Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Guided Notes: Earthquakes

What are earthquakes?

* Natural \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the ground caused by:
  + Plate movement along giant fractures
  + Volcanic activity

What causes earthquakes?

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ : the force applied to a rock exceeds its strength
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ : the deformation causes by stress
* 3 types: Compression, Tension, Shear

How do earthquakes travel?

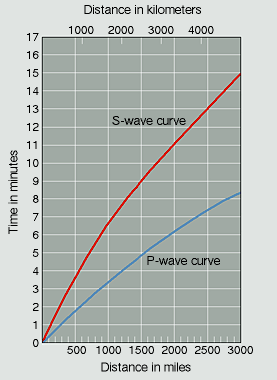
* In \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ waves!
  + Seismo- (Greek) “to shake”
* P-waves
  + Primary (1st)
  + Pulls rocks in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ direction as the wave
  + Body waves (occur inside earth)
* S-waves
  + Secondary
  + Causes rocks to move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the wave
  + Body waves (occur inside earth)
* L-waves
  + Third to arrive
  + Move in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ directions
    - Up and down
    - Side to side
  + Surface waves (MOST destructive!)

How do earthquakes travel?

* Body waves spread out from the earthquakes origin, or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* On the surface above the focus, is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[How do we detect earthquakes?](http://www.bgs.ac.uk/discoveringGeology/hazards/earthquakes/howWeMeasureThem.html)

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ : sensitive tools that can detect and record vibrations at great distances from epicenters…even though we can’t feel them!
* Many years of data from facilities around the world has allowed seismologists to construct global **time-travel curves** for P-waves and S-waves
* This allows us to predict earthquake patterns, no matter where in the world the epicenter is!
* Y-axis= Time
* X-axis= Distance
* P-waves ALWAYS travel quicker than S-waves
* Time lag= amount of time between P-waves and S-waves (increases with time)



How do we monitor seismic activity?

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ movements near a fault are a clue that an earthquake might happen. So, scientists measure ground movements near faults.
* *They use tiltmeters, creep meters, laser-ranging devices, and GPS satellites*
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ show how much the ground is tilting, or tipping.
  + Works like a carpenter’s level—water inside a glass bulb shows how much tilting there is.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ meters show how far the sides of a fault have moved in opposite directions.
  + Uses a wire stretched across a fault—gets longer when the two sides move apart.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ devices use a laser beam to detect horizontal fault movement.
  + Device times a laser beam as it travels to a reflector and back and tracks change
* To use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ , scientists put super-sensitive markers along both sides of the fault

How are earthquakes measured?

* By the amount of energy released or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Measured on the Richter Scale
* By the amount of damage done or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + Measured on the Mercalli Scale
* Some earthquakes aren’t even felt while others wipe out entire cities!



**Write a “T” for true or a “F” for false beside each statement about measuring earthquakes.**

1. Earthquakes that are a 1 on the Richter Scale and Mercalli Scale can only be felt at the epicenter.
2. The Richter Scale measures the amount of damage done by an earthquake.
3. The highest magnitude on the Mercalli Scale is 15.
4. On the Richter Scale, each number represents a 10x increase in energy released.