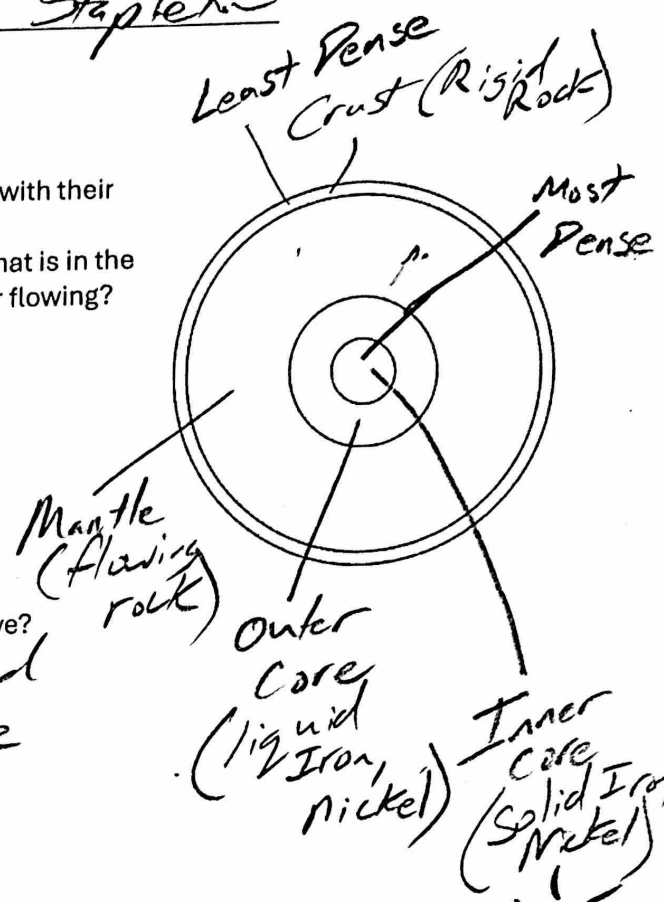
Skip: 17, 48c, 19-27

ESS 100
Final Exam Review

Name: Stapleton

Part 1: Plate Tectonics

1. Label the layers of the Earth on the diagram to the right with their names.
2. Next to the names of the layers, describe the material that is in the layer. What type of material is it, and is it rigid, liquid, or flowing?
3. Label the most dense and least dense layers.



4. Where are the Earth's plates found? In which layer?

Crust

5. Where are convection currents? What makes them move?

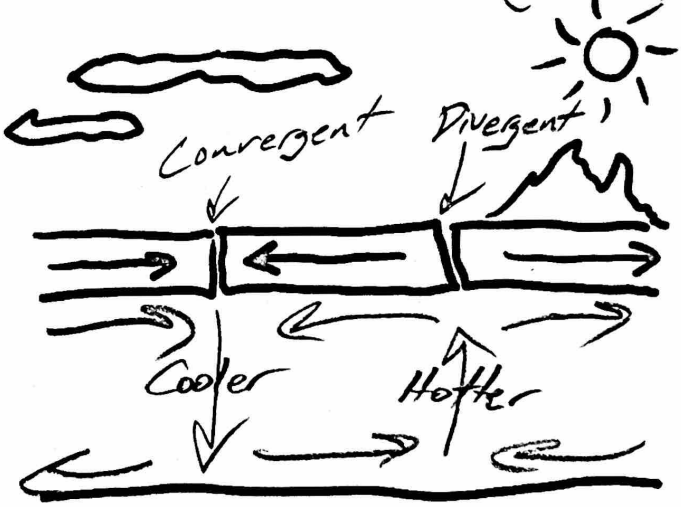
Mantle, Temperature and density differences make them rise

6. Describe <u>two</u> sources of the heat inside the Earth.

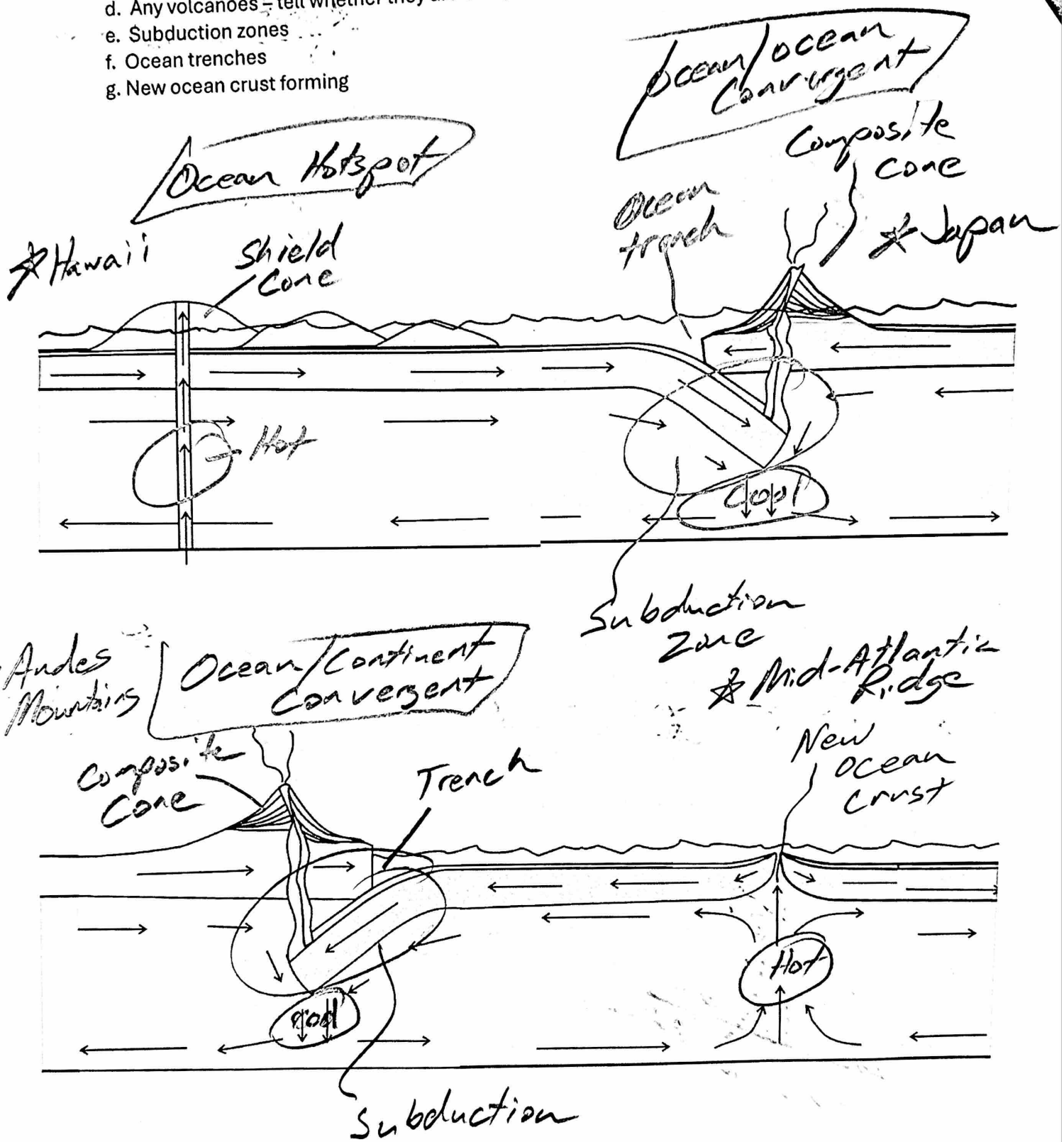
1) Radioactive Rocks
2) Compression
3) Past Collisions

On the diagram to the right...

7. Label a convergent plate boundary
8. Label a divergent plate boundary
9. Draw the currents in the mantle that are making the plates move. Make sure that you draw the rising and sinking currents.
10. Label a part of the mantle that is "hotter" than the rest of the mantle.
11. Label a part of the mantle that is "cooler" than the rest of the mantle.



12. For each plate boundary (or hotspot), label all of the following:
    a. The name of the type of plate boundary (or hotspot)
    b. A place in the real world where this exists.
    c. Especially hot places or cool places in the mantle
    d. Any volcanoes – tell whether they are composite or shield cones
    e. Subduction zones
    f. Ocean trenches
    g. New ocean crust forming



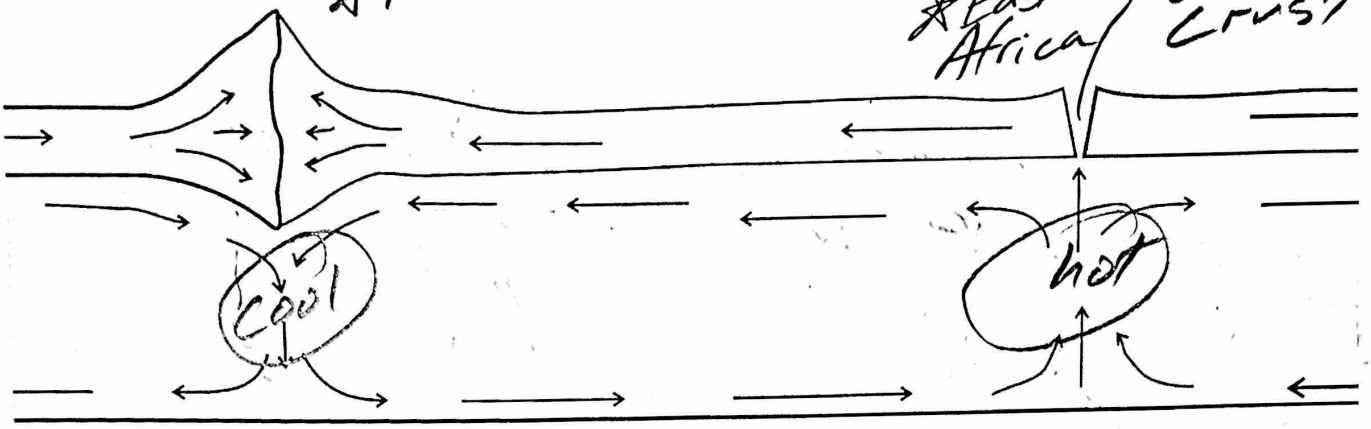
Continent/Continent Convergent

★Himalayas

Continent/Continent Divergent

★East Africa

New Ocean Crust



Part 2: Rock Dating

13. Organize the lettered rock samples from oldest to youngest. Then make a mark where the earthquake occurred in the sequence.

earthquake

Oldest										Newest
F	H	D	I	C	J	G	B	E	A	K

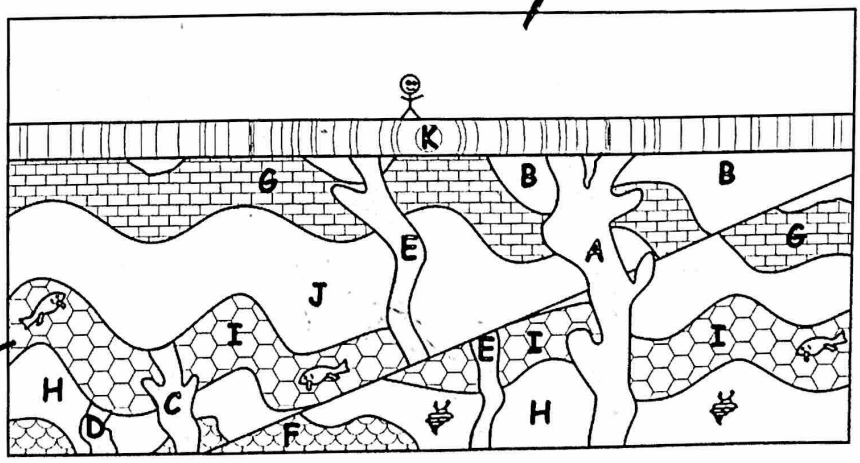
14. In the diagram on the right, which layer is older, Layer J or layer H? H

15. Which layer is older, E or A? E

16. Which layer is older, C or I? C

17. a. In the diagram on the right, which is older, magma tube A or magma tube E?

Same as #15



Total = 50 + 220 = 270

18. Sample D contains 50 K-40 parent atoms and 220 Ar-40 daughter atoms.

a. What percentage of those atoms are parent atoms?

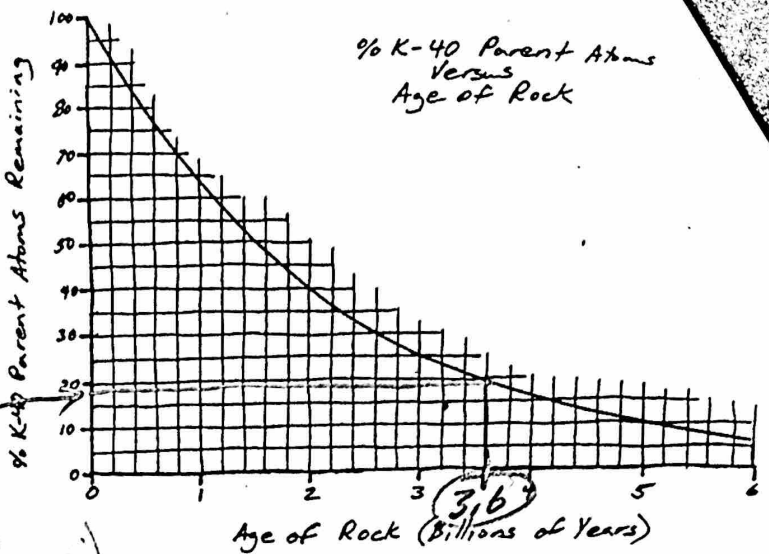
% Parents = $\frac{\text{Parents}}{\text{total}}$ (100%)

50 / 270 (100%) = 18.5%

b. Use the graph to determine the approximate age of Sample D.

3.6 Billion Years

18.5%



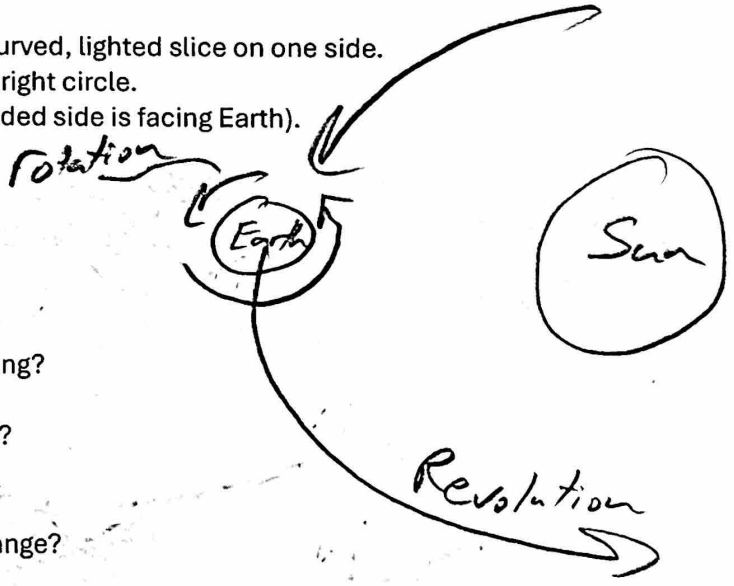
Part 3: System of the Earth, Moon, and Sun

Matching Moon Phase Terms. Some terms are used more than once:

A. Waxing B. Waning – C. Crescent D. Gibbous E. Quarter F. New G. Full

19. B In the Northern Hemisphere, this describes any moon that is lit only on the left side.
20. D A moon that is mostly lighted, with a curved slice of darkness on one side.
21. A In the Northern Hemisphere, this describes any moon that is lit only on the right side.
22. E A moon phase that appears to be half light and half dark.
23. B This describes any moon phase that is in the process of shrinking (the lighted part is getting smaller).
24. A This describes any moon phase that is in the process of growing (the lighted part is getting bigger).
25. C A moon that is mostly dark, but with a curved, lighted slice on one side.
26. G A moon phase that is a completely-lit, bright circle.
27. F A moon that is completely dark (the shaded side is facing Earth).

28. Draw a diagram showing the diffeerence between rotation and revolution. You can use the Earth or the moon in your example.



What causes this? What's moving, and how is it moving?

29. What motion causes the Moon to rise and set?

Earth's Rotation

30. What motion causes the Moon's phase to change?

Moon's Revolution

31. What motion causes the time of day to change (from morning to afternoon to night...?

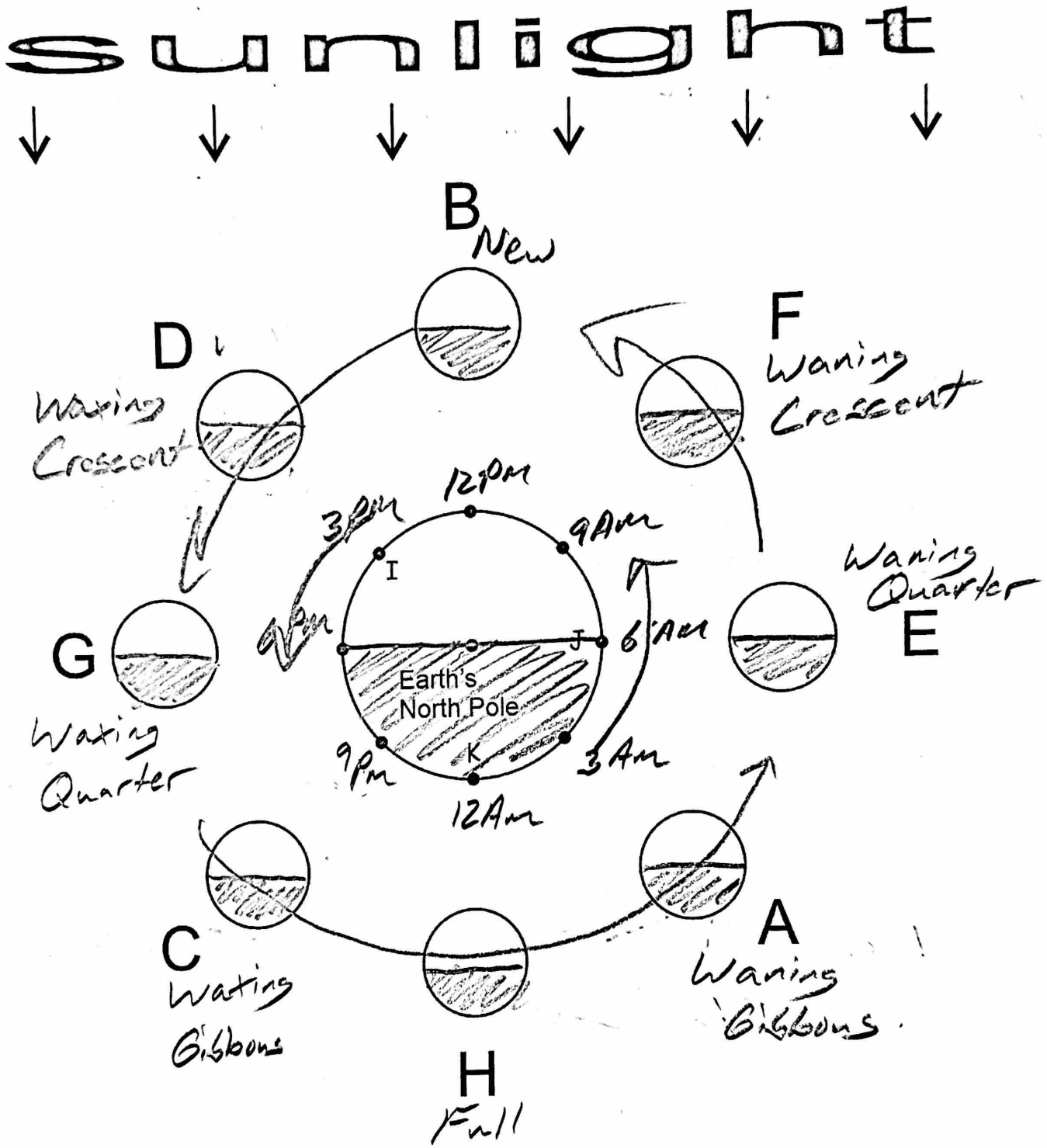
Earth's Rotation

32. What motion causes our seasons to change?

Earth's Revolution

33. On the diagram below...

- Use arrows to show the direction of the Earth's rotation and the Moon's revolution.
- Shade the dark side of the Earth and the dark side of each of the moons.
- Label the time of day at each of the dots on the Earth's equator.
- Label each moon with the name of its phase

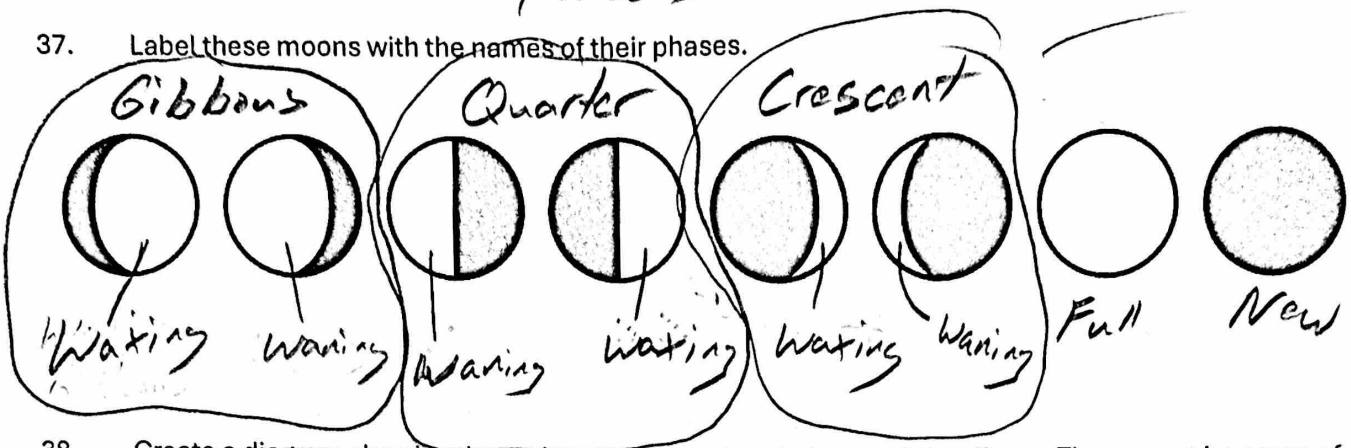


34. During which moon phase can we have a solar eclipse? New Moon

35. During which phase can we have a lunar eclipse? Full Moon

36. How long many weeks does it take for the moon to go through one complete cycle (from one full moon to the next)? 4 weeks

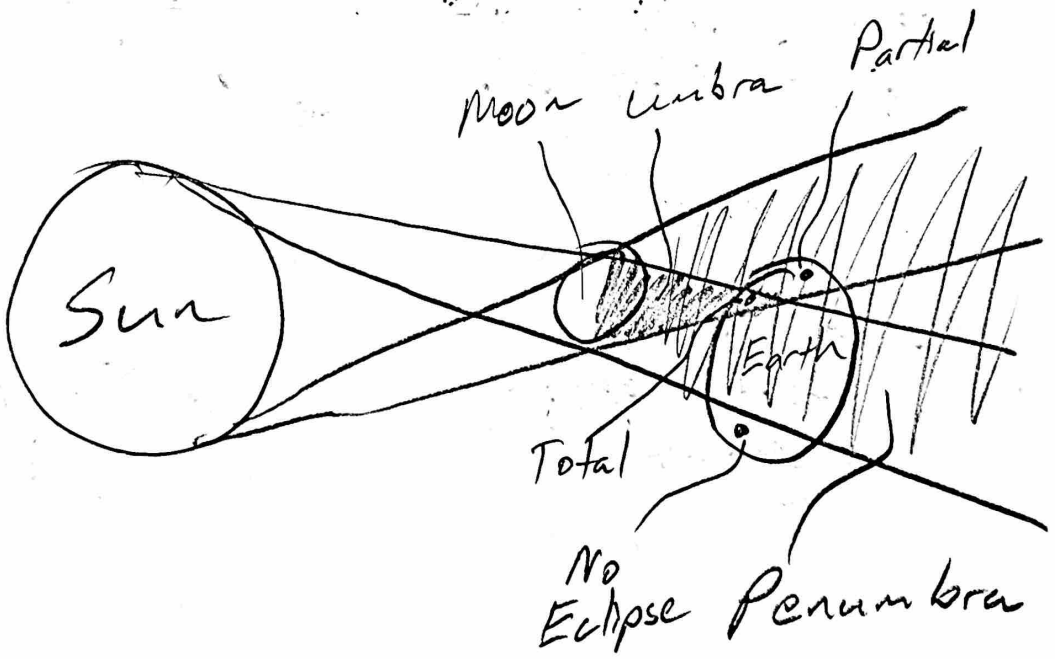
37. Label these moons with the names of their phases.



38. Create a diagram showing the umbra and penumbra during a **solar eclipse**. There must be areas of partial eclipse, total eclipse, and no eclipse. Your diagram does not have to be drawn to scale. In your diagram...

a. Show, shade, and label both the umbra and penumbra. You only need to label one part of each.
b. Label the Sun, Earth, and Moon.
c. Label places on the Earth fitting these descriptions:
   - No eclipse
   - Partial Eclipse
   - Total Eclipse

Solar Eclipse



Part 4: Meteorology (Weather and Climate)

39. There is pressure in the air all around us. We call this atmospheric pressure. What causes that pressure?

The weight of the air above us

40. How strong is atmospheric pressure, in pounds per square inch (psi)?

14.7 psi

41. What causes winds?

Pressure differences

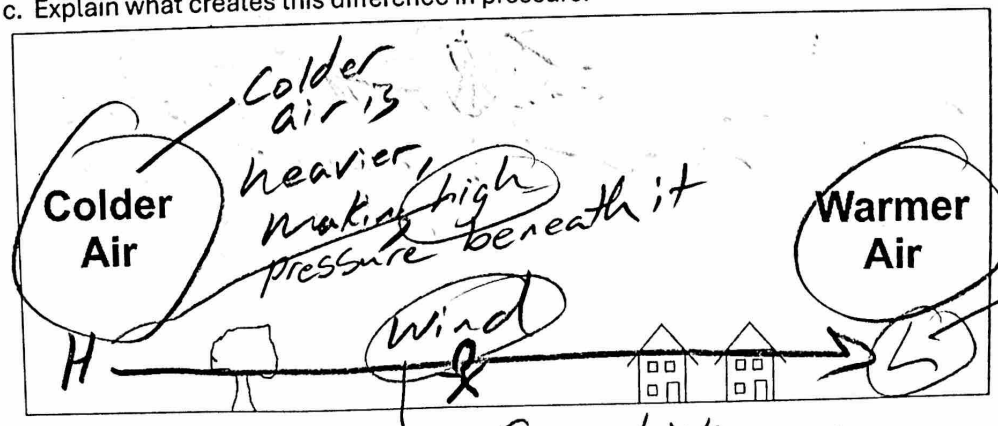
42. Where is air pressure **stronger** – at high altitudes (mountain tops) or at low altitudes (valleys)?

Lower

43. Explain why air pressure is **stronger** in those locations.

There is more air above lower places, so the weight of the air is greater.

44.
a. Use an arrow to show the wind that will be experienced by the person.
b. Explain how a difference in pressure causes the wind to blow in that direction.
c. Explain what creates this difference in pressure.



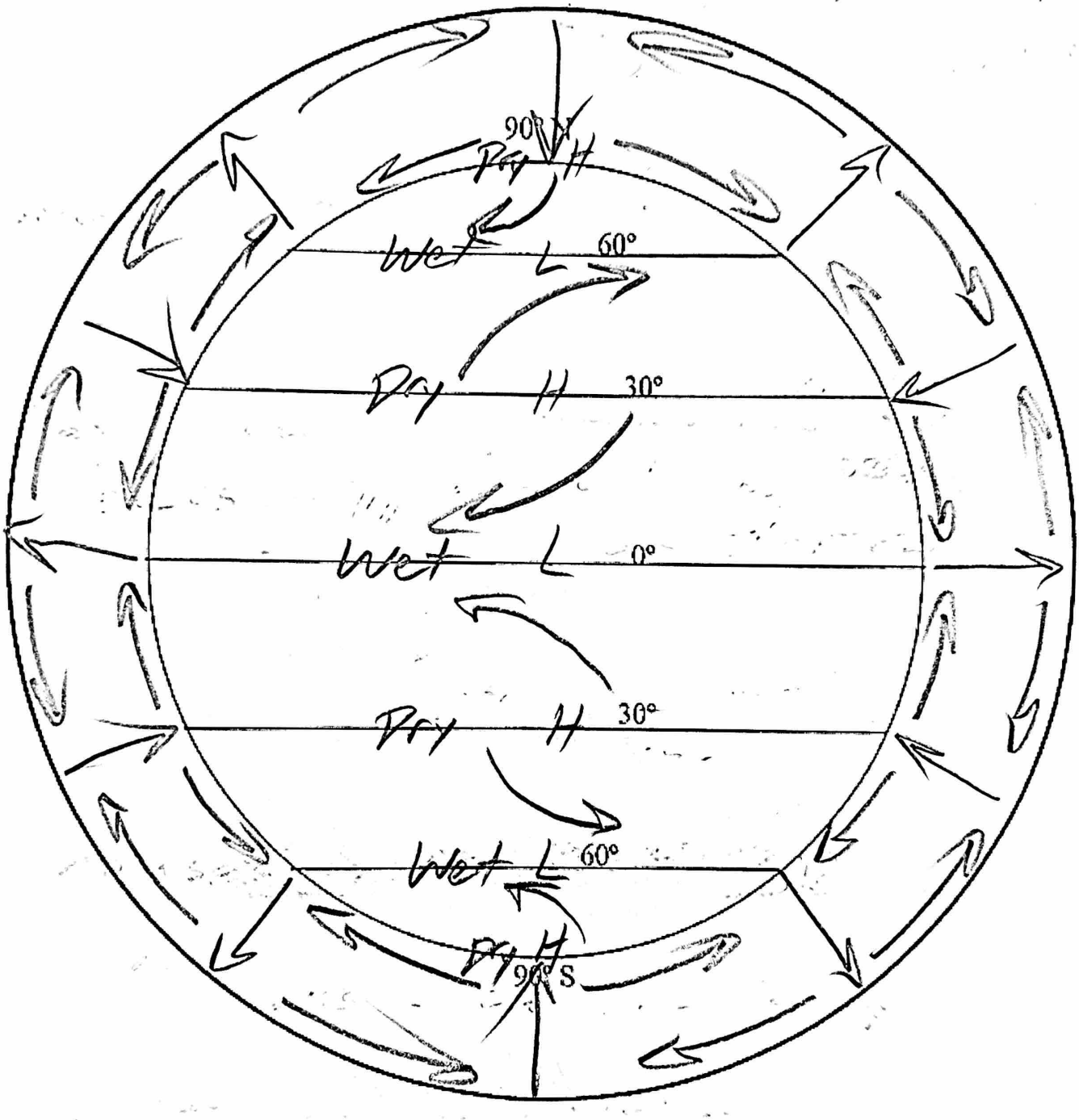
Colder air is heavier, making high pressure beneath it

Low pressure because the air above is not heavy

Blows from high pressure to low

45. On the diagram below, draw...

A. Arrows showing the circulation of the atmosphere. Only one quadrant of the full pattern is required.
B. All of the Earth's high and low pressure belts
C. The Earth's prevailing winds
D. Label the major wet (cloudy/high precipitation) and dry (clear/low precipitation) areas.



46. Choose a location on Earth where the air is rising or sinking, and explain why the air rises or sinks at that location.

Equator; Air rises because it is hot, so it has a low density.

47. Deserts:

a. Where are they found, on the Earth (at what latitudes)

Horse latitudes → 20-30° and 90°

b. Are they caused by rising air or sinking air?

c. Why does this motion of the air cause desert (dry/clear) conditions? In your answer, describe changes in pressure, temperature, and phase of matter as the air moves.

As air sinks, the pressure around it increases. This pressure squeezes the air and heats it up. Heating causes water to evaporate (clouds disappear)

48. Rainforests:

a. Where are they found, on the Earth (at what latitudes)

0° (equator) and 60°

b. Are they caused by rising air or sinking air?

c. Why does this motion of the air cause rainforest (wet/cloudy) conditions? In your answer, describe changes in pressure, temperature, and phase of matter as the air moves.

49. What causes ocean currents?

Winds push the water

50. What determines whether an ocean current is warm or cold?

Warm water comes from warm places. Cold water comes from cold places.

51. How is it possible for an ocean current near the equator to be cold?

It came from a polar region.

Part 5: Climate Change

52. Briefly describe how the greenhouse effect heats the Earth.

Sunlight travels through greenhouse gases and hits the Earth. That energy turns to infrared (heat) waves, which get trapped by greenhouse gases

53. Describe one predicted impact of global warming on us (other than higher temperatures).

- More precipitation
- More violent storms

54. Give an example of one positive feedback loop that can increase global warming. Explain how it gets started, and explain how it increases global warming.

→ Heating melts permafrost. Permafrost releases trapped methane. Methane is a greenhouse gas that causes more heating.)

→ It's hot, so we use more air conditioning. That energy use releases more greenhouse gas, which causes more heating.)

→ Heating melts snow. The Earth's surface below the snow is darker, so it heats up more)