2 Atoms and elements – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary

Write each word three times.

English	**Write it 3 times** (English)		
atom			
element			
compound			
mixture			
nucleus			
protons			
neutrons			
Electrons			
shells			
proton number			
mass number			
Isotopes			

Recall

All substances are built from about 100 simple building blocks. Sorting them into three groups, and looking inside the **atom** , is where the IGCSE course begins.

- Everything is made of **atoms**.
- Atoms join together in different ways.

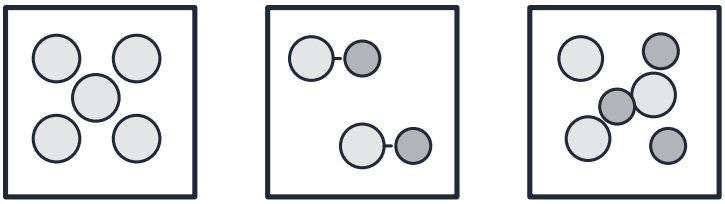
Nothing here is hard – it just sorts and names things.

New ideas

Read these first, then do the Practice.

1 Element, compound, mixture

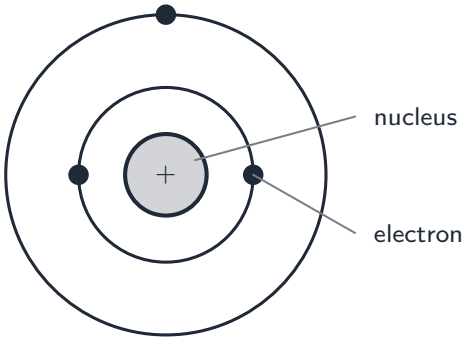
- an **element** has only **one** type of atom (e.g. copper, oxygen).
- a **compound** is two or more elements **chemically joined** (bonded) in a fixed ratio (e.g. water).
- a **mixture** is substances just **mixed**, not bonded, and easy to separate (e.g. air).



2 Inside the atom

The tiny **nucleus** holds **protons** (charge +1) and **neutrons** (charge 0). **Electrons** (charge −1) move in **shells** around it.

Particle	Relative mass	Relative charge
proton	1	+1
neutron	1	0
electron	≈ 0	−1



lithium (2,1)

The **proton number** names the element. The **mass number** is protons + neutrons.

3 Isotopes

Isotopes are atoms of the **same** element (same protons) with **different** numbers of neutrons. They have the **same chemical properties** (chemistry depends on electrons).

Watch out: the **proton number** names the element; the **mass number** is protons + neutrons, so neutrons = mass number − proton number (not just the mass number). Isotopes react the same because chemistry depends on the *electrons*, which are unchanged.

Practice

Try these in order.

2.1 Define an *element* and a *compound*. [2]

2.2 State the charge on (a) a proton, (b) a neutron, (c) an electron. [3]

2.3 An atom has 11 protons and 12 neutrons. Give its (a) proton number, (b) mass number. [2]

2.4 Write the electronic configuration of sodium (11 electrons). [1]

2.5 What are isotopes? [2]

2.6 Challenge. Chlorine has two isotopes, chlorine-35 and chlorine-37 (both with proton number 17). State how many neutrons each has, and explain why they react in exactly the same way. [3]