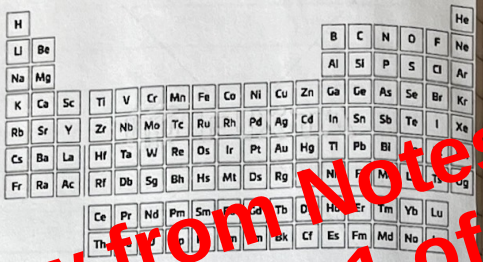
Atomic Structure

The Periodic Table shows the elements arranged in order of increasing atomic number.

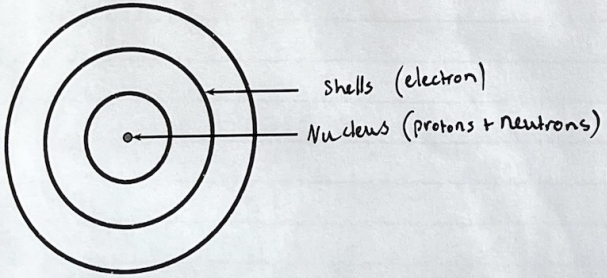


What is an element?

A substance that cannot be broken down into simpler substances

What is the structure of an atom?

An atom consists of three smaller particles called '**sub-atomic particles**' which are found in particular locations within the atom:



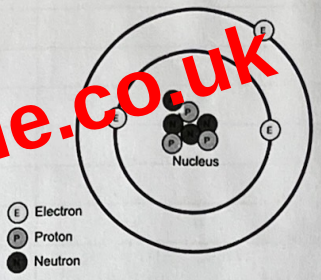
What are the properties of the sub-atomic particles?

Sub-atomic particle	Location	Relative mass	Relative charge
proton	Nucleus	1	+1
Neutron	Nucleus	1	0
Electron	Shells	$\frac{1}{1836}$	-1

Which sub-atomic particle(s) make up the mass of the atom? neutrons + protons

Which sub-atomic particle(s) contribute almost nothing to the mass of the atom? electrons

This diagram shows an atom of lithium:



From the atom to the left, give the number of:

a) **Protons?** 3

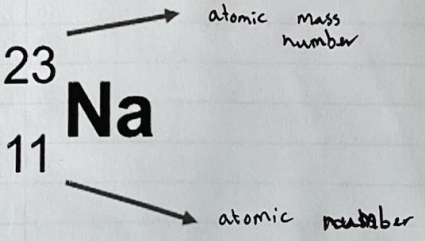
b) **Neutrons?** 4

c) **Electrons?** 3

Which is the **atomic number** and which is the **mass number**?

The atomic number is the number of protons. The atomic mass number is the number of protons and neutrons

Information about atoms is often written using symbol notation shown below and can be used to work out how many protons, neutrons and electrons an atom contains.



number of neutrons = atomic mass number − atomic mass

$n^0 = p^+ + n^0 - p^+$

The bigger of the two numbers is always the mass number.

- An atom of a particular **element** always has the same number of protons. The atomic number give the atom its identity.
- Atoms are, overall, **electrically neutral** because they have the same amount of protons and electrons.
- The number of neutrons can be calculated by the atomic mass number − atomic mass. In the example above, sodium has 12 neutrons.
- In the Periodic Table, the elements are arranged in order of increasing atomic number.