

Classifying Matter: Elements, Compounds, and Mixtures

Pure Substances

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

Elements

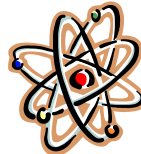


Molecules

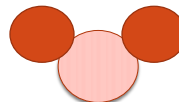
-2 or more atoms of an element



Atoms



Compounds



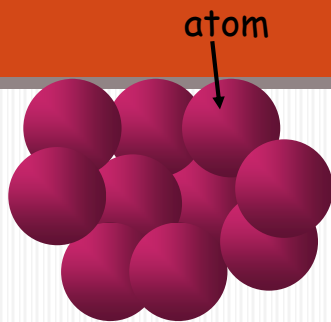
Elements

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

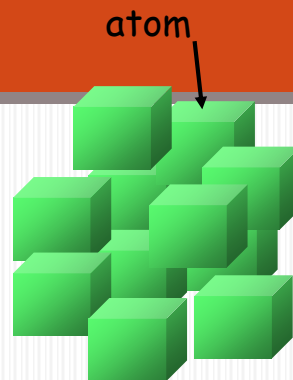
Periodic Table of the Elements

1	IA																2	O																				
1	H																2	He																				
2	IIA																VIIA		VIA		VA		IVA		IIIA													
3	Li		Be																B		C		N		O		F		Ne									
4	Na		Mg		IIIB		IVB		VB		VIB		VIIB		VII		IIB		Al		Si		P		S		Cl		Ar									
5	K		Ca		Sc		Ti		V		Cr		Mn		Fe		Co		Ni		Cu		Zn		Ga		Ge		As		Se		Br		Kr			
6	Rb		Sr		Y		Zr		Nb		Mo		Tc		Ru		Rh		Pd		Ag		Cd		In		Sn		Sb		Te		I		Xe			
7	Cs		Ba		*La		Hf		Ta		W		Re		Os		Ir		Pt		Au		Hg		Tl		Pb		Bi		Po		At		Rn			
8	Fr		Ra		*Ac		Rf		Ha		Sg		Ns		Hs		Mt		110		111		112		113													
					+ Lanthanide Series																		+ Actinide Series															
					Ce Pr Nd Pm Sm Eu Gd Tb Dy Ho Er Tm Yb Lu																		Th Pa U Np Pu Am Cm Bk Cf Es Fm Md No Lr															

An element is a substance that is made from one kind of atom only. It cannot be broken down into simpler substances.



An element



An element

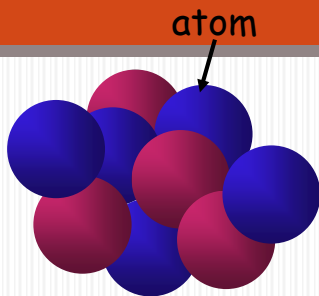
Compounds

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

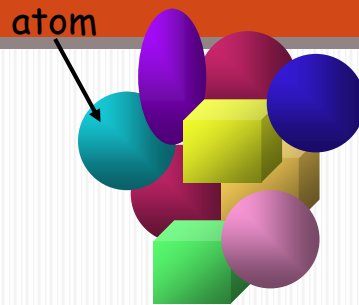
- Made of elements in a specific ratio that is always the same
- Has a chemical formula
- Can only be separated by chemical means, not physically



A compound is a substance that is made from more than one element that are chemically combined.



A compound made up of 2 different elements



A compound made up of 8 different elements

A compound can be broken down into elements



An element



A compound made up of 3 different elements

An element

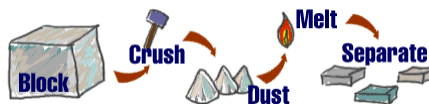
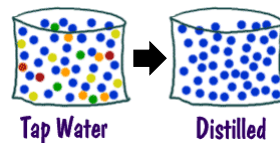
An element

Material	Made up of:	Element or compound
Water	Hydrogen and Oxygen	
Coal	Carbon	
Carbon dioxide	Carbon and Oxygen	
Oxygen	Oxygen	
Chalk	Calcium, Carbon & Oxygen	
Wax	Carbon & Hydrogen	
Table salt	Sodium & Chlorine	
Caffeine	Carbon, Hydrogen, Nitrogen & Oxygen	

Material	Element or compound
Water	Compound
Coal	Element
Carbon dioxide	Compound
Oxygen	Element
Chalk	Compound
Wax	Compound
Table salt	Compound
Caffeine	Compound

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



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Heterogeneous vs. Homogeneous Mixtures

- Homogeneous mixture – uniform throughout and you cannot visually separate the components
 - Examples – orange juice (no pulp), brewed coffee, blood, mouthwash, ketchup, mustard
- Heterogeneous mixture – components do not appear uniformly throughout the mixture
 - Examples – chicken noodle soup, orange juice with pulp, Chex mix, Lucky Charms cereal

Mixtures vs. Compounds

	Mixture	Compound
Composition	Variable composition – you can vary the amount of each substance in a mixture.	Definite composition – you cannot vary the amount of each element in a compound.
Joined or not	The different substances are not chemically joined together.	The different elements are chemically joined together.
Properties	Each substance in the mixture keeps its own properties.	The compound has properties different from the elements it contains.
Separation	Each substance is easily separated from the mixture.	It can only be separated into its elements using chemical reactions.
Examples	Air, sea water, most rocks.	Water, carbon dioxide, magnesium oxide, sodium chloride.

http://www.bbc.co.uk/schools/ks3bitesize/science/chemistry/elements_com_mix_6.shtml

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.