

1. Atomic Structure and periodic table

1.14

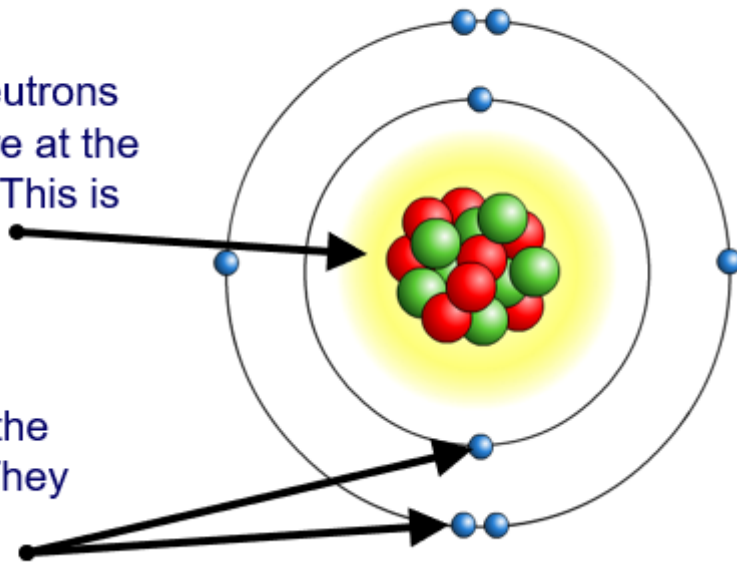
Atom - smallest unit of ordinary matter that forms a chemical element

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Protons, neutrons and electrons are **not** evenly distributed in an atom.

The protons and neutrons exist in a dense core at the centre of the atom. This is called the **nucleus**.

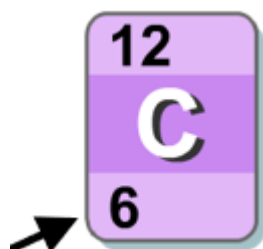
The electrons are spread out around the edge of the atom. They orbit the nucleus in layers called **shells**.



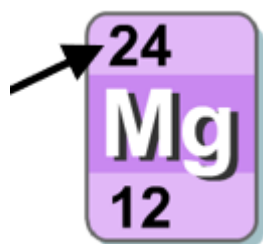
Particle	Mass	Charge
proton	1	+1
neutron	1	0
electron	almost 0	-1

1.16

Atomic Number (proton number) - number of protons in an atom



Mass Number (Nuclei Number)- sum of the protons and neutrons



1.17

atomic mass = [isotope(1) X abundance + isotope(2)x abundance]/2

To calculate the average r.a.m. of a mixture of isotopes, multiply the percentage of each isotope by its relative atomic mass and then add these together.

Naturally-occurring bromine is composed of two isotopes: bromine-79 (50.5%) and bromine-81 (49.5%).

What is the average r.a.m. of naturally-occurring bromine?

$$\begin{aligned}
 \text{average r.a.m.} &= (79 \times 50.5\%) + (81 \times 49.5\%) \\
 &= (79 \times 0.505) + (81 \times 0.495) \\
 &= 39.895 + 40.095 \\
 &= \mathbf{79.99}
 \end{aligned}$$

This figure can be rounded up.



1.18

Elements with different shell levels are ordered in periods

1.21

Metals, Nonmetals, and Metalloids																		He		
H														B		C	N	O	F	Ne
Li		Be										Al		Si	P	S	Cl	Ar	metals	
Na		Mg										Ga		Ge	As	Se	Br	Kr		
K		Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	metalloids	
Rb		Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe		
Cs		Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	nonmetals	
Fr		Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Uub	—	Uuq	—	—	—	—		
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1.22

The amount of full electron levels in a element equals the period of the element