

15. Fronts

OBJECTIVES: After completing this lesson, a student should be able to:

- * Identify areas of WARM AIR on worksheet #2
- * Identify areas of COLD AIR on the worksheet
- * Plot FRONTS on the worksheet (Grades 4-8)

TEACHER BACKGROUND: (Grades 1-8)

Once the meteorologist has plotted weather data and determined areas of high and low pressure, additional symbols can be plotted to represent movements of warm or cold air.

In this lesson, the only concepts grades 1-3 students need to learn are a cold wind (from the north) and a warm wind (from the south). Weather systems on the map create either a warm or a cold wind. Today's lesson asks primary level students to find the coldest and warmest temperatures on their maps.

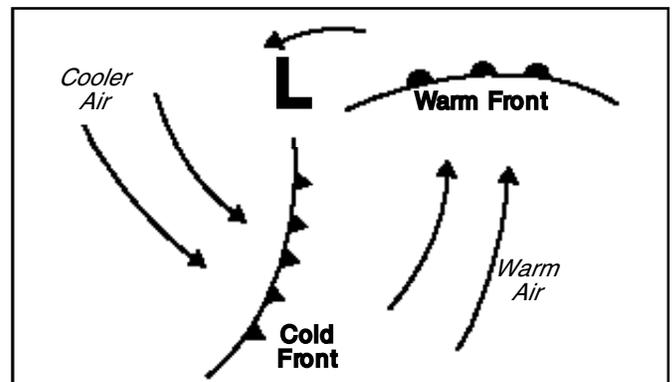
Additional notes for grades 4-8:

Students should recall our discussion from the previous lesson that high pressure usually produces fair weather, and low pressure areas are usually associated with stormy weather. The two pressure areas also produce opposite wind patterns. In the Northern Hemisphere, a **low pressure area always creates a wind that blows COUNTERCLOCKWISE around the low.** The high pressure area creates a wind that blows **CLOCKWISE around the high.** This wind around highs and lows plays a major role in transporting warm air masses from the south and cold air masses from the north. The transportation of air masses creates what are called *fronts*. Students will learn about two types of fronts on the weather map. **FRONTS are lines marking the leading edge of a change in air mass (or temperature).**

Similar to the leading edge of army soldiers moving forward along the *front line*, the leading edge of an air mass moves forward along a weather front. When we see an approaching front, we know that the air (and temperatures)

behind the front can be much different from the present air mass.

Refer to the figure below. Fronts are usually connected to a rotating low pressure system that is producing rain or snow. Fronts also help to lift and cool the air, creating clouds and precipitation. Air rotating counterclockwise around the low brings warm air from the south ahead of the low and cooler air from the north behind the center of the low.



A WARM FRONT is a red line with rounded “bumps” on the weather map showing the leading edge of a warm air mass. The rounded warm front symbols indicate to which direction the warm front is moving. **A COLD FRONT is a blue line with pointed “teeth” on the weather map showing the leading edge of a cold air mass.** The pointed cold front symbols also indicate the direction it is moving. Note in the figure above that without the counterclockwise wind circulation around the low, there would be no movement of air masses and no fronts.

Fronts

MAP-GRADES 1-3 (Time: 10 minutes)

Materials: Worksheet #2, red and blue pencils

Preparation: Distribute the student weather map worksheets. (Do NOT dispose of these maps following this lesson. We will refer to them in the next unit!)

Procedure:

1. Ask students to locate the two warmest stations. (I and J) Draw a red circle that includes both of them. (Grades 2-3 can write the word *WARM* inside.)
2. Locate the two coldest stations. (A and C) Draw one circle around them. Grades 2-3 can write *COLD* inside. (Grades 1-2 can skip step #3)
3. (Optional) On the board, write an "L." Draw arrows counterclockwise around it, representing wind. Explain how the LOW has warm southerly wind ahead of it and cold northerly wind behind it.

Evaluation: How can we have warm and cold air masses on the same map? (Regions can have opposite weather conditions) What moves warm and cold air? (wind) Collect maps for future reference. Refer to the back page for map key.

Excursion: Place a large, red "L" over Kansas. Where is the warm and cold air?

Computer Disk: Using the primary program and the *make a weather map* section, compose a map by transferring sky symbols and the appropriate *Warm* or *Cold* labels to regions of the country.

MAP-GRADES 4-8 (Time: 15 minutes)

Materials: Worksheet #2, red and blue pencils

Preparation: Distribute the worksheets. (Save maps after this!)

Procedure:

1. On the board, draw an "L" and an "H." Ask students to determine the wind around each letter.
2. Ask students to study the wind and pressure data on their maps and draw the correct system over Kansas. (LOW)
3. Draw a red circle that includes two of the warmest stations (I and J) and label it *WARM*. Draw a blue circle including the two coldest stations (A and C) and label it *COLD*.

Evaluation: Describe the weather around the Kansas LOW. (1. wind is counterclockwise 2. skies are cloudy with rain and snow 3. there's warm air ahead of the LOW and cold air behind it.) Refer to the back page for map key.

Excursions: Copy the blank weather map on the back page and draw a HIGH over Kansas. Estimate the wind and weather conditions around it. How do they differ from the map drawn with the LOW? (1. clockwise wind 2. fair skies 3. cold northerly wind ahead of the HIGH and warm southerly wind behind it)

Computer Disk: Using the secondary program on the disk, draw today's newspaper weather map of HIGHS, LOWS and warm or cold fronts. For these symbols, select "more" from the list of symbols below the map.

WEATHERSCHOOL QUESTION:

Obtain the question and correct answer from your local Weatherschool TV channel!