

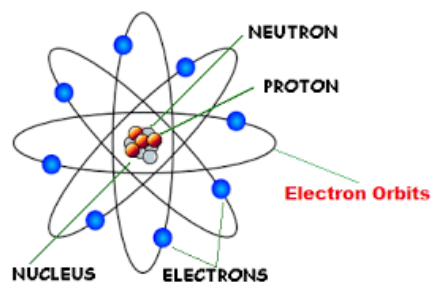
# You Matter!

Matter is anything that has mass and takes up space.

An atom is the smallest unit of ordinary matter

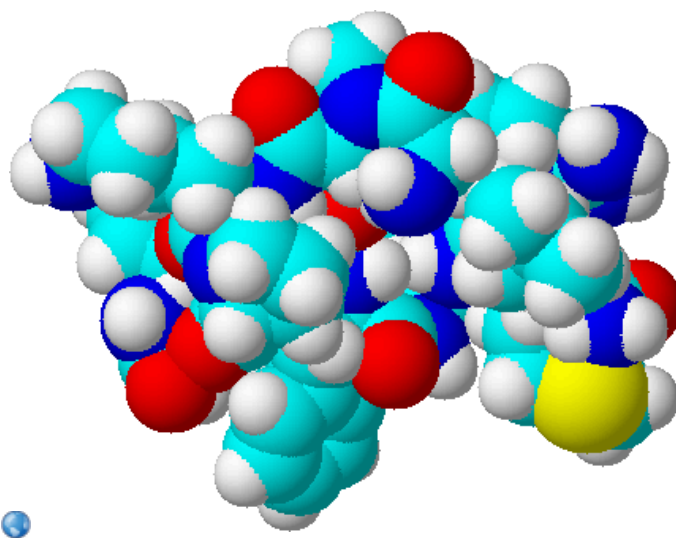


**Atomic Theory:** An atom has a small positively charged nucleus surrounded by a large region in which there are enough electrons to make the atom neutral.



# Classifying Matter!

Substances, Elements,  
Compounds & Mixtures



## Substances: a generic word for stuff we might be observing

- a type of matter--built from atoms
- fixed composition--always made up of the same thing
- can be an element, a molecule or a compound--but **NOT** a mixture!

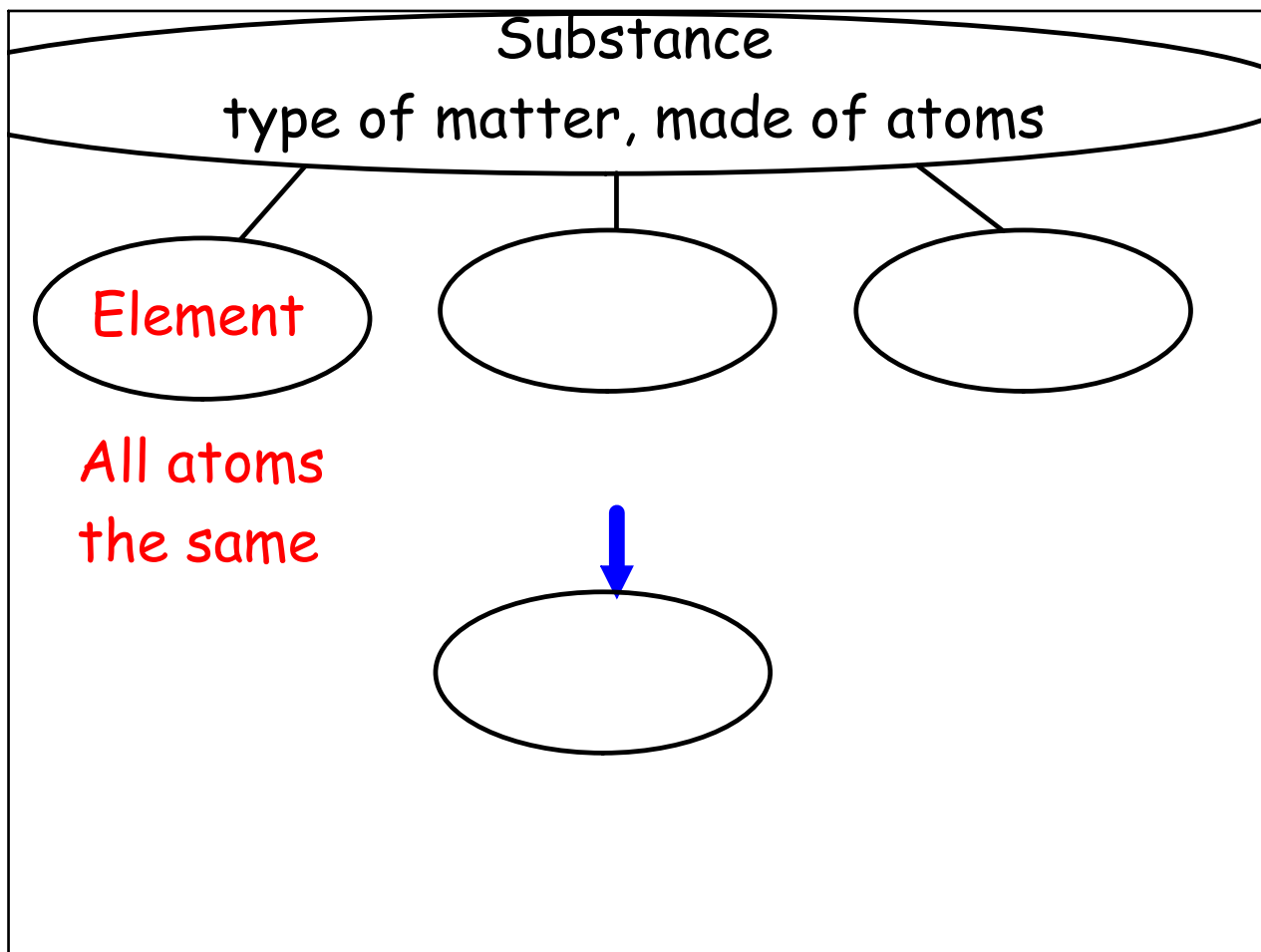
## Elements:

If all the atoms are the same in a substance it is considered an element.

Elements arranged on the periodic table by atomic numbers, atomic masses, and their characteristics.

### Periodic Table of Elements

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**Molecules:** a chunk of matter that is made up of two or more atoms chemically bonded together.

The smallest unit of a substance (molecule) that retains the same properties of the substance.

Some molecules are made **ONLY** of the same type of atoms, while other molecules are made of two or more types of atoms.

**Examples:** We write them with the atomic symbols from the Periodic Table. Subscript numbers tell you how many of each atom.

$H_2$  -- molecular hydrogen = 2 hydrogen atoms

$O_2$  -- molecular oxygen = 2 oxygen atoms

$H_2O$  -- Water =

2 hydrogen atoms, 1 oxygen atom

$CO_2$  -- Carbon Dioxide =

1 carbon atom, 2 oxygen atoms

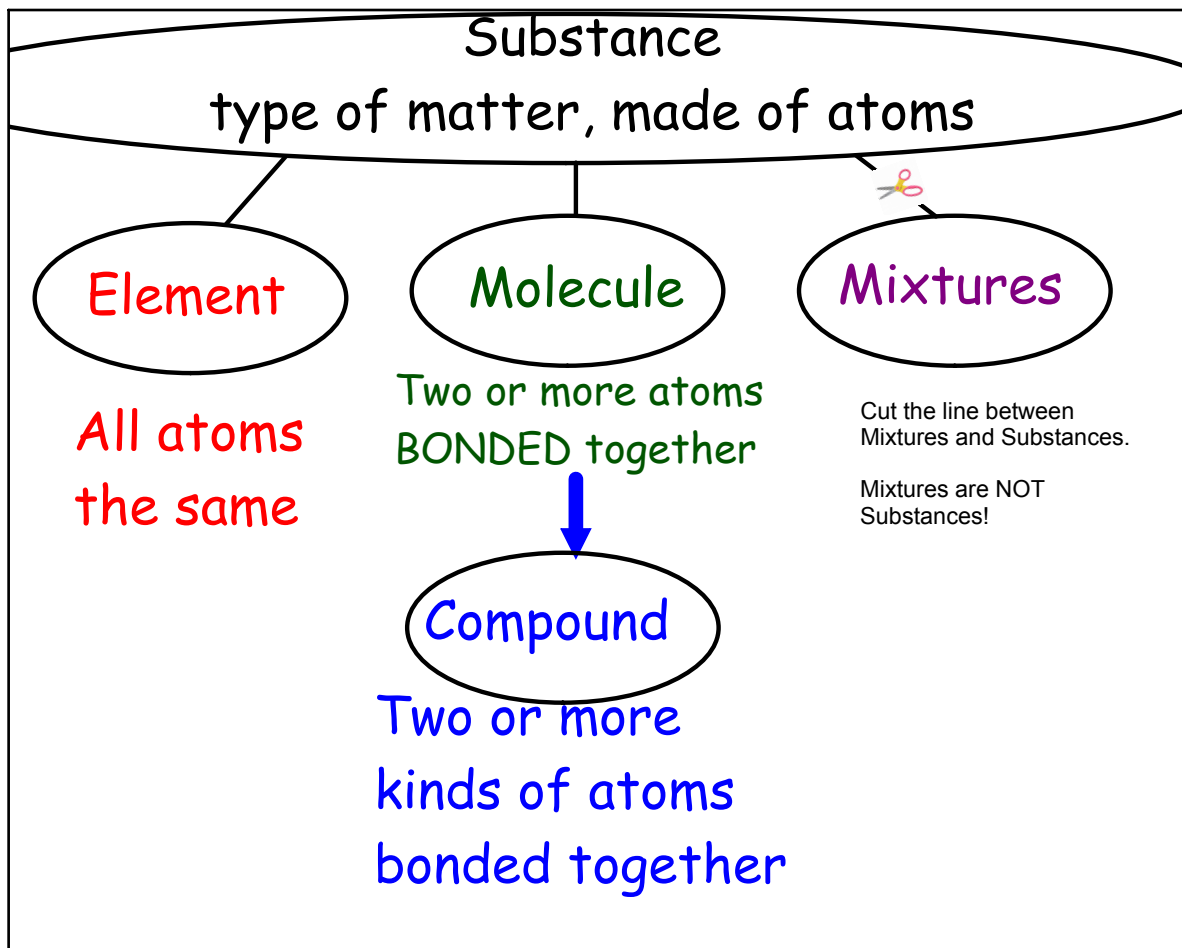
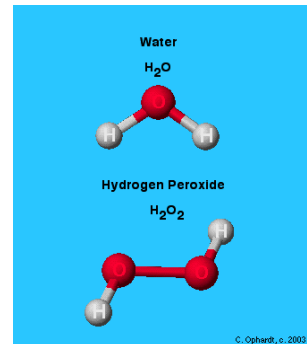
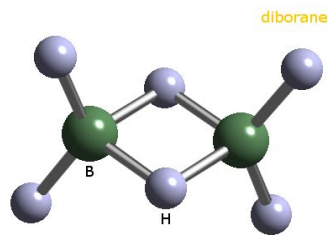
## Compounds:

Molecules made of two (or more!) elements combined

NOT ALL molecules are compounds

BUT

ALL compounds are Molecules!



**Mixture:** a material made up of two or more substances



broken down into two types

**Heterogeneous Mixtures:**

- More than two elements or molecules
- Not always the same proportions (lucky charms or trail mix)
- Can see individual properties of the ingredients
- Different materials can be distinguished easily (but you might need a microscope!)

## Heterogeneous Mixtures:

Examples of Heterogeneous Mixtures:



- Pizza (& all toppings, too!)
- Dry soup mix
- Salad dressing
- Granite



## Homogeneous Mixtures:

- Two or more substances **BLENDED EVENLY**
- Every part of the mixture is evenly mixed.
- Will not have same physical properties as the ingredients.
- Also called a ***solution***



## Homogeneous Mixtures:

Examples of Homogeneous Mixtures:

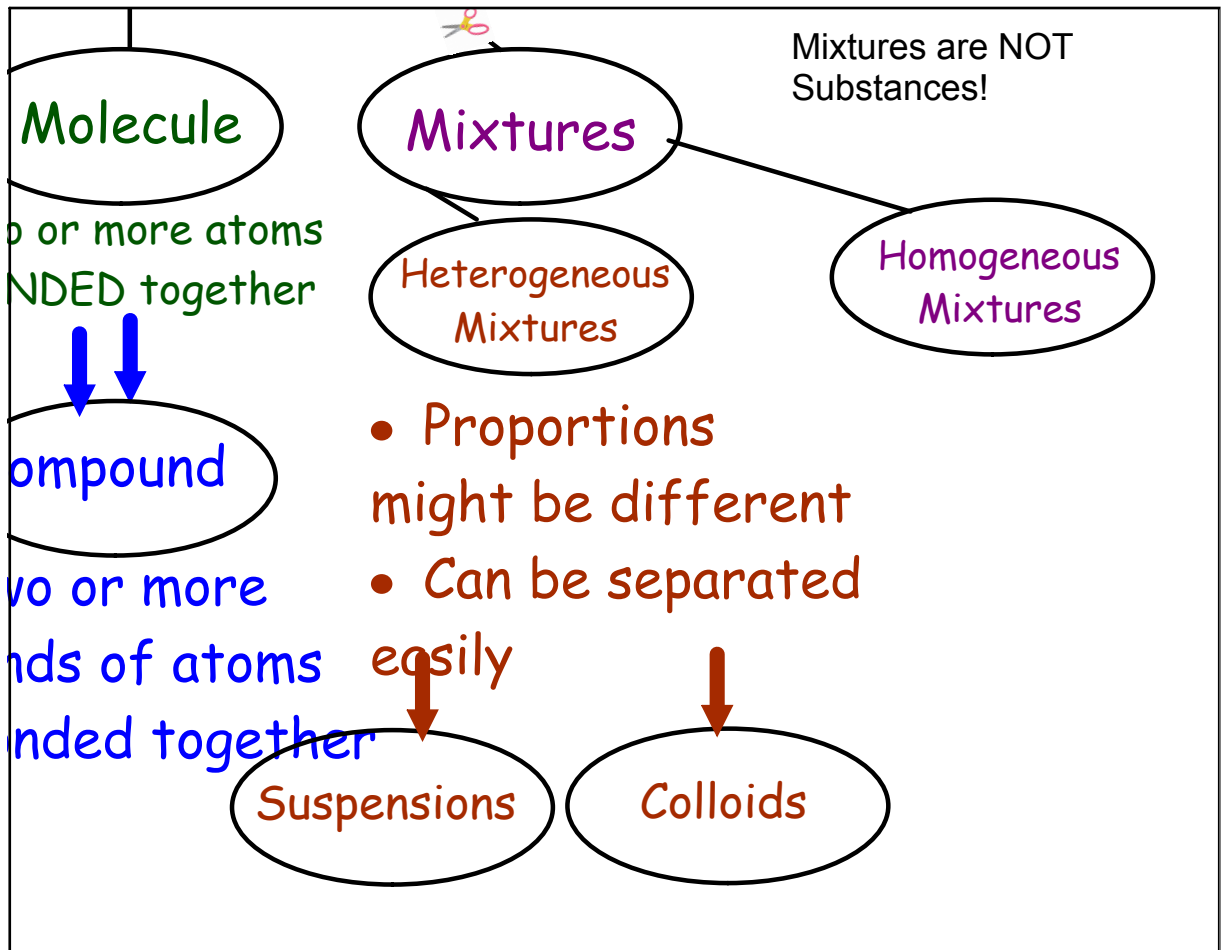
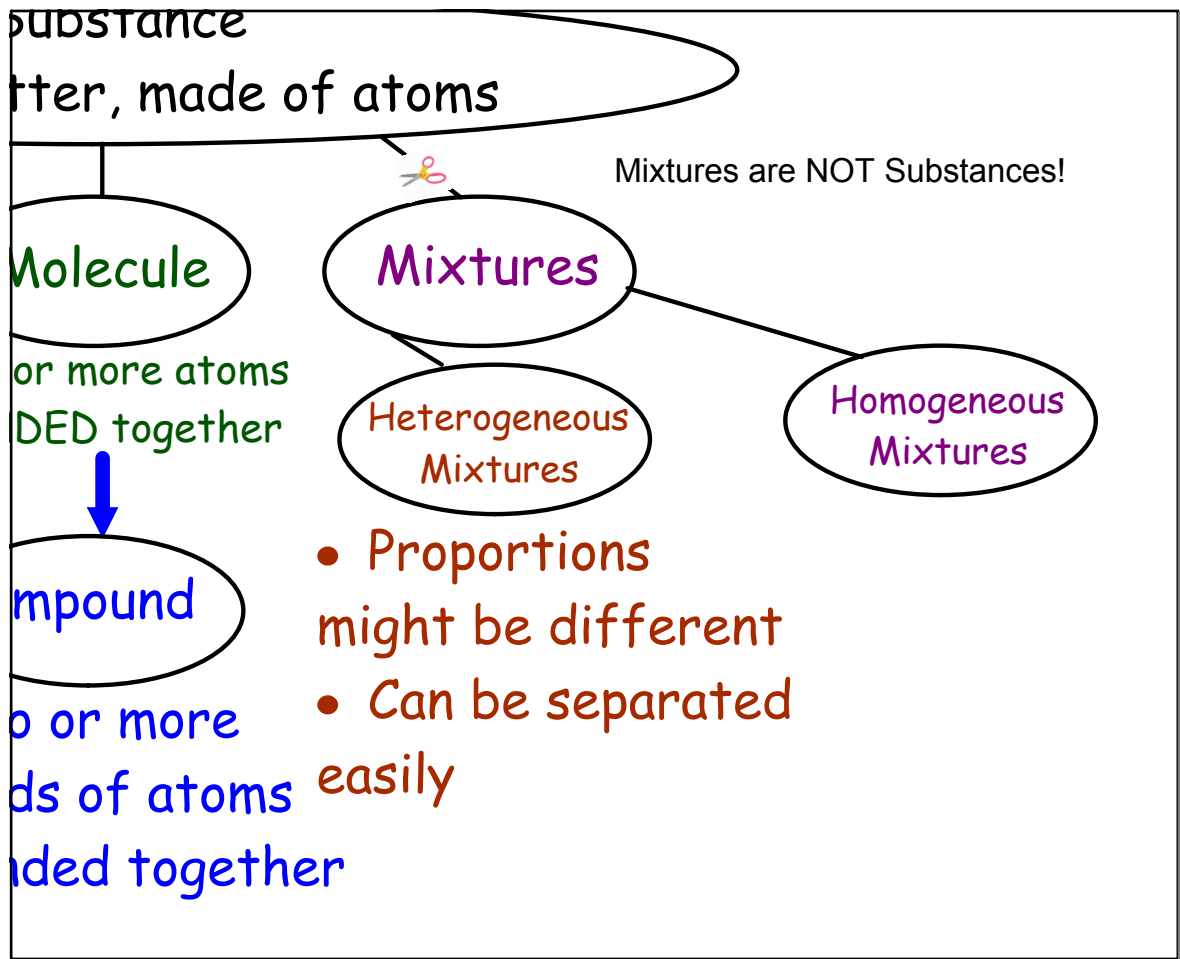


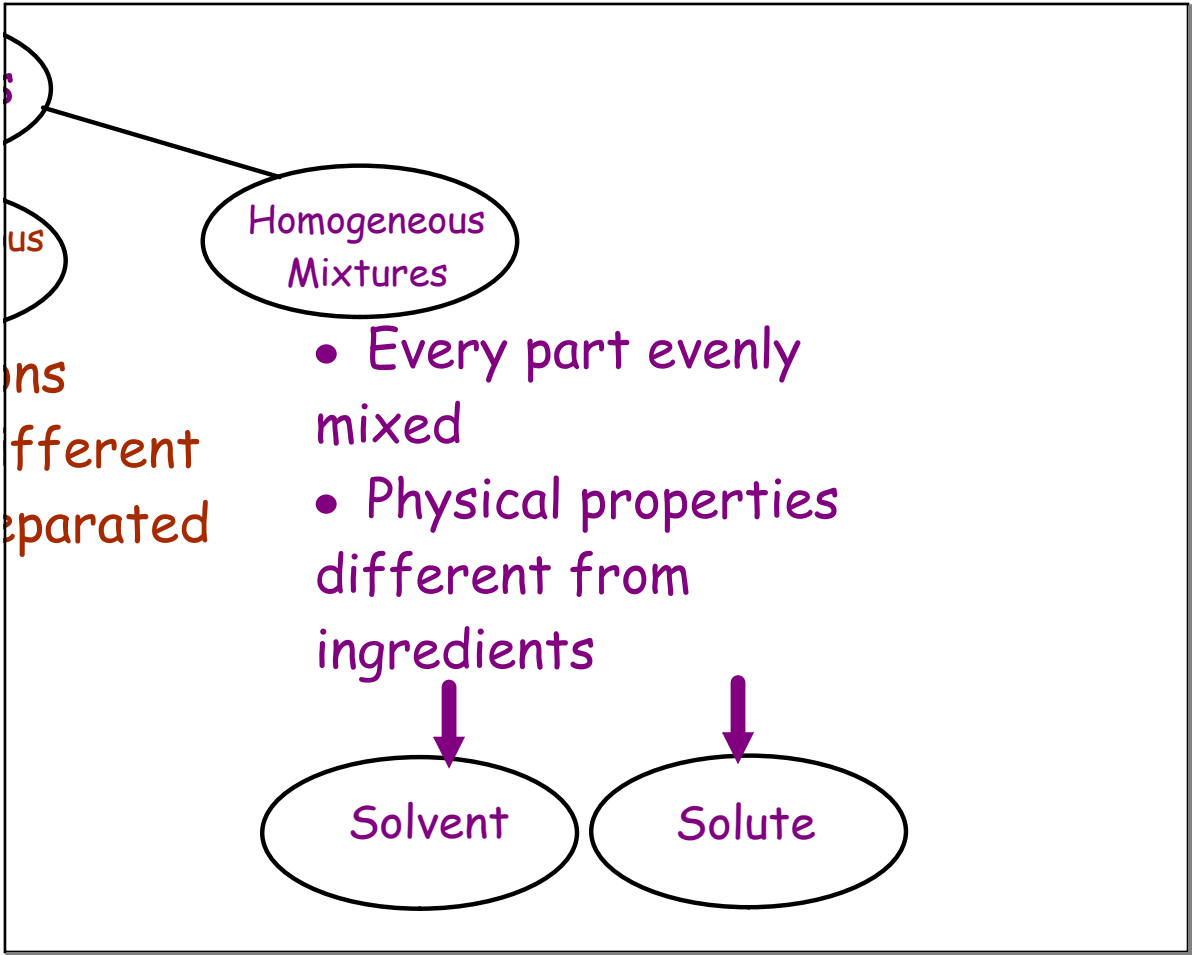
- Whipped Cream
- Brass
- Gatorade
- Koolaid



## Solutions:

- A type of homogeneous mixtures
- Solvent: the liquid that something dissolves into
- Solute: the thing that does the dissolving
- Water is the Universal solvent





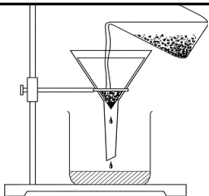
## Separating Mixtures

The collage includes four illustrations: a hand using tweezers to separate a yellow powder; a funnel on a stand filtering a mixture; a chromatography plate with a pencil line and solvent front; and a simple distillation apparatus with labels for thermometer, cooling water in/out, liebig condenser, solution, and distillate.

## Magnetism



Substances that contain a lot of iron can be separated by using a magnet

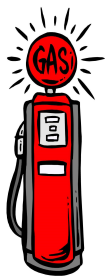


## Filter Paper (or other strainers)

Wire mesh screens will trap particles larger than the openings.

A series of screens, each with smaller openings, can be used to separate different substances

Filter Paper is a special type of paper used to trap very tiny particles.

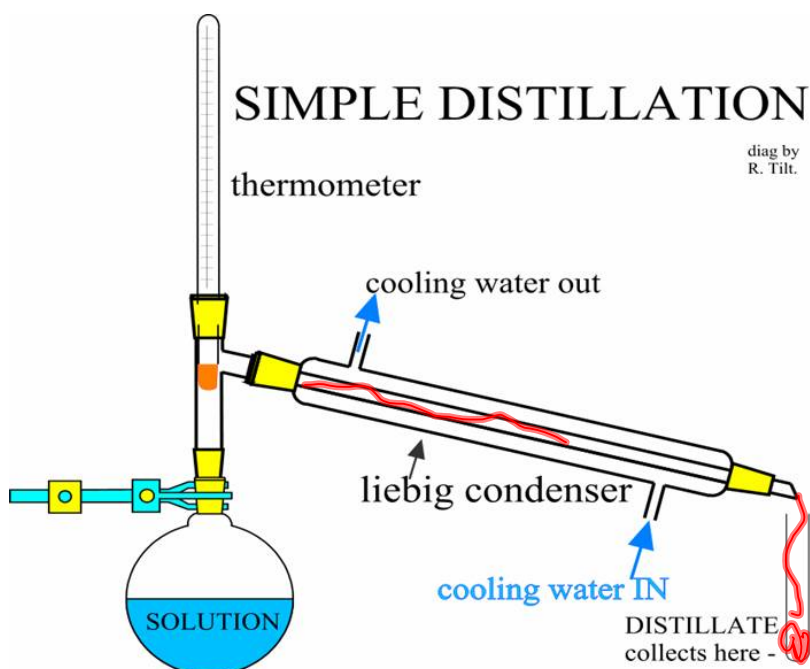
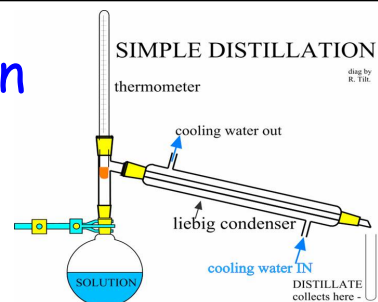


## Distillation & Evaporation

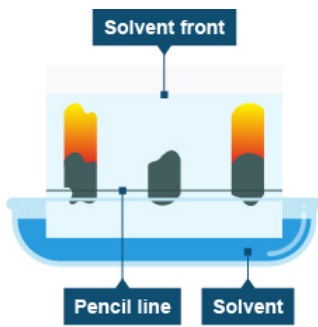
A solution is heated.

Different substances evaporate  
at different temperatures

After it evaporates, the steam is cooled  
and the substances are collected.



## Liquid Chromatography



A material is placed on chromatography paper

The edge of the paper is dipped in a solvent

The pigment "runs" up the paper to show the colors in the ink