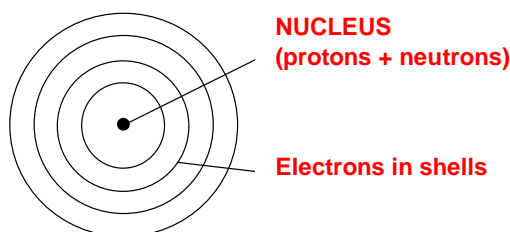




ATOMIC STRUCTURE

Atoms consist of a central **NUCLEUS** containing protons and **NEUTRONS**. The nucleus is **TINY** compared to the size of the whole atom. The nucleus is surrounded by **ELECTRONS** in energy levels (also called **SHELLS**). Atoms have no electric charge because they contain the same number of protons and **ELECTRONS**. The electrons are arranged in energy levels (**SHELLS**).

sub-atomic particle	relative mass	relative charge
proton	1	+1
neutron	1	0
electron	0.0005 or $\frac{1}{1836}$	-1



Atomic number = number of **PROTONS**

Mass number = number of **PROTONS** + number of **NEUTRONS**

The number of protons, neutrons and electrons in an atom can be worked out using the atomic number and mass number.

Number of protons = **ATOMIC NUMBER**

Number of neutrons = **MASS NUMBER - ATOMIC NUMBER**

Number of electrons = **ATOMIC NUMBER**

Atoms can be represented as follows:

$\begin{matrix} \text{mass number} \\ \text{atomic number} \end{matrix} \text{Symbol}$ e.g. ${}_{9}^{19}\text{F}$ protons = 9 neutrons = 10 electrons = 9

Atoms of the same element have the same number of **PROTONS**. In fact, it is the number of **PROTONS** that determines what type of atom it is (e.g. all atoms with 6 protons are carbon atoms). Atoms of different elements have different numbers of **PROTONS**.

Isotopes are atoms with the same number of **PROTONS** but a different number of **NEUTRONS**. This means they are atoms of the same **ELEMENT** with the same **ATOMIC** number but a different **MASS** number.

	${}_{17}^{35}\text{Cl}$	${}_{17}^{37}\text{Cl}$
protons	17	17
neutrons	18	20
electrons	17	17

Atom	Atomic number	Mass number	Number of protons	Number of neutrons	Number of electrons
${}_{11}^{23}\text{Na}$	11	23	11	12	11
${}_{3}^{7}\text{Li}$	3	7	3	4	3
${}_{18}^{40}\text{Ar}$	18	40	18	22	18
${}_{19}^{39}\text{K}$	19	39	19	20	19
${}_{13}^{27}\text{Al}$	13	27	13	14	13
${}_{92}^{235}\text{U}$	92	235	92	143	92
${}_{92}^{238}\text{U}$	92	238	92	146	92