

Part 1 - Scientific Method + The Lithosphere

Scientific Method Review

1. Draw examples of the following types of graphs:

- a. bar graph b. line graph c. scatter plot d. pie chart

2. In what situations do you use each of the different types of graphs?

- a. bar graph b. line graph c. scatter plot d. pie chart

3. Larry was told that a certain muscle cream was the newest best thing on the market and claims to double a person’s muscle power when used as part of a muscle-building workout. Interested in this product, he buys the special muscle cream and recruits Patrick and SpongeBob to help him with an experiment. Larry develops a special marshmallow weight-lifting program for Patrick and SpongeBob. He meets with them once every day for a period of 2 weeks and keeps track of how many marshmallows they can lift. Before each session Patrick’s arms and back are lathered in the muscle cream, while Sponge Bob’s arms and back are lathered with the regular lotion.

Which person is in the control group?

What is the independent variable?

What is the dependent variable?

4. What are controlled variables (a.k.a. constants’)? Why are they important to maintain?

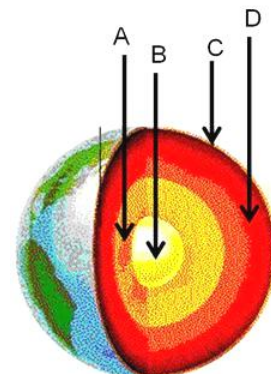
5. What is the purpose of a control group?

The Lithosphere

Plate Tectonics, Volcanoes, and Earthquakes Review – Chapters 17, 18, and 19

Match the layer of the Earth to the appropriate letter in the diagram.

- 6. Inner Core
- 7. Crust
- 8. Outer Core
- 9. Mantle

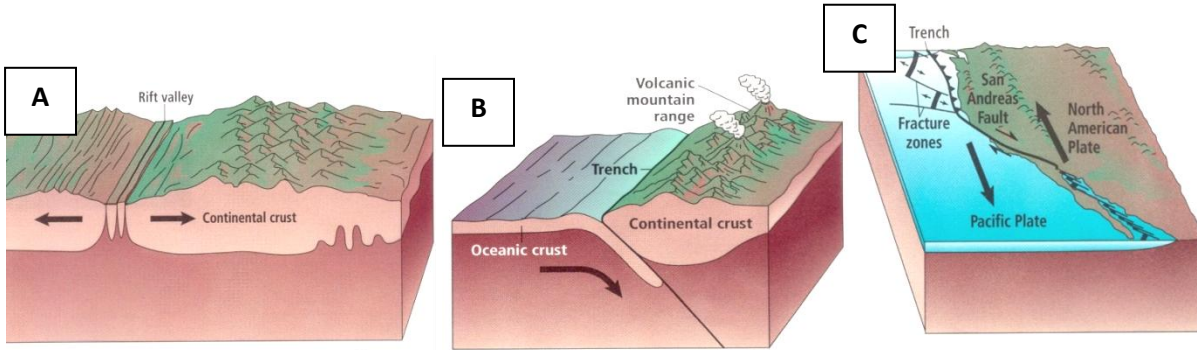


Match the boundary type to the appropriate diagram.

10. Transform Boundary _____

11. Convergent Boundary _____

12. Divergent Boundary _____



13. Two plates collide and one goes under the other. The plate that subducts under the other is probably a _____ plate (oceanic or continental) and it gets pushed under because it is _____ (more or less) dense than the other.

14. Explain what drives the movement of the tectonic plates. Draw a diagram.

15. What is the process called when one plate is forced beneath another at a convergent plate boundary?

16. The _____ states that Earth's crust and rigid upper mantle are broken into plates that move at different rates and in different directions.

- a. hypothesis of continental movement
- b. hypothesis of continental drift
- c. theory of plate tectonics
- d. theory of seafloor spreading

17. A place where two tectonic plates slide laterally past each other is called a _____ boundary and is often associated with _____ faults.

18. A place where two tectonic plates collide is called a _____ boundary and is often associated with _____ faults.

19. A place where two tectonic plates separate is called a _____ boundary and is often associated with _____ faults.

20. What were 3 pieces of Wegner's evidence to support continental drift theory?

21. Where do most volcanoes form?

22. Rhyolitic magma has the _____ viscosity, the _____ gas content and the _____ silica content of any type of magma.

- a. highest, highest, highest
- b. lowest, highest, highest
- c. highest, lowest, lowest
- d. lowest, lowest, lowest

23. Draw a picture of each volcano in the box. Be sure to show the shape of the volcano (steep sides, gently sloping, etc.)

Shield Volcano



Type of lava:
 Viscosity of lava:
 Type of eruption:

Cinder Cone volcano



Type of lava:
 Viscosity of lava:
 Type of eruption:

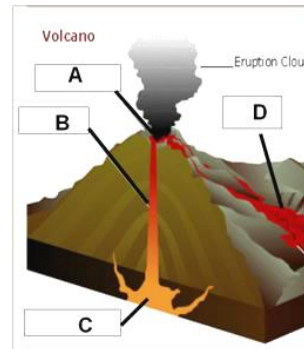
Composite/Stratovolcano



Type of lava:
 Viscosity of lava:
 Type of eruption:

Match the volcano structure to the appropriate letter in the diagram.

- 24. Magma Chamber
- 25. Vent
- 26. Lava Flow
- 27. Crater



- 28. What type of volcano is Mt. Saint Helens in Washington?
 - a. composite
 - b. cinder-cone
 - c. shield
 - d. super-volcano

29. The Earth's outer core is made of _____ (liquid, solid) and we know this because _____ (s, p) waves will not go through it.

30. Fill in the following table.

Type of wave	Direction of Motion	# on seismograph (1 st , 2 nd , 3 rd)
Primary (P Wave)		
Secondary (S Wave)		
Surface Wave		

31. What is a large ocean wave that is generated by vertical motions of the seafloor during an earthquake called?

- a. tsunami
- b. earthquake
- c. volcano
- d. global warming

32. The Richter Scale is a logarithmic scale, meaning the numbers on it increase by a factor of _____ each step.

33. How many times larger is a magnitude 4 than a magnitude 1 earthquake on the Richter scale?

- a. 10
- b. 3
- c. 100
- d. 1000

34. What type of instrument can measure the vibrations of an earthquake?

35. Describe how tectonic plates can form mountains. Which type of plates collide to form mountains?

36. What is a rating from the Richter scale based on?

- a. size of the largest surface wave
- b. wavelength between the waves
- c. damage from the largest secondary wave
- d. frequency of the primary waves

True or False - If the statement is true, mark it with a T. If it is false, change the underlined word to make it true

37. _____ Secondary (S) waves are the type of seismic wave that are the last to be recorded on a seismograph and cause the most damage in an earthquake.

38. _____ The crust is the thickest layer of the Earth.

39. _____ Movement in the inner core moves the plates of the Earth.

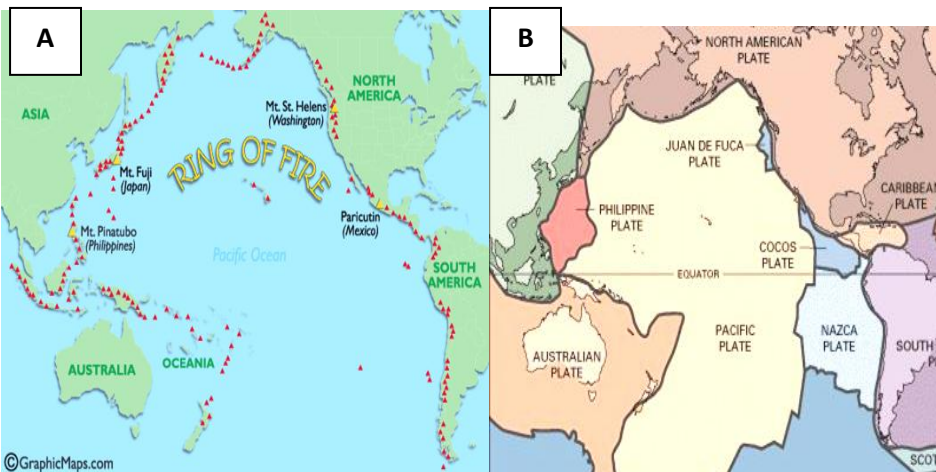
40. _____ Basaltic magma has the lowest silica content and is the least explosive.

41. _____ When magma reaches Earth's surface it is called lava.

42. _____ Oceanic plates are made of more dense basalt rock.

43. _____ The focus is where an earthquake originates, usually deep underground.

44. Tell me what each of these two pictures are showing. How do they relate to each other?



The Rock Cycle, Weathering, Erosion, and Soils Review – Chapters 4, 5, 6, and 7

45. What is the process by which rocks at the Earth's surface break down and change?

46. Roots growing into a rock is an example of _____ weathering.

47. Acid rain breaking down a rock is an example of _____ weathering.

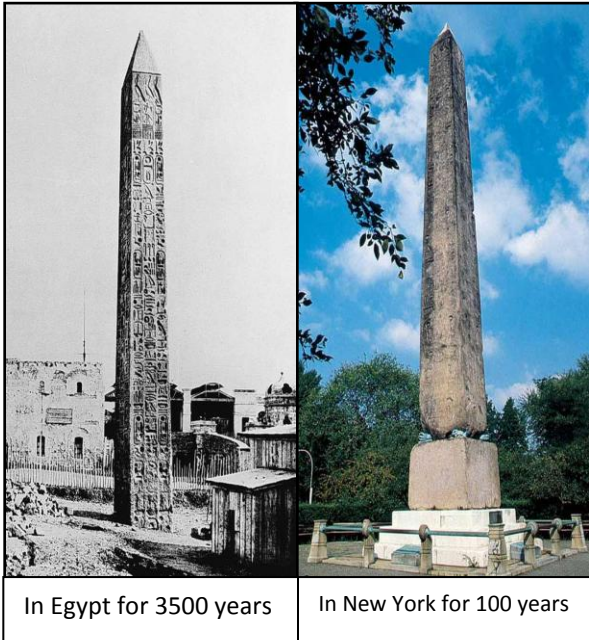
48. Which activity demonstrates chemical weathering?

- a. Freezing of water in the cracks of a granite boulder
- b. Abrasion of a streambed by tumbling rocks
- c. Dissolving of limestone by carbonic acid
- d. Boulders falling from a cliff and shattering on the rocks below

49. What Human activity causes acid rain to form?

- a. surface mining
- b. clear cutting
- c. fracking for natural gas
- d. burning fossil fuels, coal power plants, and motor vehicle exhaust

50. How did weathering rates change on the statue of Cleopatra's Needle when it moved from Egypt to New York? What caused that change?



51. The movement of weathered materials by wind or water is known as _____.

52. How are deforestation and erosion rates linked?

53. Soil that has been moved to a location away from its parent material rock is called _____.

- a. transported soil
- b. organic-rich soil
- c. residual soil
- d. soil profile

54. Eroded materials are transported and finally dropped off in a process called _____.

55. How is soil texture classified?

- a. by horizon
- b. soil particles sizes
- c. climate
- d. acidity

56. Which of the following is responsible for giving surface soil a dark brown color?

- a. clay
- b. sand
- c. iron
- d. humus

57. If you had a red or orange soil sample, there is likely a lot of which element in it?

- a. sulfur
- b. aluminum
- c. iron
- d. magma

58. How is Humus or organic matter formed in soil?

59. Which of the following soil particles would likely cause the formation of micropores and have low permeability?

- a. clay particles
- b. sand particles
- c. silt particles
- d. Sand and gravel

60. A rock that forms from the lava flow of a volcanic eruption is best described as a _____.

- a. Plutonic Igneous Rock
- b. Sedimentary Rock
- c. Volcanic Igneous Rock
- d. Metamorphic Rock

61. Marble is formed when limestone changes under high heat and high pressure. What type of rock is marble?

- a. Plutonic Igneous
- b. Sedimentary
- c. Volcanic Igneous
- d. Metamorphic

True or False - If the statement is true, mark it with a T. If it is false, change the underlined word to make it true.

62. _____ The smallest soil particles are clay particles.

63. _____ The texture of a soil affects its ability to retain water and support plant life.

64. _____ During the great depression, topsoil blew away in something called the dustbowl. This was an example of chemical weathering.

65. _____ Oxidized iron turns soil red.

66. _____ Dissolution is a form of mechanical weathering.

67. _____ Sandy soils are the best soils for agricultural uses

68. There is much more chemical weathering of rocks in tropical climates and much more mechanical weathering of rocks in colder climates. Think of a few reasons this happens.

69. What are the 5 characteristics of a mineral?

71. How does the water cycle help drive the rock cycle?

72. Why is salt considered a mineral but sugar is not?

73. What are the two main types of mineral extraction (mining)? Which one causes the most environmental degradation?

Part 2 - Hydrosphere Review

1. Compare and contrast adhesion and cohesion.
2. What are hydrogen bonds? Draw a picture of how they form.
3. Water has a _____ specific heat. This causes it to heat up and cool down _____.
4. Ice is _____ (more or less) dense than water so it _____ (sinks or floats).
5. What is salinity?
7. The greater the salinity the _____ the density of water.
8. What are 2 processes that add salt to seawater?
9. What are 2 processes that remove salt from seawater?
10. Which has a higher salinity, the Atlantic or the Pacific Ocean? Why?
11. What causes surface ocean currents?
12. What is the closest ocean current to us in North Carolina?
13. What is a gyre?
14. The _____ effect causes gyres to rotate in the _____ direction in the Northern hemisphere.
15. Use each term just one to complete the passage:
cold nutrients offshore trade-wind upwelling vertically

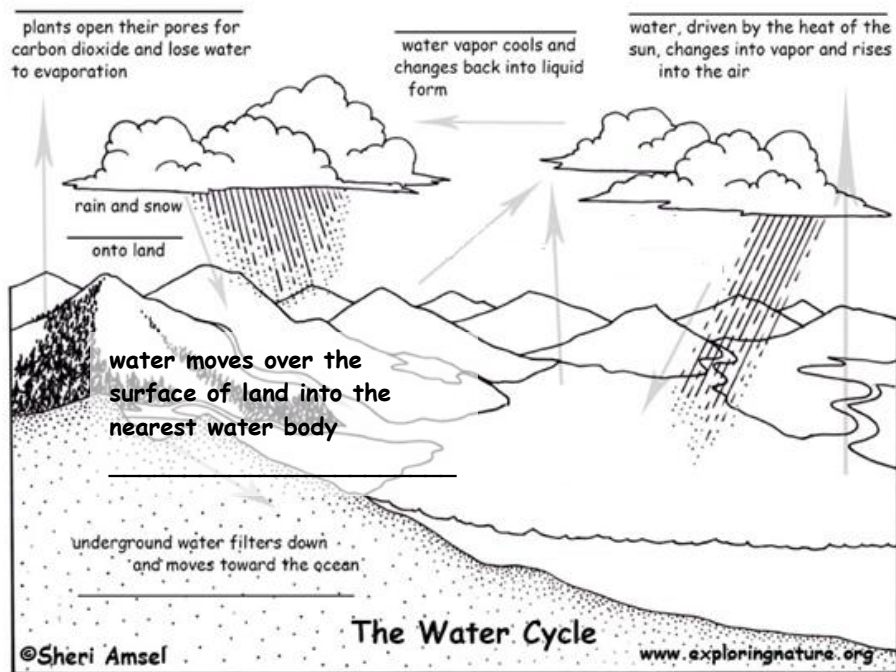
In addition to moving horizontally, ocean water moves _____. The upward motion of ocean water is called _____. Upwelling waters originate from the bottom of the ocean and are _____. Areas of upwelling exist mainly off the western coasts of continents in the _____ belts. The trade winds blow surface water _____, and the surface water is replaced by upwelling deep water. Upwelling waters are rich in _____, which support abundant marine life population

16. Explain how sonar is used to determine the depth of an ocean.

17. Describe the process of sea floor spreading. Draw a diagram.

18. Explain how barrier islands like the outer banks form.

19. Label the picture below with the following terms: infiltration, precipitation, evaporation, condensation, transpiration, runoff



20. What is an abiotic factor? Give 2 examples of abiotic factors of water quality.

21. What is a biotic factor? Give an example of a biotic factor of water quality.

22. What % of all the water on the globe is freshwater? Is it all available for human use? If not, why not?

23. Define turbidity. How is it tested?

24. Why is high turbidity an indicator of poor water quality?

25. Where does our drinking water here in Mebane come from?
26. In countries without waste water treatment facilities, are the lakes and rivers more or less polluted? Why?
27. Define point source pollution. Give at least 1 example.
28. Define nonpoint source pollution. Give at least 1 example.
29. What happens to water in urban areas when it flows down storm drains? (Is it treated or not?)
30. Describe two ways that water can gain higher levels of dissolved oxygen.
31. Describe two ways that the amount of dissolved oxygen in water can decrease.
32. How could a body of water get high levels of nitrates and phosphates?
33. What are impervious surfaces? Give 3 examples of them? How do they impact the water cycle?
34. What happens to most of the rain that falls in urban areas? Why?
35. Does the total amount of water on earth ever change? Why or why not?
36. Explain how man-made eutrophication works, step by step. What causes it and how can it lead to “dead zones?”
37. What is a watershed?
38. What do we call the highest point or elevation in a watershed that separates one watershed from another?

39. What are 3 different types of wetlands?

40. What are 3 reasons wetlands are vitally important?

41. What is an alluvial fan? How do they form? Draw one.

42. What is a delta? How do they form? Draw one.

43. What is a meander? How do they form? Draw one.

44. Water is stored underground in _____ and can be tapped and brought to the surface using _____. Natural places where groundwater comes to the surface are called _____.

45. What causes deep ocean currents?

46. Describe the conveyor belt model of ocean water circulation.

47. Where does most bottled water really come from?

48. Why is it unsustainable to drink bottled water?

Part 3 - Atmosphere, Weather, Severe Weather, and Climate

Atmosphere, Weather, and Severe Weather – Chapters 11, 12, and 13

1. Rank these gases in order from highest to lowest concentration of **earth's atmosphere** (highest concentration means that it makes up the biggest part of the atmosphere): **carbon dioxide, water vapor, oxygen, nitrogen**
2. Molecules in a substance with a high temperature move _____ (fast or slowly), while molecules in a substance with a low temperature move _____ (fast or slowly).
3. What are the three types of **heat transfer**? Give an example of each!
 - a.
 - b.
 - c.
4. What molecule is important because it blocks harmful **ultraviolet rays** from the sun?
5. Describe what happens to **temperature** as you travel higher into the troposphere.
6. Describe what happens to **air pressure** as you travel higher into the troposphere.
7. In which layer of the atmosphere is the **ozone layer** found?
8. What would be the long term effect if the **ozone layer** were destroyed? *Remember what ozone blocks!*
9. Sketch a diagram of the **water cycle**. Be sure to label all the steps (evaporation, condensation, precipitation, transpiration, infiltration, and surface runoff)
10. What are **condensation nuclei**, and why are they important for cloud formation?
11. Draw a picture of **orographic lifting**. Be sure to label the **windward side** of the mountains and the **leeward side**.
12. Which is more dense, warm air or cold air?

13. Why does **warm air** rise at a front and **cold air** stays close to the ground?

14. Draw a **convection cell**. Label the **high and low pressure** arrows.

15. What is **wind**? What causes it?

16. Where on the Earth are atmospheric low pressures found? Why?

17. Describe **cumulonimbus, stratus** and **cirrus clouds**.

18. Write the **characteristics** and **full names** of the **air masses** with the correct source region below.

<i>mP</i> <i>Full name:</i> <i>Forms over:</i> <i>Characteristics:</i>
<i>mT</i> <i>Full name:</i> <i>Forms over:</i> <i>Characteristics:</i>
<i>cP</i> <i>Full name:</i> <i>Forms over:</i> <i>Characteristics:</i>
<i>cT</i> <i>Full name:</i> <i>Forms over:</i> <i>Characteristics:</i>
<i>cA</i> <i>Full name:</i> <i>Forms over:</i> <i>Characteristics:</i>

19. The _____ Effect, where winds curve to their right in the northern hemisphere and left in the southern hemisphere, occurs due to the _____ of Earth.

20. Which layer of the atmosphere is **weather** found in?

21. Which type of severe weather is measured on the Fujita Intensity Scale?

22.

	Warm Front	Cold Front	Stationary Front	Occluded Front
Forms When....				
Associated Weather				
Symbol on Weather Map				

23. Fill in the following table about the layers of the atmosphere. (Use your foldable!)

Layer of Atmosphere	Characteristics or Function	Temperature Change (hot to cold or cold to hot?)
Troposphere		
Stratosphere		
Mesosphere		
Thermosphere		
Exosphere		

24. Fill in the blanks using the following word bank:

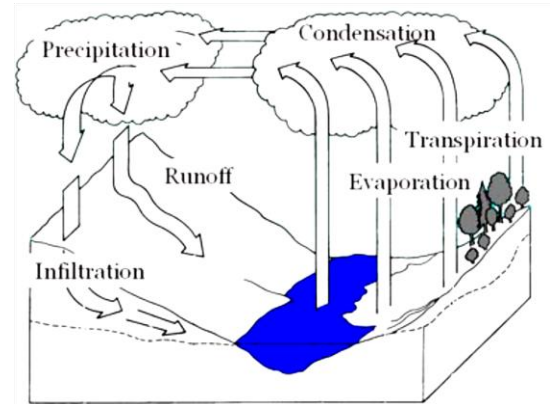
Water Vapor	Evaporation
Dew point	Latent
Temperature	Heat
Convection	Condensation
Fahrenheit	Coalesce

Heat and temperature are not the same. _____ is a measure of how rapidly or slowly molecules move. In contrast, _____ is the transfer of energy that takes place because of temperature differences. Temperature can be measured in degrees Fahrenheit, degrees Celsius, or Kelvins. The most commonly used temperature scale in the United States is _____. The atmosphere's temperature plays a role in the formation of rain. The first step in cloud formation is when liquid water on the earth's surface under goes _____ and turns into a gas. Now in the atmosphere, _____ turns from a gas back into liquid cloud droplets through _____. This process releases _____ heat. Those cloud droplets _____ together and eventually form drops big enough to fall from the sky as precipitation. The heat released goes on to fuel more _____ cells. ***Air must be saturated before condensation can occur. Saturation is the point at which the air holds as much water vapor as it possibly can. The _____ is the temperature to which air must be cooled at constant pressure to reach saturation. Until this temperature is reached, condensation cannot occur and rain cannot fall.

25. Use the diagram below to answer the following question.

Which is the process of water vapor changing to a liquid?

- a. Condensation
- b. Convection
- c. Radiation
- d. Transpiration



26. What is the main energy source behind the water cycle?

- a. Earth's internal core energy
- b. Sun's radiation
- c. Moon's gravitational attraction
- d. Radioactive decay of elements

27. What type of clouds produce thunderstorms?

- a. cirrus
- b. stratus
- c. cumulus
- d. cumulonimbus

28. Describe the formation of a thunderstorm. Fill in the blanks with the appropriate vocabulary words. No word will be used twice.

Vocabulary:

- Lift
- Coalesce
- Cool
- Moisture
- Precipitation
- Warmer
- Updrafts
- Downdrafts
- Condenses
- Latent
- Convection Cell

In order for a thunderstorm to form, there must be abundant _____ in the lower atmosphere, a mechanism to _____ the air, and the portion of the atmosphere through which the cloud grows must be _____. Air can only rise if it is _____ than the air around it. During the first stage of thunderstorm development, air rises vertically creating _____. Moisture _____ into cloud droplets, releasing _____ heat. Those cloud droplets _____ and eventually form precipitation. During the mature stage, _____ falls and cools the air around it. Cool air sinks creating _____. Updrafts and downdrafts form a _____. During the final stage, downdrafts eventually _____ the area where the warm air was fueling the storm. Updrafts stop, and the storm rains out the rest of its precipitation.

29. This table shows the Fujita Tornado Intensity Scale.

According to this table, how fast are wind speeds during the most violent Tornadoes?

How long can F0 tornadoes last?

Rank	Category	Path of Destruction	Wind Speed (mph)	Duration (time)
F0 and F1	Weak	up to 3 miles	60-115	1-10 minutes
F2 and F3	Strong	15+ miles	110-205	20 minutes or longer
F4 and F5	Violent	50+ miles	more than 200	1 hour or longer

30. The phenomena caused by the rotation of the Earth that causes winds to swirl counter clockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere is called the _____ effect.

31. Air always moves from _____ (high or low) pressure to _____ (high or low) pressure.

32. Describe the formation of a tropical cyclone (hurricane). Fill in the blanks with the appropriate vocabulary words. No word will be used twice.

Vocabulary:

Coalesce

Coriolus Effect

Trade wind cells

Condenses

Dry land

Warm

Precipitation

Convection Cell

Low

Latent Heat

Tropical cyclones form near the equator over _____ ocean water. Air is forced up due to disturbances that take place where the air from two _____ converges. Water vapor gas in the air _____ into liquid water releasing energy in the form of latent heat. Air that has been warmed by the release of latent heat rises creating _____ pressure at the ocean surface. More air moves in to fill its place. As the air rises it cools. Water droplets in the air _____ (come together). Bigger water drops fall from the sky as _____. Cool air falls back down to the warm ocean surface. This whole cycle of energy transfer through the heating and cooling of air is called a _____.

Because the Earth is spinning on its axis, the _____ causes the air of a tropical cyclone to rotate.

Condensation releases more _____, fueling the rotation of the cyclone faster and faster. The storm loses energy when it moves over either _____ or cold water because it is cut off from its fuel source of warm water.

33. What is the calm center of a hurricane called?

34. Where are the strongest winds in a hurricane located?

35. What is the most dangerous part of a hurricane?

Climate, and Climate Change Review - Chapter 14

36. Different parts of the Earth receive more or less solar radiation. Fill in the latitudes for each of the following climate zones on the Earth.

Tropics = latitudes ____ to ____°N and S

Temperate = latitudes ____ to ____°N and S

Polar = latitudes ____ to ____°N and S

37. The area of the globe that receives the most solar radiation year round is called the _____?

38. Climates are classified based on average monthly _____ and _____.

39. What is the difference between weather and climate?

40. How does Earth's orbit affect our climate? Draw a diagram.

41. Earth's tropical regions receive more of the Sun's energy than polar regions because they

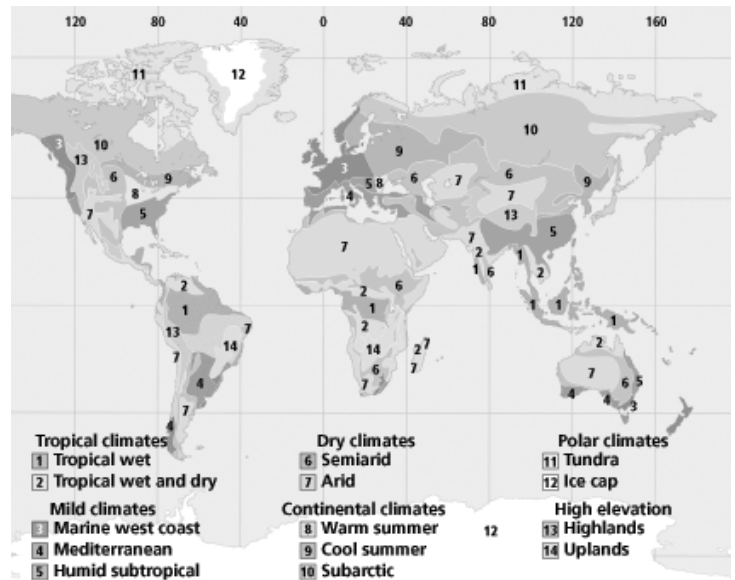
- contain a greater percentage of dry land.
- have more vegetation to absorb the Sun's energy.
- have a thinner atmosphere than the polar regions.
- receive a greater concentration of the Sun's rays.

42. According to the map, which 2 climates are found closest to the poles?

- Tropical wet and dry
- Highlands and uplands
- Semiarid and arid
- Tundra and icecap

43. According to the map, what type of a climate do we have here in North Carolina?

- Tropical wet
- Dry- Arid
- Mild – Humid Subtropical
- Continental – Cool Summer



44. How do large bodies of water affect temperature?

- they keep places warmer in the winter and cooler in the summer because water heats up and cools down more slowly than land.
- they keep places cooler in the winter and warmer in the summer because water heats up and cools down more quickly than land.
- they don't have an affect on temperature

45. What minimum length of time is used to make climate normals (temperature and precipitation) for an area?

46. Biomes are areas on Earth with similar _____, _____, and _____.

47. Match the following biomes with the climate they are found in. Draw a line linking the matching terms.

Biome:

- Tundra
- Desert
- Grassland
- Tropical Rainforest
- Deciduous Forest

Climate:

- Continental
- Tropical
- Polar
- Mild
- Dry

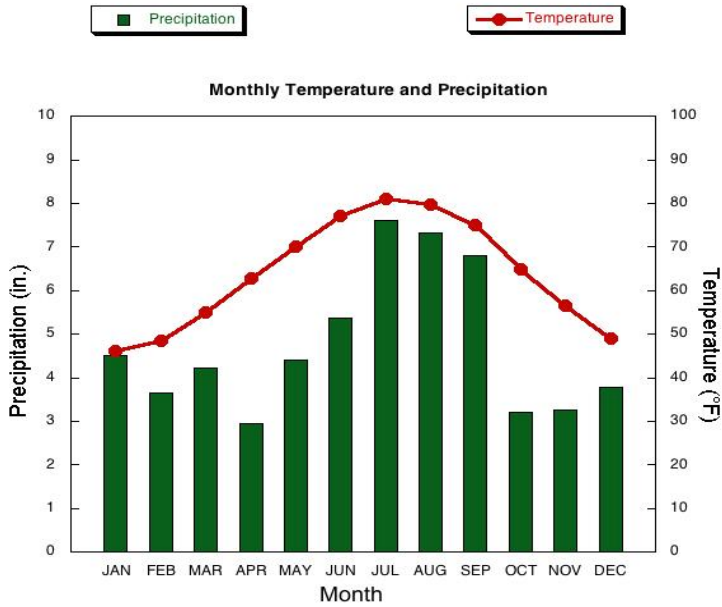
48. Throughout geologic time, the temperatures on Earth have been _____.

- only warmer than it is today.
- always cooler than it is in the present.
- a steady temperature.
- both warmer and cooler than the present.

49. There have been more than _____ ice ages on planet Earth. The most recent ice age ended _____ years ago.

50. What natural event can block solar radiation and have a short-term effect on climate?

- a. tsunami
- b. earthquake
- c. volcano
- d. global warming



51. Using the climagram to the left, which **month** has the lowest precipitation in Wilmington, NC?

52. Approximately what **temperature** °F is the warmest average shown for this location?

53. Which is the independent variable in this climagram?

54. Explain the greenhouse effect. Draw a diagram.

55. How could planting trees help reduce global warming?

56. List 3 things that you can do to reduce your impact on global warming.

- a.
- b.
- c.

58. List 4 common greenhouse gases.

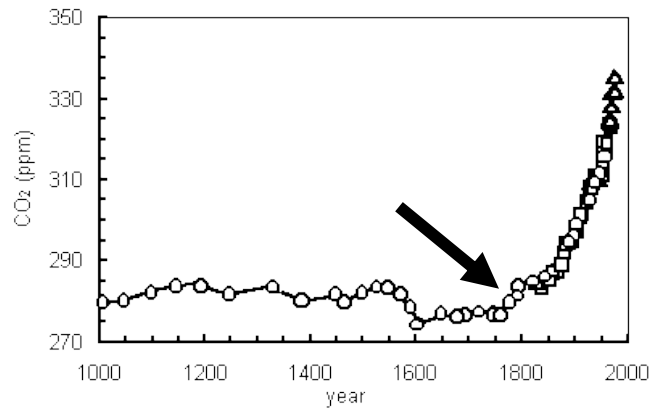
59. Which two greenhouse gases are **most** abundant in the atmosphere?

60. Describe what has happened to levels of carbon dioxide in the atmosphere over the past 200 years.

61. Describe what has happened to global average temperatures over the past 200 years.

62. Using the graph on the right, what probably caused the major increase in CO₂ in the atmosphere?

- a. too much methane from cows
- b. the industrial revolution
- c. sea-floor spreading
- d. CFCs in aerosols



63. Describe at least 3 negative impacts of climate change.

- a.
- b.
- c.

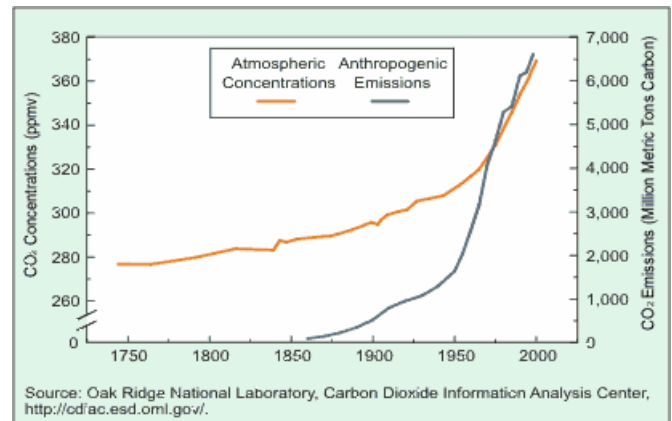
64. What country is most responsible for global climate change? Why?

65. What is the thermal expansion of water? Why should you be concerned if the water in the oceans under goes thermal expansion?

66. As the ocean water gets warmer, what do you think will happen to the intensity and frequency of hurricanes? Why? (Think about the source of energy for hurricanes).

67. Human-caused emissions of CO₂ are called **anthropogenic emissions (anthro=man) (pogenic=caused)**. Interpret the graph below to decide which statement is true about the relationship between human-caused emissions and atmospheric concentrations of CO₂.

- a. Atmospheric concentrations of CO₂ have steadily decreased as human-caused emissions have steadily increased.
- b. Before 1850, humans were releasing so much CO₂ into Earth's atmosphere that the values will not even fit on the scale of this graph.
- c. There is absolutely no correlation between human-caused emissions and atmospheric concentrations of CO₂.
- d. Since the 1960s, atmospheric concentrations of CO₂ have risen at a rate approximately equal to that of anthropogenic emissions.



True or False - If the statement is true, mark it with a T. If it is false, change the underlined word to make it true

- 68. _____ Large bodies of water heat up and cool down more slowly than land.
- 69. _____ When the Earth's orbit around the sun is more of an elliptical shape, the Earth is farther from the sun and colder.
- 70. _____ There have been at least 5 major ice ages in Earth's past.
- 71. _____ The Earth is currently in an interglacial interval.
- 72. _____ Greenhouse gases make up 10 % of the Earth's atmosphere.
- 73. _____ Scientists agree that global warming is happening but disagree about the causes or future implications.

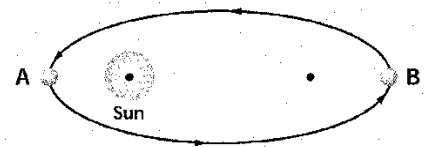
Part 4 - Astronomy Review

1. What is a geocentric model of the solar system?
2. What is a heliocentric model of the solar system?
3. What is retrograde motion, and what did it tell astronomers? Draw it.
4. Explain why there are different seasons on Earth. What does it have to do with the tilt of the Earth? Draw a diagram.
5. List the planets in order from closest to the sun to furthest from the sun.

6. Which planets are terrestrial?

7. Which planets are gas giants?

8. In the diagram, which point is at perihelion?
Which point is at aphelion?



9. Kepler's first law says that all orbits are _____ shaped.

10. What does Kepler's 2nd law say?

11. What does Kepler's 3rd law say?

12. What is fusion? How does it work in stars?

13. Define the terms **rotation** and **revolution**. Draw a diagram for each term to demonstrate your understanding.

14. What is precession? What effect does it have on Earth?

15. What is nutation? What effect does it have on Earth?



16. Identify the **type of galaxy** in the picture and give an example of the galaxy type.

17. What are the 3 types of galaxies? Rank them in order of abundance from greatest to least.

18. What do scientists think are at the center of most, if not all galaxies?

19. Earth's tilt in combination with its orbit around the Sun causes the _____.

20. The phases of the Moon cause gravitational pull on the water in the oceans and cause _____.

21. What is a neap tide? Diagram the 2 phases of the moon that correspond with a neap tide. (Show the location of the Sun, Moon, and Earth).

22. What is a spring tide? Diagram the 2 phases of the moon that correspond with a spring tide. (Show the location of the Sun, Moon, and Earth).

23. Recent observations show that the rate of expansion of the universe is _____ (speeding up or slowing down).

24. What contains 99% of the mass in the solar system and controls the motion of the planets?

25. Describe how the Doppler effect allows us to “see” the movement of distant stars.

26. What does barycenter mean? Draw a diagram to demonstrate the barycenter point between Earth and the Sun.

27. Describe the likely lifecycle of our Sun (a main sequence star) from before it was “born” until it “dies.”

28. Describe the lifecycle of a more massive star like a blue supergiant star from before it was “born” until it “dies”.

Matching

Match each item with the correct phrase below.

- | | |
|-------------------|------------------|
| a. blue shift | d. solar eclipse |
| b. vernal equinox | e. red shift |
| c. lunar eclipse | |

29. Spectrum of light seen as stars are moving farther away from the observer
30. Occurs when the Moon passes through Earth’s shadow
31. Spring day characterized by day and night of equal lengths
32. Occurs when the Moon passes directly between the Sun and Earth
33. Spectrum of light seen as stars are moving closer to the observer

Match each item with the correct statement below.

- | | |
|------------------------|-----------------------|
| a. Kepler’s first law | d. Nebula |
| b. Gravity | e. Kepler’s third law |
| c. Kepler’s second law | |

34. Statement that planetary orbits are elliptical, not circular.
35. Statement that planetary orbits speed up when closer to the gravitational pull of the sun.
36. Cloud of dust and gas that formed the Sun and planets
37. A natural phenomenon by which physical bodies attract with a force proportional to their mass.
38. Statement that planetary orbits closer to the sun move faster than those farther away from the sun.

Match each item with the correct definition below.

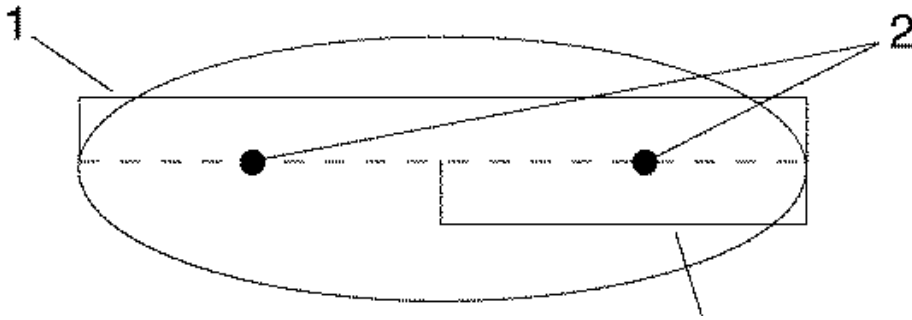
- | | |
|------------------|------------------------|
| a. black hole | d. steady-state theory |
| b. main sequence | e. big bang theory |
| c. fusion | |

39. Combining of lightweight nuclei into heavier nuclei, such as four hydrogen nuclei combining to form a helium nucleus.
40. Section of the H-R diagram into which about 90 percent of stars fall.
41. States that the Universe began as a point and has been expanding ever since.
42. Proposes that the Universe looks the same on large scales to all observers and that it has always looked that way.
43. Small, massive, dense object that has a gravity so immense that nothing—not even light—can escape it.

44. Use the terms below to label the two diagrams

- a. foci
- b. major axis
- c. perihelion
- d. aphelion
- e. Sun

Elliptical Orbit of a Planet



Orbit of Pluto

