

Unit 10: Weather Fronts

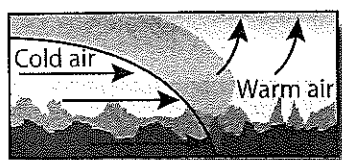
Student Information

When the sun pumps lots of heat into Earth's atmosphere, it creates air masses with many different temperatures and humidities. As these air masses bump and jostle each other, they create weather. Meteorologists define air masses by where they form. **Maritime air masses** assemble over oceans. **Continental air masses** build over land.

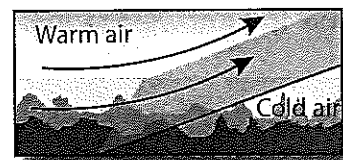
North America contends with four types of air masses:

1. **Maritime tropical** air masses form over the ocean near the equator and can bring hot, humid summers or stormy winters if they bang into cold, northerly air heading south.
2. **Maritime polar** air masses form over the Pacific Ocean and the North Atlantic. They carry cool, moist air.
3. **Continental tropical** air masses occur in the summer and form over Mexico. They bring hot air to the southwestern states.
4. **Continental polar** air masses form over northern Canada and may cause the mercury in thermometers in northern states to nose-dive.

Points of contact between air masses are called **fronts**. Fronts are found along leading edges of air masses. The temperature and pressure of the advancing air mass dictates the name of the front. For example, if a cold air mass overtakes a warm air mass, a **cold front** forms. Typically, cold, dense air plows under warm, moist air, causing it to rise rapidly. Such a front is likely to yield a sudden, heavy rain shower as the warm, moist air is quickly cooled when it rises. Conversely, if a warm air mass overtakes a cold air mass, a **warm front** is created. The less dense, warm air tends to slide over the heavy, dense cooled air. Stratus clouds often occur with longer periods of steady rainfall. A **stationary front** occurs when air masses tend to remain in place for a period of time. When two cold air masses collide and push a warm air mass up between them, an **occluded front** forms. Weather is hard to predict in this type of front. Identifying and tracking fronts is an important skill in accurately predicting the weather.



A cold front usually moves from northwest to southeast.



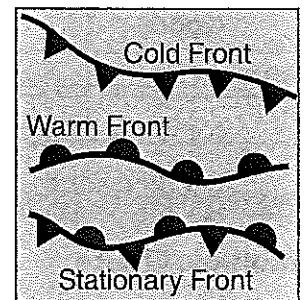
A warm front usually moves from southwest to northeast.

Fronts are where active weather occurs. Most weather systems move from either the west-southwest to east-northeast or from west-northwest to east-southeast. At times, weather patterns will be stable and yield little or no significant changes. If the differences in the air masses are great,

storms are spawned. Strong cold fronts moving quickly into warm, moist air often result in strong storms and yield a variety of severe weather conditions.

- **Rainstorms** and **snowstorms** result from the collision of different fronts. Nimbostratus clouds form when a warm front moves in and rises over cold air, often resulting in heavy rain or snow. A **blizzard** results when wind speeds exceed 56 km/h and the temperature is less than -7°C.
- **Thunderstorms** form when a cold front moves in and meets a warm front. High, cumulonimbus clouds produce thunder, lightning, and sudden air movements called **wind shears**, which are dangerous for planes.
- Spinning air masses called **cyclones** form when cool air swoops in to replace rising warm air in a region of low pressure. **Anticyclones** form in high-pressure areas with cold, dry air that spirals out in a direction opposite to cyclones, usually bringing clear, dry, and fair weather.
- Cyclones called **hurricanes** form powerful storms over tropical oceans. Similar storms that form over the western Pacific Ocean are called **typhoons**. The centers, or eyes, of such storms are calm, while around them air hurtles by at up to 480 km/h.
- Whirling funnel clouds over land called **tornadoes** form in low cumulonimbus clouds. **Water spouts** form over water. Both types of storms may cause great damage with winds that spin up to 480 km/h for tornadoes and 95 km/h for water spouts.

One way meteorologists identify air masses is to chart relative temperatures. Points with the same temperature are connected with a line on the weather map. These lines of equal temperatures are called **isotherms**. After their weather data has been collected, meteorologists are able to plot and interpret this information to make a skilled weather forecast. Meteorologists use symbols to represent fronts on a weather map. The direction that the spurs (points) or bubbles are pointing on the front indicates the direction in which the front is moving.



WEATHER MAP KEY

	stationary front		cloudy
	warm front		sunny
	cold front		showers
L	low pressure		rain
H	high pressure		

Alternating clear and shaded bands show areas of common temperature

Name: _____ Date: _____

Quick Check

Matching

- | | |
|---------------------------------|---|
| _____ 1. fronts | a. hurricanes |
| _____ 2. continental air masses | b. usually move from northwest to southeast |
| _____ 3. cyclones | c. points of contact between air masses |
| _____ 4. cold fronts | d. assemble over oceans |
| _____ 5. maritime air masses | e. build over land |

Fill in the Blanks

6. A _____ occurs when air masses tend to remain in place for a period of time.
7. _____ air masses form over the Pacific Ocean and the North Atlantic.
8. If a cold air mass overtakes a warm air mass, a _____ forms.
9. Whirling funnel clouds over land called _____ form in low cumulonimbus clouds.
10. _____ air masses form over the ocean near the equator and can bring hot, humid summers or stormy winters if they bang into cold, northerly air heading south.

Multiple Choice

11. Hurricanes that form over the western Pacific Ocean are called _____.

a. wind shears	b. tornadoes
c. typhoons	d. water spouts

12. This type of air mass forms over northern Canada.

a. continental polar	b. continental tropical
c. maritime polar	d. maritime tropical

13. This storm results when wind speeds exceed 56 km/h and the temperature is less than -7°C.

a. typhoon	b. cyclone
c. blizzard	d. hurricane