

# EARTHQUAKES

## Earthquake Locations

- Where do earthquakes occur?
  - Earthquakes occur along plate boundaries where two chunks of lithosphere scrape together
  - The focus is the location where the energy is released
  - The epicenter is location on the earth's surface directly above the focus
- Faults are cracks along which rocks slide

## Seismic Waves

- Seismic Waves- during an earthquake, several types of waves are generated. The vibrations felt are actually called seismic waves that are traveling through the Earth.

## P-Waves

- Primary wave- travels fastest so it arrives at a seismic station first
- Push-pull wave: rock vibrates forward and backward in the same direction that the wave travels
- Pass through solids and liquids (magma)

## S-Waves

- Secondary wave- arrives at a seismic station second.
- Slow wave- not as fast as the P-wave.
- Shake wave (shear wave)- vibrates side-to-side.
- Solids wave- only travels through Solids.

## Seismographs

- Instrument that detects and records seismic waves
- By studying a seismogram, we can determine a seismic wave's distance and size

## Seismic Waves Traveling Throughout the Earth

- P-Waves travel through solid and liquid
- S-Waves travel only through solids
- Seismic waves travel faster through denser material.
- Because of this, the path traveled by a seismic wave is bent towards the surface.
- Properties of the material (such as density and pressure) that the waves pass through can be inferred by the speed and angle that the waves travel.
- The layers of the earth are determined by the jumps in velocity and "echoes" of seismic waves.
- The MOHO is a boundary between the crust and the upper mantle where the velocity of waves jumps up sharply. This sharp increase in velocity is called a discontinuity.
- A shadow zone occurs on the opposite side of the earth from an earthquake because of the liquid outer core.
- S-Waves are stopped all together while the P-Waves are refracted (bent) to create a zone in which no waves are picked up at all. This zone is between  $102^\circ$  and  $143^\circ$  around the earth from the earthquake.