Student Handout
Climatograms: Abiotic Factors in the Biome

Background Information

What is the difference between a prairie and other biomes? Why do prairies occur where they occur? In this activity you will compare the climate on the prairie with climates from other biomes in the United States to determine what makes a prairie a prairie.

Procedure

To do this, you will plot a climatogram. This is a graph that shows the climate of a region. It contains two kinds of data – average monthly precipitation and average monthly temperature. Since there are two types of data, you will be making two separate graphs on the same piece of graph paper. This is called a double-y graph because there are two Y-axes. The axis on the left is labeled for temperature. Make a line graph showing the temperature data using the left Y-axis. The axis on the right is for precipitation. You will make a bar graph showing precipitation using the right Y-axis.

Step 1. Plot the data below on the graph templates provided. Use the axes as explained in the paragraph above.

Month	Temperature (C)	Precipitation (centimeters)
January	-13.3	1.4
February	-10.5	1.1
March	-3.5	1.8
April	6	2.9
May	12.4	4.7
June	17.5	7.7
July	21	5.2
August	19.9	3.8
September	13.7	2.9
October	7	2
November	-2.5	1.4
December	-9.5	1.4

Table 1: Average Monthly Temperature and Precipitation for Williston North Dakota, 100 miles north of Theodore Roosevelt National Park. North Dakota climate data from: http://www.soilsci.ndsu.nodak.edu/Enz/enz/almanacs/WillMorpt.PDF

Month	Temperature (C)	Precipitation (cm)
January	3.5	8.5
February	4.6	8.4
March	8.9	9.5
April	14.4	7.9
May	19.2	9.1
June	23.4	9.6
July	25	11.7
August	24.4	10.8
September	21.1	9.3
October	14.7	7.6
November	9.0	6.8
December	4.4	8.4

Table 2: Average Monthly temperature and precipitation for a temperate broadleaf deciduous forest, Greensboro, NC.

Month	Temperature (C)	Precipitation (cm)
January	-1	2.5
February	2	3
March	7	1.8
April	8	1
May	12	1
June	15	.8
July	20	.5
August	18	.5
September	15	.4
October	10	.6
November	5	1.8
December	1	2.2

Table 3: Average monthly temperature and precipitation for a mid-latitude desert, Reno Nevada.

Graph 1: Prairie

Temp (C)	J	F	M	A	M	J	J	A	S	O	N	D	Precip (cm)
30													23
28													22
26													21
24													20
22													19
20													18
18													17
16													16
14													15
12													14
10													13
8													12
6													11
4													10
2													9
0													8
-2													7
-4													6
-6													5
-8													4
-10													3
-12													2
-14													1
-16													0

Graph 2: Temperate Broadleaf Deciduous Forest

Temp (C)	J	F	M	A	M	J	J	A	S	O	N	D	Precip (cm)
30													23
28													22
26													21
24													20
22													19
20													18
18													17
16													16
14													15
12													14
10													13
8													12
6													11
4													10
2													9
0													8
-2													7
-4													6
-6													5
-8													4
-10													3
-12													2
-14													1
-16													0

Graph 3: Desert

Temp (C)	J	F	M	A	M	J	J	A	S	O	N	D	Precip (cm)
30													23
28													22
26													21
24													20
22													19
20													18
18													17
16													16
14													15
12													14
10													13
8													12
6													11
4													10
2													9
0													8
-2													7
-4													6
-6													5
-8													4
-10													3
-12													2
-14													1
-16													0

Step 2. Answer the following analysis questions:

1. Describe the difference in temperature and precipitation:
    - between a prairie and a temperate forest.
    - Between a prairie and a temperate desert:
2. Why aren't prairies located in the Southest or Southwest?
3. What will happen to the amount of prairie ecosystem if global warming and increased precipitation occur in that area?
4. What will happen to the amount of prairie ecosystem if we enter another ice age?
5. Think of typical organisms for each of these biomes. Write down at least two examples for each:

    Prairie Desert Temperate Forest
6. Now that you know about the climatic conditions in each environment, how have these organisms adapted for survival in their unique biome?