

## 14. Highs and Lows

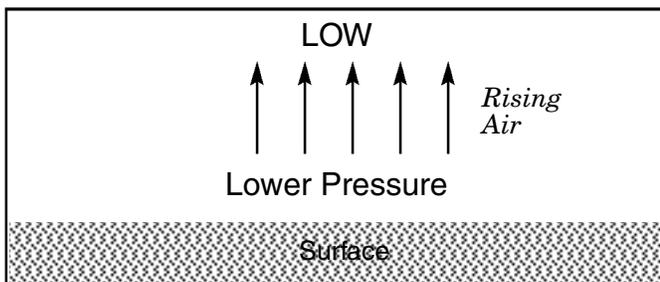
**OBJECTIVES:** After completing this lesson, a student should be able to:

- \* Identify fair weather (HIGH PRESSURE) on worksheet #2
- \* Identify areas of stormy (LOW PRESSURE) on the worksheet
- \* Plot ISOBARS on the worksheet (Grades 4-8)

### **TEACHER BACKGROUND:** (Grades 1-8)

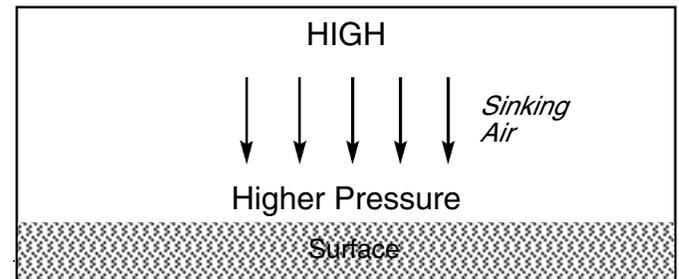
The meteorologist can study data plotted on a weather map and quickly determine if a portion of the country is under the influence of *high pressure* or *low pressure*. This lesson explains why the high or low pressure areas produce two distinct types of weather.

**LOW PRESSURE** areas usually produce cloudy, stormy weather. When a low pressure area is over a region, the air in the atmosphere is rising (just like air rising from a boiling pot of water). We know from our lesson on clouds that when air is forced to rise and cool, clouds form and precipitation might occur. That is why rising air within an approaching low pressure area means an increasing chance for clouds and rain or snow. Why is it called **LOW PRESSURE** on the weather map? Because as air rises from the surface of the earth, the pressure of the atmosphere is lower at the surface. If you and a barometer are under an area of low pressure, air that is rising weighs less on you (and the barometer), and the pressure decreases. (See figure.)



We will learn in the next lesson how **LOW PRESSURE** areas create wind and changes in temperature, as well.

**HIGH PRESSURE** areas usually produce fair weather. If you and a barometer are under a high pressure area, it means that air in the atmosphere is sinking on you (and the barometer) and pressure of the atmosphere is higher at the surface. Since air is not rising and cooling, thick cloud cover does not usually form within high pressure areas. (See figure below.) Stormy areas of low pressure are the exact opposite of fair areas of high pressure.



Students have already plotted pressure readings on their maps and can now add *isobars*, which help meteorologists to locate areas of the highest and lowest pressure. **ISOBARS** are lines which connect stations reporting the same barometric pressure. In other words, all points along one isobar line represent the same pressure. Sometimes, one has to estimate where the line is drawn between stations reporting readings that are close to the pressure reading of the isobar.

# Highs and Lows

## MAP-GRADES 1-3 (Time: 10 minutes)

**Materials:** Worksheet #2, pencil

**Preparation:** Distribute the students' worksheets #2. (Collect them after this lesson.)

**Procedure:**

1. Review the plotted data.  
*(Teachers of grades 1 and 2 may skip step #2 if they wish.)*
2. On the board, write a large letter "H" with a sun below it. Then draw a large "L" with a large, dark cloud and rain or snow below it. Explain how different weather occurs where you find an H or L on a weather map.
3. Write the data below and ask students to plot either a raindrop or a snowflake next to four more stations on the map.

STATION	SYMBOL
C	SNOWFLAKE
D	SNOWFLAKE
E	RAINDROP
H	RAINDROP

**Evaluation:** Which sky symbols have raindrops or snowflakes? (most of the cloudy symbols) Read temperatures where rain or snow is falling. Associate temperatures with types of precipitation.

**Excursion:** If no precipitation is falling today, ask what type would fall based on the temperature. If rain or snow IS falling, ask how far the temperature would have to rise or fall before the precipitation would change.

**Computer Disk:** Using today's newspaper map, make a computer weather map. Select appropriate symbols located below the map and move each symbol to the proper location.

## MAP-GRADES 4-8 (Time: 15 minutes)

**Materials:** Worksheet #2, red and blue pencils

**Preparation:** Distribute the students' worksheets #2. (Collect them after this lesson.)

**Procedure:**

1. Review the plotted data.
2. On the board (or handouts), draw a large "L" and a large "H." Ask students to help you list the types of weather associated with each letter.
3. Issue the following four weather reports and ask students to draw an appropriate symbol to represent each report next to the reporting station.

STATION	REPORT	SYMBOL
C	SNOW	SNOWFLAKE
D	SNOW	SNOWFLAKE
E	RAIN	RAINDROP
H	RAIN	RAINDROP

**Evaluation:** Associating the list of weather under the H and L on the board with the precipitation just plotted, ask students to place either a small, red L or blue H next to each station symbol.

**Excursions:** Students can draw isobar lines connecting stations reporting the same pressure reading. Draw a line connecting each station reporting the same pressure. Can you find an isobar pattern on the map around a LOW? (A LOW is over Kansas)

**Computer Disk:** Using the secondary weather map section, transfer this map or today's newspaper weather map to the computer map. In addition to the row of symbols below the map, select "more" for H and L symbols.

**WEATHERSCHOOL QUESTION:**

*Obtain the question and correct answer from your local Weatherschool TV channel!*