



# Fronts

# Lab #14

**Discussion:** A front separates two air masses with different temperatures. Cold fronts will push a warm air mass up causing the warm air to expand and cool until clouds and precipitation form. A warm front will climb up a retreating cool air mass. As the warm air rises it expands, cools, and the moisture will condense and precipitate. Note that rain will form at both a warm and a cold front. A band of rain on a weather map indicates a front is moving through.

**Purpose:** You will learn about cloud fronts and wind directions associated with fronts.

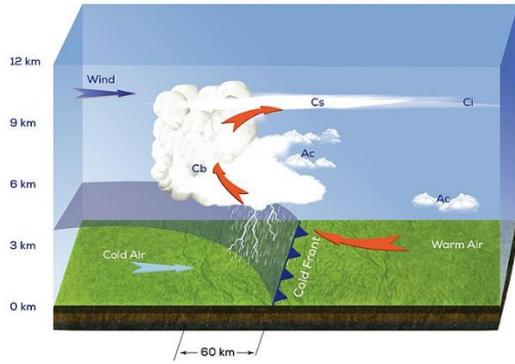
**Hypothesis:** Maps and symbols make it easier to see the relationship between weather and fronts.

**Theory:** Warm moist air will rise, cool, moisture will condense, and precipitation will occur.

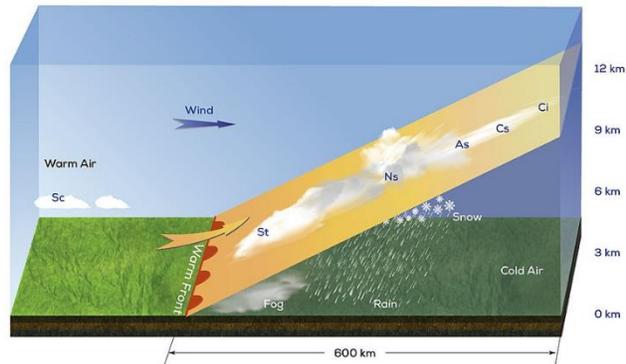
**Materials:** pencil this packet

### Warm and Cool Fronts:

Side view maps showing lifting and type(s) of cloud formation:



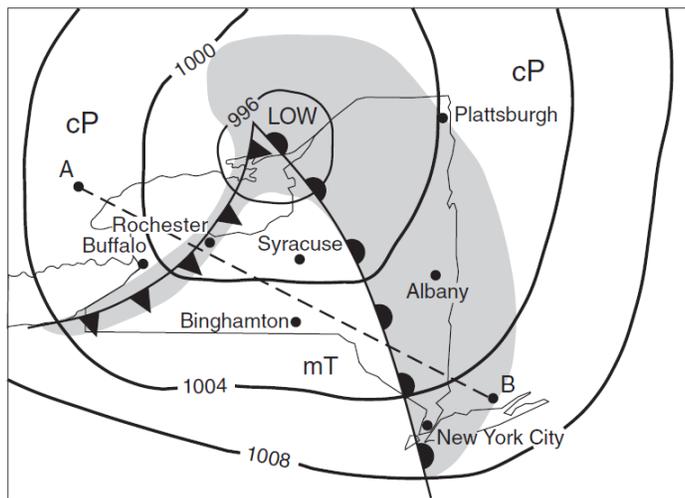
Cross-section through an Ana Cold Front with Unstable Character



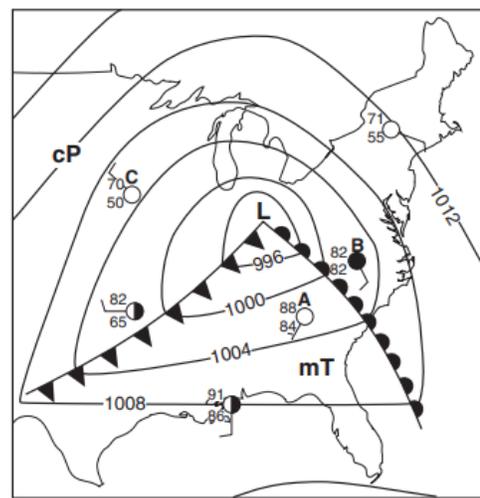
Cross-Section through a Warm Front with Stable Character

By Kh1604 - Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=92877256>

Top view maps showing weather symbols for cold and warm fronts:



areas of rain shown



no rain or cloud cover shown

**Data Collection and Processing:**

Side view maps data and observations:

1. Compare the distances typical cloud cover extends for both cold and warm fronts.

cold front: \_\_\_\_\_

warm front: \_\_\_\_\_

2. Compare the height (or thickness) of cloud cover for both cold and warm fronts.

cold front: \_\_\_\_\_

warm front: \_\_\_\_\_

3. Compare both the width (in km) and the intensity of rainfall for cold and warm fronts.

cold front: \_\_\_\_\_

warm front: \_\_\_\_\_

Top view maps data and observations:

1. Compare the relative distances (width) typical cloud cover extends for both cold and warm fronts. (Hint: use the left map.)

cold front: \_\_\_\_\_

warm front: \_\_\_\_\_

2. Write your observations regarding pressure and where the warm and cold fronts touch. (Hint: use both maps.)

\_\_\_\_\_  
\_\_\_\_\_

3. Which direction do the winds rotate around a low-pressure area? (Hint: right map.)

\_\_\_\_\_

4. Look carefully at the curvature of the clouds before either a cold or a warm front. State the relationship between the direction the front is moving and the curve of the front. (Hint: right map.)

\_\_\_\_\_  
\_\_\_\_\_

**Analysis and Conclusions:**

1. In terms of moisture and temperature, describe the type of weather associated with the air masses listed below

cP: \_\_\_\_\_

mT: \_\_\_\_\_

2. Which type of front is usually associated with anvil head cumulonimbus thunderclouds?

\_\_\_\_\_

3. Which type of front is usually associated with nimbostratus clouds that cover the entire sky (a slow, gentle rain)?

\_\_\_\_\_

4. Which direction do winds cycle around the following pressure systems in the Northern Hemisphere?

High pressure: \_\_\_\_\_

Low pressure: \_\_\_\_\_

5. Look at the right hand top view map (no rain) and describe the direction (8 points) the fronts are moving.

warm: \_\_\_\_\_

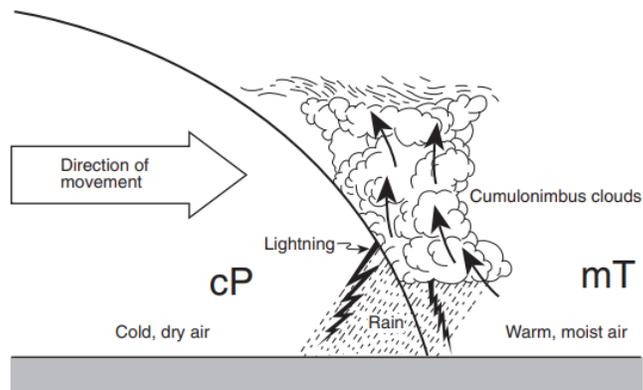
cold: \_\_\_\_\_

6. Give two reasons why warm moist air rises above the cold air as a cold front approaches.

\_\_\_\_\_

\_\_\_\_\_

Use the diagram below to answer questions 7 and 8.



7. Explain why clouds form in the rising air.

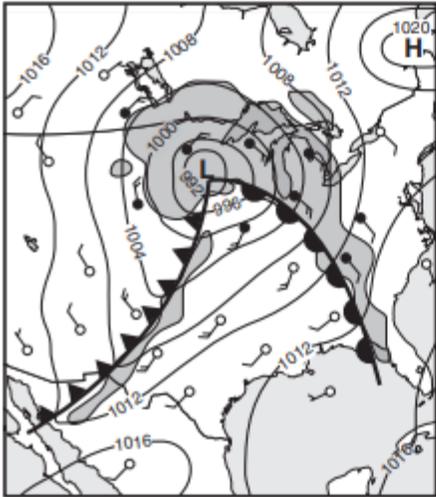
\_\_\_\_\_

\_\_\_\_\_

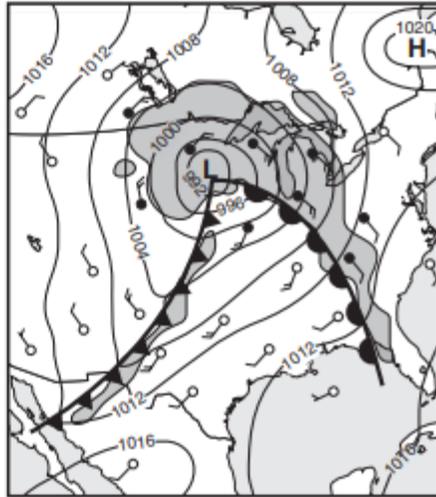
8. Central Canada was the geographic source of the cP air mass shown. Identify the most likely geographic source for the mT air mass shown in the cross section.

\_\_\_\_\_

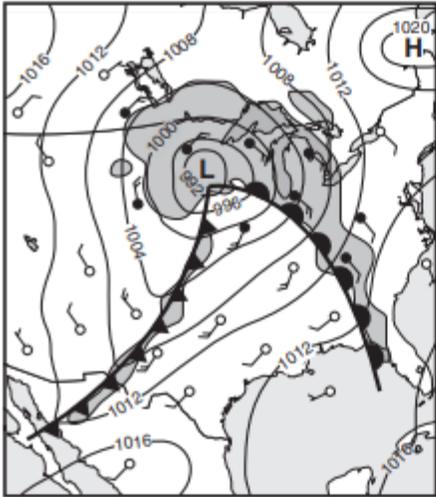
9. On which weather map do the front symbols best represent the direction of movement of the cold and warm front associated with the low pressure system shown on the map?



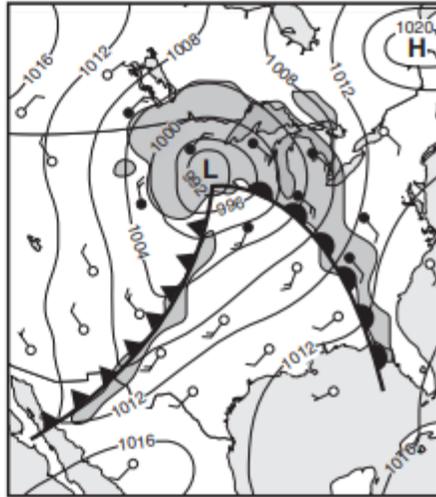
(1)



(3)



(2)



(4)