HWG Unit 4 SG 2 - Climate Zones Name _____ Date _____

I. Climate Classification

A. _____ & _____ are generally chosen as the most significant & understandable features of climate when narrowing down climatic characteristics to classify.

1. Climate is a complex phenomenon to understand given its ability to _____ over time.

B. The Köppen Climate Classification System is the most widely used system in the world today.

1. It's database uses only the mean _____ & _____ values of temperature & precipitation.
   a. Four of five zones are defined by temperature; the fifth by moisture.
      (1) Each of the five zones is subdivided according to various temperature & precipitation types.
      (2) A sixth zone has been added for high-elevation climates.

C. The Köppen Letter Code System uses a descriptive name followed by a series of classifying letters

1. The letters are defined by specific temperature and/or precipitation values.
   a. The first letter designates the major _____ group.
   b. The second letter usually describes _____ patterns.
   c. The third letter (if any) describes _____ patterns.

D. _____ are simple graphic representations of _____ temperature & precipitation data gathered from a specific weather station.

1. They are the most useful tool for studying world climate classification.
   a. They display precise details of important aspects of the climate of a specific place.
   b. They can be used to_____ of that place.

II. World Distribution of Climate Types

A. Tropical Humid Climates (Group A) are the only truly _____ climates of the world.

1. Latitudinal location molds the basic character of zone A climates.
   a. They dominate the _____ regions extending to about the 20° N & S of the equator.
2. Prevalence of moisture: most locations in zone A are among the wettest places in the world
   a. Abundant sources of moisture (_____. or more/year) & mechanisms for uplift (convection).
3. There a three types of zone A climates (Af, Aw, Am):
   a. Tropical wet (Af) is a _____ climate with the same weather day after day.
      (1) Latitude is the primary determinant caused by uniform (the same) solar radiation (insolation) all year.
      (2) There is little to no temperature variation (averages about _____ all year).
   b. Tropical savanna (Aw) (averages about 80° F all year) is the most extensive of the A climates.
      (1) There is a clear-cut seasonal alternation of _____ periods.
      (2) Annual rainfall is generally less than the other two A climates
         (a) _____ are common during the dry season.
      (3) The migration of the ITCZ coincides with upper limits of the tropical savanna climate.
   c. Tropical monsoonal (Am) climate is similar to tropical wet, except for heavy rainfall (averages about _____./year) & lower temperatures that occur with the summer monsoon season (heavy cloud cover reflects some of the insolation)
   d. Collectively, tropical savanna & tropical monsoon are sometimes referred to as _____ & _____ climates.

B. Dry Climates (Group B) cover _____ than any other climatic zone; about 30% of the Earth's land surface.

1. They are caused more by a _____ rather than lack of moisture in the air.

2. Dry climates are divided into four types (BWh, BWk, BSh, BSk), with a distinction made between steppe & desert, and where they occur.
   a. The subtropical desert climate (BWh) (arid) lies either in or very near _____ of the equator (w/in the band of subtropical highs).
      (1) The Sahara & the Arabian deserts are examples.
      (2) Many of the deserts are found along the _____ of continents due to _____ off their coasts (the Atacama in S.A., the Namib in Africa)
      (3) Precipitation is _____, unreliable, but intense, local, & brief when it does occur.
      (4) They can possess astounding daily temperature variations, commonly with as much as a _____ difference between _____ in the spring & fall.
   b. The mid-latitude desert climate (BWk) (arid) occurs deep in the _____ of continents.
      (1) Precipitation is similar to subtropical deserts, except their is seasonality
      (2) Temperature is very different from subtropical deserts in that they have _____ _____ winters.
   c. The subtropical steppe climate (BSh) (semi-arid) typically _____ subtropical deserts & has similar temperature & precipitation patterns, just not as extreme.
      (1) Rainfall is somewhat greater & more reliable.
      (2) Temperatures are more _____, not as extreme.
   d. The mid-latitude steppe climate (BSk) (semi-arid) occupies a _____ zone between mid-latitude deserts & humid climates.
      (1) There is more precipitation & less temperature extremes than neighboring deserts.

C. Mild Mid-Latitude Climates comprise Group C & occupy a region generally from the equatorward margin of the middle latitudes & extending into the subtropics; also extending poleward along western coastal areas.
1. They are known for having long & usually _____ & short, relatively mild winters.
2. They do not have a year-round growing season.
3. Precipitation is highly _____ across the subdivisions.
4. Subdivisions of the C climates are determined primarily on _____ seasonality & secondarily on summer temperatures.
   a. The Mediterranean climate zones (Csa, Csb) are found mainly on the _____ sides of continents.
      (1) Influenced why _____ winds; almost all precipitation comes from west moving _____ storms.
      (2) Coastal areas have much milder summers than inland areas due to the _____.
   b. The humid subtropical climates (Cfa, Cwa, Cwb) are generally found on the _____ _____ of continents (this is Georgia's climate zone).
      (1) They extend across more latitudes than the Mediterranean climates.
      (2) Summer temperatures are warm to hot & summers possess _____ levels of _____.
      (3) Winter temperatures are _____, but can have episodes of severely cold weather brought by west moving _____.
   c. Marine west coast climates (Cfb, Cfc) occur about 40° to 60° in latitude and on the _____ (windward) side of continents.
      (1) It extends to the east coast in some Southern Hemisphere areas (example: South America).

(2) Temperatures are _____ with few extremes due to the moderating of the _____.

(3) It is among the _____ of the mid-latitude climates.

(4) Lowland areas rarely get snow, by higher altitudes can receive some of the _____ _____ in the world along their _____-facing slopes.

(5) Rainfall probability and reliability is _____; the intensity low.

D. The severe mid-latitude climates only occur in the _____ Hemisphere between about 40º & 70º N. There is little landmass at these latitudes in the Southern Hemisphere.

1. _____ generates extremes between summer & winter temperatures due to the _____ of the moderating effects of water.
2. There are _____ distinct seasons.
3. Moderate precipitation with good soil moisture.
4. Divided into two subtypes: humid continental & subarctic.
   a. Humid continental climates (Dfa, Dfb, Dwa, Dwb) are generally found between 35º & 60º.
      (1) There are four subtypes based on latitude.
      (2) Variability in weather is the main characteristic both _____.
         (i) Cold fronts, warm fronts, heat waves, blizzards, thunderstorms, tornados, etc…
      (3) _____ prevailing winds cause frequent weather changes especially in the winter.
      (4) Summers are as warm as humid subtropical, but _____.
   b. The subarctic climates (Dfc, Dfd, Dwc, Dwd) occupy _____ mid-latitudes generally between 50º & 70º.
      (1) They create two vast _____ expanses: Alaska to Greenland & from Scandinavia to the easternmost part of Siberia in Russia.
      (2) "_____" means northern and is used in Canada (think: aurora borealis).
      (3) "_____" is the term used in Eurasia, named after the forests.
      (4) _____, dark, bitterly cold winters, the dominant season.
      (5) Mild summers very _____.
      (6) _____ annual temperature ranges in the world
      (7) Very little precipitation.

E. Polar climates comprise Group E. No month has an average temperature above 50º F.

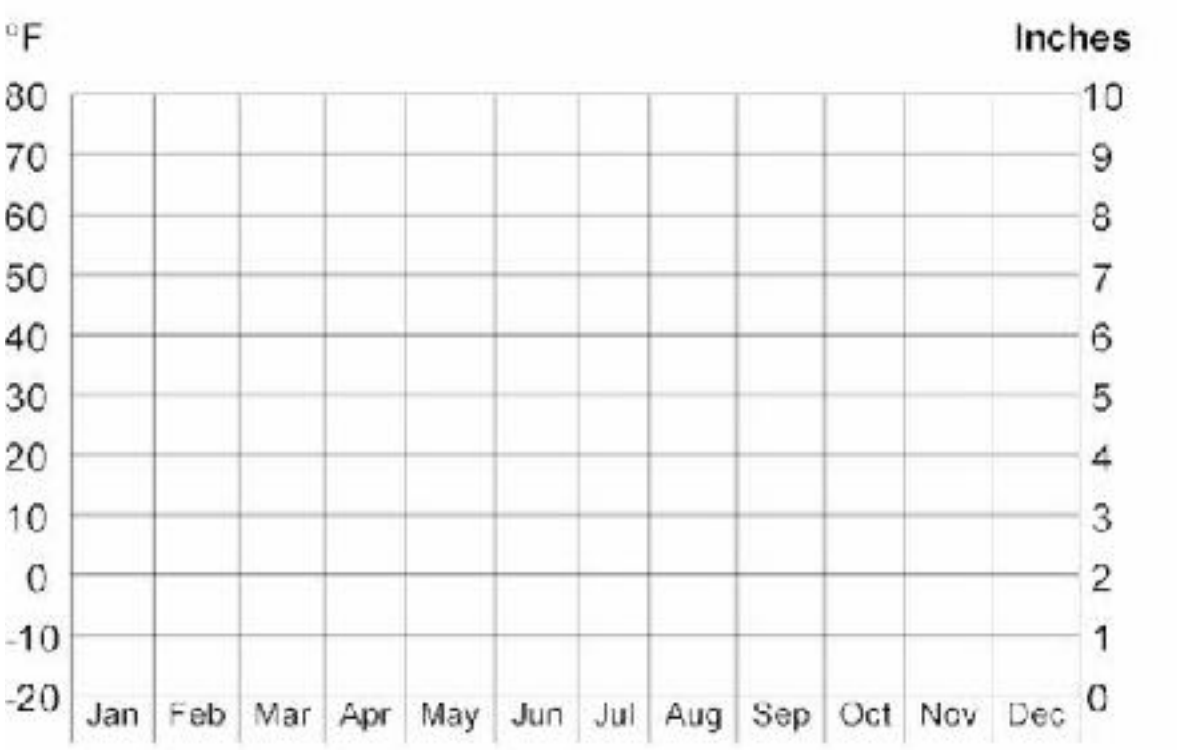
1. _____ annual temperatures in the world.
2. Extraordinarily _____ (polar deserts), but humid due to low evaporation.
3. Two subtypes (ET, EF) tundra and polar ice cap.
   a. The tundra climate (ET) has grasses but _____ due to the ground being permanently frozen starting just a few inches from the surface (_____).
      (1) Freezing temps can occur at any time.
         (a) Only _____ months have average temps above freezing.
   b. The ice cap climate (EF) occurs in _____ and most of _____.
      (1) All monthly temperature averages are _____.
      (2) Permanently covered with ice and snow.
      (3) Strong winds are prevalent.

F. The highland climate (Group H) is determined by _____ not latitude.

1. Very complex local climate variations in small areas at different altitudes.

2. Climate controls are _____ & angle of _____ to the Sun and winds.
   a. Latitude is less important, altitude is more.
   b. Leads to patterns of _____ especially in tropical highlands.
   c. Highlands have a _____ and _____ side of exposure.
      (1) Heavier precipitation and winds on the _____ side. Rapid cloud development due to _____.
      (2) Dry on the _____ side (_____ deserts)
   d. Daily temperature changes can be very high.

Climograph Practice



Average Temperature, Burlington VT

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
°C	-7.4	-7.1	-1.4	5.9	13.0	18.3	21.0	19.7	15.3	9.0	2.4	-4.7	7.0
°F	18.7	19.2	29.5	42.6	55.4	64.9	69.8	67.5	59.5	48.2	36.3	23.5	44.6

Average Rainfall, Burlington VT

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
mm	57.2	44.7	72.4	74.9	73.7	87.0	100.3	124.4	100.1	100.3	89.0	52.8	977.7
Inches	2.3	1.8	2.9	2.9	2.9	3.4	3.9	4.9	3.9	3.9	3.5	2.1	38.5