Earth Science 11
Unit 3 – Plate Tectonics
Day 5 – Earthquakes and Tsunamis #2

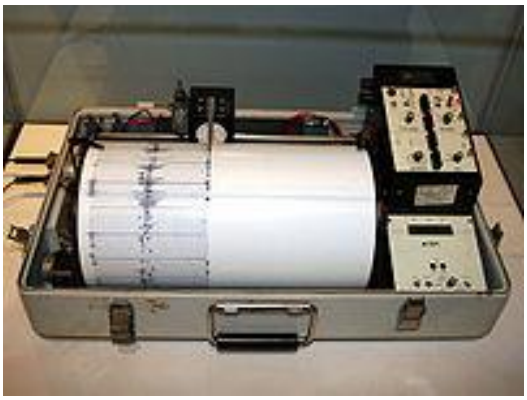
Name: _____

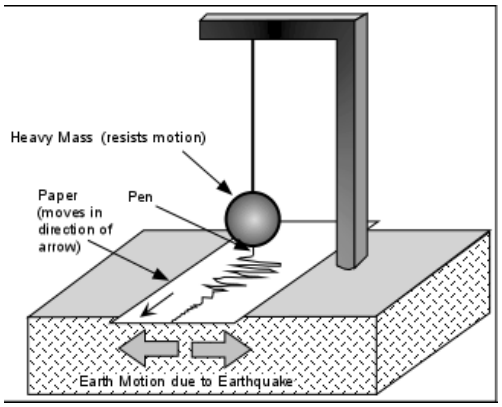
Date: _____

Block: _____

Recording Earthquakes: Every earthquake produces three major types of seismic waves that each travel at different speeds and causes different movements in the earth's crust.

Seismograph – the instrument used to detect and record seismic waves.



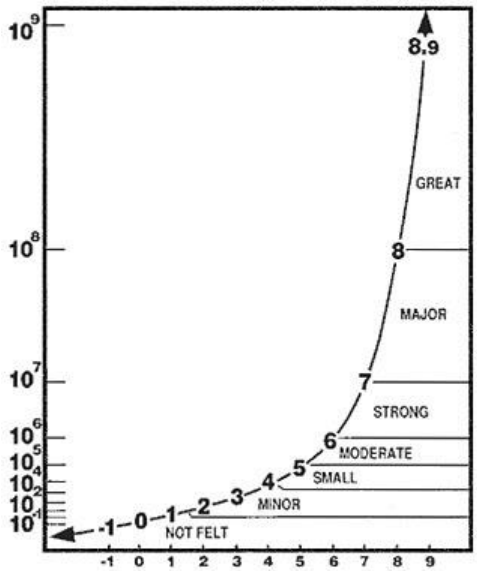


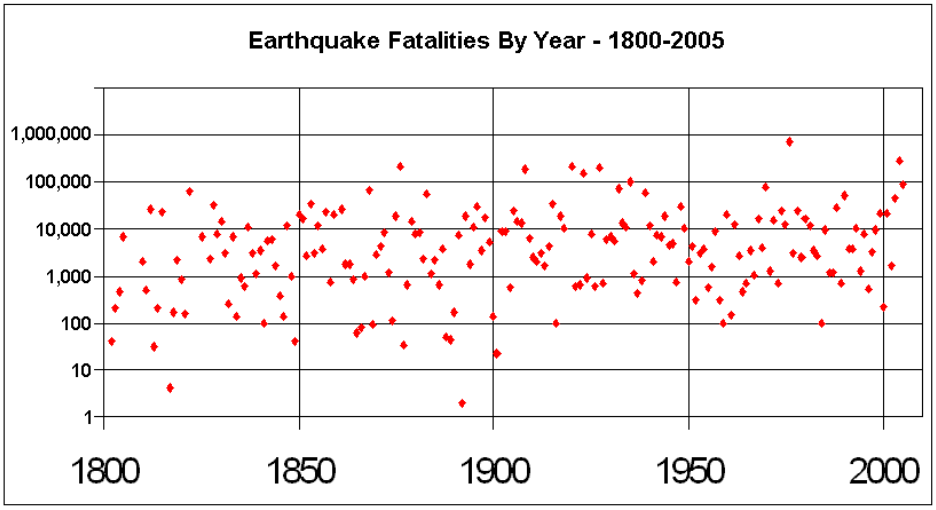
Measuring the magnitude of earthquakes: The Richter Scale is used to express the magnitude of an earthquake

Magnitude is a measure of the energy released by an earthquake.

Each increase of one whole number of magnitude represents a release of 31.7 times more energy than that of an earthquake measuring one whole number lower. An 8 would be 31.7x31.7 (~1000) times more than a 6

Description	Richter Magnitudes	Earthquake Effects	Frequency of Occurrence
Micro	Less than 2.0	Microearthquakes, not felt.	About 8,000 per day
Very minor	2.0-2.9	Generally not felt, but recorded.	About 1,000 per day
Minor	3.0-3.9	Often felt, but rarely causes damage.	49,000 per year (est.)
Light	4.0-4.9	Noticeable shaking of indoor items, rattling noises. Significant damage unlikely.	6,200 per year (est.)
Moderate	5.0-5.9	Can cause major damage to poorly constructed buildings over small regions. At most slight damage to well-designed buildings.	800 per year
Strong	6.0-6.9	Can be destructive in areas up to about 100 miles across in populated areas.	120 per year
Major	7.0-7.9	Can cause serious damage over larger areas.	18 per year
Great	8.0-8.9	Can cause serious damage in areas several hundred miles across.	1 per year
Rarely, great	9.0 or greater	Devastating in areas several thousand miles across.	1 per 20 years





Tsunamis: can surge several km inland and reach heights of 30m or more. In deep ocean waves can travel hundreds of km/h with heights of 1 m but wavelengths of 100km or more. Can travel 1000s of km without loosing much energy and as they approach sore they slow, the wavelength gets smaller, and grow taller eventually breaking and surging onsore with exceptional force.

Causes: Generally EQ, but also large underwater landslides, collapse of a flank of a Volcano into the ocean

Eruption of an underwater volcano

Impact of an asteroid or other large object into the ocean

Magnitude of Tsunamis: < 6.5 are very unlikely to trigger a tsunami... between 6.5 and 7.5 small sea level changes might be observed in the vicinity of the epicenter .... between 7.6 and 7.8 might produce destructive tsunamis.... 7.9 and greater Destructive local tsunamis are possible near the epicenter, and significant sea level changes and damage might occur in a broader region

Note: The earthquake must be a shallow marine event that displaces the seafloor

Tsunamis Misconceptions: not a single wave (movies are all wrong)

.... a series of waves seperated by minutes or even hours. Generally 2nd or 3rd wave is biggest and 1st wave is preceeded by a recession of the sea

The waves are not "breakers" but turbulent onrushing surges os debris-laden water.