

Name: _____ Date: _____ Period: _____

Study Guide for Test: Plate Tectonics, Earthquakes & Volcanoes

Copy of Class Notes at <http://feldmannscience.weebly.com>. Access website by computer or mobile device! Tutoring offered after school on Wednesday December 10th. **Test on Thursday December 11th**

Turn in your completed study guide on the day of test to receive extra credit points on your test

11-24-14 and 11-25-14 Drifting Continents --- Textbook Help: pages 443-447

Word Bank

mountain	continental
Pangea	animals

1. Alfred Wegener's hypothesis of _____ drift suggests that at one time all land formed a supercontinent, named _____.

2. The evidence of fossils, _____ chains, certain plants and _____ support Wegener's hypothesis.

3. It is generally considered that dinosaurs lived in warm climates, yet fossils remains are found in Antarctica. How can this be explained?

12-01-14 and 12-02-14 Plate Tectonics --- Textbook Help: pages 449 – 459

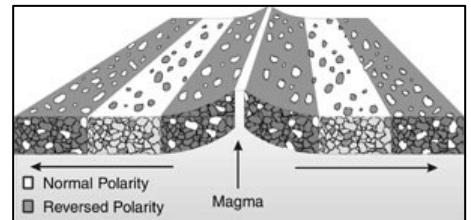
Word Bank

spreading	tectonics	young	dense	old
asthenosphere	transform	oceanic	divergent	plates
trenches	convergent	mountains	subduction	

4. The main reason why Wegener's hypothesis was originally rejected was because he could not satisfactorily explain what was causing the _____ to move.

5. Years later the evidence of seafloor _____ supported Wegener's hypothesis on how land masses move due to magma creating new ocean floor at divergent boundaries. Scientists discovered ocean ridges which are underwater _____, and ocean _____ which are narrow, long depressions with very steep sides.

6. They discovered _____ rock near ocean ridges and _____ rock near ocean trenches. There was also strips of reversed polarity rocks symmetrically, supporting growth in both directions away from the ridge.



7. The Theory of plate _____ states that the earth's surface (crust) is broken into about a dozen enormous pieces called plates.

8. The tectonic plates move about on the fluid-like upper mantle called the _____. There are two types of tectonic plates, continental (land) crust and _____ (water) crust.

9. When a plate descends beneath another plate it is called _____. Oceanic crust is more _____ and can subduct under continental crust.

10. The Earth's tectonic plates interact at boundaries. Name the three types of boundaries:



Plates are moving apart from each other

Plates are moving towards each other

Plates are moving side by side each other

Diagrams

11. Match the following boundaries with their diagram (from graham cracker lab)

_____ **Transform Plate Boundaries** are when plates move side by side with each other resulting in frequent earthquakes.

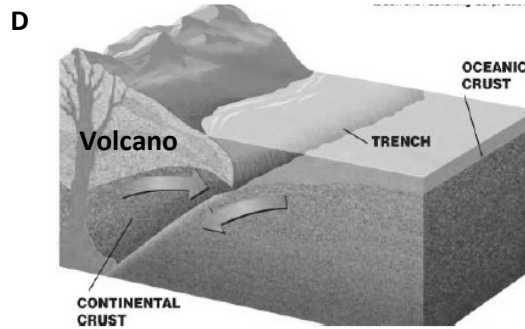
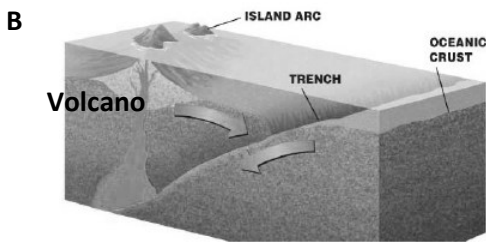
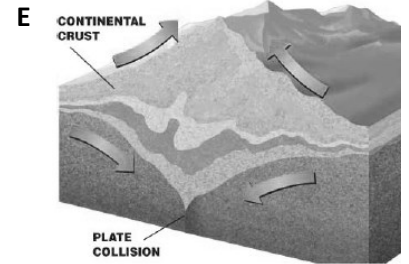
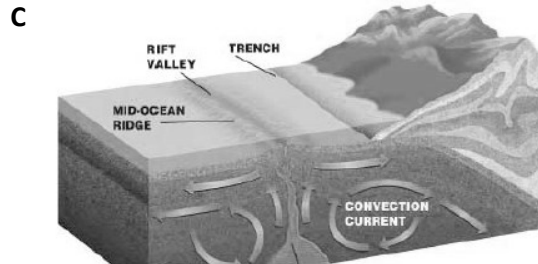
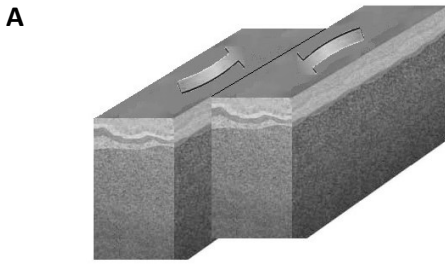
_____ **Divergent Plate Boundaries:** Where plates are moving away from each other. This movement is found along the mid-ocean ridges where new crust material is being created.

Convergent Plate Boundaries are where one plate dives (subducts) under less dense crust to be recycled back into the asthenosphere. There are *three types* of convergent plate boundaries:

_____ **Type I Ocean – Ocean:** when the ocean crust of two plates meet usually forming island arcs

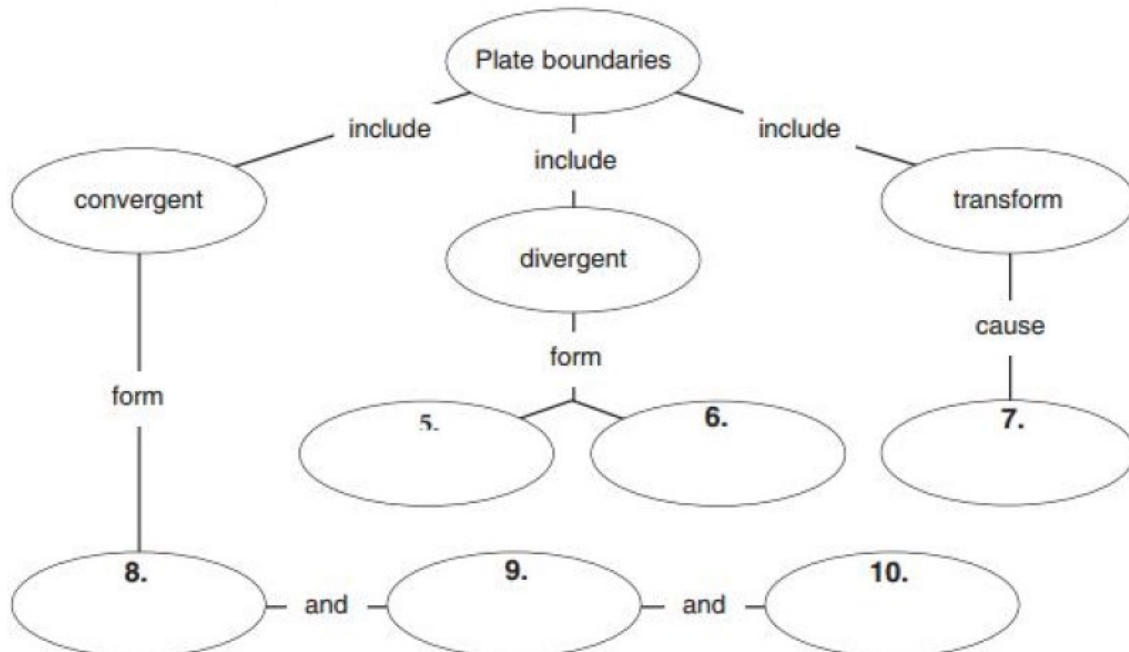
_____ **Type II Ocean – Continental:** when ocean crust subducts under continental crust forming mountain chains and volcanic activity

_____ **Type III Continental – Continental:** when two continental plates meet and buckle up forming large mountains.

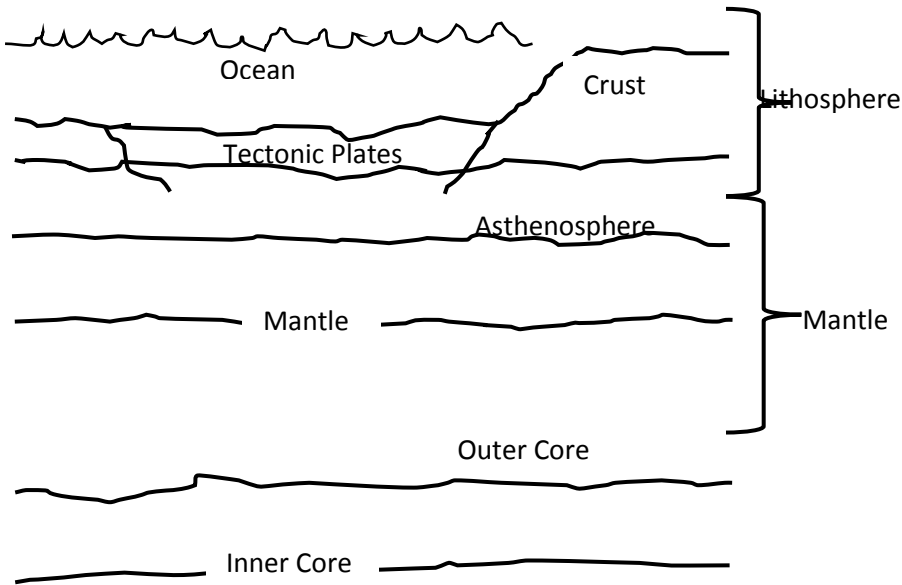


12. Complete the concept map below using the word bank (from quiz review!)

- | | | |
|----------------------------------|---|---|
| mid-ocean ridges
rift valleys | island arcs (volcanic islands)
deep oceanic trench | major earthquakes
mountains & most volcanoes |
|----------------------------------|---|---|



13. The physical structure of the Earth is divided into 5 layers:



Name the layers of the Earth described below.

_____ : Continental and oceanic crust. Divided into tectonic plates.

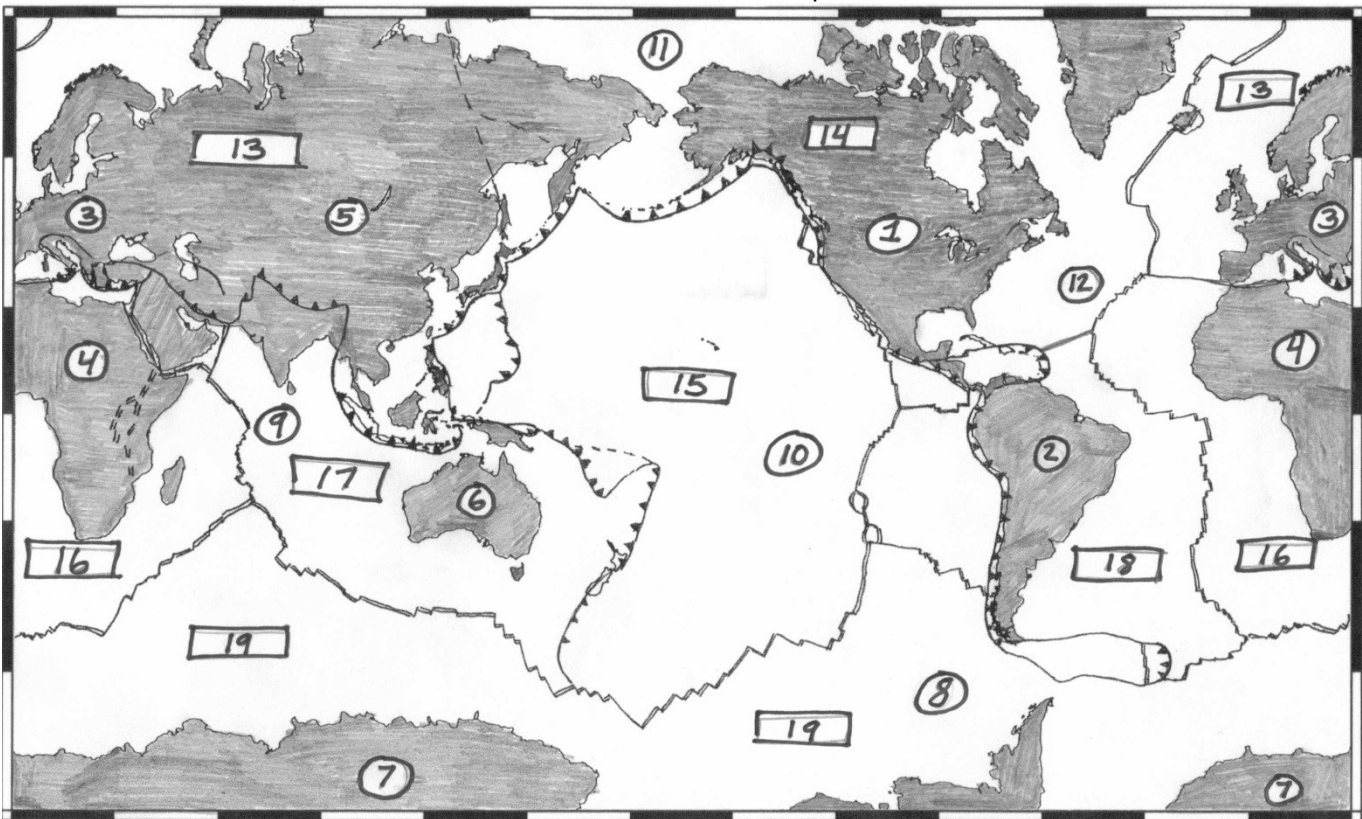
_____ : Top part of the mantle. Flows like soft plastic, think silly putty!

_____ : Thickest layer; most of the Earth's mass. Hot softened rock.

_____ : Thought to be **liquid** iron & nickel.

_____ : Thought to be **solid** iron & nickel.

14. Label the Continents, Oceans & Plates in the table below the map.



Continents

- _____ Africa
- _____ Antarctica
- _____ Australia
- _____ Asia
- _____ Europe
- _____ North America
- _____ South America

Oceans

- _____ Arctic Ocean
- _____ Atlantic Ocean
- _____ Indian Ocean
- _____ Pacific Ocean
- _____ Southern Ocean

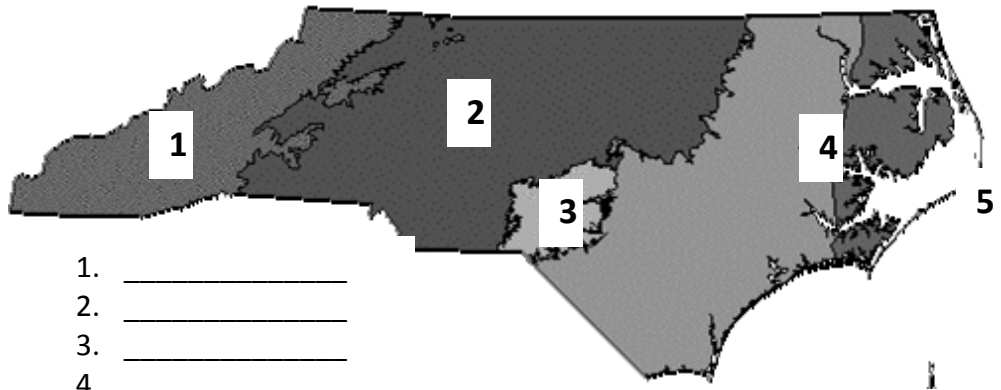
Major Plates

- _____ African Plate
- _____ Antarctic Plate
- _____ Eurasian Plate
- _____ India-Australian Plate
- _____ North American Plate
- _____ Pacific Plate
- _____ South American Plate

12-05-14 Geological History of North Carolina:

15. There are 5 Geologic Regions in North Carolina. Name the following region:

Word Bank
Sandhills
Blue Ridge Mountains
Piedmont
Coastal Islands
Upper/Lower Coastal Plains



1. _____
2. _____
3. _____
4. _____
5. _____

Complete the story of North Carolina’s geologic history....

Word Bank

foothills	Piedmont	erosion	Atlantic
moving	Outer	Appalachian	Fall

16. The Blue Ridge Mountains are a subdivision of a larger mountain range called the _____ Mountains.

17. The Piedmont is an area less steep than the mountain region, but is more elevated than the coastal plains. It is also called the _____ because of its many rolling hills that start at the base of the mountains.

18. The Coastal Plains are flatter land than the Piedmont region and they border the _____ Ocean.

19. The _____ Line is the border line between the Piedmont and Coastal Plain regions and is caused by the gathering of water into rivers that flow to the ocean.

20. Durham is located in the _____ region of North Carolina.

21. The Barrier (coastal) islands are long narrow sandy islands that protect the mainland from storms. This area is referred to as the _____ Banks.

22. The two main factors that have accounted for all of the North Carolina regions and their distinct features are _____ plates and _____, which have occurred over time.

23. Geological Timeline. Place the following events in order that they occurred by numbering 1 (oldest) to 6 (most “recent”)

- _____ Land started to form
- _____ Pangea breaks apart
- _____ Earth Formed
- _____ Appalachian Mts. start to erode creating the Piedmont
- _____ Blue Ridge Mts. and Piedmont look as they do today
- _____ North America & Europe/Africa collide, creating Pangea

12-08-14 Volcanoes & Earthquakes --- Textbook Help: pages 460 – 463; 484 – 487

Volcanoes!

Word Bank

convergent	explosive	ocean floor	sedimentary	volcanoes
water	hot spots	divergent	Ring of Fire	boundaries

- 24.** Most volcanoes form at plate _____. 80% are found along _____ boundaries, 15% are found along _____ boundaries and 5% are found far away from plate boundaries.
- 25.** Converging plates form the most _____ volcanoes! The subduction zone generates magma for the volcano from _____ rock.
- 26.** Rift volcanoes form from diverging plates. Most occur under _____ where they create new _____
- 27.** Volcanoes that do not form at plate boundaries rely on _____. The Hawaiian islands are a good example because they are located in the middle of the Pacific Plate.
- 28.** The _____ also known as the Circum-Pacific Belt is a 25,000 mile stretch containing 90% of the world's active _____.

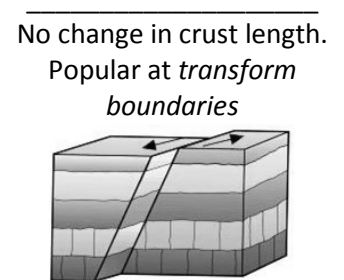
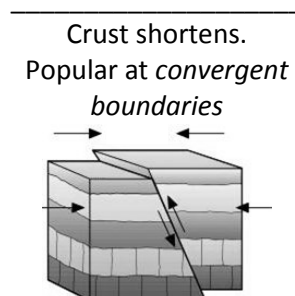
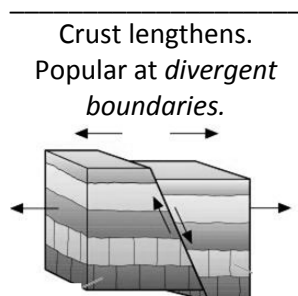
Earthquakes!

Word Bank

fault	Seismic	epicenter	Circum	ridge push
mantle convection	boundaries	gravity/slab pull	focus	earthquake

- 29.** A _____ is a fracture in the rocks that make up the Earth's crust. An _____ is the shaking of the ground caused by sudden motions along faults in the Earth's crust.
- 30.** Most earthquakes occur at plate _____. 80% occur in the _____ - Pacific Belt.
- 31.** The _____ is the point within the Earth where an earthquake rupture starts. And the _____ is the point at the surface of the Earth directly above the focus.
- 32.** A _____ Wave transmits the energy released by an earthquake.
- 33.** The underlying origin for earthquakes is movement of the plates. Earth's plates can move due to three different methods:
- (1) _____: The slow creeping motion of Earth's solid mantle caused by convection currents carrying heat from the interior of the Earth to the surface.
 - (2) _____: Weight of an elevated ridge pushes an oceanic plate toward a subduction zone.
 - (3) _____: Cooled plates become dense and sink into the mantle due to its own weight.
- 34.** Identify the following fault types.

Word Bank
Reverse Fault
Strike-Slip Fault
Normal Fault



12-09-14 Seismic Waves Lab -- Textbook Help: pages 495 – 501; 505 - 510

Since you have turned in your lab with the descriptions of seismic waves please review the following information paying particular attention to the items underlined.

Types of Seismic Waves

There are several different kinds of seismic waves, and they all move in different ways. The two main types of waves are **body waves** and **surface waves**. Body waves can travel through the earth's inner layers, but surface waves can only move along the surface of the planet like ripples on water. Earthquakes radiate seismic energy as both body and surface waves. Traveling through the interior of the earth, **body waves** arrive before the **surface waves** emitted by an earthquake.

The first type of body wave is the **P wave** or **primary wave**. This is the fastest kind of seismic wave, and, consequently, the first to 'arrive' at a seismic station. The P wave can move through solid rock and fluids, like water or the liquid layers of the earth. Sometimes animals can hear the P waves of an earthquake. Dogs, for instance, commonly begin barking hysterically just before an earthquake 'hits'. Usually people can only feel the bump and rattle of these waves.

The second type of body wave is the **S wave** or **secondary wave**, which is the second wave you feel in an earthquake. An S wave is slower than a P wave and can only move through solid rock, not through any liquid medium.

Travelling only through the crust, **surface waves** are of a lower frequency than body waves, and are easily distinguished on a seismogram as a result as a very large looking wave. Though they arrive after body waves, it is surface waves that are almost entirely responsible for the damage and destruction associated with earthquakes. This damage and the strength of the surface waves are reduced in earthquakes where the focus is deep underground.

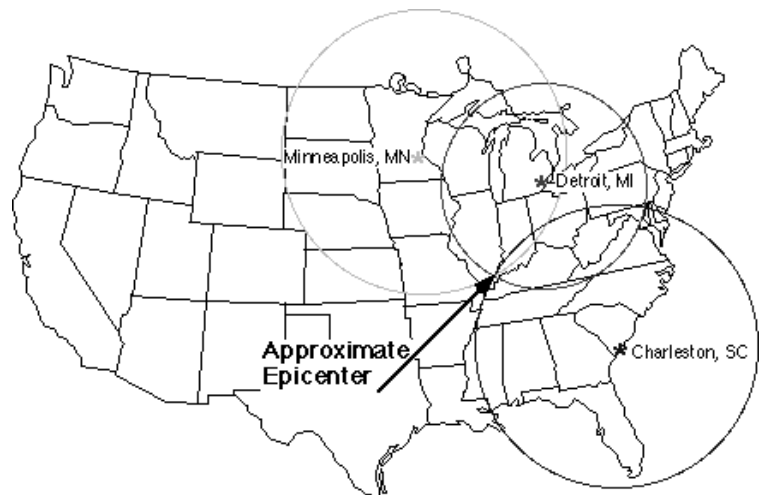
Finding the Epicenter

The epicenter of an earthquake is determined by **triangulation**. This means that seismic data is needed from at least three different locations, and where this data intersects tells us the epicenter.

When an earthquake occurs, it is recorded on numerous seismographs located in different directions. The seismograms at these locations show when the first seismic waves, the P waves, arrive and then when the next waves, the S waves, arrive.

Knowing how fast each of these waves travel, scientists can calculate how far away the epicenter was from each seismograph. What they don't know is the precise direction the waves came from—the direction of the epicenter.

Scientists then must use a map. Around each of three seismograph locations, a circle is drawn on the map with a radius that equals the known distance to the epicenter. These three circles intersect at a single point. This point is the location of the earthquake's epicenter.



Measuring an Earthquake

Magnitude (Richter Scale)	<u>Requires a seismograph.</u> Seismographs are the most reliable measures of earthquakes. Uses Arabic numbers (1, 2, 3 etc.)
Intensity (Mercalli Scale)	<u>Based upon the reports of people who experienced the earthquake and observed the destruction.</u> Uses Roman numerals (I, II, III etc.)