NCERT – GRADE 8 CHEAT SHEET

NATURE OF MATTER: ELEMENTS, COMPOUNDS, AND MIXTURES

Pumpa

Key Concepts, Definitions, Diagrams & Quick Facts

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1 MIXTURES

- A mixture contains two or more pure substances, physically mixed in any proportion.
- The components retain their individual properties.
- Mixtures can be:
  - **Uniform** (same composition throughout)
  - **Non-uniform** (composition is not the same throughout).

Examples: air, aerated water, oxygen in water, oil and water, alloys (like brass, steel).



Air (uniform) | Aerated water (uniform) | Oil and water (non-uniform) | Alloy (uniform)

2 TYPES OF MIXTURES

Uniform Mixture

- Same composition throughout.
- Components are not visible even with a microscope.
- **Example:** air.



Air (mainly nitrogen, oxygen, argon, carbon dioxide and water vapour)

Non-Uniform Mixture

- Composition is not the same throughout.
- Components are visible or can be seen (sometimes).
- **Example:** soil, oil and water, sand in water.



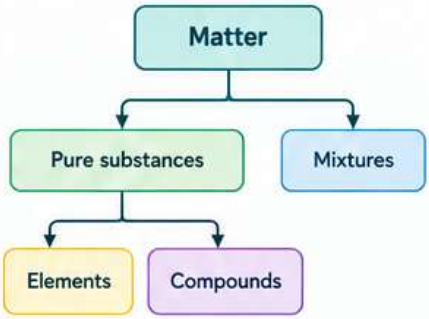
Soil (non-uniform)

Note: Dust and pollutants in air can make it non-uniform at times.

3 PURE SUBSTANCES

- A pure substance has a fixed composition and consists of only one kind of substance.
- Pure substances are of two types:

  (i) Elements **(ii) Compounds**



4 ELEMENTS

- **Elements** are the simplest substances that cannot be broken down into simpler substances by chemical means.
- They are made up of only one kind of atom.
- **Examples:** iron, copper, oxygen, hydrogen, sulphur.



Iron | Copper | Oxygen | Hydrogen | Sulphur

5 COMPOUNDS

- Two or more different elements chemically combined in a fixed ratio, forming a substance with new properties.
- Examples: water (H_2O), iron sulphide (FeS).

Physical Mixing

Components retain their individual properties.



Water + Salt

(just mixed, not a new substance)

Chemical Combination

New substance with new properties.



Water + Iron sulphide

(new substance formed)

NCERT Activities (Conceptual)

- Electrolysis of water → shows that water is a compound.
- Heating iron and sulphur → forms iron sulphide (compound).

6 ELEMENT vs COMPOUND vs MIXTURE

Feature	Element	Compound	Mixture
Composition	One kind of atom	Two or more elements in fixed ratio	Two or more substances (in any ratio)
How constituents are combined	Not combined (with other elements)	Chemically combined	Physically mixed
Properties	Retains its own properties	New properties (different from elements)	Retains individual properties
Separation / Chemical change	Cannot be separated by physical methods	Requires chemical methods	Components can be separated by physical methods

Real-life Applications

Useful Elements

- Iron (construction), copper (wiring), oxygen (breathing), sulphur (medicines).



Useful Compounds

- Water (life), salt (food), carbon dioxide (plants), medicines (various compounds).



Useful Mixtures

- Air (breathing), soil (farming), alloys (stronger metals), sea water (resources).



Minerals



Minerals are naturally occurring substances from which useful elements and compounds can be obtained.

QUICK FACTS

- A pure substance is not simply "clean" in everyday language.
- Air is a mixture of gases.
- A compound has a fixed composition (e.g. water is always H_2O).
- Mixture components retain their individual properties.

COMMON MISTAKES

- ✗ Do not call every two-substance combination a compound.
- ✗ Do not confuse a uniform mixture with a pure substance.
- ✗ Do not say elements can be chemically split into simpler substances.

KEY TAKEAWAY

- ✓ Matter can exist as elements, compounds or mixtures.
- ✓ Elements are made of one kind of atom.
- ✓ Compounds have a fixed composition and new properties.
- ✓ Mixtures have variable composition and can be separated by physical methods.
- ✓ Minerals help us obtain useful elements and compounds.

Remember: Pure ≠ simply "clean" | Air = mixture | Compound = fixed composition | Mixture = retain properties