Teaching Activity: Factors that Affect Climate

Introduction: Climate is determined by the temperature and precipitation characteristics of a region over time. The temperature characteristics of a region are influenced by natural factors such as latitude, elevation and the presence of ocean currents. The precipitation characteristics of a region are influenced by factors such as proximity to mountain ranges and prevailing winds. These, too, are natural factors that influence precipitation.

The temperature and precipitation characteristics of a region remain relatively unchanged for thousands of years. Changes in climate are very gradual. Various years throughout history may be noted for being particularly hot, cold, wet, or dry, but when many years are considered, these wild fluctuations in climate combine with many relatively "normal" years to develop a picture of the average climate characteristics of a region over time.

Objectives:

- To identify the factors that affect the climate of a region;
- To identify and analyze the effects that various factors have on the climate of a hypothetical region of the globe;

Important Terms: Climate, latitude, windward, leeward, elevation, precipitation, prevailing winds;

Materials: Student Activity Sheet " Factors That Influence Climate", world atlas, pencil/pen;

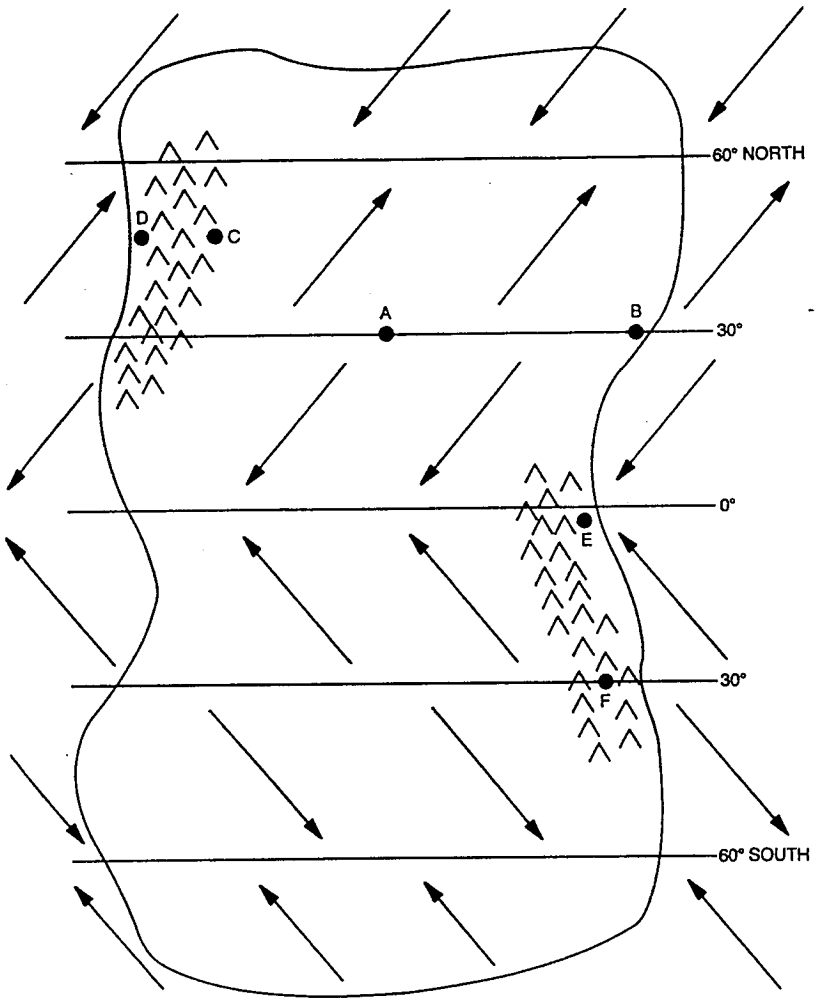
Procedure:

1. Review the table entitled "Factors that Influence Climate" with the class.
    - Go over vocabulary.
    - Present several hypothetical situation in which various climate factors are at work. Challenge students to predict the type of climate that would be found in each location.
        - **Situation A:** A certain region is located near the equator close to a major ocean. The prevailing winds in this area originate far inland. What type of climate would you expect to find in this area?
        - **Situation B:** A region is located on the leeward side of a mountain near the equator. What type of climate would you expect to find in this area?
        - **Situation C:** A region is on the windward side of a mountain at a latitude that is closer to the North Pole than to the equator. What kind of climate do you think this region would have?

2. Have students use their atlases to find cities in similar locations on the globe.

3. Instruct students to use the table of factors that influence climates to answer the questions referring to the diagram in their packet.
   - The diagram represents an imaginary continent on the Earth that is surrounded by water.
   - The arrows indicate the direction of the prevailing winds.
   - Two large mountain ranges are also indicated.
   - Points A ,B and E are at sea level. C and D are in the foothills of the mountains; F is high in the mountains.

Diagram of Imaginary Continent on Earth



Student Activity Sheet #1: Factors that Influence Climates

Factors that Influence Climates

- Those that affect:
  Temperature
  Factor Influence

1. **Latitude** – As latitude increases, the average yearly temperature decreases.
2. **Nearness to centers of large landmasses**- Locations near the center of a large landmass tend to have wide ranges in temperatures, both between day and night and seasonally.
3. **Nearness to large bodies of Water**- Large bodies of water have a moderating effect on the temperatures of coastal areas, producing low ranges in temperature, both between day and night and seasonally.
4. **Location relative to large mountain ranges**- Windward sides are cooled, while leeward sides are warmed.
5. **Elevation**- As elevation increases, the average yearly temperature decreases.
6. **Ocean Currents**- Ocean currents tend to warm temperatures of eastern coastal areas and cool temperatures of western coastal areas.

Those that affect:
Precipitation
Factor Influence

1. **Latitude**- Belts of low pressure at 0* and 60* N and S latitudes produce heavy precipitation. Belts of high pressure centered at 30* N and S produce dry climates, even deserts.
2. **Nearness to centers of large landmasses**- Locations near the center of a large landmass tend to have dry climates.
3. **Nearness to large bodies of water**- Areas near large bodies of water tend to have higher than average precipitation, especially in areas on the leeward side of the water.
4. **Location relative to large mountain ranges**- Windward sides of mountains tend to receive higher than average precipitation; leeward side tend to receive lower than average precipitation.
5. **Prevailing wind direction**- Wind Direction determines the windward and leeward sides of both mountain ranges and large bodies of water.

Student Activity Sheet #2: Factors That Affect Climate

Introduction: Climate is determined by the temperature and precipitation characteristics of a region over time. The temperature characteristics of a region are influenced by natural factors such as latitude, elevation, and the presence of ocean currents. The precipitation characteristics of a region are influenced by factors such as proximity to mountain ranges and prevailing winds. These too, are natural factors that influence precipitation.

The temperatures and precipitation of a region remain relatively unchanged for thousands of years. Changes in climate are very gradual. Various years throughout history may be noted for being particularly hot, cold, wet or dry, but when many years are considered, these wild fluctuations in climate combine with many relatively "normal" years to develop a picture of the average climate characteristics of a region over time.

Objectives:

- To identify the factors that affect the climate of a region;
- To identify and analyze the effects that various factors have on the climate of a hypothetical region of the globe;

Procedure:

1. Use the table of factors that influence climates above and an atlas to answer the questions in the **Analysis and Comprehension** section which refer to the diagram.
   - The diagram represents an imaginary continent on the Earth surrounded by water.
   - The arrows indicate the direction of the prevailing winds.
   - Two large mountain ranges are also indicated.
   - Points A, B and E are located at sea level; points C and D are in the foothills of the mountains.; point F is high in the mountains.

Analysis and Comprehension:

1. What is the direction of the wind in the region above and below 60* N and S latitudes? _____
   between 60* and 30* N and S latitude? _____
   between 30* N and S latitudes and the equator? _____

2. What could be the reason for the change in wind directions? _____
   _____
   _____

3. Give the locations of the 2 mountain ranges. _____
   _____

6. Which city probably has the same type of weather year round? Why?_____

_____

_____

a. Use an atlas to find a real city in a similar location on the globe.
What is that city? _____

7. What factor would cause location F to have a colder yearly climate than any other location?_____

_____

a. Use an atlas to find a real city in a similar location on the globe.
What is that city? _____

8.. What 3 factors would cause location E to have the greatest annual rainfall?

_____

_____

a. Use an atlas to find a real city in a similar location on the globe.
What is the name of that city? _____

9. Which location, C or D, would you expect to have the greater annual rainfall?
Why? _____

_____

_____

a. Use the atlas to locate two cities in similar locations on the globe. What are the two cities? _____

10. Which location, A or B, would you expect to have the greater range in temperature during the year? _____ Explain your answer.

_____

_____

_____

a. Use the atlas to find two cities in similar locations on the globe.
What are those cities? _____

11. Location A is in the center of a large desert. What factor could account for its low annual precipitation? _____

_____

a. Use the atlas to find a city in a similar location on the globe.
What is that city? _____

12. What 3 factors would cause the climate in location D to be cooler than at location B? _____

_____

a. Use the atlas to find a city in a similar same location on the globe.
What is that city? _____

Diagram of Imaginary Continent on Earth