Physical Geology
South Sevier High School
Lecture Notes – Chapter 19

_____
100

Name _____
Due Date _____
Per _____

1. Earth's surface is composed of a few large, thick plates that move slowly and change in size. This idea that Earth's plates move is called _____ _____.

2. _____ geologic activity is concentrated at plate boundaries, where plates move away, toward, or past each other.

3. In the early 1900's, Alfred _____ hypothesized that Earth's crustal plates must have at one time been together as one large continental mass. Support for his hypothesis came from:

    a. _____ (plant), Lystrosaurus, and Cynognathus (animals) fossils are found on all five continents.

    b. _____ (reptile) fossils are found in Brazil and South Africa only .

    c. The coastlines of _____ and South _____ fit together like pieces of a jig-saw puzzle (this was already known and accepted, but added further evidence).

4. Wegener reassembled the continents of the Earth into a supercontinent called _____.

5. Pangea later broke into two continental masses called _____ and _____.

6. _____ _____ of North America and Europe support reconstruction into Laurasia, and paleoclimate belts suggested polar _____, more potential evidence for continental drift. Even though there was viable evidence for continental drift, Wegener could not come up with a reasonable explanation for the driving force behind plate movement.

7. _____ uses mineral magnetic alignment direction and dip angle to determine the direction and distance to the magnetic pole when rocks formed.

8. (Shallower/Steeper) dip angles indicate rocks formed closer to the magnetic poles.

9. Rocks with (decreasing/increasing) age point to pole locations increasingly far from present magnetic pole positions.

10. In 1962, Harry Hess proposed the concept of _____ _____ as a possible mechanism for continental drift.

11. According to this concept, the seafloor moves away from the mid-oceanic ridge due to mantle _____. Sort of like a lava lamp.

12. Convection is _____ driven by rising hot material and/or sinking cooler material.

13. Seafloor rocks, and mantle rocks beneath them, cool and become more dense with distance from mid-oceanic ridge. When sufficiently cool and dense, these rocks may sink back into the mantle at _____ zones.

14. The downward plunge of cold rocks gives rise to oceanic _____.

15. The overall young age for sea floor rocks is explained by this model. On average, the entire ocean floor is less than _____ million years old.

16. Tectonic plates are composed of the relatively rigid _____.

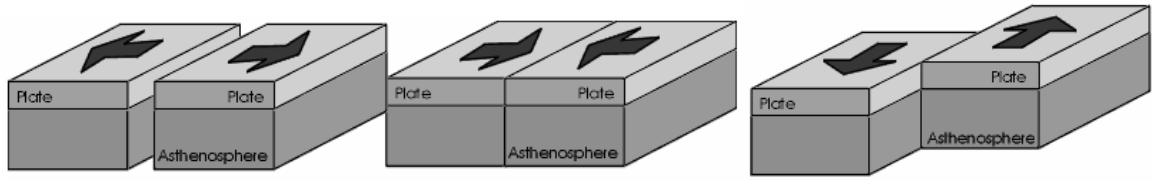
17. Lithospheric thickness and age of seafloor (decrease/increase) with distance from mid-oceanic ridge.

18. Plates “float” upon ductile _____, which acts as a lubricated surface for the plates to move on (think of it as grease).

19. Plates interact at their _____, which are classified into the following:

    a. Plates move apart from each other at _____ boundaries.
    b. Plates come together at _____ boundaries.
    c. Plates slide past one another at _____ boundaries.

20. Label each of the following images below with the correct type of tectonic boundary depicted.



_____ _____ _____

21. _____ magnetic anomalies are bands of stronger and weaker than average magnetic field strengths that are (Parallel/Perpendicular) to mid-oceanic ridges.

22. Symmetric “_____” anomaly pattern reflects plate motion away from ridge coupled with magnetic field reversals.

23. The rate of plate motion equals _____ from ridge divided by the _____ of the rocks.

24. Mid-oceanic ridges are offset along fracture zones. Fracture zone segments between offset ridge crests are _____faults.

25. Name three different methods that are used to directly measure tectonic plate movement today.

_____ _____ _____

26. At _____ plate boundaries, plates move away from each other and do the following:

- Can occur in the _____ of the ocean or within a continent.
- Divergent motion eventually creates a new _____ basin.
- Marked by rifting, basaltic volcanism, and eventual ridge _____.
- During rifting, crust is _____ and _____.
- _____ valleys mark rift zones.
- Volcanism common as magma rises through thinner crust along _____ faults.
- Ridge uplift by thermal _____ of hot rock.

27. At _____ plate boundaries, plates slide horizontally past one another and do the following:

- Marked by _____ faults.
- Transform faults may connect two offset segments of _____ ridge.
- Transform faults may connect a mid-oceanic ridge and a _____.
- Transform faults may connect _____ trenches.

28. Transform offsets of mid-oceanic ridges allow series of straight-line segments to approximate curved boundaries required by _____ Earth (in your face flat earth society!).

29. At _____ plate boundaries, plates move toward one another. There are three different types. They are:

    a. _____ boundary, marked by _____

    b. _____ boundary, marked by _____

    c. _____ boundary, marked by _____

30. The collision of two continents forms a young _____ belt in the interior of a new, larger continent. A classic example are the _____ mountains that formed when India and Asia collided.

31. Mantle _____ are narrow columns of hot mantle rock rise through the mantle and have the following characteristics:

    a. They are _____ with respect to moving plates.
    b. Large mantle plumes may spread out and _____ apart the overlying plate.
    c. Flood _____ eruptions are common.
    d. _____ apart of continental land masses.
    e. New _____ boundaries may form.

32. Mantle plumes may form "_____" of active volcanism at Earth's surface. There are approximately _____ known hotspots.

33. Hot spots in the interior of a plate produce volcanic _____. The _____ Islands (U.S. territory) is a prime example.

34. What will be the name of the next Hawaiian Island?

35. Metallic _____ deposits often located near plate boundaries.

36. Where is the deepest metallic ore deposit mine on Earth found?

37. What is the difference between a mid-ocean ridge and a mantle plume (5pts)?

38. Why does subduction generally produce andesite and not basalt (5pts)?

39. Explain the possible relationship between plate tectonics and sea level fluctuations (5pts).

40. Why can't mantle convection drive plate tectonics (5pts)?