

13-1 What is climate?

Objectives

Explain how weather and climate are related. Identify the factors that determine climate.

Key Terms

weather: day-to-day conditions of the atmosphere
climate (KLY-muh): average weather conditions of an area over many years

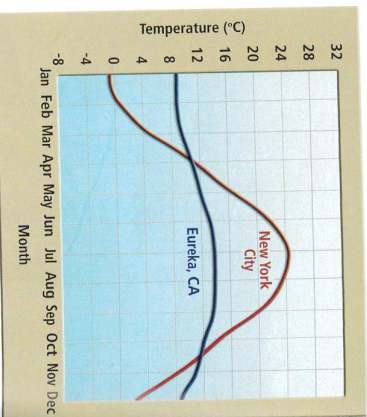
Weather and Climate Air temperature, the appearance of the sky, winds, and the amount of moisture in the air all are part of weather. **Weather** is the day-to-day conditions of the atmosphere. The average weather conditions of an area from year to year is its **climate**. Climate describes the weather patterns of an area over time.

1 DEFINE: What is climate?

Average Temperatures Average monthly and yearly temperatures can be used to describe climate. The monthly average is found by adding together the daily average temperature for each day in the month and dividing by the number of days in the month. The yearly average temperature is a total of the twelve monthly averages divided by twelve.

2 DESCRIBE: How do you find daily average temperature?

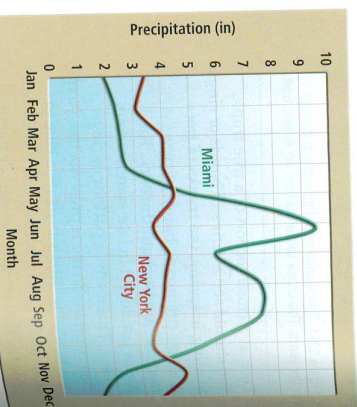
Temperature Range How much the temperature changes during the year is also important in describing climate. This is temperature range. To find the temperature range, subtract the lowest monthly average temperature from the highest. In Eureka, California, for example, the average monthly temperature for July is 14°C. In January it is 9°C. In New York City, the average monthly temperature goes from 25°C in July to about -6°C in January. New York City has a greater temperature range than Eureka does. The temperature range for Eureka is 5°C. New York City has a temperature range of 31°C. Eureka and New York City have different climates partly because they have different temperature ranges.



▲ Figure 13-2 Average monthly temperatures for New York City and Eureka, California

3 INFER: Does New York City or Eureka have a colder climate?

Average Precipitation Average monthly precipitation is also used to describe climate. Precipitation is rain, snow, sleet, or hail. Average monthly precipitation is the average amount of water from rain, snow, sleet, or hail that falls in an area in a month. It is measured in centimeters or inches.



▲ Figure 13-3 Average monthly precipitation for New York City and Miami, Florida, over a thirty-year period.

However, average precipitation is not enough to describe climate. Both Miami, Florida, and New York City get moderate amounts of precipitation yearly. However, Figure 13-3 shows that in New York City, precipitation falls steadily throughout the year. New York City gets rain, snow, sleet, and hail. In Miami, the most rain falls during a rainy season. The rainy season is May through October. Miami usually does not get snow or sleet. New York City and Miami have very different climates.

4 INFER: Which has a colder climate, Miami or New York City? Explain.

CHECKING CONCEPTS

- The condition of the atmosphere today is the _____.
- The _____ of an area describes the average weather conditions from year to year.
- Temperature _____ describes the yearly change in temperature.
- Rain and snow are two different kinds of _____.

THINKING CRITICALLY

- CALCULATE** a. The high temperature in Chicago was 12°C. The low was 8°C. What was the temperature range that day? b. The high temperature in Houston was 25°C. The low was 21°C. What was the average temperature in Houston that day?
- INFER:** What two factors have the greatest effect on climate?

BUILDING SCIENCE SKILLS

Comparing and Contrasting In warm, dry climates, people usually wear loose-fitting, light-colored, lightweight clothing. In cooler climates, they wear snug-fitting clothing and dark colors. Find out about the kinds of clothing that are appropriate to each kind of climate. What fabrics are best? How do the clothing styles of different cultures relate to their climates? Write a brief report on the relationship between clothing and climate.



How Do They Know That?

THE LOST COLONY OF GREENLAND

In A.D. 985, during a warm period, Erik the Red led an expedition to Greenland from Iceland. As a result, two small Norse settlements were established on the western coast. By the early twelfth century, there were about 5,000 people living there. They had cattle, sheep, and goats. There was plenty of wildlife. The colonists received supplies from Iceland and Scandinavia regularly.

Later that century, the weather in Greenland cooled sharply. This cooling of temperature was ahead of any climate change in Europe. The following century was even colder. These changes caused more frequent storms. More pack ice grew around the island. Visitors from Icelanders decreased. By the late 1400s, both settlements had died out completely. One possible cause was malnutrition. This is the only recorded example of an established European society being completely wiped out.

Thinking Critically How did the change in climate cause the settlements to disappear?



▲ Figure 13-4 Traces of the lost settlements of Greenland are still found there today.