INSTRUCTOR _____ *PERIOD* ____ *NAME* _____

PARTNER _____

TOPIC VIII: Moisture and Environmental Change

LAB : CLIMATE PATTERNS

INTRODUCTION: How do weather and climate differ? Weather conditions relate to the here and now. The weather at any particular location may change suddenly.

Climatology is concerned with long-term patterns of weather. Climate is a composite of weather factors that affect an area over many years. Climates do change. Fossil evidence shows present day climate patterns vary from those in the past and will continue to change in the future.

This exercise is based on an imaginary continent on an imaginary planet which is similar to Earth. Using your knowledge of weather and water budgets you will identify the different climate zones.

OBJECTIVE: In this lab you will learn to identify different climate zones based on the ratio between precipitation (P) and potential evapotranspiration (E_p), and the effects of latitude, planetary winds, elevation, mountain ranges, and large bodies of water on climate. You will use these factors to determine the climate patterns of a region.

VOCABULARY:

climate:

climate ratio:

climograph:

arid:

humid:

desert:

windward:

leeward:

planetary wind belts:

PROCEDURE A:

This is to be completed on the large diagram of an Imaginary Earth-like planet. Assume that this planet is identical to the earth in all respects except for the placement of its oceans, land masses and other surface features.

1. At the far right, label areas of high (H) or low (L) pressure to correspond with the latitudes.
2. LIGHTLY sketch arrows (from your diagram of global winds) to show the prevailing planetary winds.

   NOTE: Draw 4 arrows in each of the six sections between the marked lines of latitude. Place 1 arrow on each coast (in the ocean) and 2 on the continent.

skip 3. Draw and label circles that show any source regions of the air masses that affect the climate of the imaginary continent.

4. Using blue pencil, draw arrows to show the ocean currents that affect the coas·s of the continent. Label whether they are warm or cold. Refer to the diagram of World Ocean Currents that follows.
5. The climate ratio is the ratio of precipitation to potential evapotranspiration:

$$\text{CLIMATE RATIO} = P/E_p$$

The climate ratios are shown by the various numbers on the map. On the map color the areas according to the climate designations shown below.

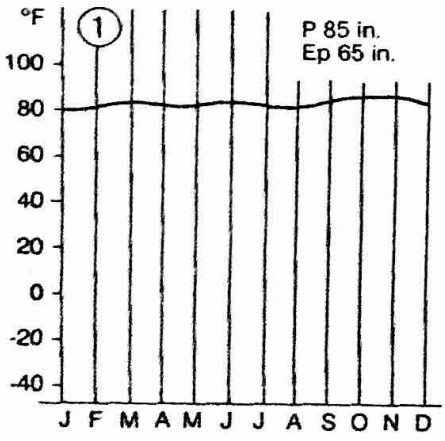
P/E_p	CLIMATE TYPE	COLOR
less than 0.4	Arid	brown
0.4-0.8	Semiarid	orange
0.8-1.2	Subhumid	yellow
greater than 1.2	Humid	green

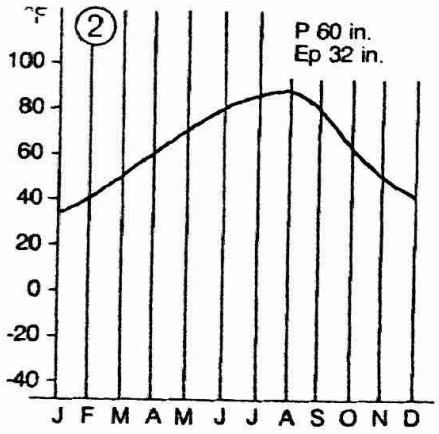
PROCEDURE B:

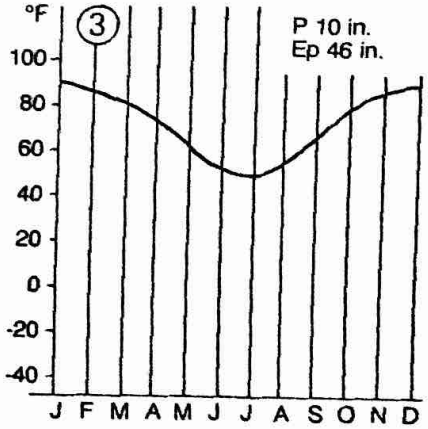
1. Using the 6 climographs provided compute the P/E_p ratio for each location.

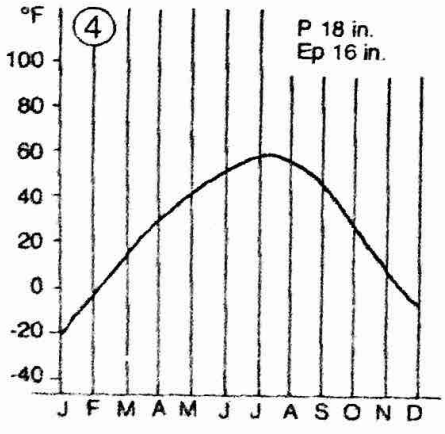
2. Find one area on the map that best fits each climograph and write in the number of the climograph at the location.

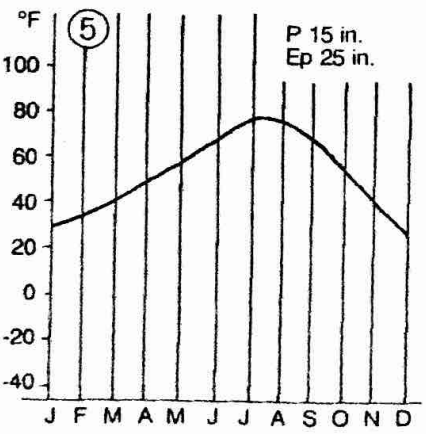
CLIMOGRAPHS

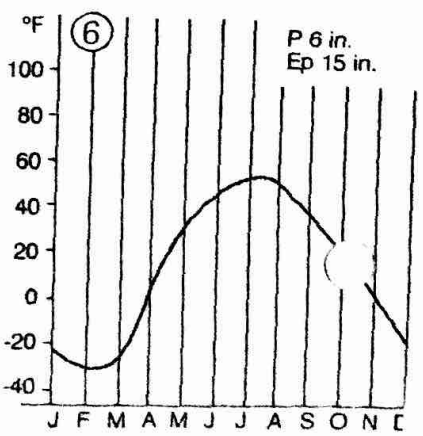




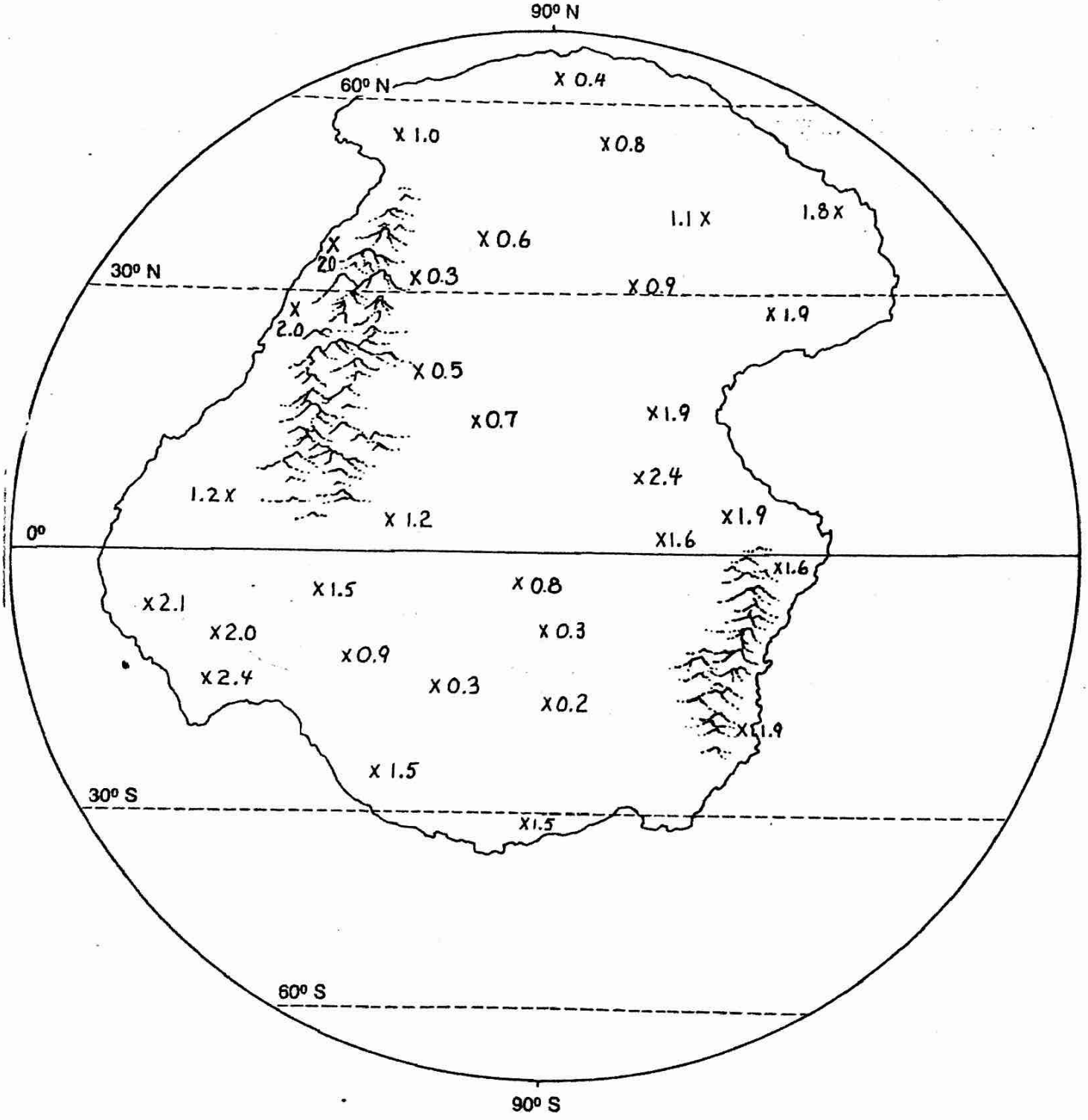








IMAGINARY EARTH-LIKE PLANET



Numbers on the continent indicate P/E_p climate ratios at selected locations.

DISCUSSION QUESTIONS: *(Answer in Complete Sentences)*

1. How can you use the calculation of the climate ratio (P/E_p) to determine a climate type?

2. As latitude increases, what general changes occur in climate patterns?

3. As elevation increases, what general changes occur in climate patterns?

4. What effect does a large body of water have on the climate of a nearby landmass?

5. How does a range of mountains affect the climate of a region?

6. How do planetary wind belts affect the climate of a landmass in the mid-latitudes?

7. How do the monthly temperatures on a climograph allow you to determine whether an area is in the northern or southern hemisphere?

8. What differences would you expect to find in two climographs representing coastal and inland locations at the same latitude?

9. Describe the difference in climates that you would expect to find if an earth-like planet had a 35° tilt of its axis instead of the 23½° tilt of earth.

CONCLUSION: What factors must you consider in order to predict the climate of an earth-like planet in space?