

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## Activity 2A: SURFACE WEATHER MAPS

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NOTICE: This activity consists of two parts:

1. This packet (complete first)
2. Internet files obtained from Mr. Nap's meteorology course page  
*(staple internet files to this packet)*

<http://www.napscience.com/weather>

### Educational Outcomes:

Weather is the state of the atmosphere at a particular time and place, mainly with respect to its impact upon life and human activity. It is defined by the various weather elements including air temperature, humidity, cloudiness, precipitation, visibility, air pressure, and wind speed and direction. The surface weather map is a useful tool for depicting weather conditions over broad areas.

After completing this activity, you should be able to:

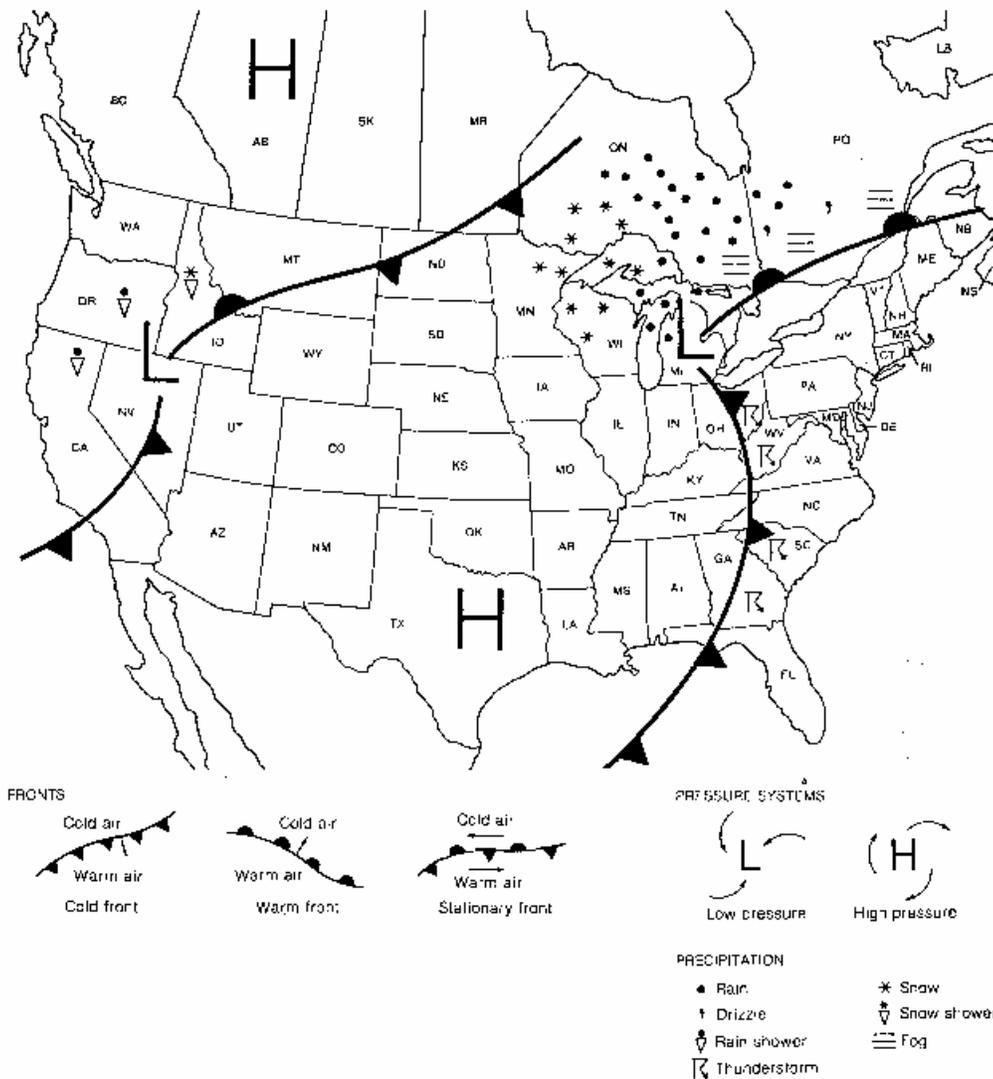
- Decode the symbols appearing on a surface weather map and describe weather conditions at various locations on the map.
- Identify fronts appearing on the map, the weather differences likely to be occurring on either side of a front, and the motions of fronts.
- Describe general relationships between wind patterns and the high and low air pressure centers shown on weather maps.

### Materials:

Hard copies of the Activity File plus designated Images.

### Investigations:

1. **Examine the surface weather map presented in Figure 1. 1** on the next page. The weather map symbols shown are those commonly seen on television and in newspapers. The H's and L's identify centers of relatively high or low air pressure compared to their surroundings. Moving outward horizontally from the L located in lower Michigan, air pressure **(increases) (decreases)**. Moving outward horizontally from the H positioned in Texas, air pressure **(increases) (decreases)**.



**FIGURE 1.1**  
On a weather map, special symbols are used to represent the state of the atmosphere at a specific time.

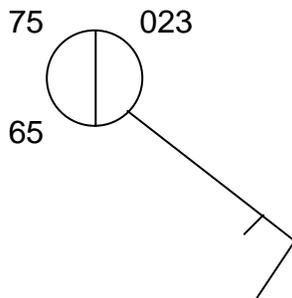
- The thick curved lines on the map are air mass boundaries. In the atmosphere, broad expanses of air with generally uniform temperature, humidity, and density come in contact with other masses of air having different temperature, humidity, and density. Because air masses of different densities do not readily mix, the boundaries separating air masses tend to remain distinct. These boundaries, called fronts, typically separate warm and cold air. The leading edge of advancing cold air is a cold front and, as shown in the lower part of Figure 1.1, is signified by spike symbols that are pointing in the direction toward which the cold front is moving. The leading edge of advancing warm air is a warm front and is signified by semicircles on the side of the front's movement. The front in the Southeastern US is a **(cold warm)** front. According to the map, persons living in South Carolina can expect **(colder warmer)** weather after the front passes.

3. Precipitation is depicted on maps by a variety of symbols including dots or periods

for **(rain)(snow)**, stars or asterisks for **(rain)(snow)**, horizontal lines for \_\_\_\_\_,

and the symbol \_\_\_\_\_ for thunderstorms.

4. Some weather maps display weather conditions at individual weather stations by the use of a station model. Interpret the following plotted data:



a. **Temperature=** \_\_\_\_\_      b. **Dewpoint=** \_\_\_\_\_

c. Wind direction is shown by the "arrow" shaft drawn into the circle representing the station. Unless otherwise noted, north is to the top on the map and east is to the right. Wind is always named for the direction from which it blows. In the above depiction, the wind direction is \_\_\_\_\_.

d. Wind speed is rounded off to the nearest 5 knots (1 knot equals 1.2 miles per hour) and is symbolized by "feathers" drawn on the clockwise side of the wind direction shaft. A full feather represents 10 knots and half feathers indicate 5 knots. A pennant indicates 50 knots and a circle drawn around the station circle signifies calm conditions. In this case, the reported wind speed is \_\_\_\_\_ knots.

e. Air pressure (adjusted to sea-level) is reported as a coded number to the nearest tenth of a millibar (mb). To decipher the plotted pressure value, first place a decimal point between the second and third number from the left. Then add a "9" or "10" to the left so that the resulting number falls within the range of air pressures that could occur at sea level (usually between 960 mb and 1050 mb). For example, a plotted value of 126 represents 1012.6 mb and 863 denotes 986.3

mb. The air pressure reported above is \_\_\_\_\_ mb.

- f. Sky coverage (total amount of cloud cover) is reported inside the station circle. An empty circle indicates no cloud, a half-shaded circle means five-tenths of the sky is cloud-covered, and a fully shaded circle stands for a completely overcast sky. The

reported cloud cover is \_\_\_\_\_.

- g. Current weather is plotted at the “9 o’ clock position on the station model (to the left of the circle) using a variety of symbols representing the particular weather conditions.

The reported current weather is \_\_\_\_\_.