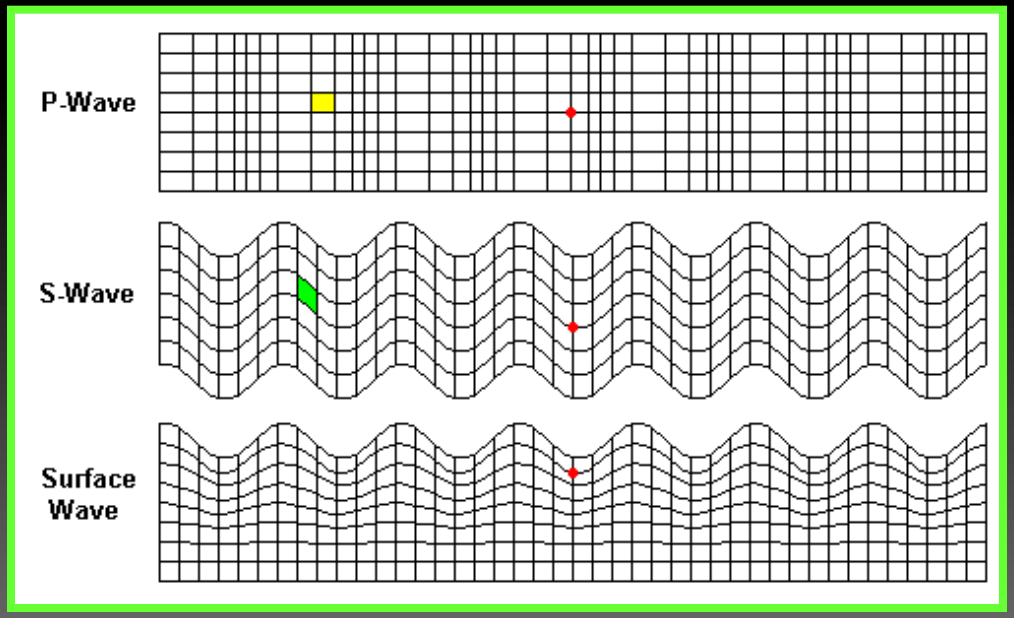
The long answer is….

- The surface of the Earth is in continuous slow motion. This is plate tectonics--the motion of immense rigid plates at the surface of the Earth in response to flow of rock within the Earth. The plates cover the entire surface of the globe. Since they are all moving they rub against each other in some places (like the San Andreas Fault in California), sink beneath each other in others (like the Peru-Chile Trench along the western border of South America), or spread apart from each other (like the Mid-Atlantic Ridge). At such places the motion isn't smooth--the plates are stuck together at the edges but the rest of each plate is continuing to move, so the rocks along the edges are distorted (what we call "strain"). As the motion continues, the strain builds up to the point where the rock cannot withstand any more bending. With a lurch, the rock breaks and the two sides move. An earthquake is the shaking that radiates out from the breaking rock.

This sudden release of energy in the earth's crust causes seismic waves.

Seismic Waves

Seismic waves are generated by an earthquake shock. Each type of wave travels at a different speed as it moves through the earth. Waves move through the earth causing the particles making up rock to move also.



Seismic Waves

Primary Waves

- first waves to arrive at a seismograph station
- fastest form of wave (1-5 miles/second)
- sometimes called compression waves or P waves
- can move through both liquids and solids
- cause rock particles to move back and forth in the same direction as the wave is traveling

Secondary Waves

- arrive after the primary waves at the seismograph station
- can travel through solids but not liquids
- cause particles to move back and forth at right angles to the line of wave movement
- called a sine wave, S wave, or a transverse wave

Surface Waves

- travel along the outer surface of the earth
- slower speeds
- Particles move in rocks like waves would move in water, in a circular motion
- Cause most of the destruction during an earthquake

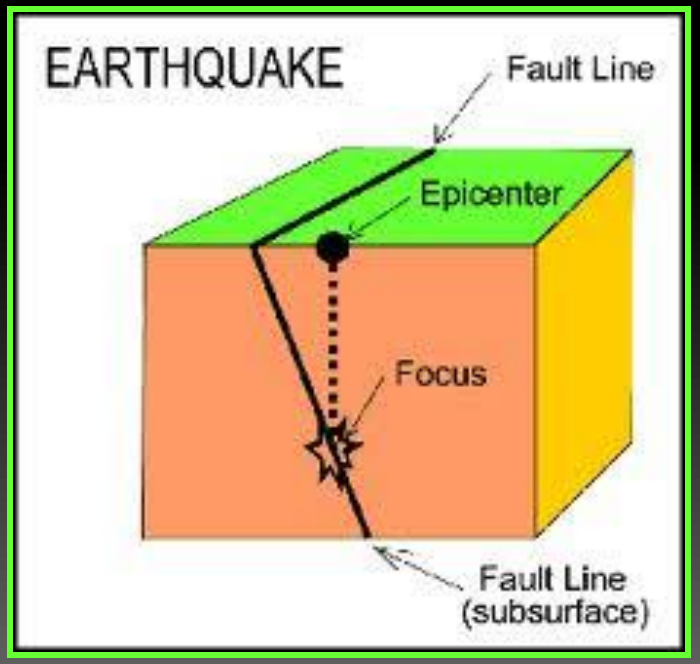
Can you demonstrate a primary, secondary, and surface seismic wave using a slinky?

Every earthquake has an epicenter.

Epicenter

The focus of an earthquake is the point in the Earth's interior where stress is released and rocks move. Waves move outward away from this area.

The **EPICENTER** is the place along the surface of the earth, above the focus, where the earthquake feels the strongest.



How do you determine the epicenter of an earthquake?

- To determine the location of the epicenter of an earthquake, you need to know the difference in arrival times of the **P (PRIMARY)** and **S (SECONDARY) WAVES** at the seismograph station. The greater the difference in time of arrival for the P and S waves, the farther away an earthquake occurred from a station.
- From arrival time information, scientists construct time-distance graphs. The seismic records indicate the distance but not the direction to the epicenter. To determine the precise location of an earthquake, records from at least three seismograph stations are needed.
- **P (PRIMARY) WAVES** travel at about 6 Km/sec. **S (SECONDARY) WAVES** travel at about 3.5 Km/sec. **SURFACE WAVES** travel about 2 Km/sec.

So, now that I've shared my earthquake research with you, it's time for you to research an earthquake to share with others.

EARTHQUAKE TRADING CARDS

Insert Picture Here

Name of Earthquake

Geographic Location -

Epicenter Longitude/Latitude –

Date –

Richter Scale –

Death Toll –

Injury Count –

Damage Cost –

Odd Fact(s) -

How did this earthquake affect South Carolina?

Each student will research their earthquake and fill in the information on this trading card. Please make sure to remember your grammar rules when writing your response to the final question. When you are finished, you will present your research with the class.

8th Grade Standards

Science

- 8-3.2: Explain how scientists use seismic waves—primary, secondary, and surface waves—and Earth's magnetic fields to determine the internal structure of Earth.
- 8-3.3: Infer an earthquake's epicenter from seismographic data.

Social Studies

- 8-5.5: Summarize the human, agricultural, and economic costs of natural disasters…

ELA

- 8-2.4: Create responses to informational texts through a variety of methods.
- 8-5.1: Create informational pieces that use language appropriate for the specific audience.
- 8-6.6: Select appropriate graphics, in print or electronic form, to support written works, oral presentations, and visual presentations.