

LESSON
10

What causes fronts to move?

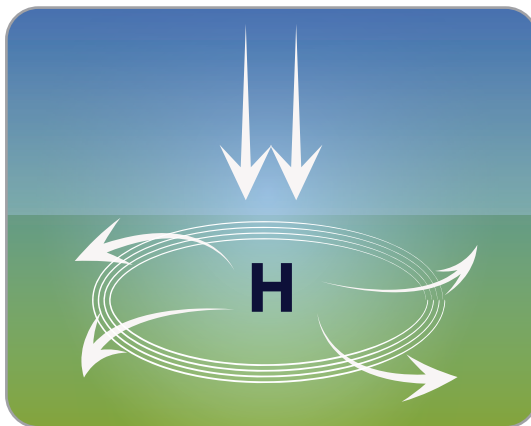
STEP 1: Remember air pressure? There's more to it.

In Lesson 5 you learned that air pressure causes air to move.

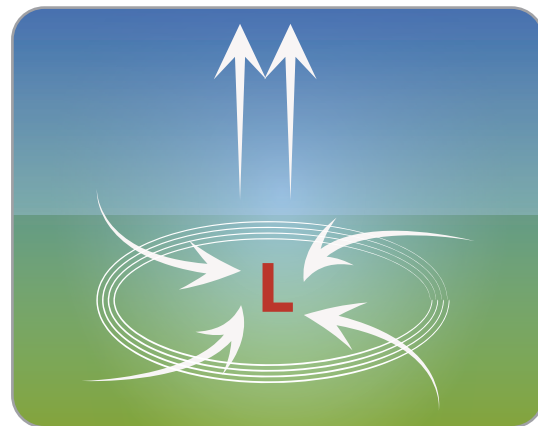
- Air rises in the atmosphere when it has lower pressure.
- Air sinks in the atmosphere when it has higher pressure.

You learned how air moving up and down is able to cause a small isolated storm. It turns out the same thing can happen over vast areas (the size of large US states), and this creates winds that can move fronts.

Air pressure isn't always the same from place to place. In one location, air might have somewhat lower pressure, which causes it to move upward. In another location, air might have somewhat higher pressure, which causes it to move downward.



In areas with high pressure, air moves downward and spreads outward once it gets to the land. High pressure is marked with a blue H on weather maps.



In areas with low pressure, air moves upward, so nearby air rushes in to fill the space. Low pressure is marked with a red L on weather maps.

The air rushing into low pressure and away from high pressure is wind.

Measurements of air pressure are made using an instrument called a barometer. Barometers used for weather measurements record the pressure in units called millibars (mb). The average air pressure at ground level is 1013.3 mb.



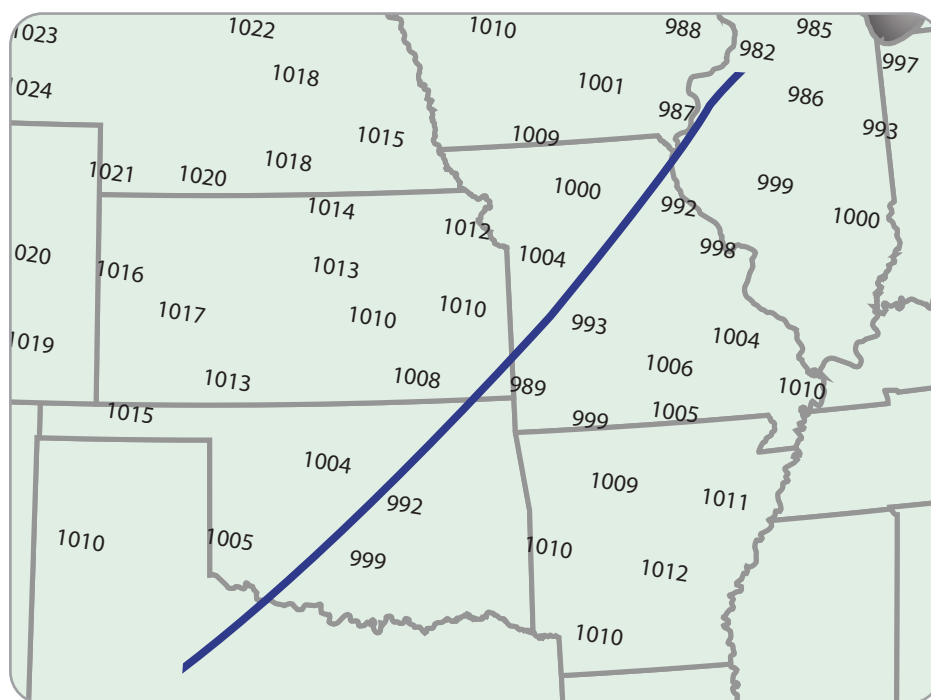
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STEP 2: Analyze pressure data over a region.

Follow the instructions to identify and analyze areas of high pressure and low pressure on the map below and figure out which direction the cold front is moving.

- Color code the areas with high and low pressures (and add the colors to the key).
 - Highlight the highest pressures on the map (more than 1015 mb) with a colored pencil.
 - Highlight the lowest pressures (less than 995 mb) with a different colored pencil.
- Draw arrows on the map to indicate the direction that the wind is blowing. Remember that wind flows away from high pressure and towards low pressure.
- Based on the direction that wind is blowing, draw triangles on the front. (The triangles should point in the direction that the front is moving.)
- The areas with the highest pressure and lowest pressure are labeled on a weather map (like the symbols in the key).
 - Mark the location with the highest pressure on the map with a blue H.
 - Mark the location with the lowest pressure on the map with a red L.

PRESSURE MEASURED IN MILLIBARS (mb)



KEY:

L the center of an area of low pressure
H the center of an area of high pressure

cold front

1014.4 1014.6
1015.8
barometric pressure (mb)

highest pressures - more than 1015 mb (choose a color)
 lowest pressures - less than 995 mb (choose a color)



DISCUSS AS A CLASS:

Which way did the wind blow? What evidence do you have to support your claim?



What causes fronts to move?

STEP 3: Analyze pressure data in one location.

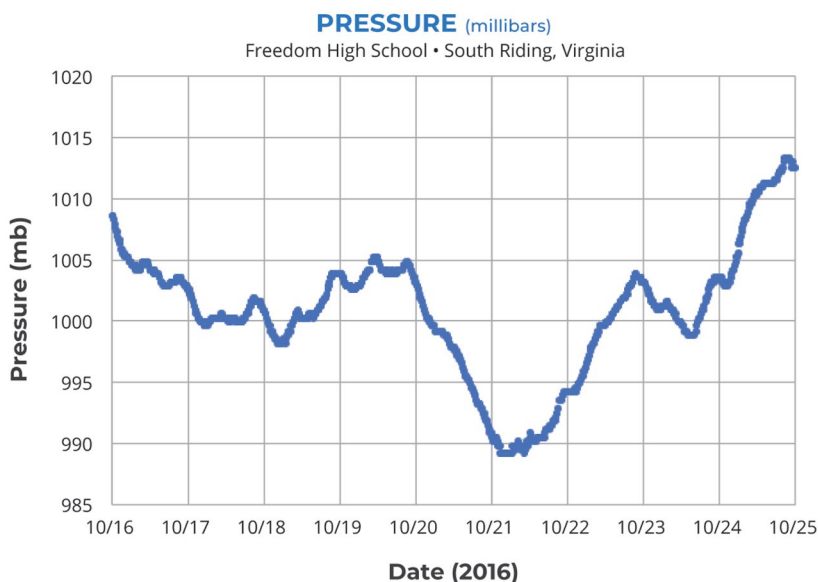
In Lesson 8 you looked at weather data from Freedom High School in South Riding, Virginia, over a 10-day period, when a cold front passed through the area. The pressure data below was collected at Freedom High School during that same 10-day period. Remember that the cold front arrived at Freedom High School early on October 21.



How did the pressure change over time? Add **What I See** and **What It Means** statements to describe the pressure before, during, and after the cold front.



Note: The vertical lines on the graph indicate noon on each of the dates listed on the x-axis.



1. When was barometric pressure the lowest? When was it the highest?
2. Write a sentence to describe where pressure is lowest and highest around a cold front.
3. Take a look at the wind data in Lesson 8. The windiest time during this storm was when the pressure was lowest. Write a sentence to explain why winds happen when air pressure is low.

