Name Key Period Date

The Geosphere Review

The following are general topics that will be assessed on the FFLA. Please make sure you spend time learning from your notes, assignments, and this review. Make sure your *Geosphere Learning Targets* are done. Then answer each of the following questions completely and accurately.

1. What is the purpose of studying geology? In other words, why are rocks so valuable?

   Rocks have stories to tell about Earth's history.

2. Describe how you can use rock layers to identify transgressions and regressions of the ocean in the past.

   sea level rises / sea level falls

   Land — sandstone - shale - Limestone - Ocean

   • Rock layers show when shifts in those rocks happen, recording sea level changes.
   • If rocks shift toward land - transgression

3. Who was Alfred Wegener?

   • Meteorologist that developed the Theory of Continental Drift.

4. What is the theory of continental drift?

   - Continents were once together in a supercontinent called Pangaea and have slowly been moving around the Earth.

5. Describe three pieces of evidence that Wegener used to develop his theory.

   a. Continents look like puzzle pieces that fit together

   b. Identical fossils found on opposite sides of the ocean (S.A. + Africa).

   c. Glacier Remains and other geologic formations spanning multiple continents.

6. Why was Alfred Wegener's theory rejected by scientists?

   • He was a meteorologist, not a geologist.
   • He didn't explain how the continents were moving.

7. Describe the three major discoveries that were discovered after Wegener died that led to the theory of plate tectonics.

   a. New rock being formed at mid-ocean ridges and older rock on both sides further from the mid-ocean ridge.

   b. Magnetic stripes on both sides of the ridge.

   c. Earthquakes were found to occur in clusters at weak spots in Earth's Crust.

8. Who was Harry Hess?

   Developed the Theory of Sea-Floor Spreading.

9. How are continental drift, sea-floor spreading, and the Theory of Plate Tectonics connected?

   • Theory of continental drift came first. Then, the theory of Sea-Floor spreading explained more observations. Finally, the Theory of Plate Tectonics was built on the other two theories & answered more questions.

10. Summarize the theory of plate tectonics.

    • Earth's lithosphere is divided into sections called "Plates." Those plates move because of convection currents in the asthenosphere.

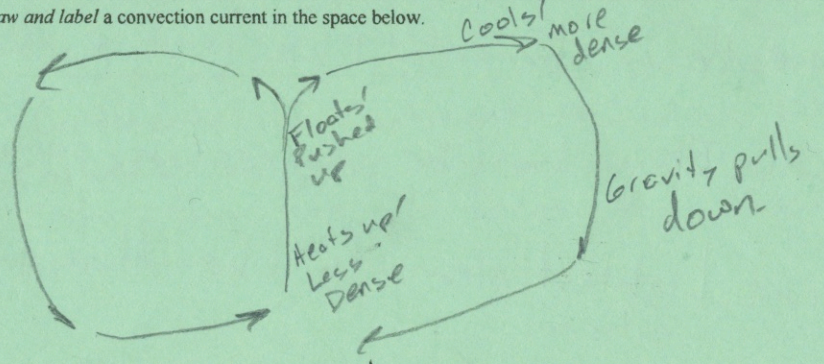
11. How does Wegener's theory of continental drift relate to the modern Theory of Plate Tectonics?

    - The Theory of Plate Tectonics is built on parts of Wegener's theory.

12. Are theories discovered or developed? How does the Theory of Plate Tectonics illustrate this?

    - Developed. We improved our explanations (theories) as we gained more and more information.

13. *Draw and label* a convection current in the space below.



14. *Write* a description of a convection current. What causes them to happen?

- A fluid becomes hot / less dense and gets pushed up by more dense fluids. As it moves up, it cools & becomes more dense and then sinks (gets pulled down by gravity)

15. Where does the Earth's interior heat come from?

a. Radioactive decay of unstable atoms.
- Some heavy atoms turn into smaller atoms and release lots of energy

b. Extraterrestrial Impacts: rocks from space hit Earth.

c. Gravitational Contraction: Earth was bigger, gravity pulled all of the atoms closer together.

16. Which of the sources of Earth's internal heat are known as the "Heat of Formation?"

ET Impacts AND Gravitation Contraction

17. How did the Earth's interior heat lead to the formation of the Earth's layers?

- Earth was so hot it was a big ball of molten rock. Heaviest elements sank to the middle and the lighter elements floated out.

18. Describe the characteristics of the different layers of the Earth based on chemical properties.

Core: Heavy elements like iron, nickel.

Mantle: Elements like magnesium, some iron.

Crust: Lightest elements like Aluminum, oxygen, silicon.

19. Describe the characteristics of the different layers of the Earth based on physical properties.

- Inner Core: solid
- Outer Core: Liquid
- Mesosphere: solid
- Asthenosphere: plastic (partially molten)
- Lithosphere: Solid

20. What evidence is there that the Earth's interior has layers?

- Seismic waves traveling through the Earth bend when moving through the different layers.

21. How do scientists know where one plate begins and another ends?

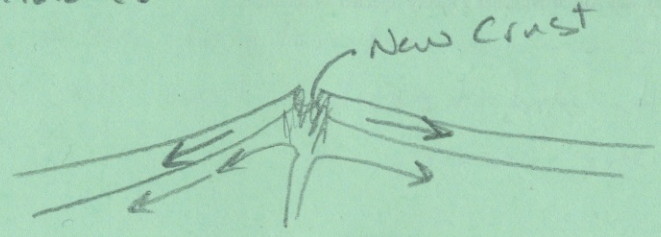
Earthquakes happen much more often at the edges of the plates.

22. What is the primary differences between oceanic and continental crust?

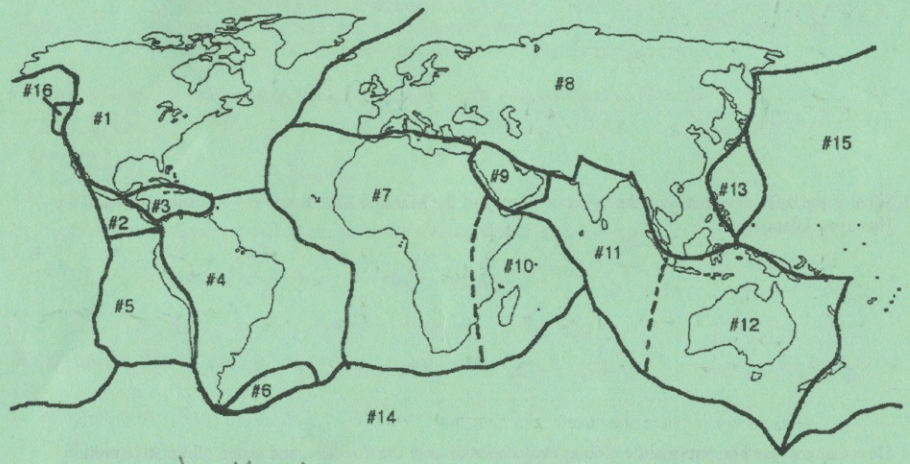
- Oceanic crust is more dense and thinner than continental.

23. Summarize and draw what happens at divergent boundaries.

- Two plates move apart from each other and new crust is created or <u>constructed</u> in the middle.



24. Name the plates shown on the map below.



a. Plate 1: North American
b. Plate 2: Cocos
c. Plate 3: Caribbean
d. Plate 4: South American
e. Plate 5: Nazca
f. Plate 6: Scotia
g. Plate 7: Nubian (African)
h. Plate 8: Eurasian
i. Plate 9: Arabian
j. Plate 10: Somalian
k. Plate 11: Indian
l. Plate 12: Australian
m. Plate 13: Phillipine
n. Plate 14: Antarctic

15: Pacific
16. Juan de Fuca

25. Describe two pieces of evidence that proves the ocean floor is actually moving apart in some areas.

a. New crust at the Mid-Ocean ridges and the crust gets older and older as you move further out.
b. Symmetrical lines of reversing magnetic polarity on opposite sides of the ridge.

26. Give an example of a divergent boundary.

Mid-Atlantic Ridge between the South American plate and the Nubian Plate.

27. Summarize what happens at transform boundaries.

- Two plates slide horizontally past each other. No crust is created or destroyed.

28. What is the most well-known transform boundary in the United States?

San Andreas fault in California. North American + Pacific

29. What is subduction?

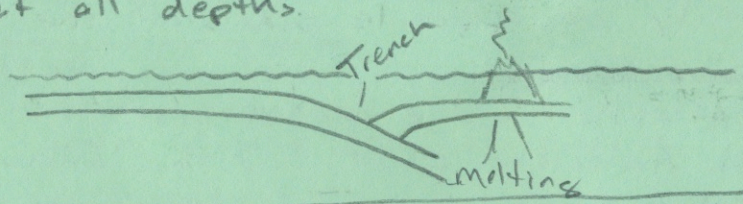
- When a plate slides under a less dense plate at a convergent boundary.

30. List one example of each of the types of convergent boundaries.

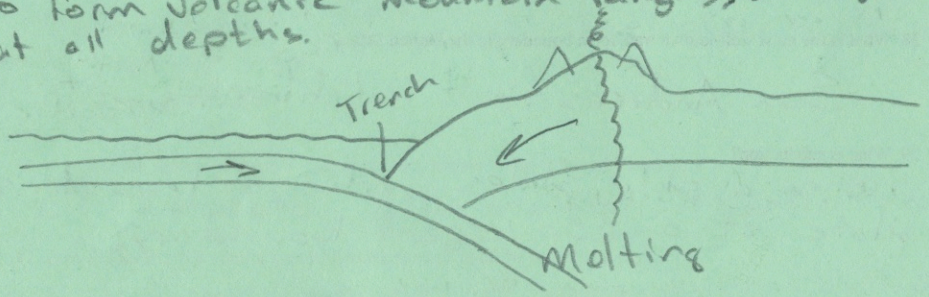
a. Oceanic vs. Oceanic → Pacific plate slides under the Phillipine plate, forming the Mariana Trench and Islands.
b. Oceanic vs. Continental → Nazca plate slides under the S. American plate to form the Andes Mtns.
- Juan de Fuca plate under N. American
c. Continental vs. Continental → Indian plate collides w/ the Eurasian. They push each other up to form the Himalayan Mountains.

31. Summarize and draw what happens at the three types of convergent boundaries.

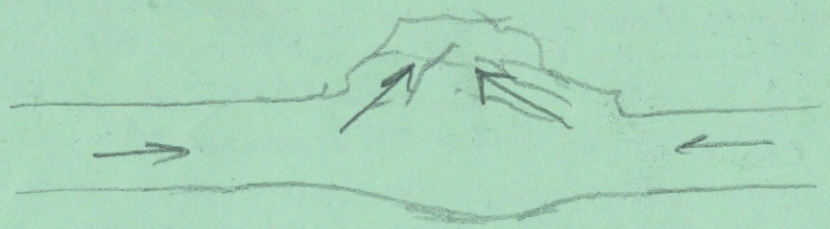
a. Oceanic vs. Oceanic - two pieces of oceanic crust collide. One goes under the other, melts, and some of that material gets pushed up to form volcanic island arcs. Earthquakes at all depths.



b. Oceanic vs. Continental: oceanic plate subducts under the continental plate, melts, gets pushed back up to form volcanic mountain ranges, Earthquakes at all depths.



c. Continental vs. Continental: two pieces of Continental crust hit each other and push each other up, creating tall mountains. No volcanoes, shallow earthquakes.



32. What can you expect to always be present in a convergent boundary involving oceanic crust?

- Volcanoes
- Subduction
- Earthquakes at multiple depths

33. What is the difference between the volcanic islands of the Mariana Islands and the volcanic islands of the Hawaiian Islands?

- Hawaiian Islands are created by a hot spot in the middle of a plate.
- Mariana Islands are formed by an oceanic vs. oceanic convergent boundary

34. How can you use hotspot (mantle plumes) volcanoes to infer the direction and speed of a plate's motion?

- Oldest island will be the farthest from the current hotspot. Knowing the age and distance between islands allows us to figure out the plate speed.

35. What's a tsunami?

Surge of water that can be very destructive.

a. What causes tsunamis?

- Usually an underwater earthquake.