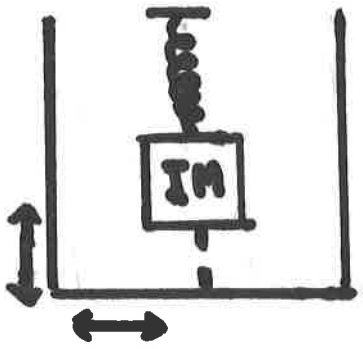
Three rules of three:

1. A seismograph has 3 parts.

a. Inertia member---inertia is (1) the tendency of a body in motion to stay in motion until acted upon by an outside force or (2) the tendency of a body not in motion to stay not in motion until acted upon by an outside force. In a seismograph, this is a weight suspended on a spring.

b. Transducer---way of picking up the relative motion between the ground (which moves) and the inertia member (which does not move) , converts this motion into a form which can be recorded.

c. Recorder---started out using smoked glass, the rolls of paper, then a sheet of paper on a rotating drum. Now stored electronically.



2. Each seismic station has 3 seismographs.

a. One measures north-south movement

b. One measures east-west movement

c. One measures vertical movement

3. It takes 3 seismic stations to locate where an earthquake occurred

What is being measured? When an earthquake occurs energy is radiated out in all directions from its source (focus). These are called Earth waves.

Earth waves:

1. Body waves—travel from the source through the body of the earth before arriving at the seismic station

a. P waves, pressure wave, compression wave. Travels through any material whose molecules can be squeezed together and pulled apart, therefore will travel through solids, liquids, and gasses. Direction of propagation and direction of particle movement are the same. You see the same thing when you play with a Slinky. Sound is

an example of a P wave. P waves travel the fastest.

b. S wave, sine wave, shear wave—Travels through any material that resist a change of shape, therefore will not travel through liquids or gasses. Direction of propagation and direction of particle movement are perpendicular to each other. Tie a rope to an object. Shake the other end of the rope up and down. The wave travels horizontally from you to the object while the rope itself moves vertically. S waves travel about 2/5s the velocity of a P wave.

For example, the P waves and the S waves start at the same place but travel away with different velocities. The P waves arrive at the seismic station first then followed by the S waves. This difference in arrival time is called the time lag. If it takes one minute for the P wave to get from the focus to the seismic station, the S wave will take 2 1/2 minutes to get to the same seismic station. The lag time would be 2 1/2 minus 1 or 1 and 1/2 minutes. The lag time tell you the distance (but not direction) from the seismic station to the focus. This is a circle but don't know where

on the circle. Data from a second seismic station which intersects the first circle narrows the location to 2 places. Data from a third seismic station locates it specifically. Data from 3 seismic stations are needed to specifically locate an earthquake.

Do you know of any other instance where 2 different energy sources start at the same place and travel out and away with different velocities? 1 Mississippi, 2 Mississippi, etc.

2. Surface waves---travel from the focus to the epicenter and then spread out along the surface, reach seismic station later than P and S waves because they travel slower than P and S waves and they travel a further distance.

a. R wave, Rayleigh wave---elliptical particle movement like a wave on the beach, particle movement up and down

b. Q wave, Love wave---sideways particle movement