Figure 2 *Cold air masses that form over the North Atlantic Ocean can bring severe weather, such as blizzards, in the winter.*

Cold Air Masses

Most of the cold winter weather in the United States is influenced by three polar air masses. A continental polar (cP) air mass forms over northern Canada, which brings extremely cold winter weather to the United States. In the summer, a cP air mass generally brings cool, dry weather.

air mass a large body of air where temperature and moisture content are constant throughout

A maritime polar (mP) air mass that forms over the North Pacific Ocean is cool and very wet. This air mass brings rain and snow to the Pacific Coast in the winter and cool, foggy weather in the summer.

A maritime polar air mass that forms over the North Atlantic Ocean brings cool, cloudy weather and precipitation to New England in the winter, as shown in **Figure 2.** In the summer, the air mass brings cool weather and fog.

Warm Air Masses

Four warm air masses influence the weather in the United States. A maritime tropical (mT) air mass that develops over warm areas in the Pacific Ocean is milder than the maritime polar air mass that forms over the Pacific Ocean.

Other maritime tropical air masses develop over the warm waters of the Gulf of Mexico and the Atlantic Ocean. These air masses move north across the East Coast and into the Midwest. In the summer, they bring hot and humid weather, hurricanes, and thunderstorms, as shown in **Figure 3.** In the winter, they bring mild, often cloudy weather.

A continental tropical (cT) air mass forms over the deserts of northern Mexico and the southwestern United States. This air mass moves northward and brings clear, dry, and hot weather in the summer.

Reading Check **What type of air mass contributes to the hot and humid summer weather in the midwestern United States?** (*See the Appendix for answers to Reading Checks.*)

Figure 3 *Warm air masses that develop over the Gulf of Mexico bring thunderstorms in the summer.*

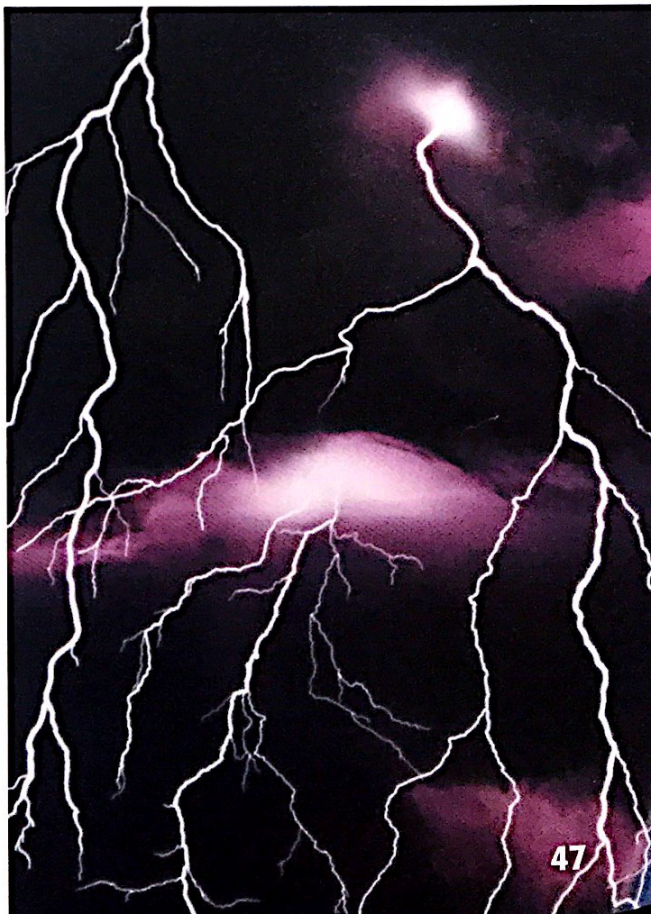
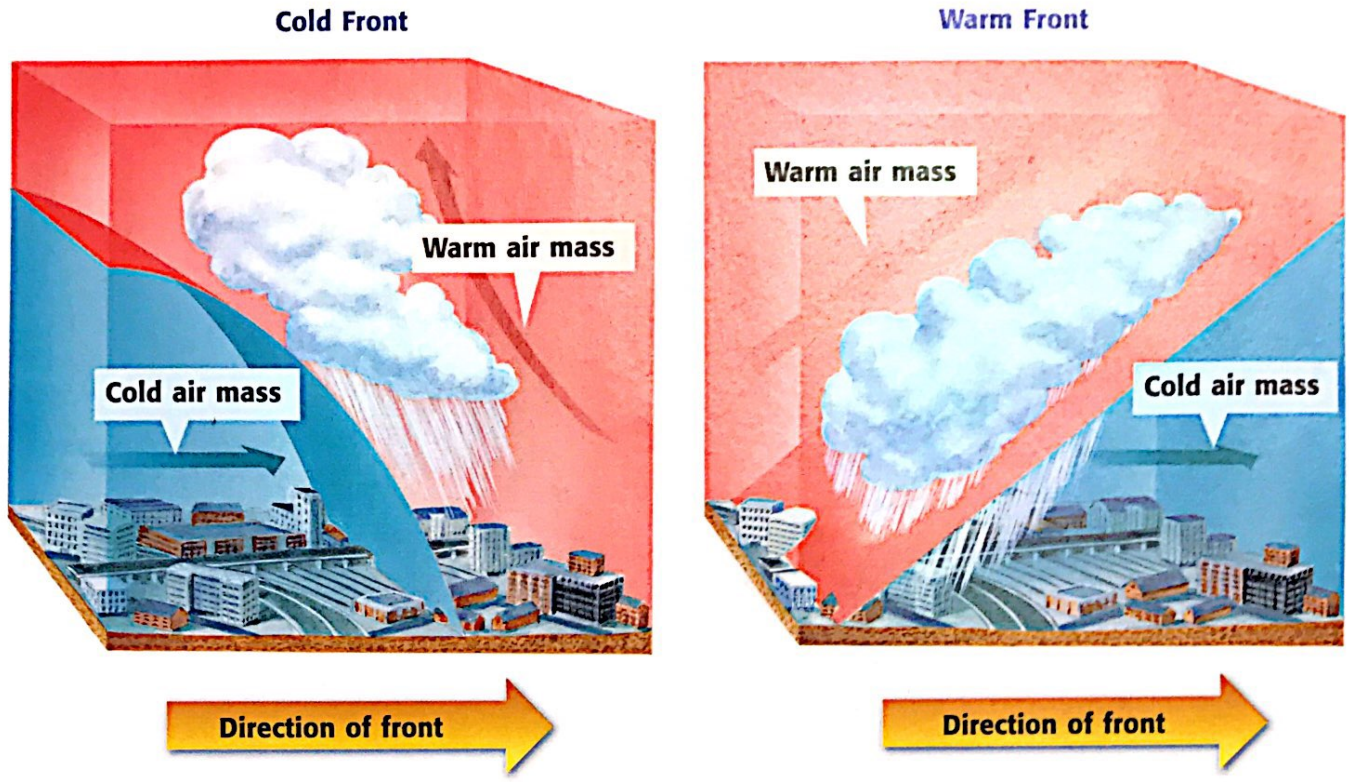


Figure 4 Fronts That Affect Weather in North America



Fronts

front the boundary between air masses of different densities and usually different temperatures

Air masses that form from different areas often do not mix. The reason is that the air masses have different densities. For example, warm air is less dense than cold air. So, when two types of air masses meet, warm air generally rises. The area in which two types of air masses meet is called a **front.** The four kinds of fronts—cold fronts, warm fronts, occluded fronts, and stationary fronts—are shown in **Figure 4.** Fronts are associated with weather in the middle latitudes.

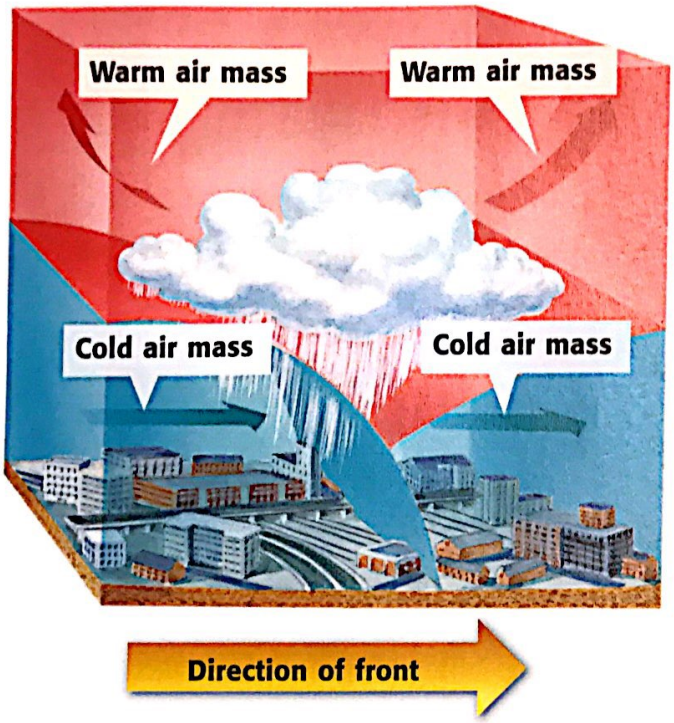
Cold Front

A cold front forms where cold air moves under warm air, which is less dense, and pushes the warm air up. Cold fronts can move quickly and bring thunderstorms, heavy rain, or snow. Cooler weather usually follows a cold front because the air mass behind the cold front is cooler and drier than the air mass that it is replacing.

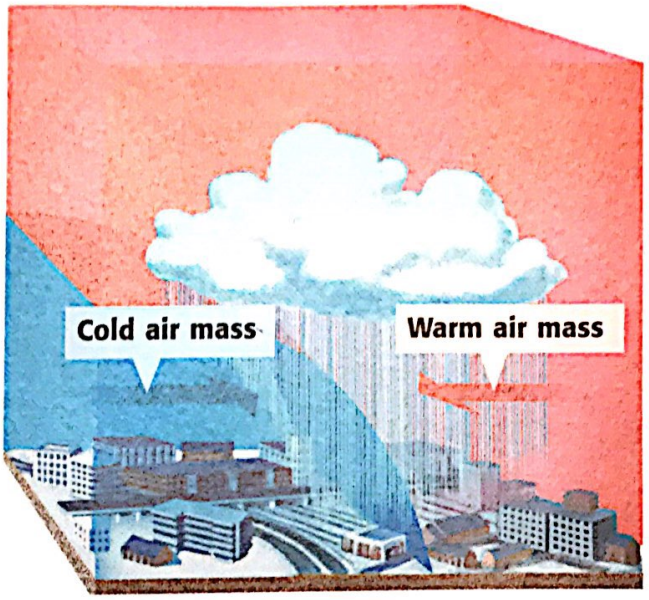
Warm Front

A warm front forms where warm air moves over cold, denser air. In a warm front, the warm air gradually replaces the cold air. Warm fronts generally bring drizzly rain and are followed by clear and warm weather.

Occluded Front



Stationary Front



Occluded Front

An occluded front forms when a warm air mass is caught between two colder air masses. The coldest air mass moves under and pushes up the warm air mass. The coldest air mass then moves forward until it meets a cold air mass that is warmer and less dense. The colder of these two air masses moves under and pushes up the warmer air mass. Sometimes, though, the two colder air masses mix. An occluded front has cool temperatures and large amounts of rain and snow.

Reading Check **What type of weather would you expect an occluded front to produce?**

Stationary Front

A stationary front forms when a cold air mass meets a warm air mass. In this case, however, both air masses do not have enough force to lift the warm air mass over the cold air mass. So, the two air masses remain separated. This may happen because there is not enough wind to keep the air masses pushing against each other. A stationary front often brings many days of cloudy, wet weather.

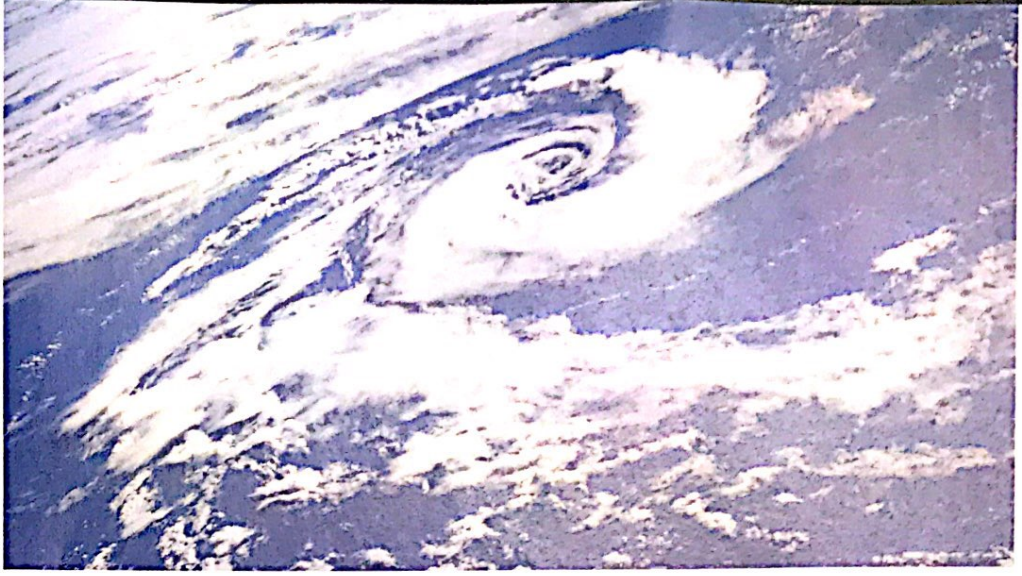


Figure 5 *This satellite image shows a cyclone system forming.*

Air Pressure and Weather

You may have heard a weather reporter on TV or radio talking about areas of low pressure and high pressure. These areas of different pressure affect the weather.

Cyclones

cyclone an area in the atmosphere that has lower pressure than the surrounding areas and has winds that spiral toward the center

Areas that have lower pressure than the surrounding areas do are called **cyclones.** Cyclones are areas where air masses come together, or converge, and rise. **Figure 5** shows a satellite image of the formation of a cyclone system.

Anticyclones

anticyclone the rotation of air around a high-pressure center in the direction opposite to Earth's rotation

Areas that have high pressure are called **anticyclones.** Anticyclones are areas where air moves apart, or diverges, and sinks. The sinking air is denser than the surrounding air, and the pressure is higher. Cooler, denser air moves out of the center of these high-pressure areas toward areas of lower pressure. **Figure 6** shows how wind can spiral out of an anticyclone and into a cyclone.

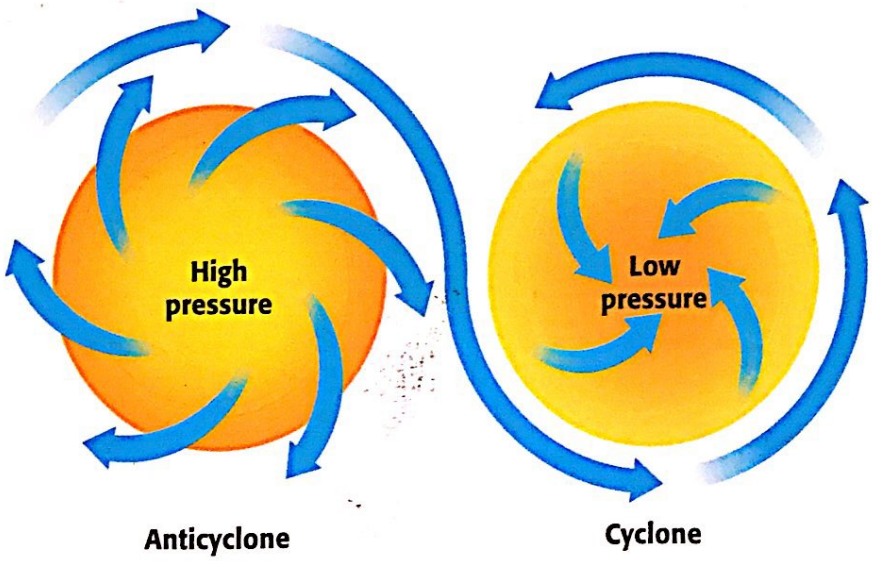


Figure 6 *As the colder, denser air spirals out of the anticyclone, it moves towards areas of low pressure, which sometimes forms a cyclone.*