

## Unit 2 Formative Assessment – Plate Tectonics

### Chapter 8: Earthquakes

1. When an earthquake occurs, energy radiates in all directions from its source, called the \_\_\_\_\_.

- A. Epicenter  
**B. Focus**  
C. Fault  
D. Seismic center

2. A fault is \_\_\_\_\_.

A. A place on Earth where earthquakes cannot occur.

**B. A fracture in the Earth where movement has occurred.**

- C. The place on Earth's surface where structures move during an earthquake.  
D. Another name for an earthquake.

3. Identify **AND** describe the **three (3)** types of seismic waves:

A: \*\* **P-WAVES: Push-Pull (Primary "Compressional" Waves)**

- **Compress and expands rocks in same direction of wave travel**
- **Fastest traveling wave (first to arrive)**
- **Travels through solid and liquid Earth material**

B: \*\* **S-WAVES: Shake-Shear (Secondary "Shearing" Waves)**

- **Rocks move sideways (perpendicular) in relation to wave travel**
- **Travels slower than P-Waves (second to arrive)**
- **Can travel through *solid* Earth material ONLY**
- **Cannot travel through liquid Earth material**

C: \*\* **SURFACE WAVES: Up/down and side-to-side motion**

- **Travels slowest of all wave types (last to arrive)**
- **Most *destructive* seismic wave**

4. Describe how scientists find the epicenter of an earthquake?

Scientists use at least (3) seismometers (seismic stations) to accurately triangulate source (focus) of an earthquake

Seismometers measure/record vibrations inside Earth and produce seismographs that determine magnitude (Richter Scale) of earthquakes

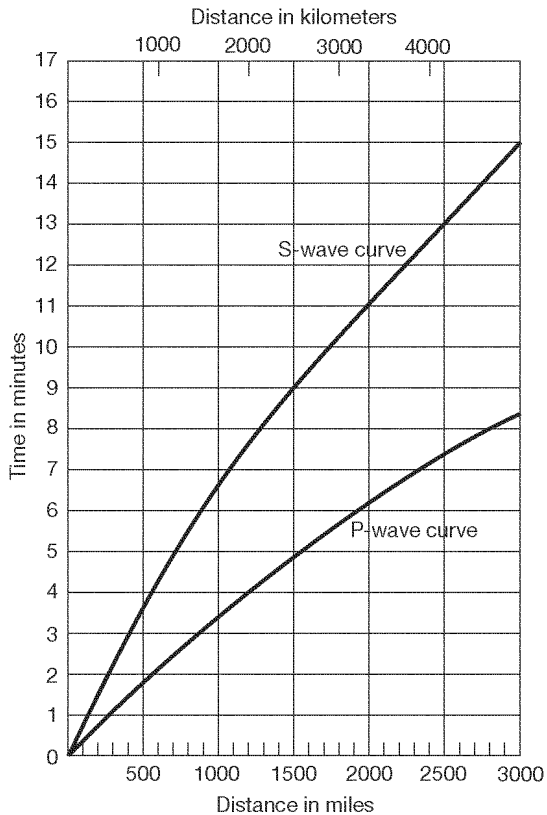


Figure 8-1

5. According to Figure 8-1, what is the distance between the seismic station and an earthquake epicenter, if the first S wave arrives 5.0 minutes after the first P wave?

In miles: ~ 2000 – 2100 miles

In Kilometers: ~ 3400 – 3500 km

- Lag Time = 00:05:00
- Use “Wedgy Method”

### Chapter 9: Plate Tectonics

6. Who proposed the Continental Drift hypothesis AND what does it say?

Alfred Wegener → Continents (landmasses) once joined together as a supercontinent, Pangaea, and slowly drifted apart from one another

7. List **four (4)** pieces of evidence to support this hypothesis:

- A. **Apparent fit (like a puzzle) of continents → N. America/Africa**
- B. **Similar rocks found on different continents → Mtn Ranges**
- C. **Similar fossils found on different continents → Mesosaurus**
- D. **Glacial deposits on present day equatorial continents**

8. What was the response of the scientific community to this hypothesis and why?

**Rejected → Wegener could not explain how (mechanism) and why continents moved apart without destroying lithosphere (fractures)**

9. What is the weaker, hotter zone beneath the lithosphere that allows for motion of Earth's rigid outer shell?

- A. Crust
- B. Outer Core
- C. Asthenosphere**
- D. Inner Core

10. Most of Earth's earthquakes, volcanoes, and mountain building occur \_\_\_\_\_.

- A. in the center of the continents.
- B. **at plate boundaries.**
- C. in the Himalayas.
- D. at volcanic island arcs.

11. Match the left column with the right column by drawing arrows:

- |                          |   |                          |
|--------------------------|---|--------------------------|
| Convergent Boundary      | → | Grinding past each other |
| Divergent Boundary       | → | Moving together          |
| Transform-fault Boundary | → | Moving apart             |

12. Match the left column with the right column by drawing arrows:

- |                           |   |                                    |
|---------------------------|---|------------------------------------|
| Land Rift Valleys         | → | Divergent Oceanic-Oceanic          |
| Continental Volcanic Arcs | → | Convergent Oceanic-Oceanic         |
| Mountains                 | → | Convergent Oceanic-Continental     |
| Volcanic Island Arcs      | → | Convergent Continental-Continental |
| Trenches                  | → | Divergent Continental-Continental  |
| Ocean Ridges              | → | Convergent Oceanic-Continental     |

13. Match the left column with the right column by drawing arrows:

- |                            |   |   |
|----------------------------|---|---|
| Destructive Plate Margins  | → | Divergent Boundaries <b>(ocean ridges create new crust)</b>   |
| Constructive Plate Margins | → | Convergent Boundaries <b>(subduction zones destroy crust)</b> |

14. Scientists agree that convection currents occurring in the \_\_\_\_\_ are the driving force for plate movement.

- A. crust
- B. outer core
- C. mantle**
- D. inner core

15. The main source of heat in the Earth's interior is due to \_\_\_\_\_.  
 A. the warm troposphere of our atmosphere  
 B. the eruption of volcanoes  
 C. the convection currents in the core  
**D. the radioactive decay of elements**
16. \_\_\_\_\_ causes oceanic lithosphere to *slide down the sides* of the oceanic ridge due to *gravity*.  
 A. Mantle plume  
 B. Convective flow  
**C. Ridge-push**  
 D. Slab-pull
17. \_\_\_\_\_ is thought to be the primary *downward arm of convective flow* in the mantle.  
 A. Mantle plume  
 B. Convective flow  
 C. Ridge-push  
**D. Slab-pull**
18. The \_\_\_\_\_ is a rigid outer layer of Earth that rests on top of a weak plastic layer of the mantle called the \_\_\_\_\_.  
 A. asthenosphere, inner core  
 B. asthenosphere, lithosphere  
**C. lithosphere, asthenosphere**  
 D. lithosphere, inner core

**Chapter 10: Volcanoes**

19. Contrast lava and magma.

**LAVA – Molten rock ON Earth's surface**

**MAGMA – Molten rock INSIDE Earth's surface**

20. In what geographical region of the world are most volcanoes found? Why is this true?

**“Ring of Fire” – Subduction of Pacific plate on all sides where 80% of world's volcanoes form at convergent boundaries that produce volcanic island arcs and continental volcanoes**

21. Which of the following is NOT a type of pyroclastic material?

- A. Lahar**  
 B. Cinders  
 C. Lapilli  
 D. Volcanic bomb

**Lahar is a mudflow that slides down the sides of the volcano, whereas pyroclastic material is ejected out of the crater during eruption**

22. **Describe** three (3) different types of pyroclastic material:

- A: \*\* **CINDERS** – Smaller solid lava rocks EJECTED from crater during eruption
- B: \*\* **LAPILLI** – Molten lava rocks EJECTED from crater during eruption
- C: \*\* **VOLCANIC BOMB** – Large lava rocks EJECTED from crater during eruption

**Human Impact of Earthquakes and Volcanoes**

23. **Describe** the necessary safety precautions and action responses of people living in regions with:

A: Earthquakes -

- 1) Close all cupboards and cabinets to prevent from opening
- 2) Secure large appliances to floor
- 3) Non-perishable food, bottled water, blankets

B: Volcanoes -

- 1) Close all doors and windows
- 2) Wear long-sleeve shirts/pants to prevent heat burns
- 3) Wear mask to protect from ash inhalation

**Geologic History of North Carolina**

24. **Describe** how the Appalachian Mountains were formed (include the name of tectonic plates involved and their motion)

- 1) Early Earth – Oceanic and continental crust formed (Pangaea produced) – Crust mainly consisted of oxygen & silicon
- 2) Overtime, supercontinent broke apart
- 3) Continental drift (divergent) occurs as landmasses form Laurasia

- 4) Laurasia – Shift in convection cells due to mass crustal movement causes a magnetic pole reversal (N→S) and supercontinent converges again
- 5) Continental collision (convergent) between N. America and Africa, thus forming Appalachian Mountains - ~470-480 mya
- 6) Post collision – Due to this massive crustal movement again, magnetic poles “flip” again back to normal conditions (N→N), thus causing continents to diverge once more producing landmasses in present day locations

25. What is the fall line in NC? Where is it found?

**Fall Line – Geologic boundary separating a plain (coastal plains) and upland region (piedmont).**

**North Carolina's fall line runs north to south from Roanoke Rapids, NC to Rockingham, NC**