

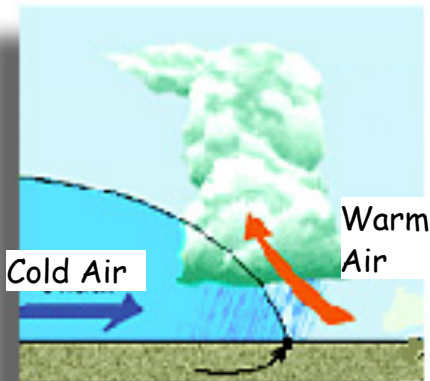
Weather Wize

Local weather conditions are controlled by the movements of large bodies of air called air masses. These large bodies of air are named for the region over which they originate and have certain properties of temperature and moisture that characterize that type of air mass. For example, air masses that are moist have maritime in their name, and if dry, continental. Those that are cold have polar in their name, and if warm have tropical in their name.

1. What characteristics would a continental tropical air mass have? _____ & _____
2. What characteristics would a maritime polar air mass have? _____ & _____
3. What type of air mass forms over land? (maritime / continental)

When two air masses with different properties meet they do not easily mix. Instead, the boundary where they meet becomes a front that will affect local weather conditions. There are four types of weather fronts: cold fronts, warm fronts, stationary fronts, and occluded fronts.

A **cold front** forms when a cold air mass meets and pushes under a warm air mass. Violent storms are often associated with cold fronts which are then followed by fair cool weather.



A cold front is pictured on a map with the symbol below.



4. Why do you think precipitation is associated with a front? Think about what might happen to the warm, moist air as it is pushed upward by the cold air mass.

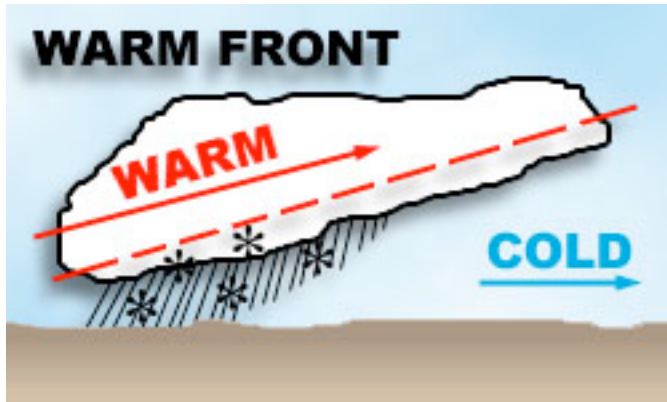
How does the temperature change? _____

What happens to moisture in the air? _____

5. Locate a cold front on the weather map and label it with a **C**.

A **warm front** forms when a warm air mass is replacing a cold air mass. The mass of warm air over takes the colder air and moves over it as shown below. Warm fronts usually bring rain showers followed by hot, humid weather.

A warm front is pictured on a map with the symbol below.



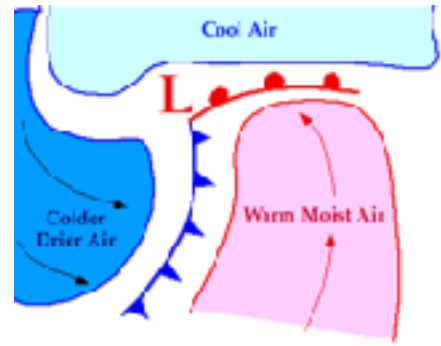
6. Locate a warm front on the weather map and label it with a W.
7. When a warm front occurs the (warm / cold) air is moving faster.
8. The precipitation that comes with a warm front is the result of (warm rising air / cool sinking air)

A **high pressure** system is a body of cool, falling air. As the air falls it warms and spreads out giving rise to winds that rotate in a clockwise direction. Since warm air can hold more moisture than cold air, any moisture in found in the cold air mass remains held in the air. As a result the air in a high pressure system is usually dry and there is little or no precipitation associated with a high pressure system. High pressure systems bring bright, sunny weather.



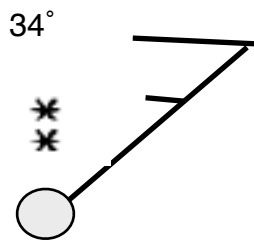
9. As the air with a high pressure system sinks it (cools / warms) allowing it to hold (more / less) moisture.
10. Temperatures to the (East / West) of a high pressure system would be warm.

A low pressure system is a body of warm, rising air. Low pressure systems are associated with stormy weather because as the air rises it cools and the water vapor it contains condenses into clouds and precipitation. As the air in the system rises, cooler surrounding air moves in to replace it. The winds resulting from a low pressure rotate in a counter clockwise direction.



11. The warm air rising in a low pressure system is moving due to (conduction / convection).
12. If you were standing to the east of a low pressure system the wind at your location would be from your (south / west).

When air pressure is different in two areas it causes air to begin to flow from higher pressure to lower pressure, resulting in wind. Wind speed and direction also plays a part in determining local weather. Wind conditions for an area are represented with this symbol:



The wind direction is found by moving toward the weather station shown as a circle; in this case, NE. Wind speed is indicated by the flags or "barbs" on the line. In this symbol the lines represent 15 mph. Each full line represents 10 mph. Along with this symbol are other weather conditions such as temperature (34°) and precipitation (snow). Cloud cover is shown by the percentage of the circle that is filled in.

13. Give the wind speed and direction, cloud cover and temp. for Dubois Idaho.

14. Give the wind speed and direction, cloud cover and temperature for Cincinnati, Ohio.

15. What are the conditions on the right of the cold front?
Wind Direction _____ Temperature _____
16. What are the conditions on the left of the cold front?
Wind Direction _____ Temperature _____
17. How might the differences in conditions help meteorologists create weather maps?

Local weather conditions can be predicted by observing the location and movement of high and low pressure systems and the fronts that are associated with them. Both cold and warm fronts bring a predictable sequence of weather changes.

Use the weather map to look at conditions on each side of the front to make a choice for each numbered box.

Weather Conditions with a Cold Front

Weather Condition	As the Front Approaches	Contact with the Front	After the Front Passes
Temperature	warm	sudden cooling	1 (warm / cool)
Winds	2 (NW / SW	Variable and gusty	West to Northwest
Precipitation	Increasing	Heavy rain, snow, or hail.	3 increasing or decreasing
Clouds	4 (Increasing or decreasing)	Thunder clouds	Decreasing
Atmospheric Pressure	decreasing	Leveling off then increasing	5 (Increasing or decreasing)

Weather Conditions with a Warm Front

Weather Condition	As the Front Approaches	Contact with the Front	After the Front Passes
Temperature	Constant	Sudden warming	6. (Increasing or decreasing)
Winds	South to Southeast	Variable	7. (NW / SW)
Precipitation	8. (Light showers / no precipitation)	Decreasing precipitation	Decreasing precipitation
Clouds	Layered storm clouds	Layered storm clouds	9. (Increasing / Decreasing)
Atmospheric Pressure	10. (Increasing / Decreasing)	Leveling off	Slight rise followed by a decrease