

Year 10 C Pathway

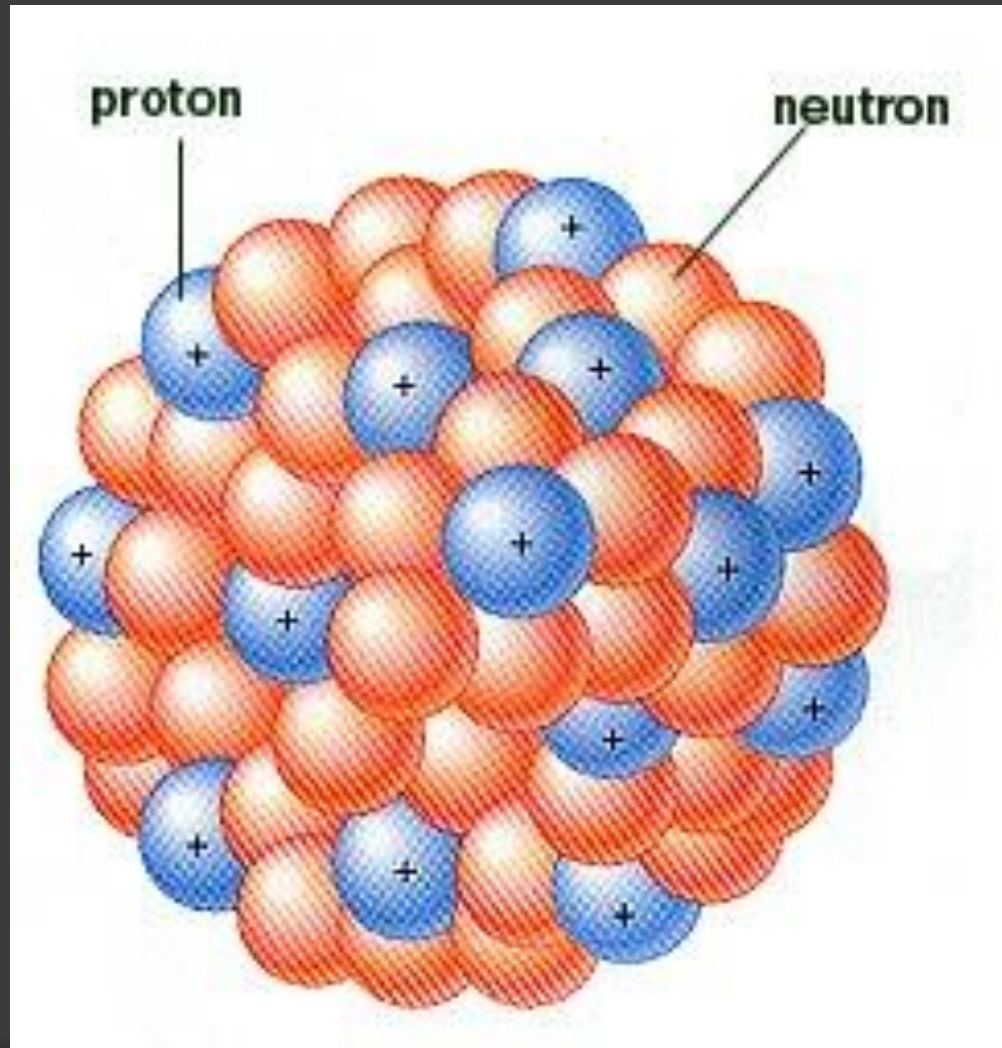
Mr. D. Patterson

INTRODUCTORY CHEMISTRY

Outcomes

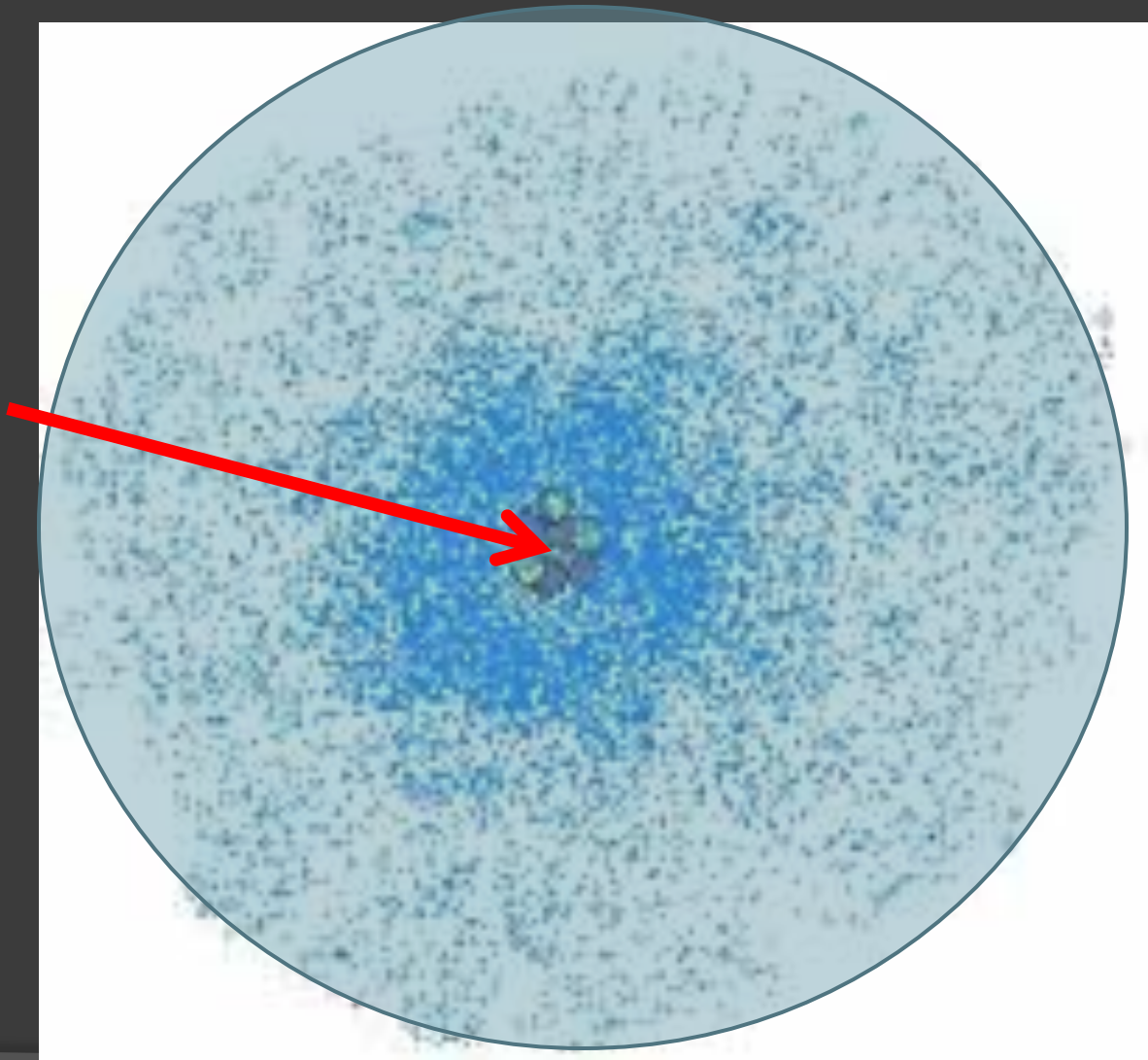
- Describe the parts that make up an atom
- What is the mass and charge for protons, neutrons and electrons
- Use $\frac{A}{Z}X$ notation to determine mass number and atomic number
- Describe what an isotope is and use $\frac{A}{Z}X$ notation to identify different isotopes

The Atom – Structure (Nucleus)



The Atom - Structure

Nucleus



Electron
Cloud

The Atom – Mass and Charge

Particle	Mass (kg)	Relative Mass	Charge
Proton	1.673×10^{-27}	1	+1
Neutron	1.675×10^{-27}	1	0
Electron	9.110×10^{-31}	1/2000	-1

The Atom – Atomic notation



- ⦿ X – element symbol (E.g.: C, O, N, Fe)
- ⦿ Z – atomic number (number of protons)
- ⦿ A – mass number (protons + neutrons)

Atomic Number (Z)

- ⦿ Used to identify the number of protons in the nucleus
- ⦿ The number of protons is fixed for each element
- ⦿ E.g: An oxygen atom will **always** have 8 protons. A carbon atom will **always** have 7 protons.

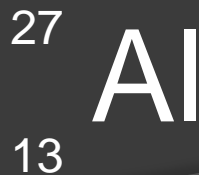
Mass Number (A)

- ⦿ Used to identify the total number of protons and neutrons combined
- ⦿ The number of neutrons can vary between atoms of the same element
- ⦿ Eg: An oxygen atom will always have 8 protons and usually 8 neutrons
- ⦿ Mass number = 8 protons + 8 neutrons = 16

Atomic Notation– Example

⦿ Using normal convention, identify the representation of a normal Aluminium atom

- What is the elements symbol?
- What is the atomic number?
- What is the mass number?



Atomic Notation – more examples

Element Symbol	No. of protons	No. of neutrons	Atomic Number (Z)	Mass Number (A)
C	6	6		
N			7	14
F	9			19
	19	20		39

Hint: $Z = \text{no. of protons}$

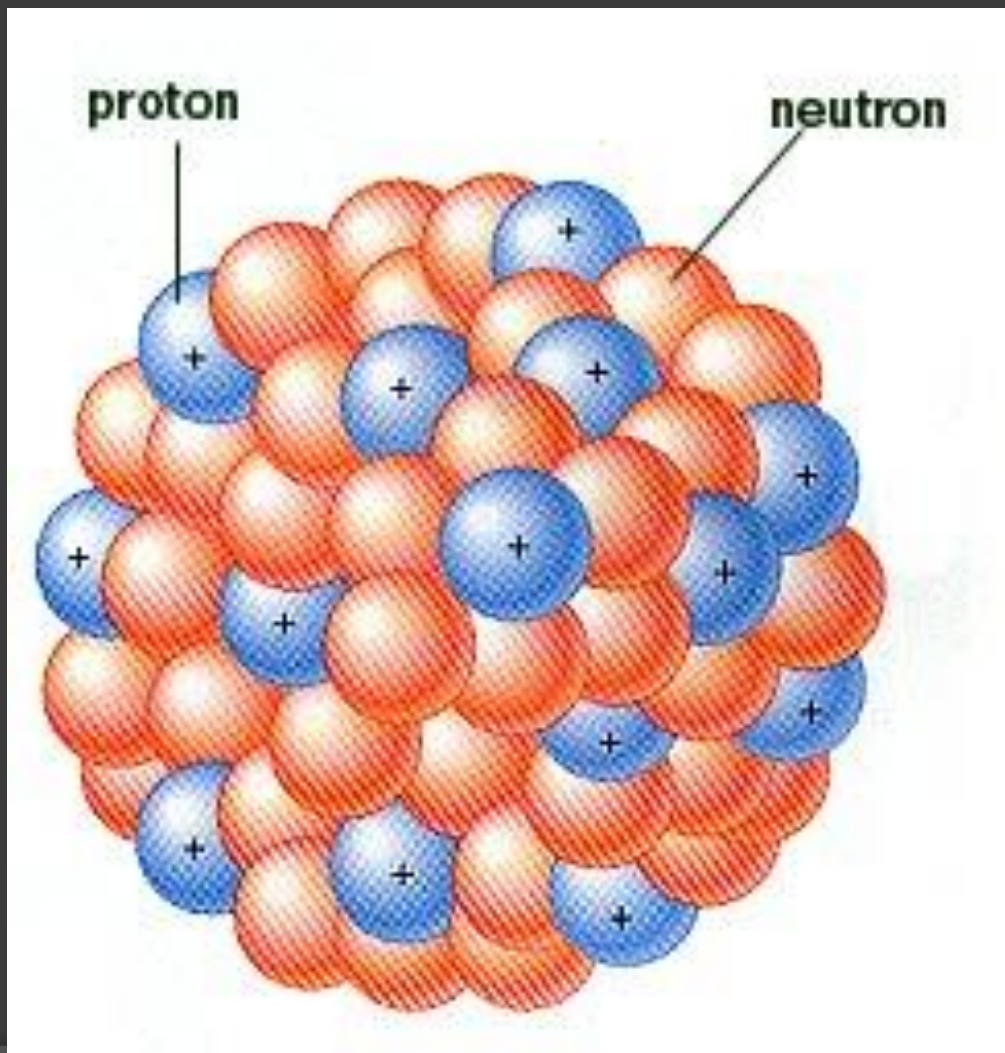
Hint: $A = \text{no. of protons} + \text{no. of neutrons}$

Hint: Use periodic table to find the element with atomic number 19

Atomic Notation – more examples

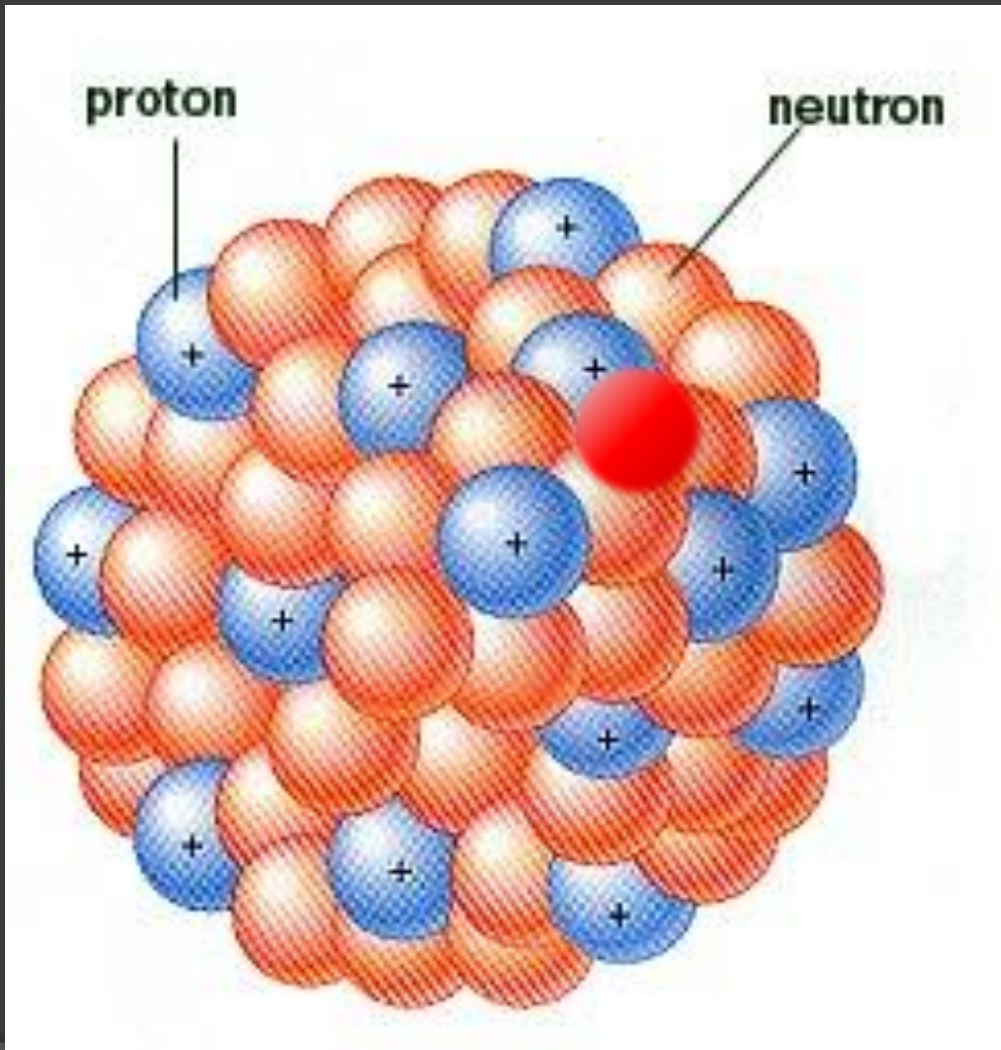
Element Symbol	No. of protons	No. of neutrons	Atomic Number (Z)	Mass Number (A)
C	6	6	6	12
N	7	7	7	14
F	9	10	9	19
K	19	20	19	39

Isotopes

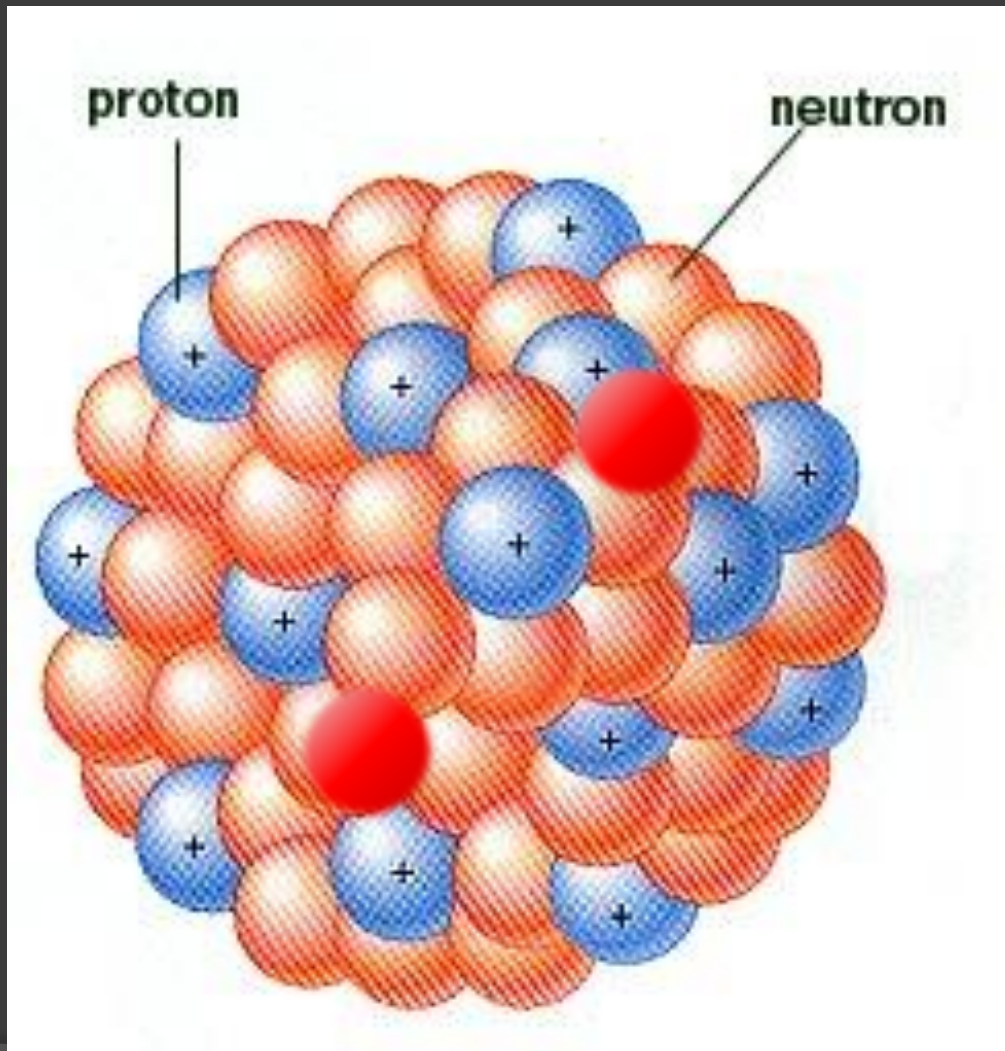


$^{80}_{35}\text{Br}$

Isotopes



Isotopes



Isotopes

- Isotopes are atoms of the same element (Carbon, Oxygen, etc.) but have different number of neutrons (and thus mass number too)

Isotope 1

Isotope 2

Isotope 3

Mass number (no. of protons + neutrons) changes



Atomic number (no. of protons) stays the same

Isotopes – real example

- Chlorine has an atomic number of 17; this means it has 17 protons
- Chlorine has two naturally occurring isotopes. A chlorine atom may have 18 or 20 neutrons (mass of 35 or 37)
- This is why the mass number for chlorine is 35.5. It is an average mass calculated from how common each isotope is.

Outcomes

- Describe the parts that make up an atom
- What is the mass and charge for protons, neutrons and electrons
- Use A_ZX notation to determine mass number and atomic number
- Describe what an isotope is and use A_ZX notation to identify different isotopes
- Checkpoint 1.1, 1.2, Set 1