Lesson

48 Making and Reading Weather Maps

4.9.a, 4.10.a, 4.10.b

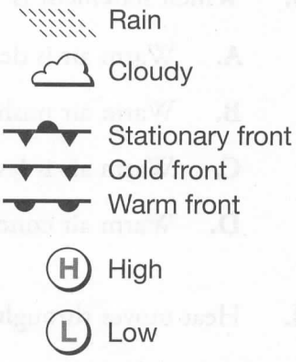
Getting the Idea

Key Words
weather map
low-pressure area
high-pressure area
air mass
front
warm front
cold front
stationary front
occluded front

What kind of information helps you decide what to wear in the morning? Look at any major newspaper or local news broadcast, and you are likely to find a map of your area. These maps are helpful tools used to display present and upcoming weather conditions in a format that is easy to read and understand. The best way to understand these maps is to learn what aspects of the weather are being studied.

Weather Map Features

Scientists use tools such as computers and maps to analyze and display weather data and prepare forecasts about upcoming weather. A map that summarizes what is happening in the atmosphere at a certain time is called a **weather map**. Data collected at weather stations all over the country are compiled into weather maps. The first step in understanding a weather map is to look at a map key, such as the one below.

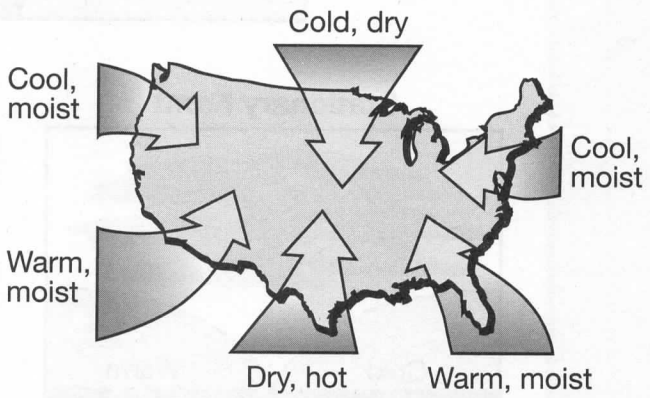


A key is a list of all the symbols used on a map. A map symbol is a picture that stands for a feature of Earth or a condition of the atmosphere. The symbols used on different weather maps can vary slightly. The atmospheric conditions you are likely to see represented on a weather map include areas of high and low air pressure, cloud cover, types of precipitation, temperature, and fronts.

Notice in the key shown on page 268 that the letter H stands for an area of high air pressure and the letter L stands for an area of low air pressure. A **low-pressure area** is an area where the air is slowly rising. This means that clouds often form in areas of low pressure. Air masses tend to move toward areas of low pressure. If an area of low pressure is hanging over your town, the weather is probably cloudy and maybe rainy, too. A **high-pressure area** is an area where the air is slowly sinking. Clouds do not usually form when air is sinking, so having a high-pressure system overhead usually means good, clear weather. The air mass in a high-pressure area tends to be pushed out toward areas of low pressure.

Air Masses

An **air mass** is a large body of air that has the same properties throughout. How warm, cool, wet, or dry the air mass is depends on the specific type of land or sea over which it passes. For example, an air mass that forms in the tropics is warmer than an air mass that develops at higher latitudes. In the United States, six different types of air masses affect our weather.

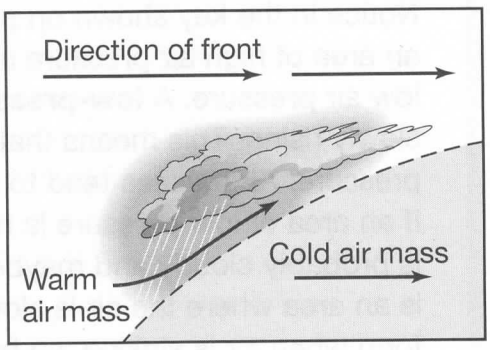


Six major air masses affect weather in the United States

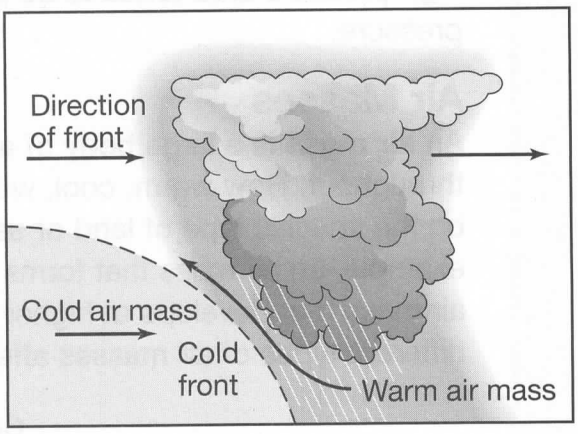
Fronts

The boundary between two types of air masses is called a **front**. Fronts include both cold and warm air masses. High-pressure systems move into low-pressure systems at fronts. Most changes in weather occur at one of four types of fronts: warm, cold, occluded, or stationary, as illustrated below.

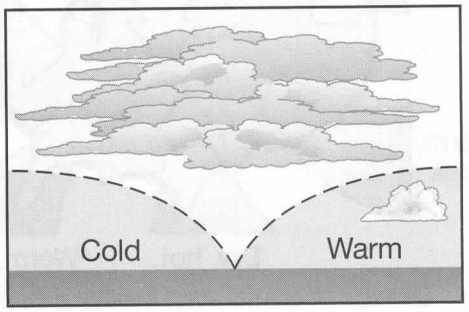
Warm Front



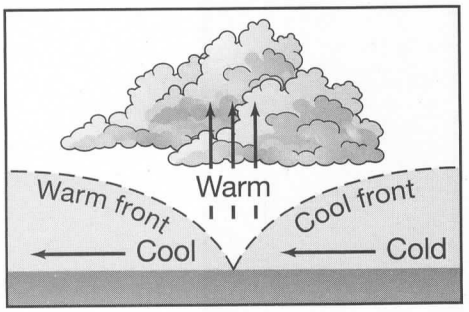
Cold Front



Stationary Front



Occluded Front



A **warm front** forms when a warm, moist air mass slides up and over a cold air mass. Since moist air is rising in a warm front, clouds are usually produced. Warm fronts generally bring a light drizzle or rain and are followed by clear and warm weather.

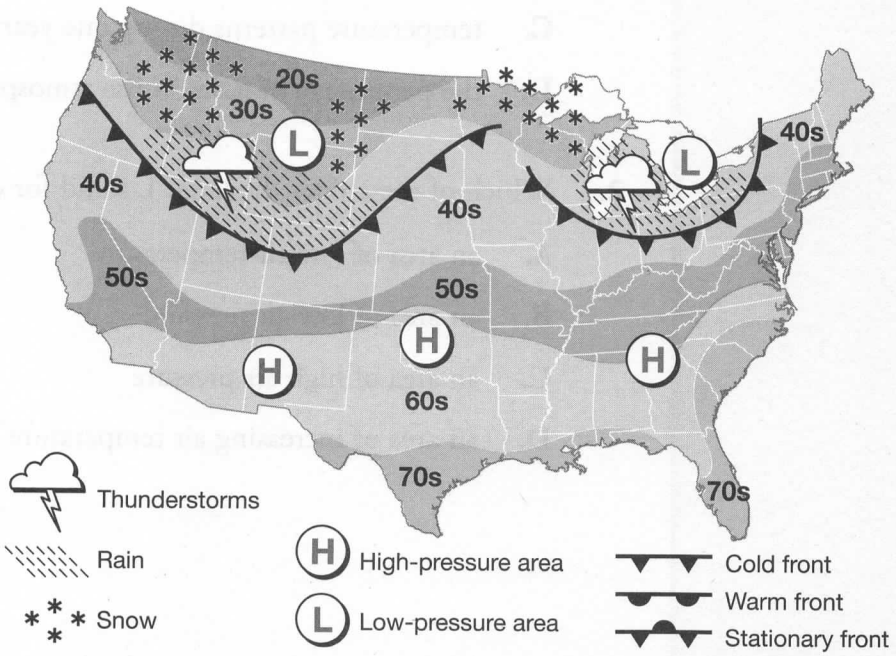
A **cold front** occurs as a cold air mass pushes under a warm air mass, forcing the warm air to rise sharply. Because the air rises so quickly, tall cumulonimbus clouds are often created. As a result, heavy rains, thunderstorms, and snow are associated with cold fronts. After a cold front passes, the weather is usually cold and clear.

A **stationary front** is the result of warm air meeting cool air when the air masses do not have enough force to lift the warm air mass over the cold air mass. A stationary front brings light winds and wet weather, sometimes lasting for several days.

An **occluded front** forms when a warm air mass is caught between two colder air masses. The warm air is forced to rise off the ground. Strong winds and cooler temperatures bring large amounts of rain or snow.

Reading Weather Maps

An example of a weather map covering the continental United States is shown below.



Test Tips . . .

Cover the answer choices before you read a multiple-choice question. Read the question and try to answer it in your own words. Then read all the choices. Choose the one that is closest to your answer.

Look at the key to the map on page 271. Notice that each type of front has a different symbol. The triangles or half circles of the symbols point in the direction in which the front is moving. In the United States, large weather systems move generally from west to east. The numbers on the map refer to temperatures that can be expected in these areas. The maps often use bands of color or shading to show areas that will have the same temperature ranges.

According to this map, there are three high-pressure air masses over different parts of the United States. What kind of weather is the map showing for Colorado?

DISCUSSION QUESTION

Why do you think the list of symbols used on a weather map is called a key?

LESSON REVIEW

1. Which of these does a normal weather map feature?

   A. atmospheric conditions at a certain time

   B. land features found at certain places

   C. temperature patterns during one year

   D. the percentage of gases in the atmosphere

2. Which of these does the letter L stand for on a weather map?

   A. an area of low air temperature

   B. an area of low air pressure

   C. an area of high air pressure

   D. an area of increasing air temperature

3. Which of these is the boundary between two air masses?

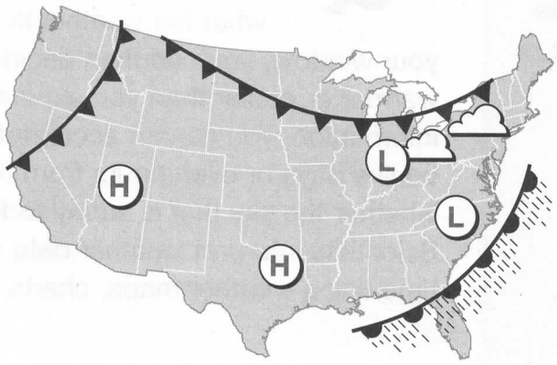
   A. a low-pressure area

   B. a high-pressure area

   C. a front

   D. a key

Use the weather map below to answer question 4.



4. Which of the following can be seen on this weather map?

   A. high pressure over the East Coast

   B. a cold front moving from the West Coast toward the east

   C. a stationary front in the north

   D. a warm front moving down from Canada