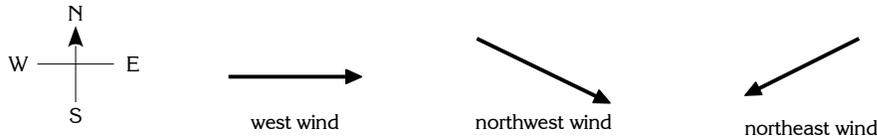


# Reading Weather Maps

*Objective: To gain a deeper understanding of what you see on weather maps!!*

For the rest of your life, you'll probably look at weather forecasts or weather maps more often than you do anything else that is directly related to science. Wouldn't it be nice to really understand what you're looking at?

NOTE: When meteorologists talk about the direction of winds, they always state the direction that a wind is coming FROM. For example, a northwest (or "northwesterly") wind comes from the northwest and moves toward the southeast. Some examples:



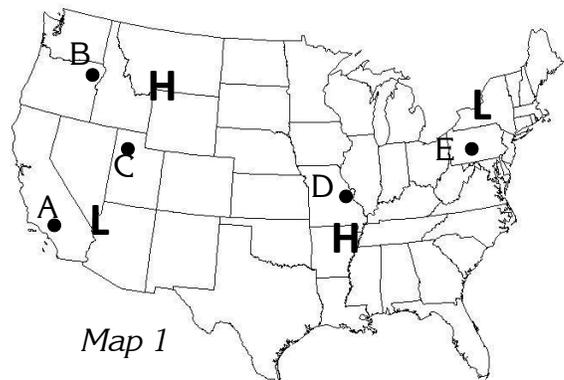
## ***Highs and Lows***

In a High pressure system, shown by an "H" on a weather map, air from high altitudes is sinking toward the ground. This air is compressed and heated as it sinks, so any clouds in the air tend to evaporate and disappear. Highs have clear skies. Due to the Coriolis Effect, winds flowing away from a High also turn clockwise.

In a Low pressure system, shown by an "L", converging winds are lifted up to high altitudes. Lifted air expands and cools, forming clouds and often precipitation. Lows have cloudy skies. Due to the Coriolis Effect, winds flowing toward a Low also turn counterclockwise.

Both Highs and Lows gradually move across the country as the prevailing west-to-east winds carry them along. Pressure systems sometimes stay put over one region for a few days at a time, but typically they move anywhere from 30-50 mph. A fast-moving system can cross about half of the country in 24 hours.

1) On Map 1, to the right, from what direction will the wind blow at the following locations? (You might want to draw some circular arrows in around the H's and L's to help you visualize this.)



- A)
- B)
- C)
- D)
- E)

- 2) Refer back to Map 1. Would you expect rain at location D today? Why or why not?
  
- 3) Would you expect rain at location D tomorrow? Why or why not?
  
- 4) Suppose it's been a nice day in Columbus, with a clear sky and gentle winds from the north. Is a High or a Low responsible for this? Where is this pressure system relative to Columbus? Draw the "H" or "L" in on the map.

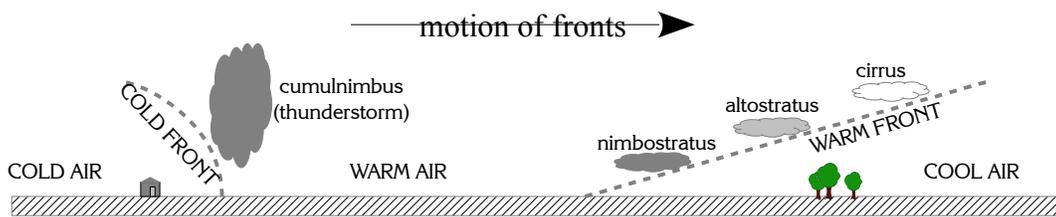


### ***Fronts and air masses***

An **air mass** is a very large volume of air with nearly-uniform temperature and humidity. Boundaries between air masses are called **fronts**. As winds blow air masses around and change their shapes, fronts can sweep across the country and bring dramatic changes to the weather. The two main types of front are cold fronts and warm fronts. On a weather map, cold fronts are marked with triangles (like icicles) while warm fronts are marked with semicircles (like the Sun).

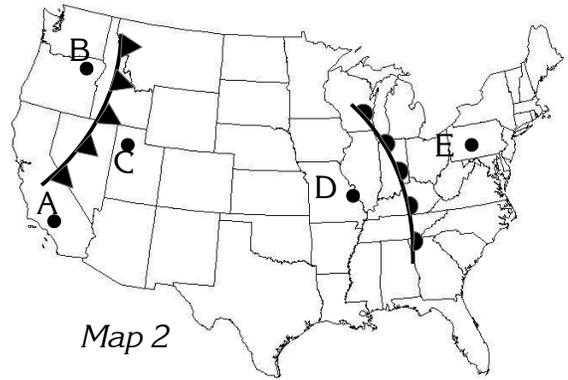


Below is a "side view" of both types of front. The fronts are moving to the right. Ahead of both types of front, warmer air is lifted up and forms clouds and precipitation. However, a warm front has a gentle slope which forms clouds at the cirrus and alto levels before the precipitation arrives in the form of long, steady nimbostratus. Cold fronts have much steeper slopes and lift air more suddenly, leading to the formation of cumulonimbus clouds (thunderstorms).



Pressure systems usually travel across the US from the west to the east, although certain storms will travel more northward out of the Gulf of Mexico or along the east coast.

- 5) Look at Map 2. For each location, state whether the temperature... has recently gotten warmer, has recently gotten colder, is about to get warmer, or is about to get colder.



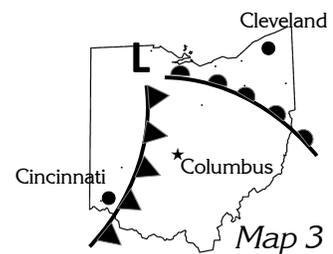
- A)  
B)  
C)  
D)  
E)

- 6) Over the next day or so, what sort of precipitation should be expected at location E?
- 7) Over the next few hours, what sort of precipitation should be expected at location C?

### ***Pressure systems and fronts together***

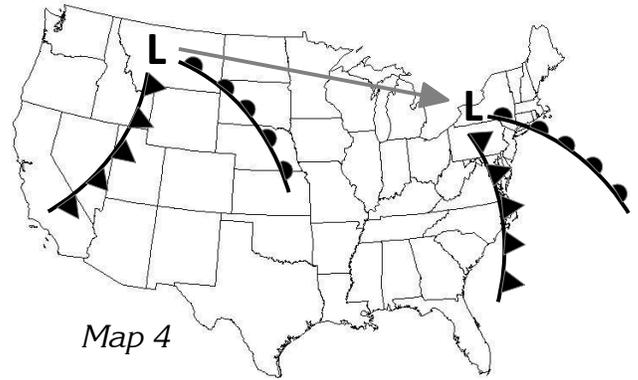
In North America, weather fronts are usually associated with a Low pressure system. High pressure systems are more stable and don't move as much air around. The picture below shows the most common arrangement of a Low with its two fronts. The counterclockwise rotation around a Low brings colder, northern air down to the south and moves warmer, southern air around to the east. Over time, the fronts rotate slowly around the Low like hands of a clock running in reverse.

- 8) Map 3 shows the fronts associated with a Low moving through Ohio. To start, draw in arrows showing the wind directions around this Low.
- 9) When the cold front hits Columbus, from what direction will the wind be blowing there?



- 10) Which of the "3C" cities has probably just experienced some thunderstorms?
- 11) Which city is about to experience thunderstorms?
- 12) Toledo is almost directly under the "L" on Map 3. What's the weather probably like there?

13) Map 4 shows a Low along with the path that it moves along, called a “**storm track**”. As this whole system approaches and passes through Ohio, what changes in temperature will we experience?

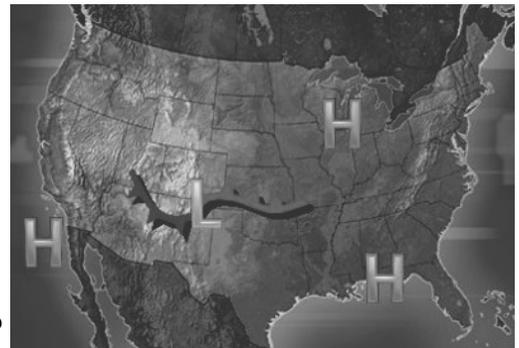


14) At the system approaches and goes through Ohio, what sequence of clouds and precipitation will we see?

15) Look at the Low's final position on Map 4. From what direction will the prevailing winds in Ohio be blowing with the Low in that position?

To the right is a map that Accuweather predicted for today's weather – Wednesday, March 27.

16) What is the main feature on this map that would be affecting Ohio for the next day or so?



17) What sort of weather would we expect from this system?

18) What direction would most of the winds in Ohio be today?

19) The Low over New Mexico may be over Kentucky or Tennessee by Friday. What effects would it probably have on us? Will we see temperature changes? Clouds or rain? Changes in the wind?