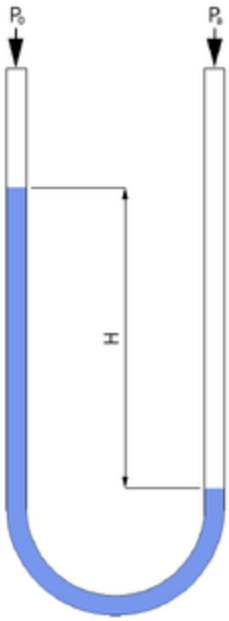
SLO # 7.1.2 The fourth state of matter 'plasma':

Plasma is a hot ionized gas consisting of approximately equal numbers of positively charged ions and negatively charged electrons. The characteristics of plasmas are significantly different from those of ordinary neutral gases so that plasmas are considered a distinct "fourth state of matter." For example, because plasmas are made up of electrically charged particles, they are strongly influenced by electric and magnetic fields while neutral gases are not.

SLO # 7.4.2 Use of the height of a liquid column to measure the atmospheric Pressure:

Liquid column



The difference in fluid height in a liquid column manometer is proportional to the pressure difference. $$H = \frac{P_a - P_o}{g\rho}$$

Liquid column gauges consist of a vertical column of liquid in a tube whose ends are exposed to different pressures. The column will rise or fall until its weight is in equilibrium with the pressure differential between the two ends of the tube.

A very simple version is a U-shaped tube half-full of liquid, one side of which is connected to the region of interest while the reference pressure (which might be the atmospheric pressure or a vacuum) is applied to the other. The difference in liquid level represents the applied pressure. The pressure exerted by a column of fluid of height h and density ρ is given by the hydrostatic pressure equation, $P = hg\rho$. Therefore the pressure difference between the applied pressure P_a and the reference pressure P_0 in a U-tube manometer can be found by solving $P_a - P_0 = hg\rho$. If the fluid being measured is significantly dense, hydrostatic corrections may have to be made for the height between the moving surface of the manometer working fluid and the location where the pressure measurement is desired.

Although any fluid can be used, mercury is preferred for its high density (13.534 g/cm^3) and low vapour pressure. For low pressure differences well above the vapour pressure of water, water is commonly used (and "inches of water" is a common pressure unit). Liquid-column pressure gauges are independent of the type of gas being measured and have a highly linear calibration. They have poor dynamic response. When measuring vacuum, the working liquid may evaporate and contaminate the vacuum if its vapor pressure is too high. When measuring liquid pressure, a loop filled with gas or a light fluid must isolate the liquids to prevent them from mixing. Simple hydrostatic gauges can measure pressures ranging from a few Torr (a few 100 Pa) to a few atmospheres. (Approximately 1,000,000 Pa)

A single-limb liquid-column manometer has a larger reservoir instead of one side of the U-tube and has a scale beside the narrower column. The column may be inclined to further amplify the liquid movement. Based on the use and structure following type of manometers are used

SLO # 7.4.4 Changes in atmospheric pressure in a region may indicate a change in the weather:

High and Low Air Pressure:

Certain weather conditions are associated with high and low pressure systems.

High Pressure Areas:

High pressure areas, or highs, are shown by "H" symbols. In a high pressure system, air pressure is greater than the surrounding areas. This difference in air pressure results in wind, or moving air. In a high pressure area, air is denser than in areas of lower pressure. The result is that air will move from the high pressure area to an area of less density, or lower pressure. Winds blow away from high pressure areas toward areas having lower air pressure.

Low Pressure Areas:

Low pressure areas, or lows, are shown by "L" symbols. Winds tend to blow into low pressure areas because air, like other gases, moves from areas of higher pressure into areas of lower pressure. As winds blow into a low, the air moves up. This upward flow of air can cause clouds and precipitation to form.

Air pressure is measured by barometers. In general, weather will improve when pressure increases and worsen when pressure decreases.

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