Classifying Matter: Elements, Compounds, and Mixtures

All matter has certain characteristics in common that separate it from whatever is not matter. Can you tell which is which? Work with a partner at your table. You will be given a set of cards. Each card has 6 items on it. Try and classify all the items in the chart. What characteristics does the matter have that the not matter does not?

Does it Matter or NOT

Matter	Not Matter

What is Matter

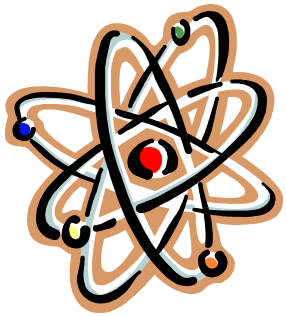
- Matter is anything that has mass and takes up space
- Matter is made up of atoms. An atom is the smallest unit of matter
- Atoms can combine or bond to form a molecule

Pure Substances

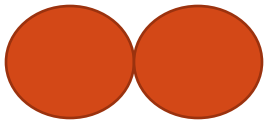
- A sample of matter that has definite chemical and physical properties.

Elements

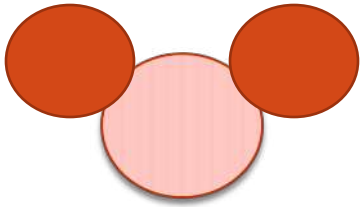
Atoms



Molecules

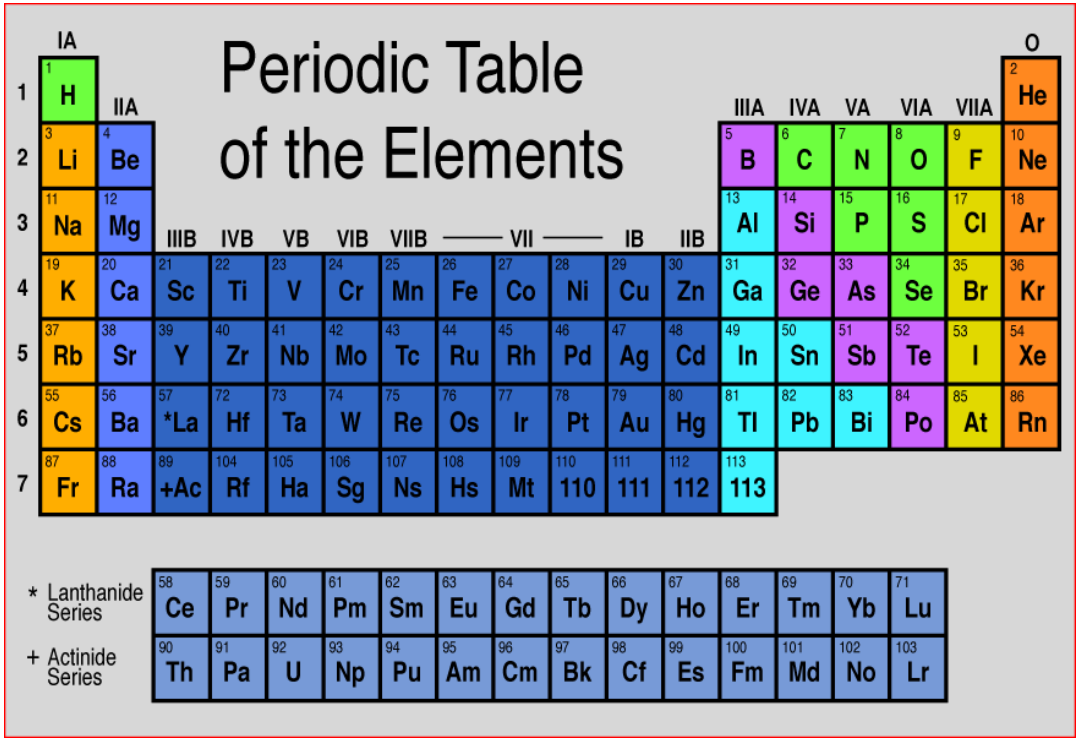


Compounds



Elements

- pure substance that cannot be separated into simpler substance by physical or chemical means.



Compounds

Pure substance composed of two or more *different elements joined by chemical bonds.*

- Made of elements in a specific ratio that is always the same
- Has a chemical formula
- Can only be separated by chemical means, not physically

H_2O

$NaCl$

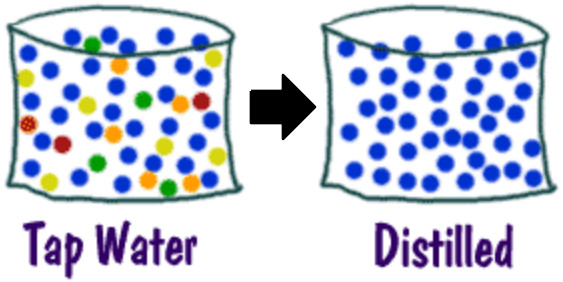
CO_2

Mixtures

- A combination of two or more pure substances that are **not chemically combined**.
- substances held together by *physical forces, not chemical*
- No chemical change takes place
- Each item retains its properties

in the mixture

- They can be separated physically



Can you identify the following?

You will be shown a series of photos. Tell if each photo represents an item composed of an element, compound, or mixture.

Review:

- An **element** contains just one type of atom.
- A **compound** contains two or more different atoms joined together.
- A **mixture** contains two or more different substances that are only physically joined together, not chemically.
  - A mixture can contain both elements and compounds.

Elements	Compounds	Mixtures

Directions

- You will be shown a series of pictures. Write the name of the item in the correct column, Element, Compound or Mixture
- If it is a mixture, put an He if you think it is heterogeneous and an Ho if it is homogeneous

Element, Compound, or Mixture?

Rocks

Element, Compound, or Mixture?

Rocks

Element, Compound, or Mixture?

Copper

Element, Compound, or Mixture?

Copper

Cu

Element, Compound, or Mixture?

Jelly Beans

Element, Compound, or Mixture?

Jelly Beans

Element, Compound, or Mixture?

Table Sugar

Element, Compound, or Mixture?

Table Sugar

$C_{12}H_{22}O_{11}$

Element, Compound, or Mixture?

Diamond

Element, Compound, or Mixture?

C

Diamond

Element, Compound, or Mixture?

Tea

Element, Compound, or Mixture?

Tea

Element, Compound, or Mixture?

Salt

Element, Compound, or Mixture?

NaCl

Salt

Element, Compound, or Mixture?

Neon Gas

Element, Compound, or Mixture?

Ne

Neon Gas

Element, Compound, or Mixture?

Salad

Element, Compound, or Mixture?

Salad

Element, Compound, or Mixture?

Pure Water

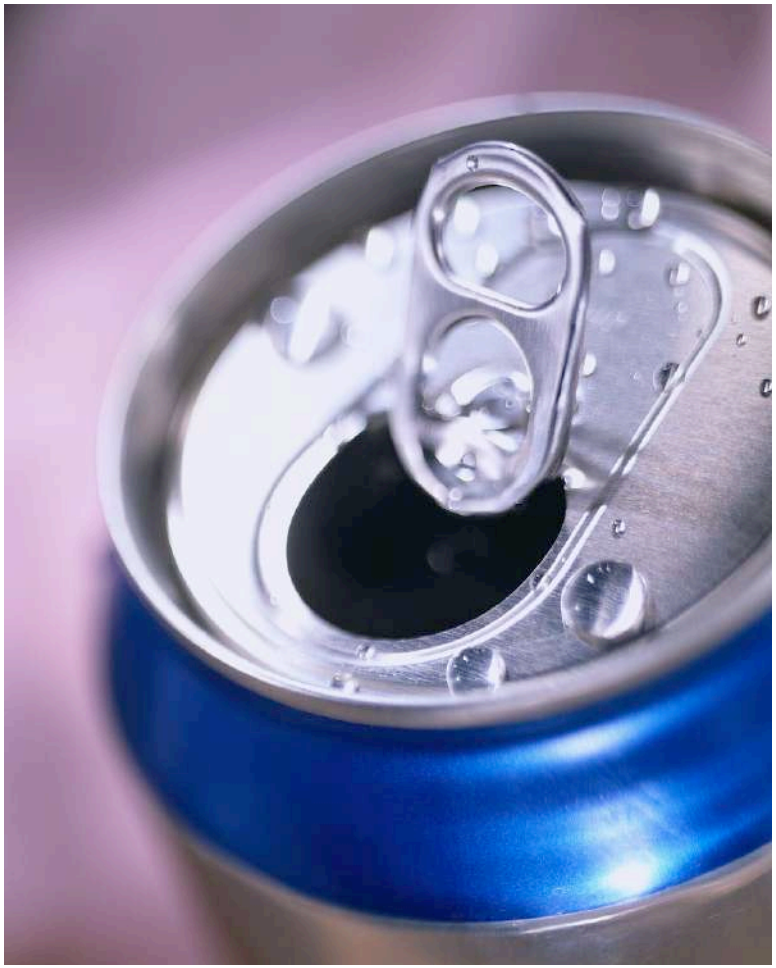
Element, Compound, or Mixture?

H_2O

Pure Water

Element, Compound, or Mixture?

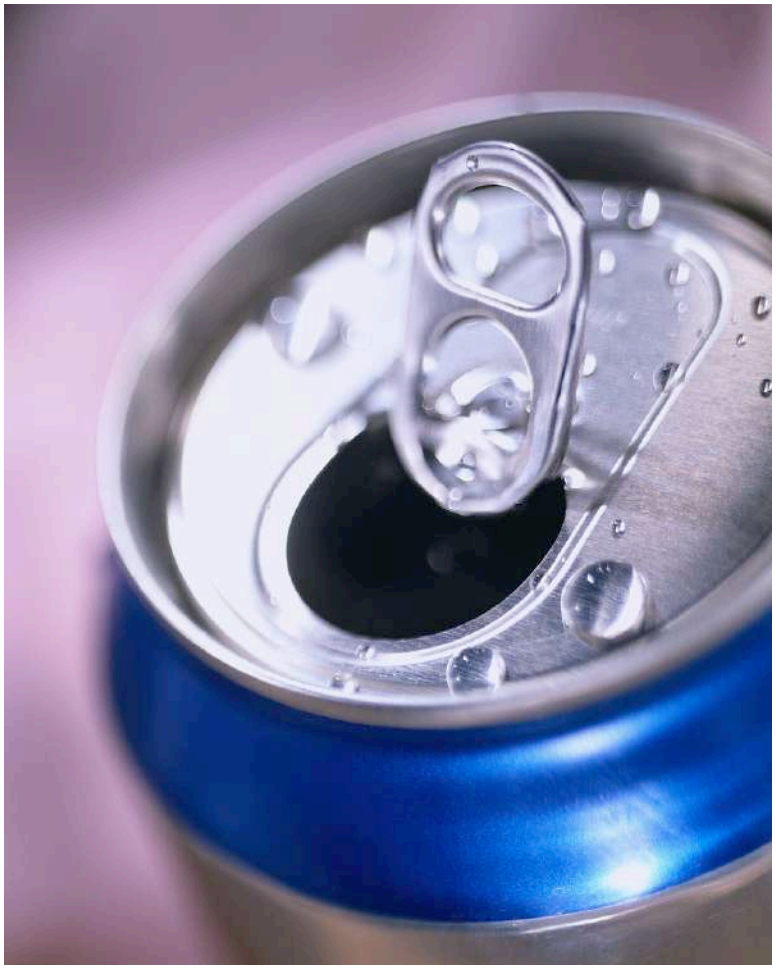
Aluminum



Element, Compound, or Mixture?

Al

Aluminum



Element, Compound, or Mixture?

Lemonade

Element, Compound, or Mixture?

Lemonade

Element, Compound, or Mixture?

Silver

Element, Compound, or Mixture?

Silver

Ag

Element, Compound, or Mixture?

Sand

Element, Compound, or Mixture?

Sand

Types of Mixtures

- **Two main categories**
- **Homogeneous** – molecules are mixed up in an even distribution
- **Heterogeneous** – molecules are **not** mixed up in an even distribution

Homogeneous Mixtures

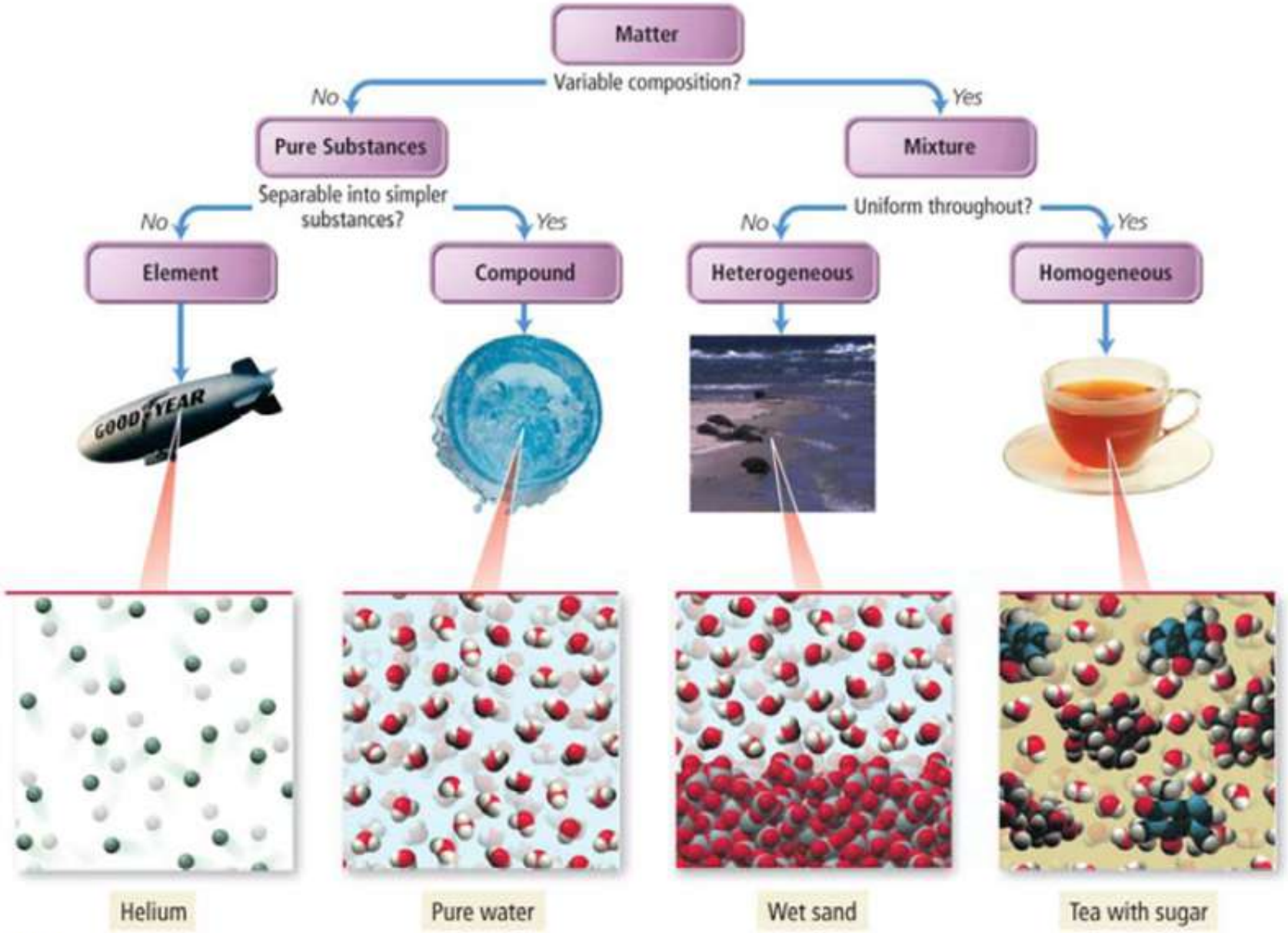
- **Solutions**- a well mixed mixture—appears to be a single substance
  - Solute - the substance being dissolved
  - Solvent – the substance in which the solute is being dissolved
    - water is considered a universal solvent
    - Particles do not scatter light
    - Ex:coffee, lemonade, Kool-Aid

Homogeneous Mixtures

- **Colloids**- a mixture of tiny particles that are bigger than those in a solution, but smaller than in a suspension
  - Do not settle out over time
  - Scatter light
  - Ex. Mayonnaise, milk, gelatin, whipped cream

Heterogeneous Mixtures

- **Suspensions** – a mixture in which particles are dispersed in liquid or a gas and will eventually settle out
  - Particles can scatter light
  - Can be filtered out using a filter
  - Ex. Snow globe, sand in a bucket of water, muddy water, Italian salad dressing



Notes

- Detailed notes are located at:

http://www.middleschoolscience.com/elements-compounds-mixtures-notes-isn.pdf

- Flow Chart:

http://www.middleschoolscience.com/matter-flow-chart-isn.pdf