Knowleb

PxV=nRT
Law of *Ideal Gases*

What does each of these letters refer to according to the equation above?

P	Absolute pressure
V	Volume
n	Gas moles
R	Universal constant of ideal gases
T	Absolute temperature

The piece of glass is hermetic. If it does not break, what are the only two non-constant parameters in this system?
The P (pressure) and the T (temperature). The V (volume) the n (number of moles) and the R (constant of the ideal gases) are constant.

What will happen to the P if we increase the T?
If V, n and R are constant, increasing the T has to increase P to meet the ideal gas formula.

What will happen if we heat the large sphere with our hand?
The liquid will begin to **ascend**.

Why?
When the liquid is in the large sphere and we warm it up, the gas begins to expand. This **expansion** increases the pressure on everything that surrounds it. As the glass is solid, the gas does not have enough force to break it, so the only option is to push the liquid to expand. This is reason why the liquid rises.

Now that all the liquid is up in the small sphere, will the liquid go down if we heat it? Why?
Yes, for the same reason as in the previous test. When heated, the gas expands and increases pressure on the liquid, which causes it to go down the pipe.

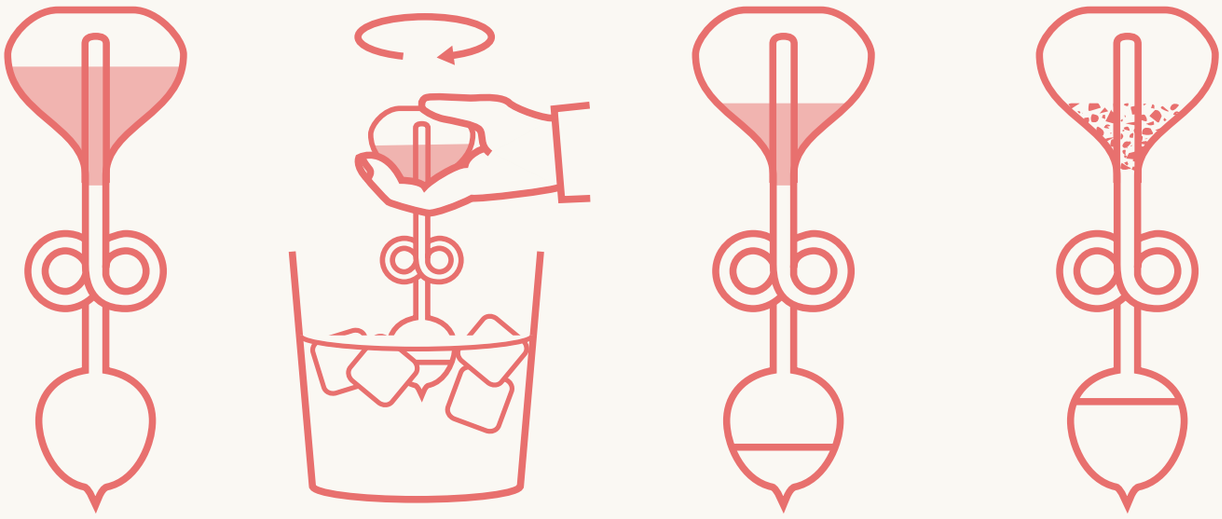
If we return all the liquid to the small sphere, we put the piece upside down and apply heat to the small sphere. Will the liquid rise? Why?
No. As there is no tube to the base of the small sphere *(in the large one there is one)* the gas can rise freely without the need to push the liquid. In fact if there are some drops of liquid left in the tube that connects both spheres, it is possible to observe how the gas pushes them, meaning it is raising.

Knowleb
Law of *Ideal Gases*

When the liquid is in the large sphere, we place the PxV upside down and submerge the small sphere and the central tube (both empty) in a beaker with ice, we will see that transparent liquid gradually fills the small sphere and in the end only colored powder remains in the large sphere. Why does this happen?

The gases occupy all the space they have. When the gas comes into contact with the cold tube it **condenses** and falls into the small sphere. Gradually, the liquid of the large sphere is transformed into gas and condenses until everything ends up in the small sphere.
The dye is solid and it needs a much higher temperature to evaporate, so it remains in solid state in the large sphere.

Distillation is a very common procedure in organic chemistry laboratories. It is often used to separate mixtures of solids and liquids, and even two or more liquids with different boiling points.



If we leave the device in the freezer overnight, the next morning it will still be liquid. Knowing that the freezing point of water is 0°C, that of acetic acid is + 16°C and that of ethanol -114°C, what liquid does PxV contain?
The water and the acetic acid would be frozen after a while in a freezer (-18°C approx.) While the ethanol remains liquid until it reaches -114°C that freezes, so we deduce that the liquid inside the PV is ethanol (ethyl alcohol).

Which of them would you use as antifreeze?
Ethanol, since added to any other substance causes its freezing point to fall considerably.

At what stage would the content be if it were acetic acid and we left it in the fridge overnight?
In solid phase. As soon as the temperature drops below 16 ° C (the refrigerator is usually at + 5 ° C) the acetic acid freezes.

Puede encontrar y descargar este documento en **español** en nuestra web **knowleb.com/recursos**
Vous pouvez trouver et télécharger ce document en **français** sur notre site web **knowleb.com/recursos**

Get to know us at
knowleb.com

WARNING
This is not a toy
Laboratory Glassware
Contains Ethyl Alcohol

MADE IN CHINA
Imported by Leboriz SLU
www.leboriz.com