

Pure substances and impure materials

In science, a **pure substance** contains only one element or compound. Impure materials may be mixtures of elements, mixtures of compounds, or mixtures of elements and compounds.

Elements:

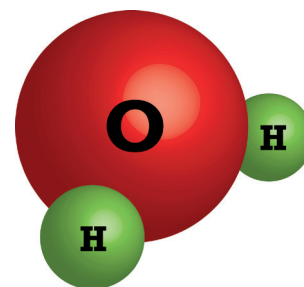
- consist of only one type of atom;
- can exist as either atoms or molecules;
- cannot be broken down into a simpler type of matter by either physical or chemical means.

Compounds:

- consist of atoms of two or more different elements chemically joined together;
- always contain the same **ratio** of their component atoms;
- have fixed properties that are different from their component elements **as** a new substance is formed when the constituents are chemically combined;
- can only be separated into their elements by chemical means.

Mixtures:

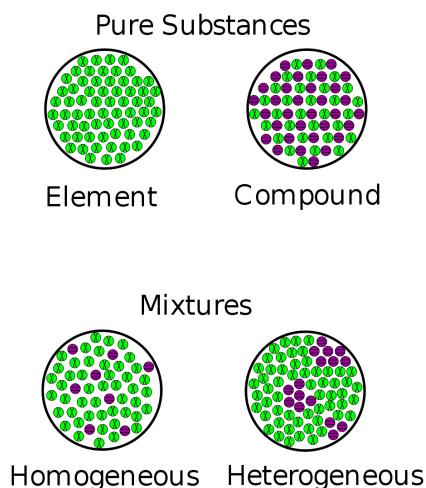
- consist of two or more different elements and/or compounds joined together physically, not chemically;
- have constituents which are present in varying ratios;
- do not have fixed properties;
- form no new substance and each substance in the mixture keeps its own properties;
- can be separated into their constituent parts by physical means.



An example of compound: water

■ Mixtures

Mixtures are absolutely everywhere. They may be made by dissolution of a solute in a solvent, or by diffusion, in which particles of different substances mix together. There are different types of mixtures.



■ Types of mixtures

- **Homogeneous Mixtures**, in which the two or more substances that form the mixture are **evenly** distributed throughout the mixture. Solutions are a special type of homogeneous mixtures in which one substance (the solute) is evenly **spread out** and **thoroughly** mixed in another substance (the solvent). They are the best mixed of all mixtures. Alloys are usually homogeneous mixtures in which the main element (or elements) are metal(s). Amalgams are special types of alloys that combine mercury and other metals.

as: *poiché*
 evenly: *uniformemente*
 ratio: *proporzione*

spread out: *distribuito*
 thoroughly: *completamente*

Matter
Anything that has mass and takes up space (solid, liquid or gas)

Mixture
A system of matter that is made up of 2 or more substances that are not chemically combined

Pure Substance
A substance that cannot be physically separated any further into other substances

Element
The simplest form of matter that cannot be separated by chemical or physical process


Compound
Elements that are chemically compound in fixed ratios

- **Heterogeneous Mixtures**, in which the two or more substances that form the mixture are not evenly distributed throughout the mixture. Suspensions are heterogeneous fluid mixtures containing solid particles large enough for sedimentation. The solid particles may be separated from the liquid by leaving it to stand or by filtration. Colloids are heterogeneous mixtures in which one substance is microscopically dispersed evenly throughout another substance. Emulsions are special colloids which have a mixture of oils and waters.

Some mixtures that appear homogeneous at first glance are heterogeneous upon closer inspection. Examples include blood and sand.

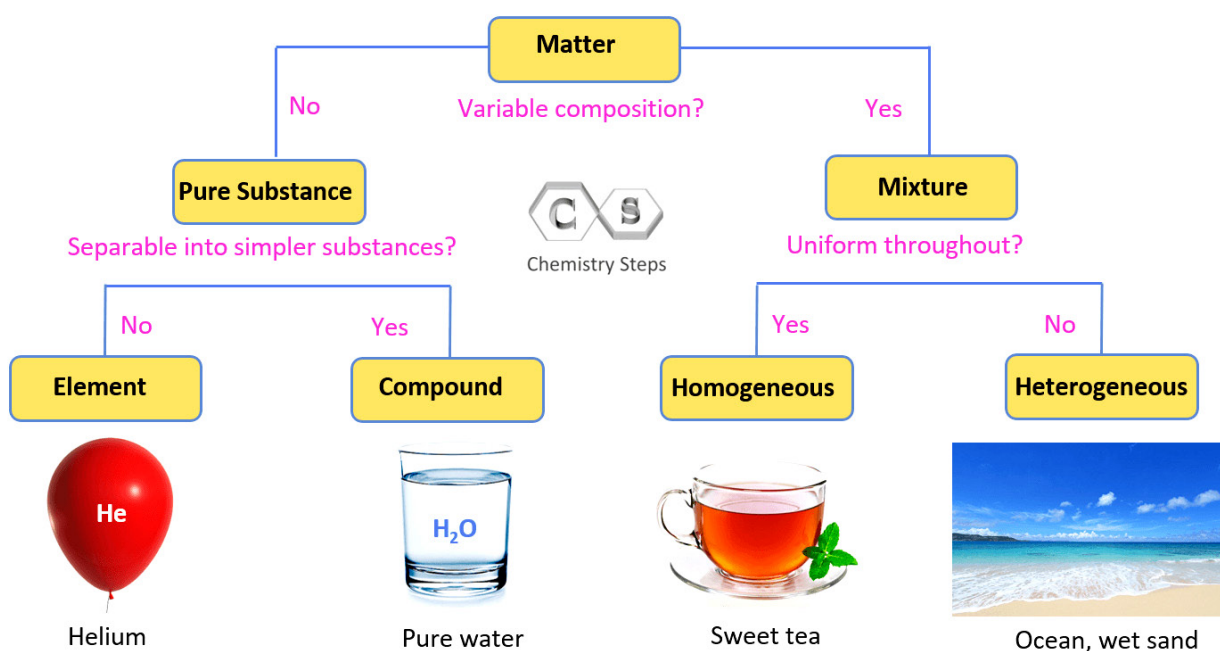
closer: più preciso

glance: sguardo

- 1  Based on your experience, can you say which of these are elements, compounds, homogeneous or heterogeneous mixtures, solutions, suspensions, colloids, and alloys? Write them in the correct column, then compare your choices in groups.

aluminium foil • brass • bronze • cereal and milk • copper wire • dishwashing liquid • fruit salad • gasoline • gold • ice cubes in a drink • ice tea • mayonnaise • milk • salad dressing • salt • sand in water • sea water • snow globe • stainless steel • sugar • vinegar • vodka • water • whip cream

Element	Compound	Homogeneous Mixture	Heterogeneous Mixture	Solution	Suspension	Colloid	Alloy





2 Use the prepositions/adverbs in the box to complete the summary of the reading passage.

by • down • from • in • into • of • throughout • up

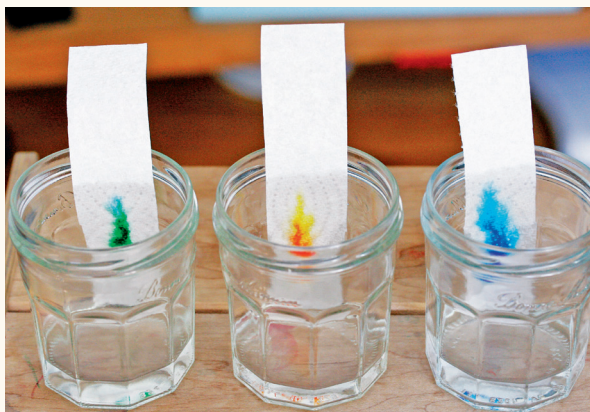
An element is as a pure substance made

1. **2.** one type **3.**
atom or molecule. An element cannot be
broken **4.** **5.** simpler
substances or transformed **6.** a
chemical reaction. A compound is a pure
substance made **7.** **8.** two
or more types **9.** elements (atoms)
chemically combined **10.** a fixed
proportion. It can be further subdivided
11. simpler substances **12.**
chemical means only.

A mixture is a combination **13.**
elements or compounds not chemically joined
together. It can be
further subdivided
14.
simpler substances
15. physical
means. Each
substance keeps its
own properties and
can be separated
16. the

mixture.

The constituents **17.** a homogenous
mixture are uniformly mixed **18.**
the mixture. The constituents **19.**
a heterogeneous mixture are not uniformly
mixed **20.** the mixture. **21.**
a solution, the solute is the dissolved
substance; the solvent is the substance doing
the dissolving. A suspension is a mixture
22. liquids with particles
23. a solid which may not dissolve
24. the liquid. A colloid is a mixture
25. which one substance



26.
microscopically
dispersed insoluble
particles is suspended
27. another
substance. Basically
alloys are a mixture
28. two or
more metals.