

Classifying Matter: Elements, Compounds, and Mixtures

Elements

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

Periodic Table of the Elements

	IA																			O	
1	1 H																				2 He
		IIA																			
2	3 Li	4 Be																			
3	11 Na	12 Mg																			
			IIIB	IVB	VB	VIB	VIIB	VII	IB	IIB											
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr			
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe			
6	55 Cs	56 Ba	57 *La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn			
7	87 Fr	88 Ra	89 +Ac	104 Rf	105 Ha	106 Sg	107 Ns	108 Hs	109 Mt	110	111	112	113								

* Lanthanide Series	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
+ Actinide Series	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

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



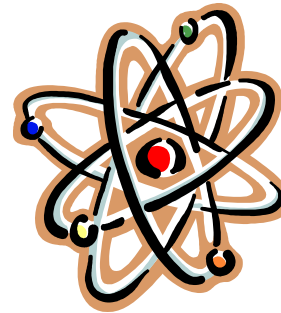
Pure Substances

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

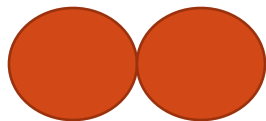
Elements



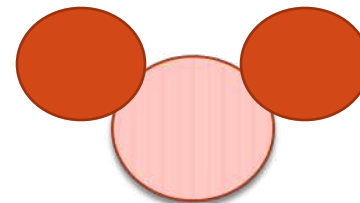
Atoms



Molecules

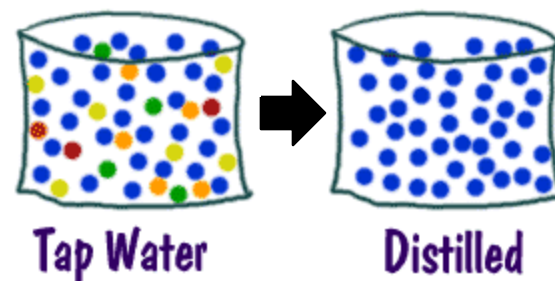


Compounds



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



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.

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.

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



Element, Compound, or Mixture?

Diamond



Element, Compound, or Mixture?

Diamond

C



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?

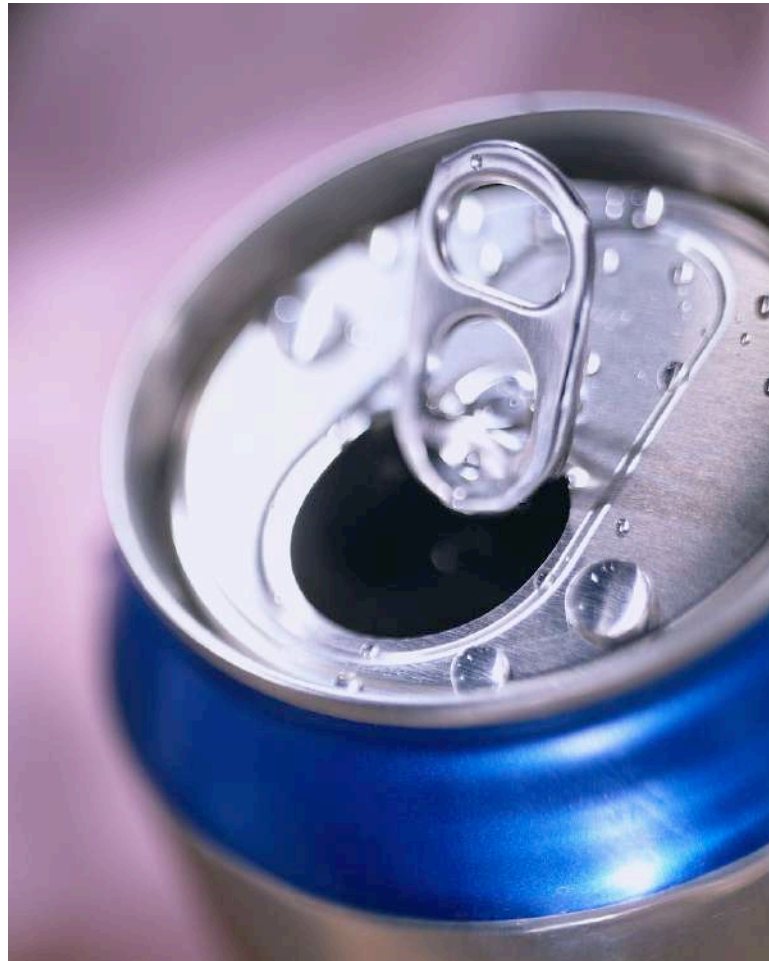


Pure Water



Element, Compound, or Mixture?

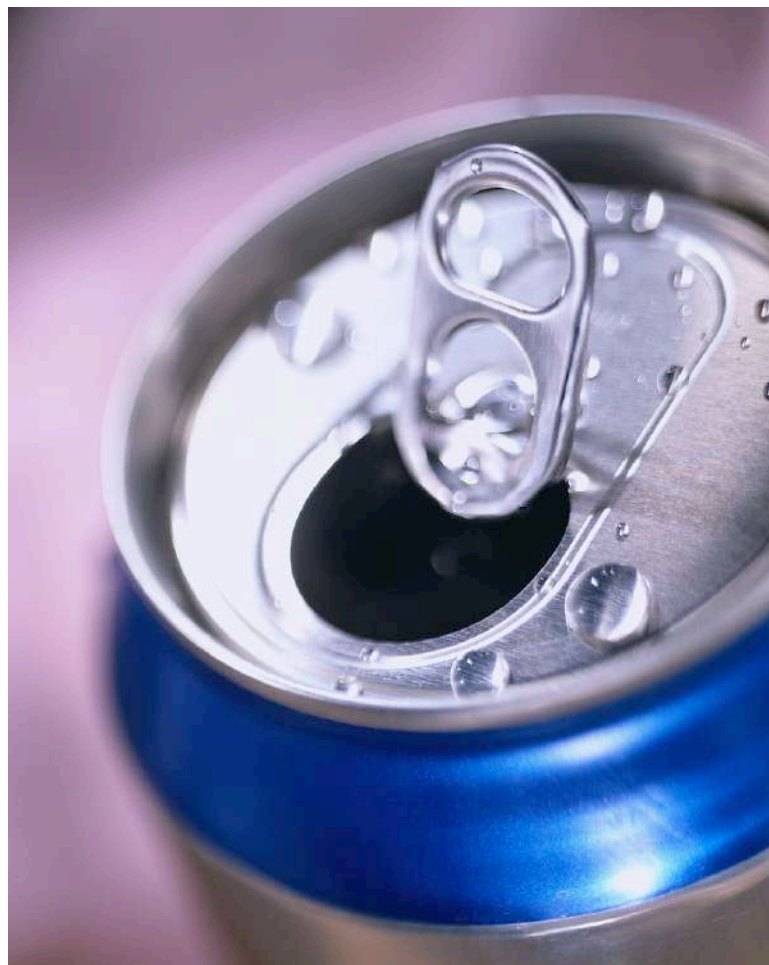
Aluminum



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?

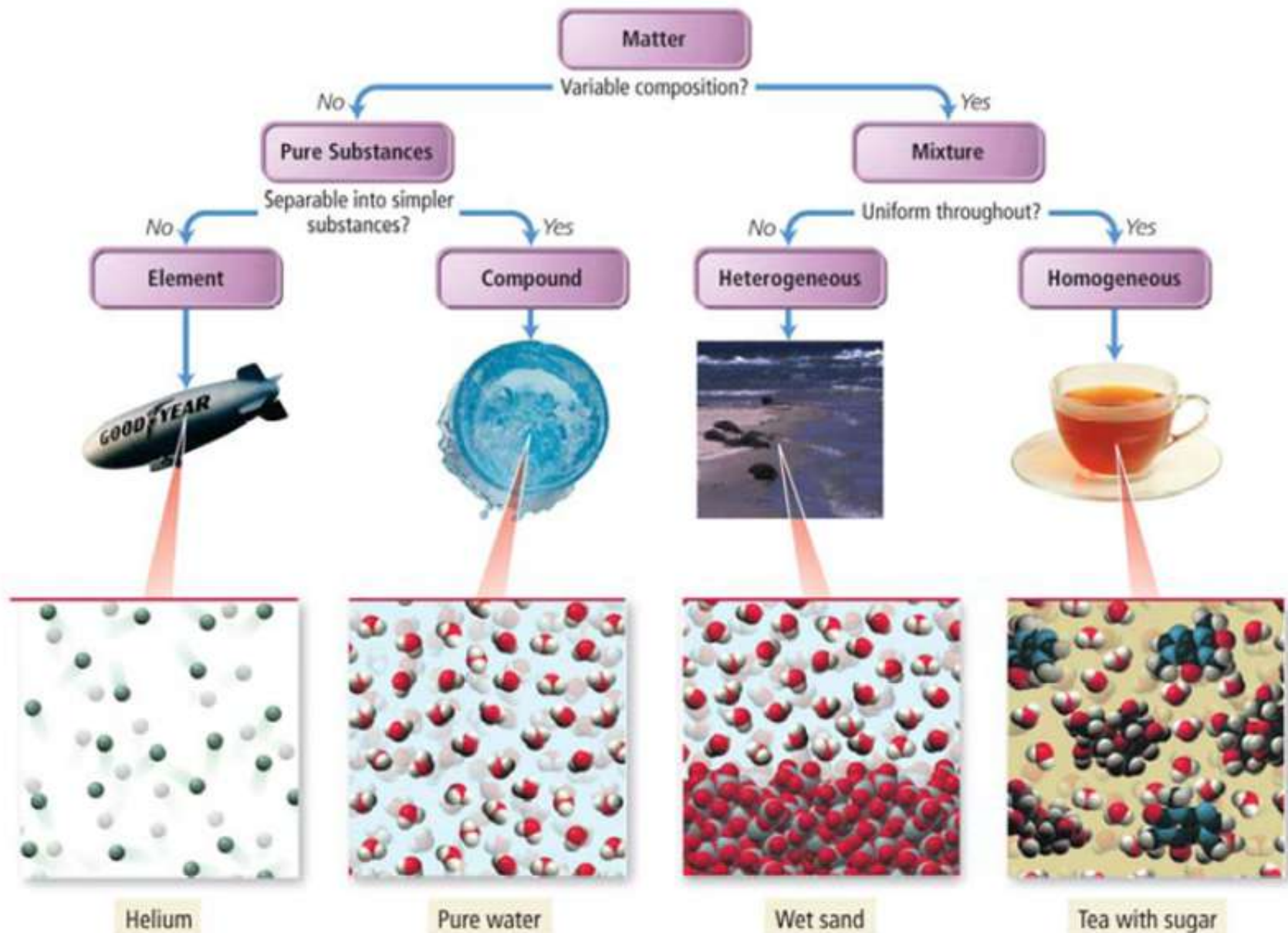
Sand



Element, Compound, or **Mixture**?

Sand





Study Jams – Elements and Compounds

- <http://studyjams.scholastic.com/studyjams/jams/science/matter/elements-and-compounds.htm>

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>