

## GEOL 106 Earthquake Country Mid Term I Study Guide

**Scientific Method:** What are the steps? Can we tell what step we are in?

**Energy:** How are these forms manifested in the Earth Sciences? What is energy? What is a force? What is the difference between Kinetic and Potential Energy? Can energy change form?

**Hazard vs. Risk:** What are these and what is the difference?

**Earthquakes:** What are they? What causes them? What are the results of an earthquake? What is an earthquake fault?

**Stress and Strain:** What is stress? What is strain? How do these relate to earthquakes? What three types of stress and strain are there? What is Hooke's Law? What is elastic? What is plastic?

**Elastic Rebound Theory:** What is this and how does it relate to earthquakes? What event gave rise to this theory? What are the steps in the elastic rebound theory? What earthquake resulted in the evidence that led to this theory?

**Origin of the Earth and Time:** What is the age of the Earth? What are the two types of time that geologists use? What is the law of superposition? What is a radioactive half-life? Can we use radiocarbon ages to evaluate the age of the earth? Why or why not?

**Earth's Structure:** What are the two ways that people describe the structure of the Earth? What are the layers (in both systems)? What is the radius of the Earth? What is density? What does density do as one goes to the center of the earth? Which is more dense, oceanic or continental crust? How can you tell (hint: looking at the elevation and crustal thickness)? What is Isostasy? Why are there continents in some places and oceans in other places?

**Plate Tectonics:** What is plate tectonic theory? What are plates? Where are they? What are in between the plates? How can we see the boundaries of the plates? Do the plates move (aliens)? If so, why? How can we tell? What is thermal convection? How might thermal convection transfer energy from the mantle to the plates? How might thermal convection transfer energy within the mantle? What happens when plates get older and colder? What are

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the observations that led to plate tectonic theory? What are magnetic anomalies (how do they form)? What can they tell us about plate motions? What can they tell us about Earth's magnetic field?

**Seismology:** What is earthquake magnitude? How is magnitude calculated (what three variables need to be known)? What is intensity? What affects intensity? What is a hypocenter or focus; and epicenter? What are the different seismic waves? What are their motions? Which is first, second, third, to arrive and why? What is refraction? What does the plot of the seismic wave velocity vs. depth into the earth tell us? What is the difference between earthquakes in California and Virginia? How can one locate an earthquake with seismologic data? How can one determine the magnitude of an earthquake using seismologic data?

**Plate Boundaries:** What are the three types of plate boundaries? What type of stress and strain is each type of boundary associated with? Does crust get shortened, lengthened, or neither at which plate boundary fault? What are some examples of these plate boundaries? What are the three types of convergent plate boundaries (can you think of an example of each)?

**Faults:** What are the three main types of faults? What types of stress and strain does each fault type associate with? What are the two other types of faults (modifications/combinations of the three fault types)? What types of faults associate with what types of plate boundaries? Why? What is the strike and what is the dip of a fault? What are the two kinds of folds? What type of fault can make a fold? If a fault does not reach the surface, what is it called? How can you tell which direction a fault moved (slickenlines, offset streams, offset geologic layers)?

**Example Great Earthquakes:** Subduction zone fault earthquakes generate what kinds of deformation during interseismic and coseismic periods? What other natural disasters that also occur during subduction zone earthquakes? Which are the example earthquakes and their magnitudes?