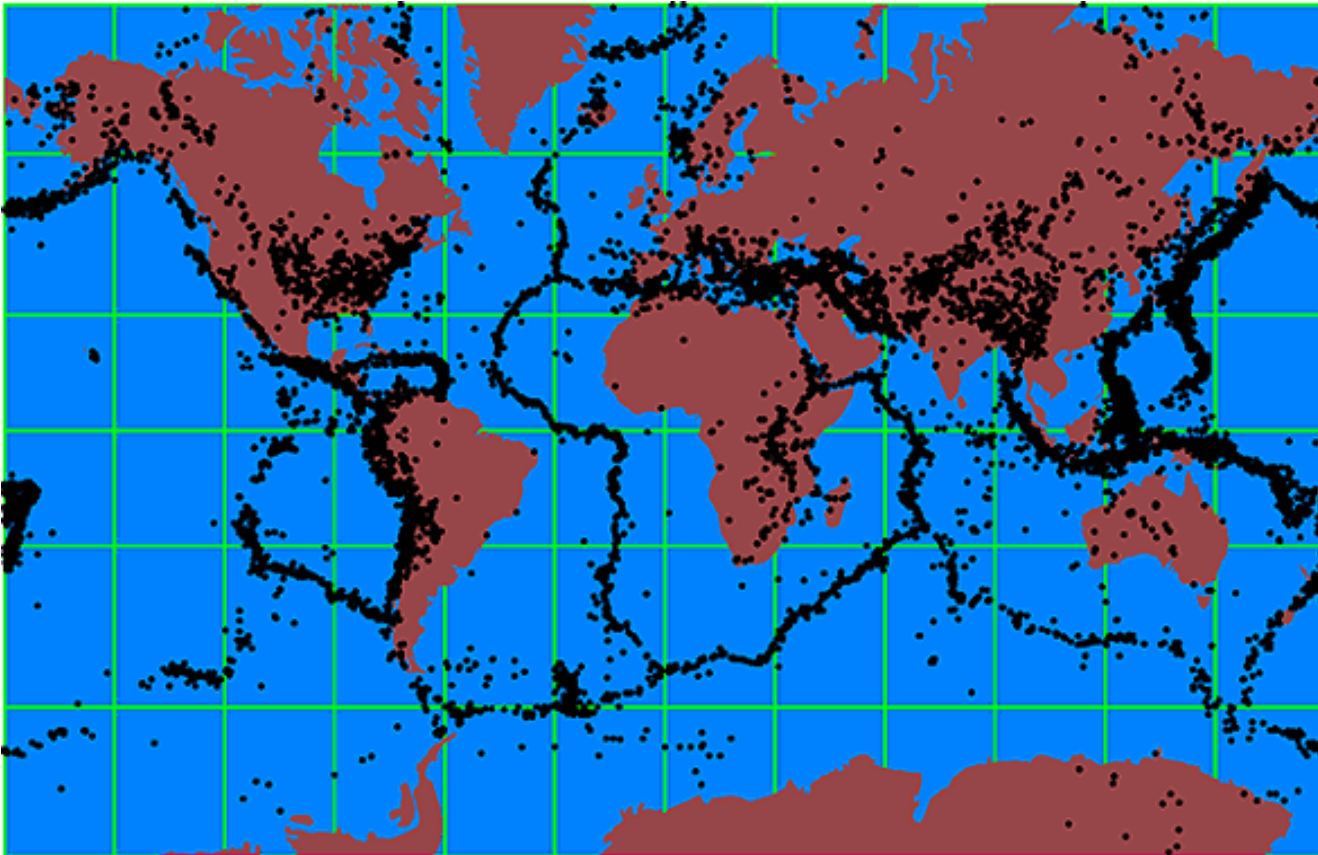


Earthquakes

Geology Unit: Slides 106-123

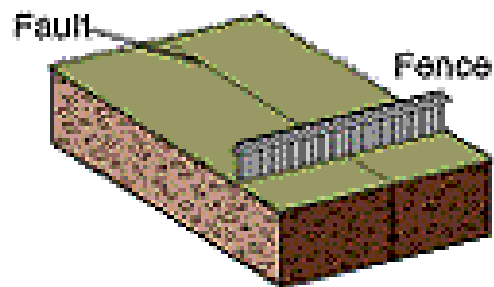
Earthquakes

- Definition
 - Shaking of the Earth's crust due to the release of built up energy from two plates grinding against one another.

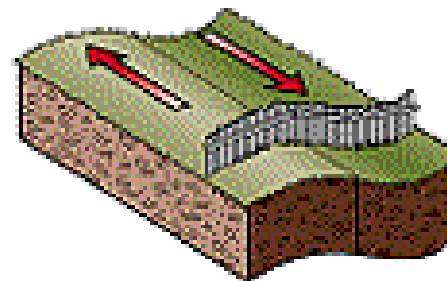


Causes of Earthquakes

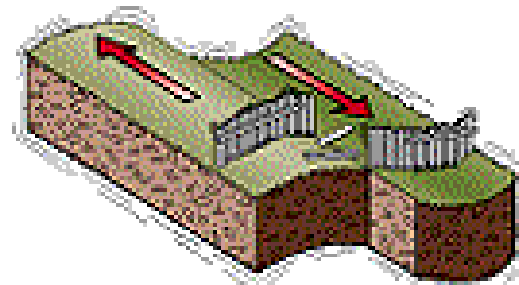
- Friction between the plates stops them from sliding past one another.
- This allows energy to build up in the plates which causes them to deform.
- When the plates can store no more energy the two plates snap past one another regaining their original shape, but in new positions
 - » *Called the Elastic Rebound Theory



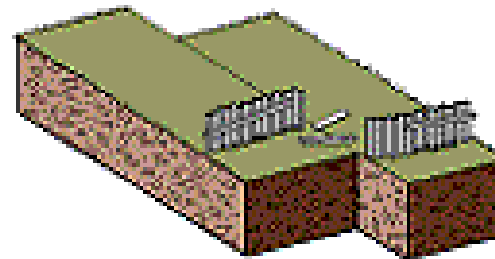
(a) Original position



(b) Deformation



(c) Rupture and release of energy

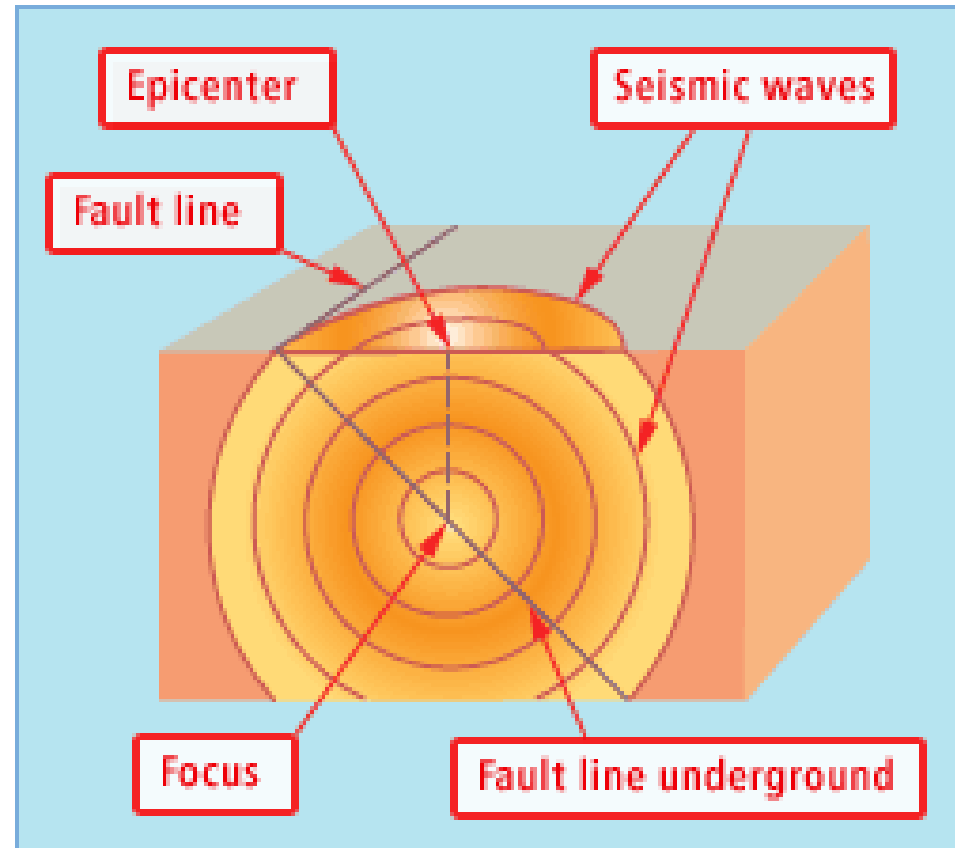


(d) Rocks rebound to original undeformed shape



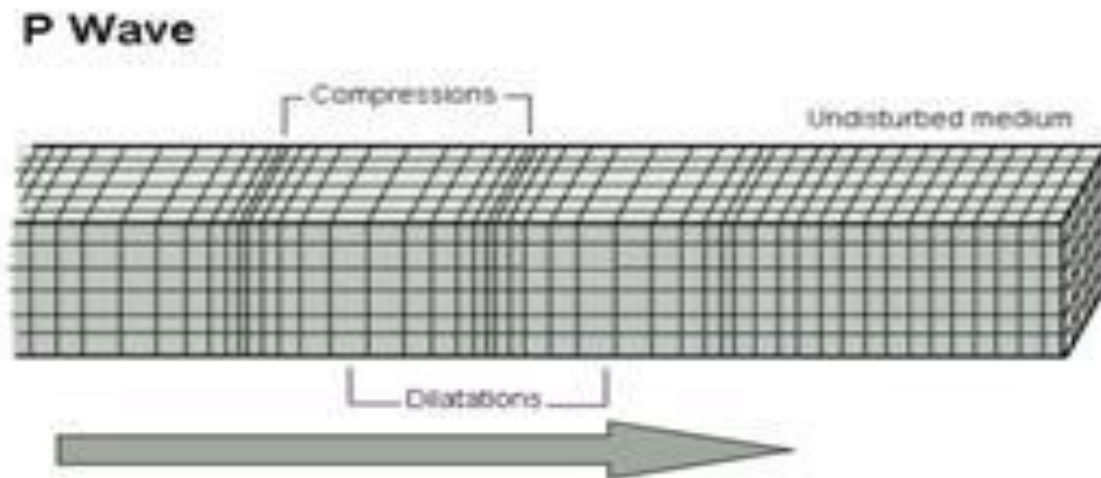
“Parts” of an Earthquake

- Fault – Crack in the Earth’s surface where two plates meet and slide past one another. (transform boundary)
- Focus – location beneath the crust along a fault where the energy between the plates was stored.
- Epicenter – location on the surface directly above the focus.



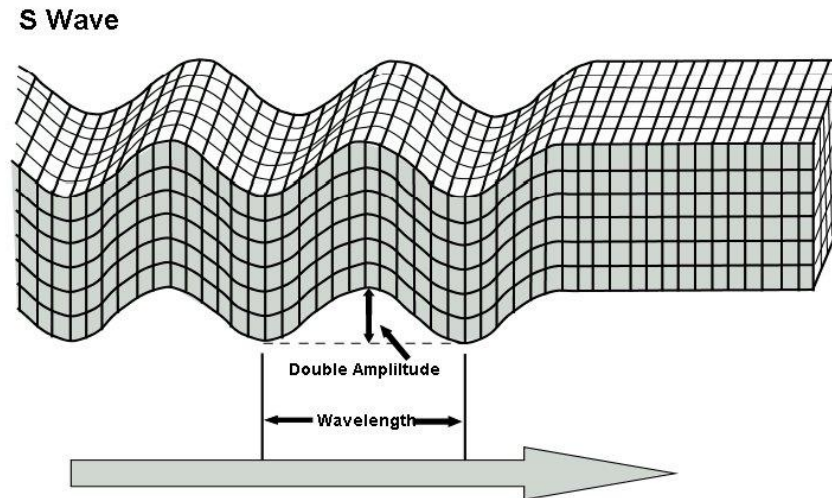
Seismic Waves

- Primary Waves (P Waves)
 - Fastest
 - Travel through solids and liquids
 - Waves have a compressional motion
 - Have the least amount of ground movement (least amount of damage)



Seismic Waves

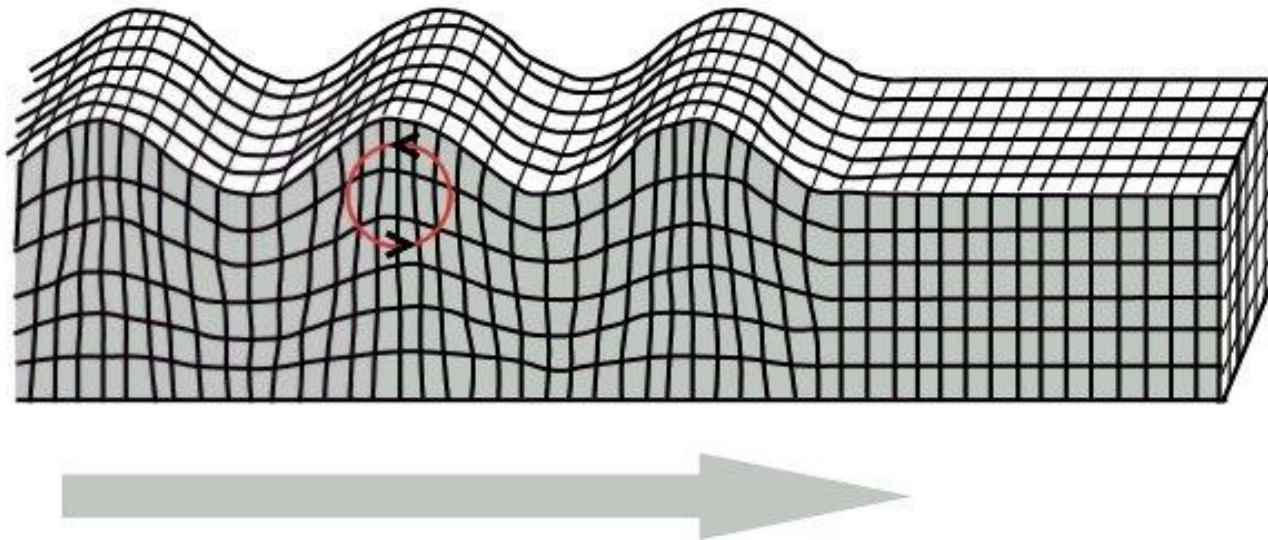
- Secondary Waves (S Waves)
 - Second fastest waves
 - Waves can move only through solids
 - Have a shearing motion



Seismic Waves

- Surface Waves (Rayleigh Waves)
 - Move only along the surface
 - Slowest, but have the most ground movement
 - Cause the most damage
 - Motion is like that of a water wave

Rayleigh Wave



Measurement Scales

- Richter Scale
 - Measures the amount of energy released by an earthquake.
 - Scale from 1 – 10
 - It is an exponential scale, so the amount of energy increases 10 times for each increase in number.

Measurement Scales

- Mercalli Scale
 - Based on the amount of damage caused by the earthquake.
 - Scale from I – XII (1 – 12)

Modified Mercalli Intensity Scale

- I Not felt
- II Felt only by persons at rest
- III–IV Felt by persons indoors only
- V–VI Felt by all; some damage to plaster, chimneys
- VII People run outdoors, damage to poorly built structures
- VIII Well-built structures slightly damaged; poorly built structures suffer major damage
- IX Buildings shifted off foundations
- X Some well-built structures destroyed
- XI Few masonry structures remain standing; bridges destroyed
- XII Damage total; waves seen on ground; objects thrown into air

Earthquake Hazards

- Ground Shaking
- Foundation Failure (buildings collapse)
- Fires (1906 – San Francisco → 80% of the city burned down)
- Landslides
- Tsunami – huge waves caused, generally, by underwater earthquakes







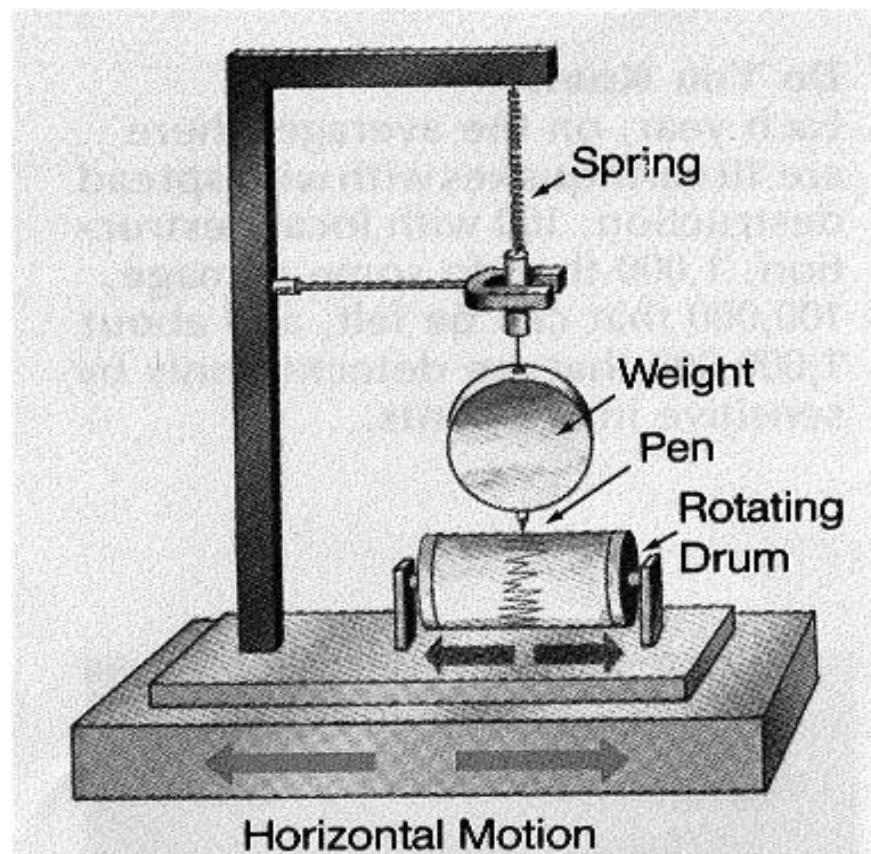
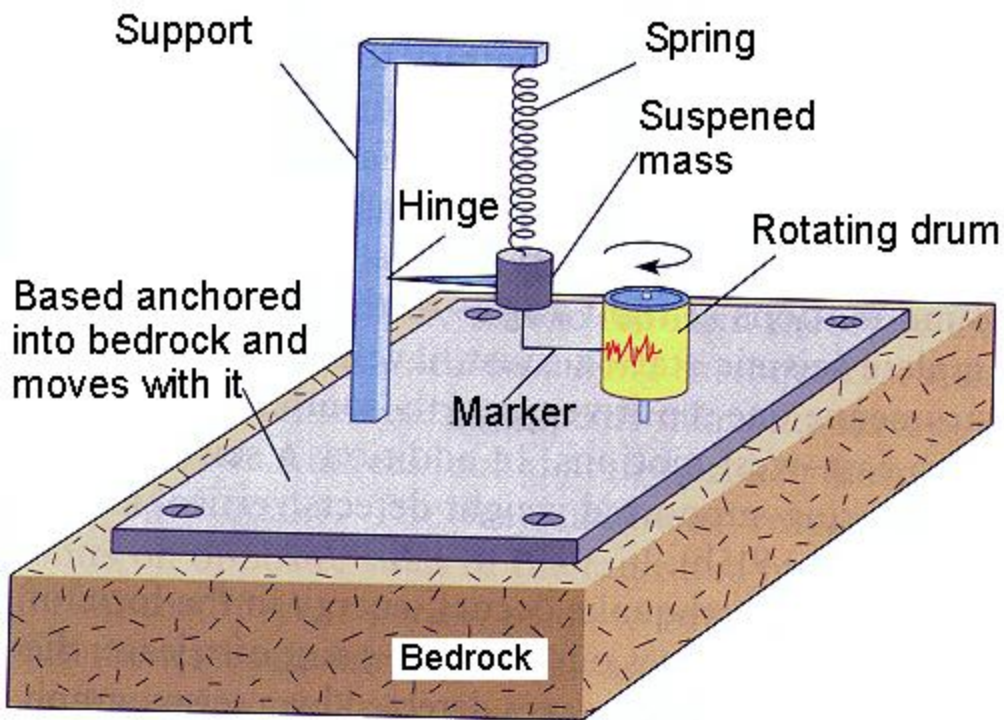
EXIT ONLY

STOP

Instruments for Measuring Earthquake Strength

- Seismograph
 - Instrument that measures the amount of ground movement during an earthquake.
 - Geologists then use the amount of ground movement to determine the strength of the earthquake. (Place it on the Richter Scale)





Can you read a quake?

An earthquake has just hit- can you tell where: Study these seismograms

