

Isobars

Environmental Science

Name: _____ Period: _____ Date: _____

Essential Question: How do I interpret isobars?

Weather forecasters use terms like isobars very often. The prefix "iso" means equal or constant and the root "bar" means weight or pressure, so an **isobar is a line of constant pressure**.

Isobars are **lines of equal atmospheric pressure** drawn on a meteorological map. Each line passes through a pressure of a given value, provided certain rules are followed. **Wind is a direct consequence of air pressure differences**. The greater the contrast in pressure difference between two areas, the faster the wind will blow, so closer isobars on a weather map predict higher **velocity** winds or stronger winds.

The rules for drawing isobars are-

- Isobar lines may never cross or touch.
- Isobar lines may only pass through pressures of 1000 + or - 4. In other words, allowable lines are 992, 996, 1000, 1004, 1008, and so on.
- The atmospheric pressure is given in millibars (mb). One millibar = 0.02953 inches of mercury.

Using a black colored pencil, lightly draw lines connecting identical values of sea level 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.

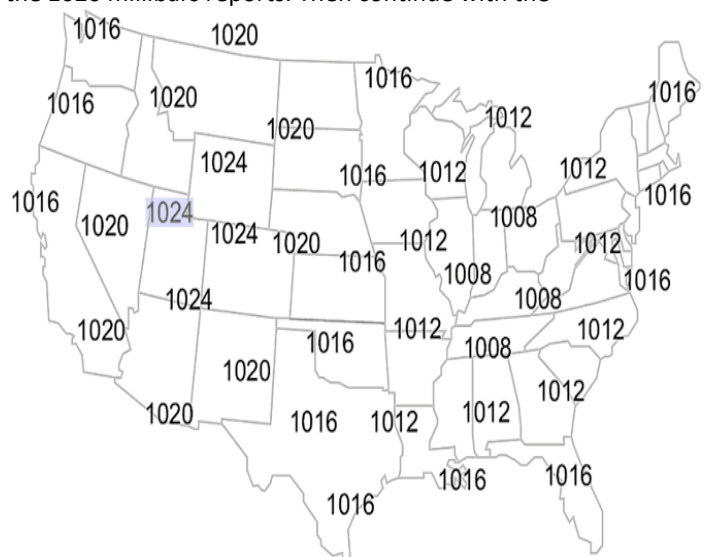
Procedure:

Begin drawing from the 1024 millibars station pressure over Salt Lake City, Utah. Draw a line to the next 1024 value located to the northeast (upper right). Without lifting your pencil draw a line to the next 1024 value located to the south and then to the one located southwest, finally returning to the Salt Lake City value. Remember, isobars are smooth lines with few, if any, kinks. **DO THIS PROCEDURE IN ALL FOUR WEATHER MAPS.**

The result is an elongated circle, centered approximately over Eastern Utah. The line that was drawn represents the 1024 millibars line and you can expect the pressure to be 1024 millibars everywhere along that line. Repeat the procedure with the next isobar value. Remember, the value between isobars is 4 millibars. Since there are no 1028 millibars values on the map, then your next line will follow the 1020 millibars reports. Then continue with the remaining values until you have all the reports connected with an isobar.

1. Label each isobar with the appropriate value.

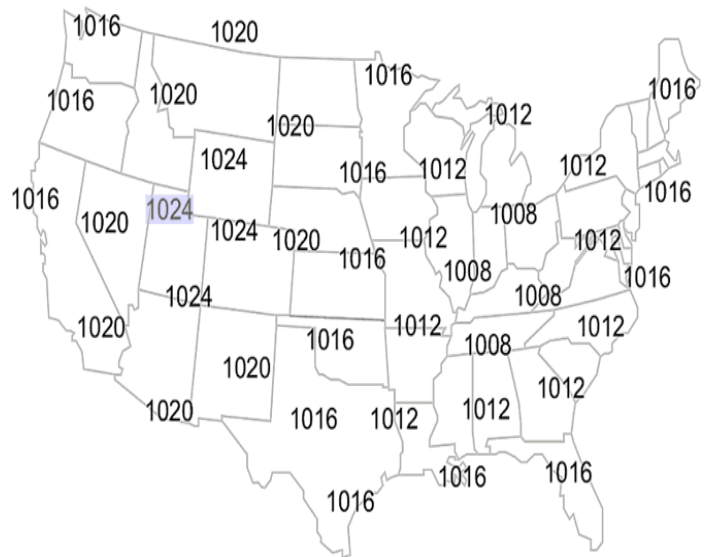
Traditionally, only the last two digits are used for labels. For example, the label on the 1024 mb isobar would be 24. A 1008 mb isobar would be labeled 08. A 992 mb isobar will be labeled 92. These labels can be placed anywhere along the isobar but are typically placed around edges of the map at the end of each line. For closed isobars (lines that connect) a gap is placed in the isobar with the value inserted in the gap.



Analysis

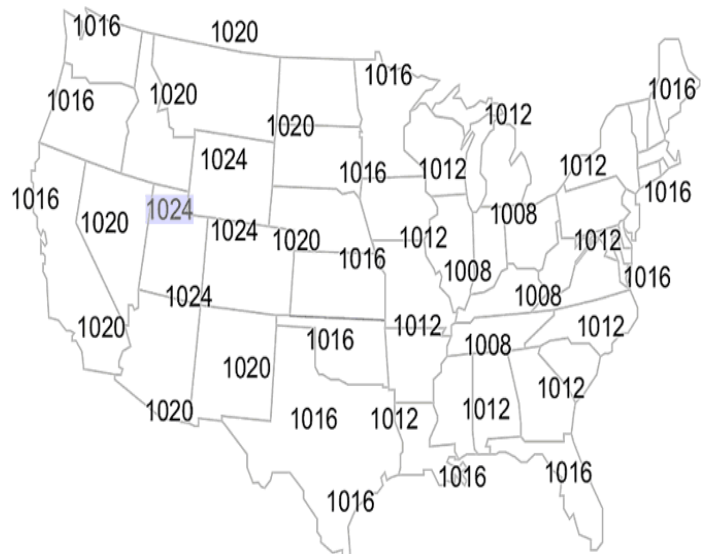
2. Isobars can be used to identify "Highs" and "Lows". The pressure in a high is *greater* than the surrounding air. The pressure in a low is *lower* than the surrounding air.

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



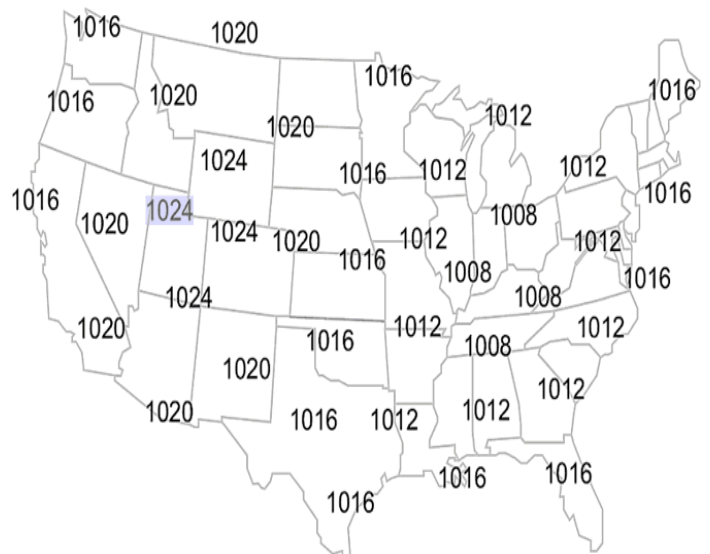
3. High pressure regions are usually associated with dry weather because as the air sinks it warms and the moisture evaporates. Low pressure regions usually bring precipitation because when the air rises it cools and the water vapor condenses.

- Shade, in green, the state(s) you would expect to see rain or snow.
- Shade, in yellow, the state(s) you would expect to see clear skies.



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

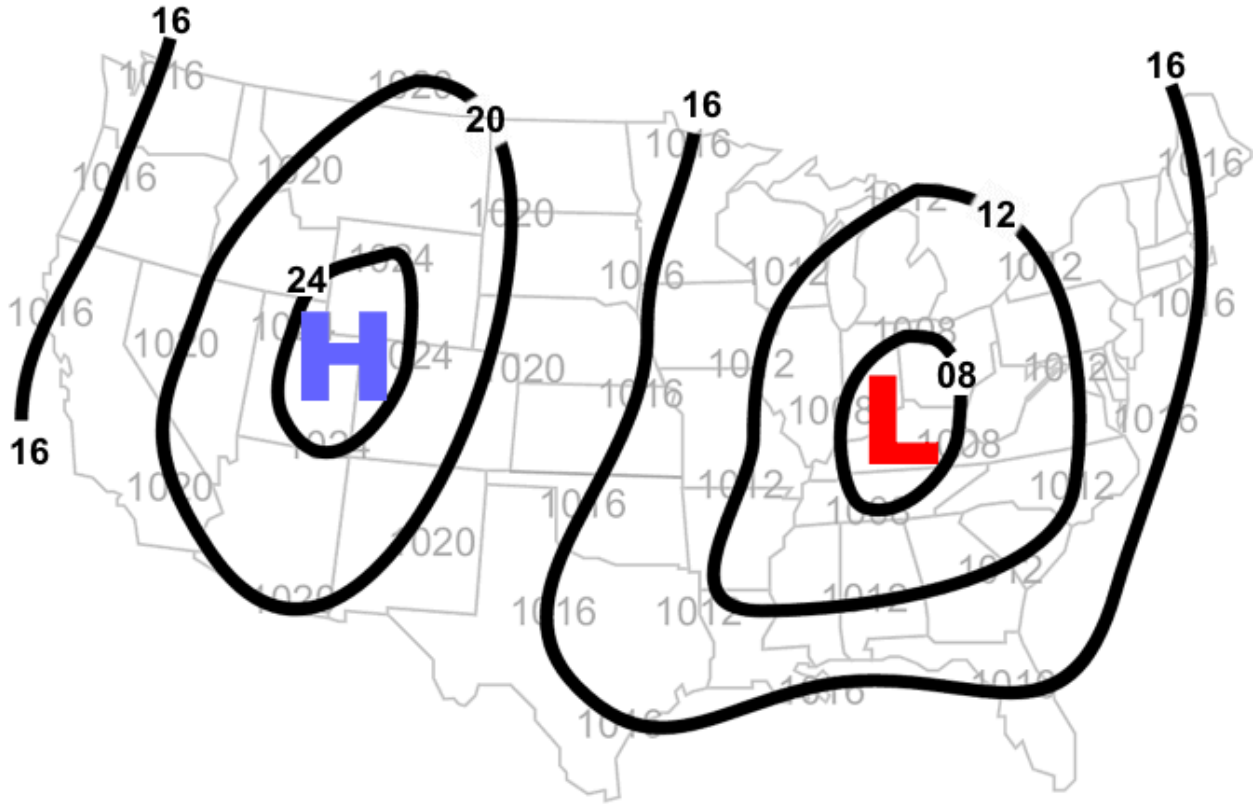
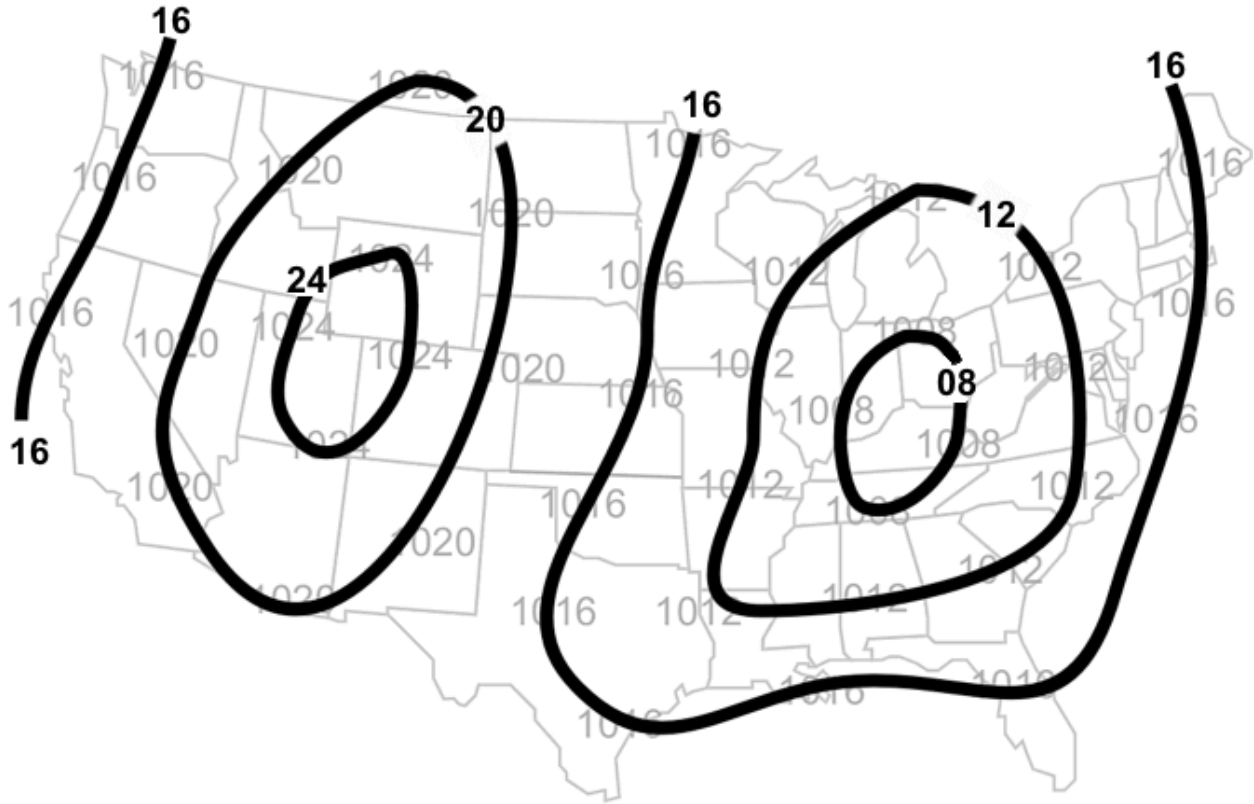
- Draw arrows around the "H" on your map to indicate the wind direction.
- Draw arrows around the "L" on your map to indicate the wind direction.

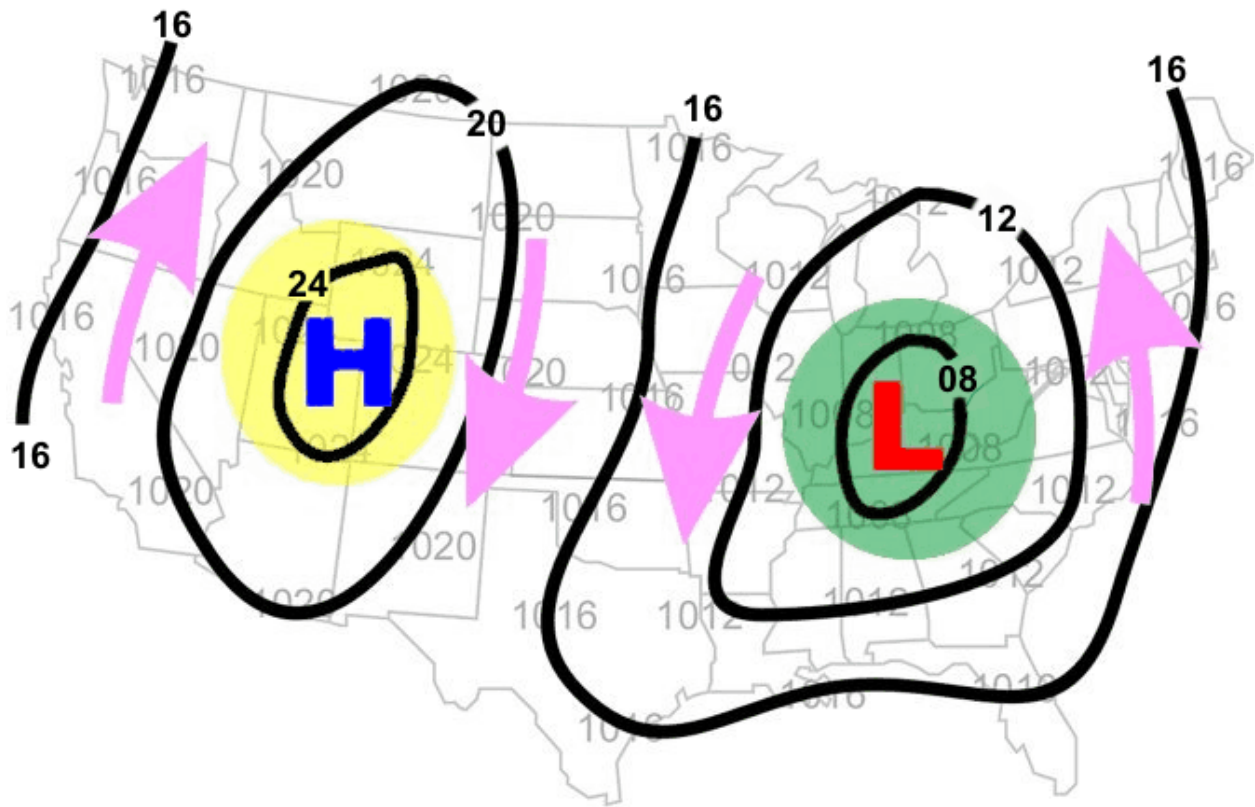


Clarifying Questions:

1. What are isobars?

2. What kind of wind is present when the isobars are close to each other? Far from each other?





<http://www.youtube.com/watch?v=Zp7lLxyw5oY>

<http://www.youtube.com/watch?v=hKGQJEp-Pys>

<http://www.youtube.com/watch?v=jmQ8FWnM0fA>

<http://www.youtube.com/watch?v=XtWIAwSAPNE>

Air pressure (glass upside down with card index card)

<http://www.youtube.com/watch?v=O37XuRkS5UE>