

2007

Fronts

STORM Project

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Activity 5
Fronts
Level 2

<http://www.uni.edu/storm/activities/level2/index.shtml>

National Science Education Standards: As a result of activities in grades 5-8, all students should be able to develop an understanding about scientific inquiry, structure of earth system, and understandings about science and technology.

Teacher Background: The term “front” came from military meteorologists, who decided that just like enemies who are in battle will fight along a front, so to do air masses with different properties. These battle lines or fronts indicate a change in the weather. On a weather map fronts are drawn there is large change in temperature and a shift in wind direction. On a weather map, fair weather is generally associated with high-pressure systems, while stormy weather is usually associated with low-pressure systems. A cold front means a cold air mass is pushing into a warmer air mass, and is shown on the weather map with blue triangles pointing in the direction of the warmer air, or in the direction in which the colder air is moving. A warm front means a warm air mass is pushing into a colder air mass, and is shown on the weather map with rounded semicircles pointing in the direction of the moving warm air. Sometimes you will hear meteorologists also refer to fronts as “boundaries”.

Fronts extend outward from Lows, but not Highs. In the northern hemisphere, fronts rotate slowly counterclockwise around Lows. Cold fronts move at an average speed of about 30 miles per hour, while warm fronts average about half that speed.

Engage:

Ask the class to do the following:

1. Write down five things that you know about warm and cold fronts.

Explore:

Assist your students as needed with the following steps.

Access the activity website <http://www.uni.edu/storm/activities/level2/act5.shtml> and click on the Current Weather map. Observe the map and map answer the following questions.

1. How does the wind direction “ahead of” (meaning in front of) the cold front compare to the wind direction behind the cold front?
2. How do the temperatures ahead of the cold front compare to the temperatures behind the cold front?
3. Is there any precipitation near the cold front? If so, where?
4. How does the wind direction ahead of the warm front compare to the wind direction behind the warm front?

5. How do the temperatures ahead the warm front compare to the temperatures behind the warm front?
6. Is there any precipitation near the warm front? If so, where?

Explain:

Answer the following questions.

1. What weather would you expect a city to have if it is...
 - a. ahead of a cold front?
 - b. behind a cold front?
 - c. ahead of a warm front?
 - d. behind a warm front?

Extend:

This activity will assist students in interpreting weather maps on which fronts are identified. From the activity website, <http://www.uni.edu/storm/activities/level2/act5.shtml>, access the Current US Weather map.

1. Locate a city just ahead of a cold front (if one exists today), and write the name of that city on your paper.
 - a. What changes in wind direction will you expect for that city as the front passes by?
 - b. At the time the front passes the city, what changes do you expect in temperature?
2. Locate a city just ahead of a warm front (if there is one today), and write the name of that city on your paper.
 - a. What changes would you expect in cloud cover for this city as the warm front arrives?
 - b. As the warm front passes, what changes would you expect in wind direction?
 - c. After the front passes, what changes in temperature would you expect for this city?
3. In which of the two cities would you expect some type of precipitation?
4. Obtain the same surface map several hours later (or the next day), and write how well you predicted the weather for the cities.

Evaluate:

1. Collect student sheets.

For Further Inquiry:

As your students, “If cold fronts move about twice as fast as warm fronts, what should happen to the distance between the fronts over time?” Have students design an investigation to answer this or any other questions they have about fronts.

Fronts
Student Sheet

Engage:

Answer the following:

Write down five things that you know about warm and cold fronts.

Explore:

1. Access the activity website <http://www.uni.edu/storm/activities/level2/> , and click on the Current Weather map. Observe the map and map answer the following questions.
2. How does the wind direction ahead of (meaning in front of) the cold front compare to the wind direction behind the cold front?
3. How do the temperatures ahead of the cold front compare to the temperatures behind the cold front?
4. Is there any precipitation near the cold front? If so, where?
5. How does the wind direction ahead of the warm front compare to the wind direction behind the warm front?
6. How do the temperatures ahead the warm front compare to the temperatures behind the warm front?
7. Is there any precipitation near the warm front? If so, where?

Explain:

Answer the following questions.

2. What weather would you expect a city to have if it is
 - a. ahead of a cold front?

- b. behind a cold front?

- c. ahead of a warm front?

- d. behind a warm front?

Extend:

This activity will assist you in interpreting weather maps that display fronts. From the activity website access a current weather map.

5. Locate a city just ahead of a cold front (if one exists today), and write the name of that city on your paper.

a. What changes in wind direction will you expect for that city as the front passes by?

b. At the time the front passes the city, what changes do you expect in temperature?

6. Locate a city just ahead of a warm front (if there is one today), and write the name of that city on your paper.

a. What changes would you expect in cloud cover for this city as the warm front arrives?

b. As the warm front passes, what changes would you expect in wind direction?

c. After the front passes, what changes would you expect for this city?

7. In which of the cities would you expect some type of precipitation?

8. Obtain the same surface map several hours later (or the next day), and write how well you predicted the weather for the cities.