

# WEATHER MAPS

(adapted from the National Weather Service JETSTREAM – an online weather school)  
<http://www.srh.weather.gov/srh/jetstream/matrix.htm>

The best way for meteorologists to display weather information is by using weather maps. Over the years, meteorologists have developed a code to help them fit lots of information into a small space. We will learn how to read the basic symbols of weather maps and what types of clouds to expect in different environments.

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## **SURFACE PRESSURE:**

This map shows the sea level pressures for various locations over the contiguous U.S. The values are in whole millibars (the standard measure of pressure used by meteorologists, a more common measure of air pressure usually reported in the news is inches of mercury.)

980 mb (millibars) = 28.94 inHg (inches of mercury, Hg is the scientific abbreviation for mercury)

1000 mb = 29.53 inHg

1024 mb = 30.24 inHg

## **Objective:**

Using a black colored pencil, lightly draw lines connecting identical values of pressure. Remember, these lines, called isobars, do not cross each other. Isobars are usually drawn for every four millibars, using 1000 millibars as the starting point. Therefore, these lines will have values of 1000, 1004, 1008, 1012, 1016, 1020, 1024, etc., or 996, 992, 988, 984, 980, etc. These lines should be smooth, it is easiest to start with either the highest or lowest pressure areas and work from there. Continue with the remaining values until you have drawn in all the isobars.

## **Analysis:**

Isobars can be used to identify "Highs" and "Lows". The pressure in a high is greater than the surrounding air. The pressure in a low is lower than the surrounding air.

- \* Label the center of the high-pressure area with a large blue "H".
- \* Label the center of the low-pressure area with a large red "L".

High-pressure regions are usually associated with dry weather because as the air sinks it warms and the moisture evaporates. Low-pressure regions usually bring precipitation because when the air rises it cools and the water vapor condenses.

- \* Shade, in green, the areas where you would expect to see rain or snow.
- \* Shade, in yellow, the areas where you would expect to see clear skies.

In the northern hemisphere the wind blows clockwise around centers of high pressure. The wind blows counterclockwise around lows.

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- \* Draw arrows around the "H" on your map to indicate the wind direction.
  - \* Draw arrows around the "L" on your map to indicate the wind direction.
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**SURFACE TEMPERATURE:**

This map shows the air temperature for various locations over the contiguous U.S. The values are in °F.

**Objective:**

Using a blue colored pencil, lightly draw contour lines connecting equal temperature values every 10°F. Remember, like isobars, these lines (called isotherms) do not cross each other.

**Procedure:**

You will draw lines connecting the temperatures, much like you did with the sea-level pressure map. However, you will also need to interpolate between values. For example, if there is a measurement of 30°F next to a measurement of 50°F there must be a place in between where the temperature is 40°F. The simplest way to interpolate is to put the 40°F contour in the middle between the 30°F and the 50°F. Interpolation involves estimating values between stations which will enable you to properly analyze a map.

**Analysis:**

Isotherms are used to identify warm and cold air masses.

- \* Shade, in blue, the region with the lowest temperatures.
  - \* Shade, in red, the region with the warmest air.
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**DEWPOINT:**

This map shows the dewpoint temperature for various locations over the contiguous U.S. The values are in °F. Dewpoint is a way to measure how moist the air is at a given location. Dewpoint is the temperature where dew would form or rain would fall given the amount of moisture in the air.

**Objective:**

Using a green colored pencil, lightly draw lines connecting equal values of dewpoint temperatures, every 10°F. Remember, like isobars, these lines (called isodrosotherms) are smooth and do not cross each other.

**Procedure:**

You will draw lines connecting the dewpoint temperatures, much like you did with the air temperature map. You will also need to interpolate between values.

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**Analysis:**

Isodrosotherms are used to identify surface moisture. The closer the temperature and dewpoint are together, the greater the moisture in the atmosphere. The greater the moisture in the atmosphere the greater the chance of rain.

\* Compare your surface temperature map with your dewpoint map. Shade in areas where you think it might rain or be foggy in blue.

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**PRESSURE CHANGE:**

This map shows change in surface pressure (in whole millibars) during the past three hours at various locations.

**Objective:**

Using colored pencils, you will draw lines connecting equal values of pressure change for every two millibars. These lines are drawn for the -8, -6, -4, -2, 0, +2, +4, +6, +8, etc values. Remember, like isobars, these lines (called isallobars) are smooth and do not cross each other.

**Procedure:**

Using a blue colored pencil, beginning at any +2 value, lightly draw lines connecting equal values of the +2 millibars pressure change. Remember, you will need to interpolate between values to draw your lines correctly.

Draw the remaining "positive" pressure change value(s) at two millibars intervals in blue.

Using red colored pencils, lightly draw a line connecting equal pressure change values of less than zero (0). Finally, using black, draw a line connecting the zero (0) line.

**Analysis:**

Cold fronts are often located in areas where the pressure change is the greatest. The front represents the boundary of different air masses. Cold air is denser than warm air so when a cold front passes your location, the pressure increases. We analyze for pressure change to look for these boundaries. We can also tell where high pressure and low pressure systems are moving by looking where the greatest change is occurring.

- \* Shade, in red, the region where the surface pressure change is -2 millibars or less.
- \* Shade, in blue, the region where the surface pressure change is +2 millibars or more.

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