KNOWLEDGE ORGANISER · EDEXCEL IGCSE CHEMISTRY · SECTION 1

1.2 Elements, Compounds & Mixtures

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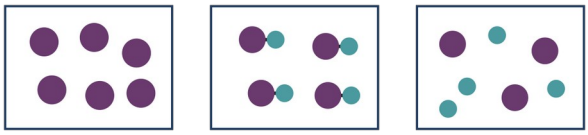
1. KEY VOCABULARY

TERM	MEANING
Element	A substance made of only one type of atom.
Compound	Two or more elements chemically bonded together.
Mixture	Two or more substances not chemically bonded.
Atom	The smallest particle of an element.
Molecule	Two or more atoms covalently bonded together.
Pure substance	A single element or compound, nothing else mixed in.
Alloy	A mixture of a metal with one or more other elements.

2. ELEMENT vs COMPOUND vs MIXTURE

	ELEMENT	COMPOUND	MIXTURE
Made of	One atom type	Elements bonded	Substances not bonded
Separated by	Cannot	Chemical reaction	Physical methods
Fixed ratio?	—	Yes	No
Properties	Own	New, own	Like its parts

3. PARTICLE PICTURES



ELEMENT — one type of atom

COMPOUND — different atoms chemically bonded

MIXTURE — not chemically bonded

Elements = one colour. **Compounds** = different atoms joined.
Mixtures = different particles, not joined.

4. SEPARATING MIXTURES

METHOD	SEPARATES	USES
Filtration	Insoluble solid from liquid	Difference in solubility
Crystallisation	Dissolved solid from solution	Solvent evaporates, crystals form
Simple distillation	Solvent from solution	Difference in boiling point
Fractional distillation	Two liquids	Different boiling points
Chromatography	Dissolved substances (e.g. dyes)	Different solubility / movement

5. PURITY & CHROMATOGRAPHY

A pure substance melts and boils at one fixed temperature. An impure one melts over a range and at a lower temperature.
Chromatography: a pure substance gives one spot. Rf = distance moved by spot ÷ distance moved by solvent. Rf is always between 0 and 1.

6. THE WHY

Why mixtures are easy to separate: the substances are not chemically bonded, so physical methods (heating, dissolving, filtering) are enough — no reaction needed.
Why compounds are hard to separate: the elements are held by chemical bonds, so only a chemical reaction can break them apart.

7. COMMON EXAM MISTAKES

✗ "Air is a compound."
✓ Air is a mixture of gases — not chemically bonded.
✗ "A compound has the properties of its elements."
✓ A compound has its own new properties.
✗ "Distillation separates an insoluble solid."
✓ Filtration does that; distillation separates by boiling point.

8. SELF-CHECK · cover & quiz

Can you…

1. Define element, compound and mixture?
2. Draw the particle picture for each?
3. Name the method to separate sand from water? Salt from water?
4. Explain why a mixture is easier to separate than a compound?
5. Describe how a pure substance behaves when heated?
6. Calculate an Rf value and say what it tells you?