

1.3 MASS #, ATOMIC # & ISOTOPES

OBJECTIVES:

To define the terms mass number, atomic number and isotopes

Suggest how Scientists can use isotopes

YOUR THOUGHTS...

What do we mean by:

- Atomic Number
- Mass Number
- Isotopes

KEY WORDS:

ATOMIC NUMBER

MASS NUMBER

ISOTOPE

CARBON DATING

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MASS NUMBER, A:

Total number of protons AND neutrons

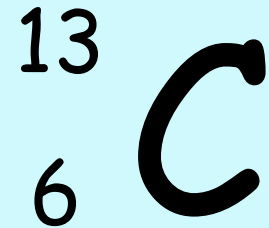
These nucleons are responsible for virtually all the mass of an atom

ATOMIC NUMBER, Z:

The number of protons in the nucleus

Sometimes called the proton number

Same for all atoms of the same element



$$\text{Neutrons} = \text{Mass Number} - \text{Atomic Number}$$

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ISOTOPES

Every **atom** of a particular **element** has the **same** number protons (and therefore electrons)

Atoms with the same number of protons but **different** numbers of neutrons are called **isotopes**

Different isotopes of the same element react chemically in the same way

Different isotopes vary in mass number because of different numbers of neutrons

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ISOTOPES

- Has 3 isotopes
- Mass numbers of 12, 13, & 14
- All react in the same way

Name	Carbon-12	Carbon-13	Carbon-14
Symbol	${}^{12}_6\text{C}$	${}^{13}_6\text{C}$	${}^{14}_6\text{C}$
Protons	6	6	6
Neutrons	6	7	8
Abundance	98.89%	1.11%	Trace

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ISOTOPES IN THE REAL WORLD

E.g. Carbon Dating

Some isotopes are unstable and break down (radioactivity)

Each isotope decays at a measured rate → its half life

E.g. Carbon 14 → half life is 5730 years

Scientists work backwards to calculate how long it would take for carbon-14 levels to fall from amount in a living sample to the amount in the dead sample

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COPY AND COMPLETE THE TABLE

Mass #	Atomic #	Electron #	Neutron #
9	4		
23	11		
		7	7
		9	10
	15		16

CARBON DATING

Summarise carbon dating → use page 9 to help you

1.3 MASS #, ATOMIC # & ISOTOPES

COPY AND COMPLETE THE TABLE

Mass #	Atomic #	Electron #	Neutron #
9	4	4	5
23	11	11	12
14	7	7	7
19	9	9	10
31	15	15	16

CARBON DATING

Summarise carbon dating → use page 9 to help you

1.3 MASS #, ATOMIC # & ISOTOPES

I CAN...	I AM...
Define mass number and atomic number	C
Calculate mass number, atomic number and neutron number	B
Explain what isotopes are	A
Suggest how isotopes can be used by scientists	A*

How low can you go?? Write what you can do and what grade this is → show some proof you can do this!