Name: _____ Date: _____ Pd: _____

Unit 7 Formative Assessment – Severe Weather & Climate

1. Which gases are responsible for the Greenhouse Effect?

Water Vapor, Carbon Dioxide, Ozone, Methane

2. The two most important heat-absorbing gases in the lower atmosphere are ____.
   a. oxygen and nitrogen
   b. ozone and chlorofluorocarbon
   c. argon and hydrogen
   d. water vapor and carbon dioxide

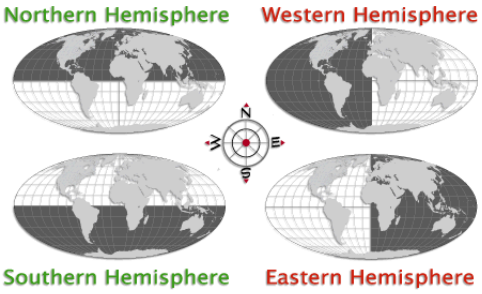
3. What is the enhanced greenhouse effect?

Warming of lower atmosphere and surface as a result of trapped greenhouse gases. Although global warming process is natural, the enhanced greenhouse effect is due to *HUMAN INTERACTION*, such as the burning of fossil fuels.

4. Circle the correct phrase that will make each statement correct:

   a. Places at higher elevations tend to be ***(warmer/colder)*** than places at lower elevations.
   b. Places near water have ***(extreme/moderate)*** climates than places farther from water.
   c. As latitude increases, the intensity of the solar energy **increases/decreases**.
   d. Where an area is near **land/water**, the temperatures are more temperate.

5. Which hemisphere has the greatest temperature variations? What **MAJOR** factors make this true?



NORTHERN HEMISPHERE **; Has more LAND mass, and therefore experiences more CONTINENTAL climate conditions**

6. Which phenomenon is associated with surface temperatures in the eastern Pacific Ocean that are warmer than average? **El Niño** OR **La Niña**

7. An arid climate is **(wet/dry).** A humid climate is **(wet/dry).**

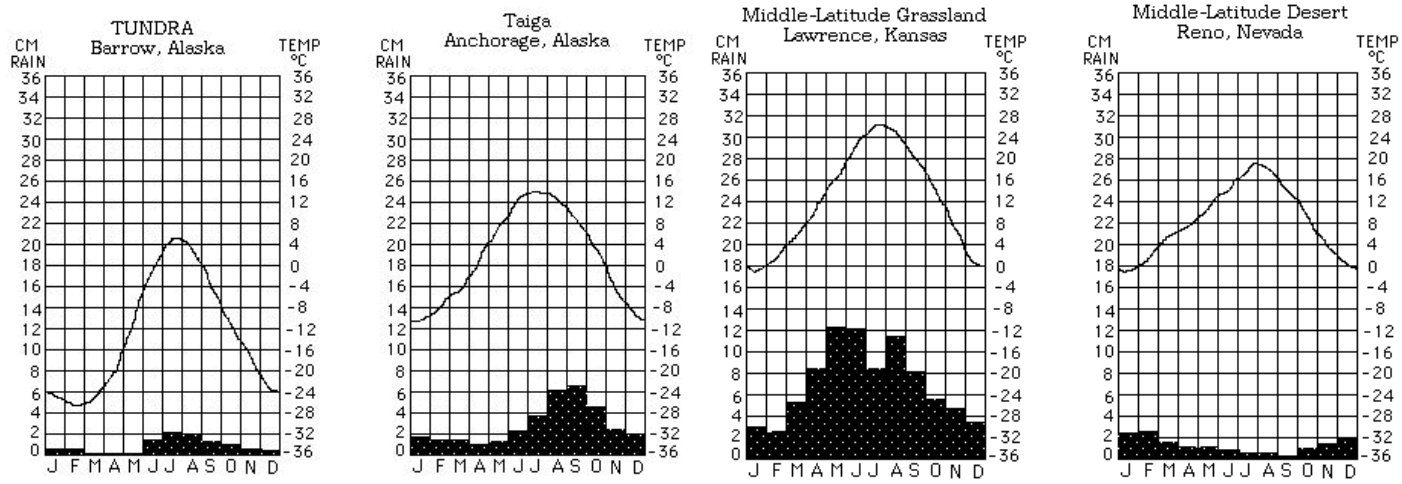
8. A significant change in carbon dioxide concentration in the atmosphere is likely caused by ___.
   a. More frequent El Niño
   b. **Increase use of fossil fuels**
   c. Polar jet stream winds
   d. Increased hydrothermal vents

9. ***CIRCLE*** all of the factors that determine Köppen climate zones: ***temperature***, *elevation,* ***LATITUDE***, ***precipitation***, *pressure,* ***vegetation***

10. What is the main source of acid deposition in the Northeast United States?
   a. Ground level ozone
   b. Nitrogen from volcanoes
   c. Methane from thawing Siberian lakes
   d. Sulfur dioxides from coal burning

11. What factors are included in an air quality index?
   Level (amount) of air pollution & potential health hazards

12. Using the climatograms below:
   a. What is the temperature ***range*** for Anchorage, Alaska? __**-10°C to 14°C**__
   b. How much rain does Barrow Alaska get in August? __**~2cm**__
   c. Which of the four cities below has the greatest ***average*** amount of rainfall?
   __**Lawrence, Kansas**_
   d. What is the temperature of Reno in January? __**-1°C**__



13. During which stage of thunderstorm development would each of the following occur:

a. Precipitation begins → _**Mature**_
b. Updrafts decrease → _**Dissipation**_
c. Cloud formation → _**Cumulus**_
d. Most intense stage → _**Mature**_
e. Updrafts and downdrafts create convection cell → _**Mature**_
f. Warm air runs out → _**Dissipation**_

14. What conditions are necessary for a tornado to form?

*** Tornadoes form when wind speed and direction change suddenly with height.**

**** Tornadoes also form around low pressure centers, and therefore require the RISING OF AIR, INWARD horizontal flow of air, and COUNTER-CLOCKWISE rotation of air flow.**

15. What factor does the Enhanced Fujita scale use to determine the intensity of a tornado?

a. Diameter of funnel
b. Wind speeds
c. Amount of damage caused
d. Duration of tornado

16. A. Where does a hurricane usually develop?

Large, rotating, low pressure storm formed over warm water

B. What factors allow it to develop in these areas?

1- Abundant supply of warm ocean water

2- Rising of warm air moisture

17. Describe the three stages of a hurricane as it develops over time.

1- <u>Tropical Depression</u>: Water disturbance at low pressure center (20-40 mph)

2- <u>Tropical Storm</u>: Rising of warm moisture continues and storm strengthens to 40-75 mph

3- <u>Category Hurricane</u>: Air pressure drops with an abundance of warm moisture with winds >75 mph

18. How does a hurricane over water differ from a hurricane that makes landfall? Explain **WHY**.

Hurricane over water is much more powerful (abundance of warm moisture) than a hurricane that makes landfall (lack of warm moisture and friction with coastline)

19. The heating of the lower layer of the atmosphere from radiation absorbed by certain heat-absorbing gases is called: **Greenhouse Effect**

20. List several weather instruments used by meteorologists **AND** briefly describe its purpose.

1- Barometer: Air Pressure

2- Thermometer: Temperature

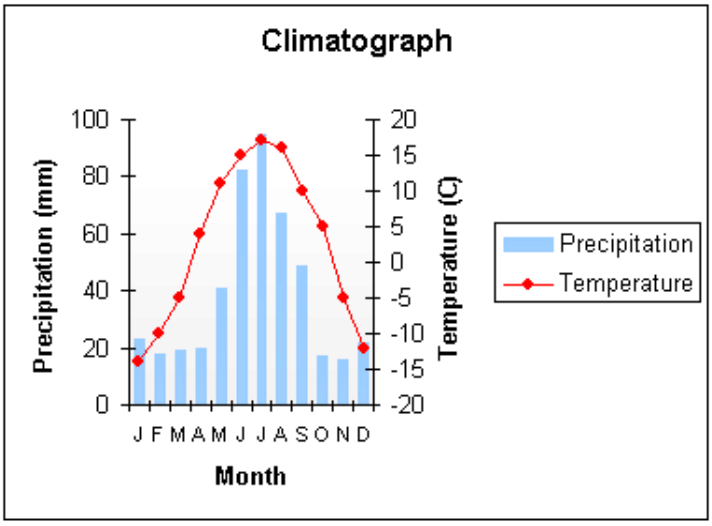
3- Hygrometer: Moisture Content

4- Psychrometer: Relative Humidity (H_2O Content vs Capacity)

5- Anemometer: Wind Speed

6- Rain Gauge: Amount of Precipitation

21. Analyze the climatogram below. Answer the questions based on the graph.



a. What is the highest temperature? In which month does it occur?

17°C ; July

b. What is the lowest temperature? In which month does it occur?

-13°C ; November

c. Describe the climate. When is it warm, cold, wet and dry?

*** Warm = J,J,A**

*** Cold = D,J,F**

*** Wet = J,J,A**

*** Dry = O,N**

22. Explain the significance of ground level ozone and its effect on human health, vegetation, and sensitive ecosystems.

Ground-level Ozone is ozone in the lower atmosphere (troposphere) where airborne particles pose the greatest pollutant threat to health. Affects infants, older adults, and patients with lung disease most. Ecosystems affected include forests, parks, wildlife refuges, and wilderness areas.

23. Why is the amount of carbon dioxide concentration increasing at such a fast rate in our atmosphere?

The amount of carbon dioxide concentration is increasing at a fast rate due to an increase in burning of fossil fuels.

24. Identify both natural and man-made causes of climate change.

*** NATURAL:**

1- Change in *latitude* (increase in latitude = decrease in intensity of solar radiation)

2- *Topography* – Large bodies of water affect coastal areas to experience more moderate climate & mountain climates are typically cooler than sea level temperatures

*** MAN-MADE:**

1- Burning of *fossil fuels* (petroleum, gasoline, natural gas)

2- Factories/industries/automobiles release *carbon dioxide*

25. Identify three (3) impacts of global warming.

1- Increase in average global temperatures

2- Rise in sea levels due to melting of polar ice caps

3- Malnutrition (lack of agriculture)

4- Increase in respiratory disease as it becomes harder to breathe

5- Tropical infectious disease due to increase in temperature

26. Create a climatogram for ***precipitation*** and ***temperature*** of the following biome below:

a. Be sure to label the climatogram with its biome name.
b. All *temperature* readings are measured on the *right side* of the climatogram.
c. All *precipitation* measurements are on the *left side* of the climatogram.
d. Be sure to draw a ***line graph for temperature*** and a ***bar graph for precipitation***.

**** Santa Monica, California: Chaparral Biome**

Month	J	F	M	A	M	J	J	A	S	O	N	D
Precipitation (cm):	8.9	7.6	7.4	1.3	1.3	0	0	0	0.3	1.5	3.5	5.8
Temperature (ºC)	11.7	11.7	12.8	14.4	15.6	17.2	18.9	18.3	18.3	16.7	14.4	12.8

NOTE: The climatogram below shows precipitation in millimeters (mm) and not centimeters (cm) and precipitation and temperature scales are switched.