

Unit 1 — Homework & Practice

8 weeks · do one each week · the **spaced retrieval** part is no-notes

v2.1

Name _____ Class _____

WEEK 1 Matter & classifying substances



DEFINITIONS — WRITE IN FULL SENTENCES

matter _____

elemental substance _____

compound substance _____

mixture _____

CORE PRACTICE Classify each as **elemental substance**, **compound substance** or **mixture**:

Elemental substance	Compound substance	Mixture

iron · water · air · oxygen · salt water · carbon dioxide · brass · sodium chloride

1. Which of these are **molecular elemental** (same atoms joined)? O₂ · Fe · He · N₂

2. Explain why air is a **mixture** and not a compound substance.



DEFINITIONS

chemical symbol

chemical formula

subscript

CORE PRACTICE Count the atoms of each element:

Formula	Atoms	Formula	Atoms
H_2O		FeCl_2	
CO_2		MgCO_3	
HSO_4		$\text{Ca}(\text{OH})_2$	
2CO_2		$(\text{NH})_2\text{SO}_4$	

SPACED RETRIEVAL (NO NOTES)

1. Define **elemental substance**.

2. Classify: argon · iron chloride · pure water.

**DEFINITIONS — THESE ARE TESTED WORD-FOR-WORD**

atomic number (Z) _____

mass number (A) _____

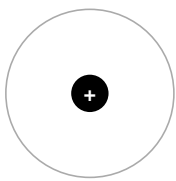
nucleus _____

CORE PRACTICE

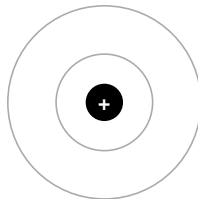
1. Complete: the three particles and their relative charge & mass.

Particle	Relative charge	Relative mass
proton		
neutron		
electron		

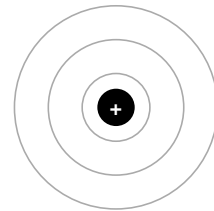
Draw Bohr diagrams (show electron arrangements):



Helium (Z=2)



Carbon (Z=6)



Sodium (Z=11)

SPACED RETRIEVAL (NO NOTES)1. How many atoms in total in **CaCO₃**?2. Is **frying an egg** a physical or chemical change? (you'll learn why later)



DEFINITIONS

ion _____

isotope _____

electron arrangement _____

CORE PRACTICE — COMPLETE THE TABLE (WORK IN EVERY DIRECTION)

Element	Z	A	Protons	Neutrons	Electrons
	6	12			
Oxygen		16			
		23	11	12	
			9	10	9

1. Write the ion: magnesium loses 2 e _____ chlorine gains 1 e _____

2. How many **neutrons** in uranium-238 ($^{238}_{92}\text{U}$)?

3. Hydrogen (^1_1H) and deuterium (^2_1H): one **difference** and one **similarity**.

SPACED RETRIEVAL (NO NOTES)

1. Define **mass number**.



DEFINITIONS

group

period

noble gas (Group 18)

CORE PRACTICE

Element	Group	Period	Metal / non-metal?
Sodium			
Chlorine			
Argon			

1. An element has arrangement **2, 8, 7**. Which **group** and **period**?

2. Why are the **noble gases** unreactive?

3. Predict one property of an element in Group 1 (use its position).

SPACED RETRIEVAL (NO NOTES)

1. Particle with 10 electrons, 11 protons, 12 neutrons — atom or ion? Metal?

**DEFINITIONS**

reactivity

alkali metal (Group 1)

halogen (Group 17)

CORE PRACTICE

1. Order by **increasing reactivity**: potassium, lithium, sodium.

2. **Explain** why potassium is more reactive than lithium — use **shells** and **distance from the nucleus**.

3. Down Group 17, does reactivity increase or decrease? Predict: F or I more reactive?

SPACED RETRIEVAL (NO NOTES)

1. Define **group**.

2. Classify: brass · oxygen · water.



DEFINITIONS

physical change

chemical change

law of conservation of mass

CORE PRACTICE

1. Physical or chemical? frying an egg · melting ice · rusting · dissolving sugar · a firework.

2. State symbols: what do **(s)**, **(l)**, **(g)**, **(aq)** mean?

3. Balance: $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$ and $\text{Na} + \text{Cl}_2 \rightarrow \text{NaCl}$

4. Explain why magnesium forms **MgCl₂** but lithium forms **LiCl**.

SPACED RETRIEVAL (NO NOTES)

1. Explain the reactivity trend down Group 1 (one line).

**DEFINITIONS**

rate of reaction
(change in
concentration of
reactant or product
over time)

collision theory
(successful collisions)

catalyst

CORE PRACTICE

1. Name the three main factors that change the rate, and say **why** (collisions).

2. On a rate graph, what does a **steeper** line mean? When does the line level off?

WHOLE-UNIT RETRIEVAL (NO NOTES) — EXAM STYLE

1. Define **atomic number** and **mass number**.

2. Particle with 17 p, 17 e, 18 n and one with 17 p, 17 e, 20 n — what is their relationship?

3. Draw the Bohr diagram for chlorine ($Z = 17$) and give its group.

4. Balance: $\text{Al} + \text{Cl}_2 \rightarrow \text{AlCl}_3$
