Locating & Determining Air Masses

Name Name _____ Period

STUDENT ACTIVITY PAGE

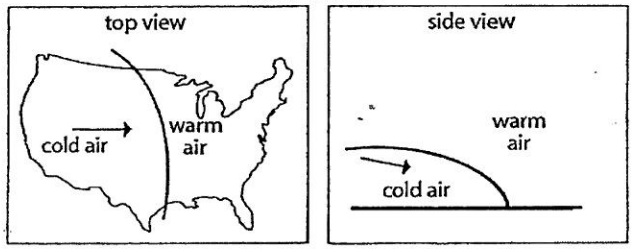
Chapter 12 - Meteorology

BEFORE YOU BEGIN

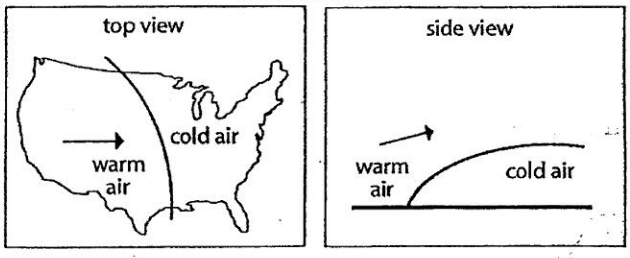
The properties of the air in the atmosphere are not the same everywhere. However, there are broad regions of air with relatively uniform temperature and/or humidity. These regions are known as **air masses**. Air masses move over the surface of the earth and can overtake, be overtaken by, or mix with, other air masses they encounter.

The boundaries between air masses are called **fronts**. Types of fronts are determined by the relative temperatures of the air masses involved. If a warmer air mass is overtaking a colder air mass, it will slide *over* the colder air mass because warm air is less dense than cold air. The boundary between the warm air mass and the cold air mass in a case like this is called a **warm front**. If colder air is overtaking warmer air, the colder air will slide *under* the warmer air, because cold air is denser. The boundary between the two air masses in a case like this is called a **cold front**. In this activity, you will identify and simulate air masses and fronts.

COLD FRONT



WARM FRONT



PROCEDURE Read

PART A

Data Tables 1 and 2 are grids that represent surface air temperatures in degrees Celsius over a 10-km-× 10-km square area. There are three air masses and two fronts in this area. Data Table 2 represents data taken about 10 minutes after the data in Data Table 1.

1. Examine Data Table 1. Locate and sketch in the boundaries of the three air masses (you may draw directly on the Table). Remember, you are looking for boundaries between areas with noticeably different temperatures.
2. Estimate the average temperature of each of the three air masses and label them in increasing order of temperature: *cool*, *medium*, and *warm*. Remember that these terms are only relative.
3. At this point you know which air masses are which, but you don't know what kind of fronts are present. To determine which fronts are present, repeat step 1 for Data Table 2. Notice that the fronts have moved.

Iowa
Time: 3 pm

14	13	13	15	13	13	15	14	19	19
13	15	14	14	13	14	15	15	20	20
15	14	14	14	15	15	13	18	19	20
15	15	15	14	15	15	21	20	19	20
14	14	15	15	14	20	19	20	20	19
15	16	14	23	23	24	19	20	19	18
23	23	24	22	22	23	24	21	20	20
22	23	24	23	24	23	23	23	20	19
23	24	23	25	25	24	24	24	23	18
22	24	24	24	25	24	23	23	22	17

Iowa (Same location)
Time 6 pm

14	13	13	15	13	13	15	14	15	19
13	15	14	14	13	14	15	15	14	20
15	14	14	14	15	15	13	14	19	20
15	15	15	14	15	15	15	20	19	20
14	14	15	15	14	15	23	20	20	19
15	16	14	14	15	24	24	24	19	18
14	15	15	14	22	23	24	21	23	20
15	23	24	23	24	23	23	23	24	24
23	24	23	25	25	24	24	24	23	24
26	25	26	24	23	25	25	23	24	24

Concluding Questions:

1. Did you label the 3 air masses in EACH table as cool, medium, and warm as appropriate? If not, label them now.

2. From the movement of the fronts and the type of air masses behind them, determine the type of each front (warm or cold). To help you determine the type of fronts consider the following:

    a. Look at each boundary segment.
    b. Which air mass "pushed" the other one?
    c. If the warmer of the two masses "pushed" the other, it is a warm front.
    d. If the cooler of the two masses "pushed" the other, it is a cold front.

3. Color each boundary segment to show the type of front it represents. Be sure to include:

    a. Appropriate color
    b. Appropriate shape
    c. Shape pointing in appropriate direction

4. What main types of clouds are usually found at:
    a. Cold front:

    b. Warm front:

5. Does the warm air rise faster at a cold or warm front?