

LESSON NOTES

Subject: Basic Science

Year/Level: 10

Week 19

Strand	2: MATTER
Sub Strand	2.1 : INVESTIGATING MATTER
Content Learning Outcome	Investigate the structure of an atom and explain the properties of common elements in relation to their position on the periodic table.

INTRODUCTION

All that can be observed around us, using our senses, is either **matter** or **energy**.

Matter is the stuff around us and of what we are made.

The building blocks of matter are very small **particles**.

Everything around us is made of very tiny pieces, or particles.

Your body is made of particles. So are your desk, your chair, and this book. These particles are so tiny that it is impossible to pick up just one of them, and look at it.

However, there is a machine that is powerful enough to take pictures of *groups* of particles.

It is called **scanning electron microscope**. The microscope is very powerful, but still not powerful enough to show just one particle.

Matter, we can say is made of particles. This way thinking about matter is called **model**. A model is a way of explaining what something is and how it works. The model that we use to explain matter is called **particle model**. According to the particle model, all matter is made up of tiny particles called **atoms**. Everything is made of atoms.

Structure and Constituents of an Atom

Chemists are people who study types of matter and the changes matter goes through.

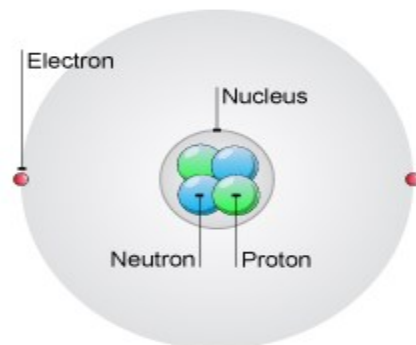
Nowadays, scientists and nonscientists alike accept that matter is made of tiny particles.

These **tiny particles** are **atoms**.

The word 'atom' comes from the Greek word *atomos* meaning indivisible or unable to be broken down any further.

Atoms are made from 3 kinds of sub atomic particles (particles smaller than an atom). **These are building blocks of atoms:**

1. **Protons** – are **positively (+)** charged particle which are tightly packed together in the nucleus of the atom.
2. **Neutron** – are neutral particle which have **no charge** and are found in the nucleus.
3. **Electron** – are **negatively (-)** charged particle which move around the nucleus in shells or orbits.



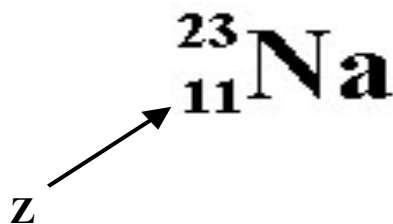
Proton and neutron are heavier than electron.

The negative charge electron balances the positive charge proton thus the *number of proton is equal to the number of electron.*

Atomic Number (Z)

number of protons (p) in any atom.

determines the element of the atom, e.g. any atom with 6 protons is carbon, regardless of the number of **neutrons** and **electrons**.



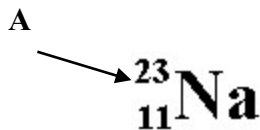
elements are arranged in the Periodic Table in ascending order of atomic number so it's easy to find the name or symbol for an atom if you know the atomic number.

11	12	14	16	19	20
B	C	N	O	F	Ne
5	6	7	8	9	10

Mass Number (A)

total number of protons (p) and neutrons (n) in an atom.

mass number is usually about twice the atomic number.

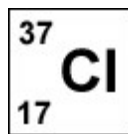
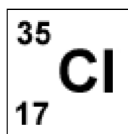


Isotopes

occurs when **two atoms** of the **same element** have **different numbers of neutrons**.
have the same atomic number but a different mass number.

Example:

Compare these two atoms – chlorine.



both chlorine

both have the same atomic number

different mass numbers

they're **isotopes** of chlorine.

Both isotopes have 17 protons.

isotope with mass number 35 has 18 neutrons.

isotope with mass 37 has 20 neutrons.

ACTIVITY:

State how many protons and electrons the following atoms would have:

<u>Atom</u>	<u>Number of protons</u>	<u>Number of electrons</u>
Lithium	3	_____

Sodium	_____	11
Fluorine	_____	_____
Magnesium	_____	_____

...STAY SAFE... 