

**Geology II Student Notes**  
**Earthquakes**  
**Chapter 6**

**Name** \_\_\_\_\_  
**Date** \_\_\_\_\_  
**Period** \_\_\_\_\_

*Vocabulary: Please number and define each term below in a complete sentence on a separate sheet of paper (Those terms with a \* please illustrate)*

Aftershock	Earthquake	Elastic Rebound Theory
Epicenter*	Fault Zone	Focus
Intensity	L Wave*	Mercalli Scale
Microquake	P Wave*	Pacific Ring of Fire*
Richter Scale*	S Wave*	Seismic Gap
Seismograph	Tsunami*	Seismogram
Triangulation*		

**6.1 Earthquakes and Plate Tectonics**

1. How is an earthquake produced?

- Rocks normally pressed together at \_\_\_\_\_
- \_\_\_\_\_n prevents rocks from moving
- Stress overwhelms fault and rocks suddenly grind past each other releasing \_\_\_\_\_

2. What is Elastic Rebound Theory?

- Rocks stressed eventually fractures at the weakest point releasing \_\_\_\_\_

3. How is a focus different than an epicenter or a fault?

- \_\_\_\_\_ - is where the slippage occurs
- \_\_\_\_\_ - the point on the Earth's surface directly above the focus, the most shaking occurs here
- Fault- a break or crack in the crust along which \_\_\_\_\_

4. What is the difference between a(n):

- Shallow focus- >70 km to surface- \_\_\_\_\_
- Intermediate focus- 70-300 km below surface
- Deep focus- 300-650 km below surface- found near at \_\_\_\_\_
- How can earthquakes don't occur deeper than 6500 km?

5. What are the three major earthquake zones of the world?

- \_\_\_\_\_ - combination of transform and subduction zones
- \_\_\_\_\_ - Divergent boundaries
- Eurasian-Melanesian Mountain Belt- caused by Eurasian, Indian and African Plate

6. What are fault zones and where is a good example of one?

- fault zones form at plate boundaries due to intense stress in opposite directions-ex.

\_\_\_\_\_

7. Where were the most widely felt series of earthquakes in U.S. history, why there (read page 102 "Big Squeeze")?
- New Madrid, Missouri 1812
  - North American Plate began breaking apart \_\_\_\_\_ then stopped being pressed from mid-Atlantic ridge

## 6.2 Recording

1. How does a seismograph work?
  - 3 sensing devices- 1 vertical, 2 horizontal- north to south, east to west, record on seismogram- \_\_\_\_\_
  - using a heavy weight attached to \_\_\_\_\_ which holds the weight still even when the Earth moves
  
2. Define the following seismic waves:
  - \_\_\_\_\_ - primary, push/pull waves, travel through solid and liquids, fastest waves 1.7 times faster than S Wave
  - \_\_\_\_\_ - secondary, side to side, travel only through solids
  - \_\_\_\_\_ - Long, surface waves, move up and down, travel through all materials, slowest and most damaging
  - P and S waves are sometimes called body waves because they travel through the body of the Earth, L waves do not
  - \_\_\_\_\_ - areas that do not receive body waves due to the outer core being liquid, P waves are refracted and S wave never penetrate
  
3. How do we locate the epicenter/focus of an earthquake?
  - Need \_\_\_\_\_ seismographs in three different locations
  - After reading a seismogram and using a time-travel graph can locate radius of how far away the \_\_\_\_\_ is from that station
  - Using three stations can locate exact epicenter and focus through process of \_\_\_\_\_
  
4. How is an earthquake measured?
  - The strength, energy, power or magnitude of an earthquake is measured using the \_\_\_\_\_
  - The scale was developed by Charles Richter in the 1940's
  - The scale goes from 1 being the weakest to 10 strongest
  - Each number on the scale is \_\_\_\_\_ times more energy than the previous value
  - A number higher than a 6 is a destructive earthquake
  - \_\_\_\_\_ measures intensity of an earthquake, the damage done, not as accurate, based on observation

### 6.3 Earthquake Damage

1. What kind of damage occurs due to earthquakes?
  - collapsing buildings, falling objects, flying glass, explosions caused by broken gas and electric lines, flooding from collapsed dams, tsunami
  - Most building survive large \_\_\_\_\_ movements; few buildings survive up and down movements
  - \_\_\_\_\_ - buildings on solid rock experience little damage; buildings on landfills collapse
  
2. What causes some earthquakes to be more damaging than others?
  - a less severe earthquake which has a longer duration can be more damaging than a more severe brief earthquake
  - earthquake \_\_\_\_\_, strength of the buildings and time of day
  
3. What causes a tsunami?
  - faulting and underwater \_\_\_\_\_
  - depending on the depth and shape of the coastlines, \_\_\_\_\_ heights can vary
  
4. Why is the Seismic Sea Wave System important?
  - Can predict a tsunami more rapidly \_\_\_\_\_
  
5. Impact on Society: “The Great Hanshin Earthquake”
  - Date: 11/17/1995
  - Where: \_\_\_\_\_
  - Magnitude: 7.2
  - Property loss: 190,000 buildings destroyed from collapses and fires= \$100 billion and 5,500 deaths, thousands injured and 310,000 homeless
  
6. What are some precautions that should be taken if your in an earthquake?
  - keep a supply of canned food, bottled water, flashlights, batteries, portable radio
  - be able to turn off the gas, water and electricity
  - stand in a \_\_\_\_\_ when it occurs, stay away from windows, heavy furniture
  
7. Career Focus: Earth Forces
  - What’s the difference between a Volcanologist and an Exploration Geophysicist?
    - \_\_\_\_\_ - monitor and predict volcano eruptions by using a seismograph, also study ancient lava flows which can save future lives
    - \_\_\_\_\_ - study Earth’s subsurface, to locate sources of fresh water, petroleum by using seismic surveys- used to find certain types of rock where petroleum might be found, then find the best place to drill

8. What are some ways that seismologists are trying to predict earthquakes?

- \_\_\_\_\_ - can possibly sense the coming catastrophe
- Based on the \_\_\_\_\_ can make approximate future predictions

9. What is a seismic gap?

- \_\_\_\_\_ around faults, zones of immobile rock called seismic gaps
- place where rock is locked and unable, no earthquakes for \_\_\_\_\_ - likely locations of future earthquakes, several sites on the San Andreas Fault

10. What are some other signs of a possible future earthquake?

- scientists detect a slight tilting of the ground before an eq
- detect \_\_\_\_\_ due to stress
- magnetic and electric properties of rocks change
- increased \_\_\_\_\_ from strained rocks
- decrease in P waves from other earthquakes, the longer the decrease in speed last the stronger the earthquake will be
- \_\_\_\_\_ often goes up and down, becomes cloudy or increases in radon

11. What could be one possible solution to weakening earthquakes, based on tests from Rangely, CO?

- \_\_\_\_\_, weakens earthquakes