

## 2.2 Structure of an atom

Different substances are made up of different particles.

- If we cut a piece of substance repeatedly until it is too small to be cut, we get “**atom**”.
- **Atom** is the **smallest part of an element**.
- **An element** is a substance that is made up of one kind of atoms only which have different sizes and masses for **different elements**.
- **Different elements** are represented by different **symbols**.
- Each **symbol** consists of at most 1 capital letter.

You can refer to the Periodic Table at the last page. Some of them are similar to the elements' names, some are not (they are related to the Latin names of the elements).

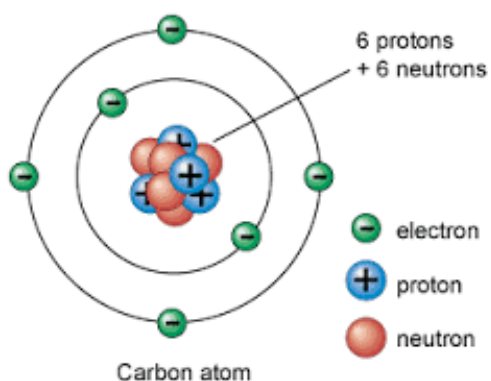
### Activity (1):

Find out the symbols and the uses for the first 20 and the common elements using the Periodic Table and Internet.

Order	Element	Symbol	Uses
1	Hydrogen	H	Rocket fuel, making fertilizers
2			
3			Mobile phone batteries
4			Watch spring
5			Tennis racket
6			
7			
8			
9			
10			
11			Table salt
12			Flash light bulb
13			
14			
15			Matches, fireworks
16			Matches, fertilizers, pesticide
17			
18			
19			Fertilizer
20			Element for bones and teeth

Other common elements:

Element	Symbol	Uses
Titanium		Spaceshuttle
Chromium		Making stainless steel
Manganese		Making alkaline-manganese battery
Iron		
Cobalt		Cobalt chloride paper for testing water
Nickel		Making coins and stainless steel
Copper		
Zinc		Making brass
Lead		Petrol-addictives
Mercury		
Tin		Making food can
Tungsten		
Silver		
Gold		
Platinum		



Atoms are made up of three parts – **protons, neutrons** and **electrons**.

Based on the diagram of atom shown, fill in the following information:

Part	Symbol	Relative mass	Relative charge	Position in an atom
Proton				
Neutron				
Electron				

\* You are not required to memorize the number of neutrons for each element.

Because all atoms are neutral (no charge), **the number of protons must be the same as the number of electrons**.

## 2.3 Atomic number and mass number

**Atomic number** (order of the elements) = **no. of protons** = **no. of electrons**

This number is like the identity of every element, and it is unique.

**Mass number** = **no. of protons** + **no. of neutrons**

as electrons are too light to be counted in mass number.



In this case, it means that Helium (He) has 2 protons (atomic number), 2 electrons (atomic number) and 2 neutrons (mass number – atomic number).

### Activity (2):

Complete the following table:

Atom	Atomic number	Mass number	No. of protons	No. of neutrons	No. of electrons
Fluorine			9	10	
Boron		11			5
Phosphorus	15	31			
Neon			10	10	
Potassium				20	19
Gold	79			118	
Iron		56			26
${}^7_3\text{Li}$	3	7			
${}^{27}_{13}\text{Al}$		27			
${}^{40}_{20}\text{Ca}$					
${}^{93}_{41}\text{Nb}$					
${}^{200}_{80}\text{Hg}$					