

What Makes the Wind Blow? Understanding Pressure Patterns

Geology/Earth Science

Name: _____

Period: _____

Date: _____

Background and Purpose

All of the weather around us is caused by uneven heating of the Earth by the sun. Different areas of the world receive different amounts of heating. Differences in heating cause differences in pressure. Differences in pressure cause wind. Low pressure at the surface is generally associated with stormy weather. High pressure at the surface is generally associated with clear weather. This activity will investigate how scientists measure pressure and plot it on a weather map. You will plot isobars to find out where high and low pressure areas exist. Isobars are lines that connect points with equal pressure. This activity was modified from Project Atmosphere Canada at the following web address:

(http://www.msc-smc.ec.gc.ca/education/teachers_guides/module8_high_and_lows_e.html).

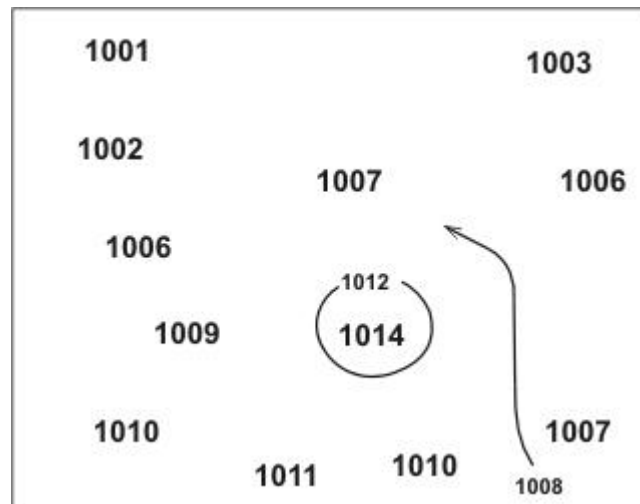
Materials

- Pencil and colored pencils
- Map with Pressure Readings

Part 1: Practicing Drawing Isobars

1. Draw the 1008 and 1004 mb isobars on the following practice grid. Here are some tips for drawing isobars taken from Project Atmosphere Canada.

- Always draw an isobar so that air pressure readings greater than the isobar's value are consistently on one side of the isobar and lower values are on the other side.
- When positioning isobars, assume a steady pressure change with distance between neighbouring stations. For example, a 1012-hPa isobar would be drawn between the observations of 1013 hPa and 1010 hPa about one-third the way from the 1013 hPa reading.
- Adjacent isobars tend to follow a similar pattern. The isobar that you are drawing will generally parallel the curves of its neighbours because horizontal changes in air pressure from place to place are usually gradual.
- Continue drawing an isobar until it reaches the boundary of the plotted data or "closes" to form a loop by making its way back to its starting point.
- Isobars never stop or end within a data field, and they never fork, touch or cross one another.
- Isobars cannot be skipped if their values fall within the range of air pressure reported on the map. Isobars must always appear in sequence, for example, there must always be a 1000-hPa isobar between a 996-hPa and 1004-hPa isobar.
- Always label isobars.



Part 2: Drawing Isobars on a Weather Map of the United States

1. Draw the 996, 1000, 1004, 1008, 1012, 1016, 1020, and 1024 millibar isobars on the weather map of the US on the back side. **Use pencil first!** Make sure to label your isobars.
2. Shade the isobar regions by using different colored pencils. Make a color key next to your map with the following ranges: less than 996, 996-1000, 1000-1004, 1004-1008, 1008-1012, 1012-1016, 1016-1020, 1020-1024, and greater than 1024. You should have 9 different shades or colors that have a logical sequence.
3. Find areas that have High and Low pressure. Mark these with an H for High and an L for Low.
4. Draw the direction of rotation of winds around the Highs and winds around the Lows. See page 420.

Questions

1. What is the wind speed like when isobars are close together? Far apart?
2. A) In which direction does wind blow? From High to Low or from Low to High? B) What causes the wind to turn and blow *around* pressure centers? C) What direction is the rotation in the Northern Hemisphere? D) What direction is the rotation in the Southern Hemisphere?