

# Classifying Matter: Elements, Compounds, and Mixtures

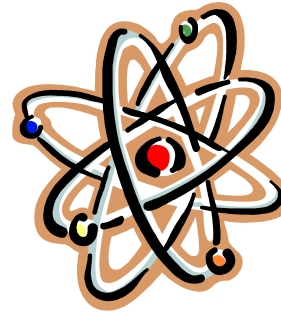
# Pure Substances

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

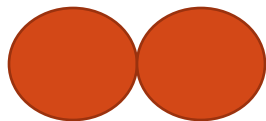
## Elements



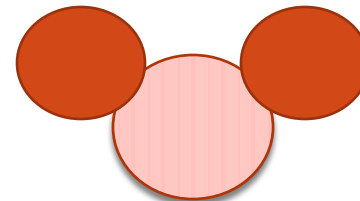
## Atoms



## Molecules



## Compounds



# Elements

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

**Periodic Table of the Elements**

	IA																			O	
1	1	2																			2
	H		IIA																		He
2	3	4																			10
	Li	Be																			Ne
3	11	12																			18
	Na	Mg	IIIB	IVB	VB	VIB	VIIB	VII	IB	IIB											Ar
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36			Kr
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br				Kr
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54			Xe
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I				Xe
6	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86			Rn
	Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At				Rn
7	87	88	89	104	105	106	107	108	109	110	111	112	113								
	Fr	Ra	+Ac	Rf	Ha	Sg	Ns	Hs	Mt	110	111	112	113								

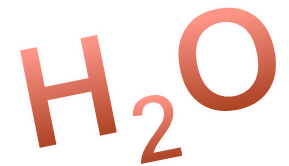
  

* Lanthanide Series	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
+ Actinide Series	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

# Compounds

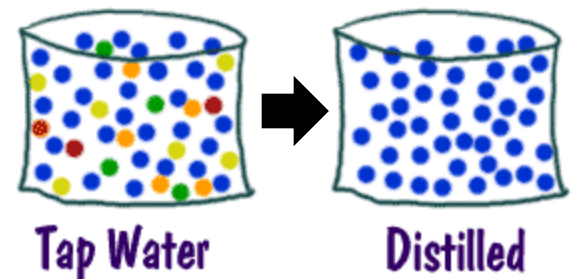
Pure substance composed of two or more *different elements* joined by *chemical bonds*.

- 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



# 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
<b>Composition</b>	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.
<b>Joined or not</b>	The different substances are not chemically joined together.	The different elements are chemically joined together.
<b>Properties</b>	Each substance in the mixture keeps its own properties.	The compound has properties different from the elements it contains.
<b>Separation</b>	Each substance is easily separated from the mixture.	It can only be separated into its elements using chemical reactions.
<b>Examples</b>	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



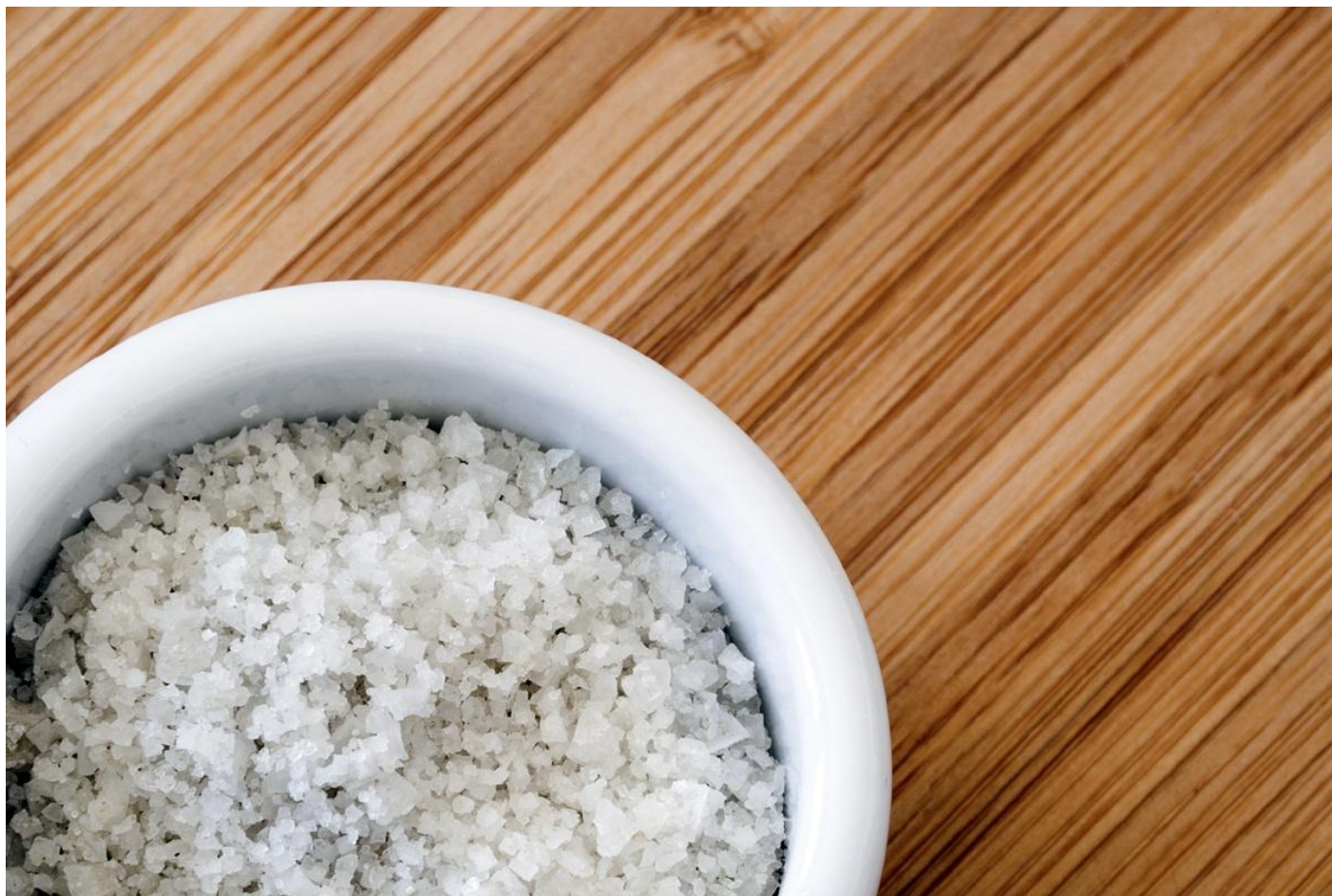
Element, Compound, or **Mixture**?

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?

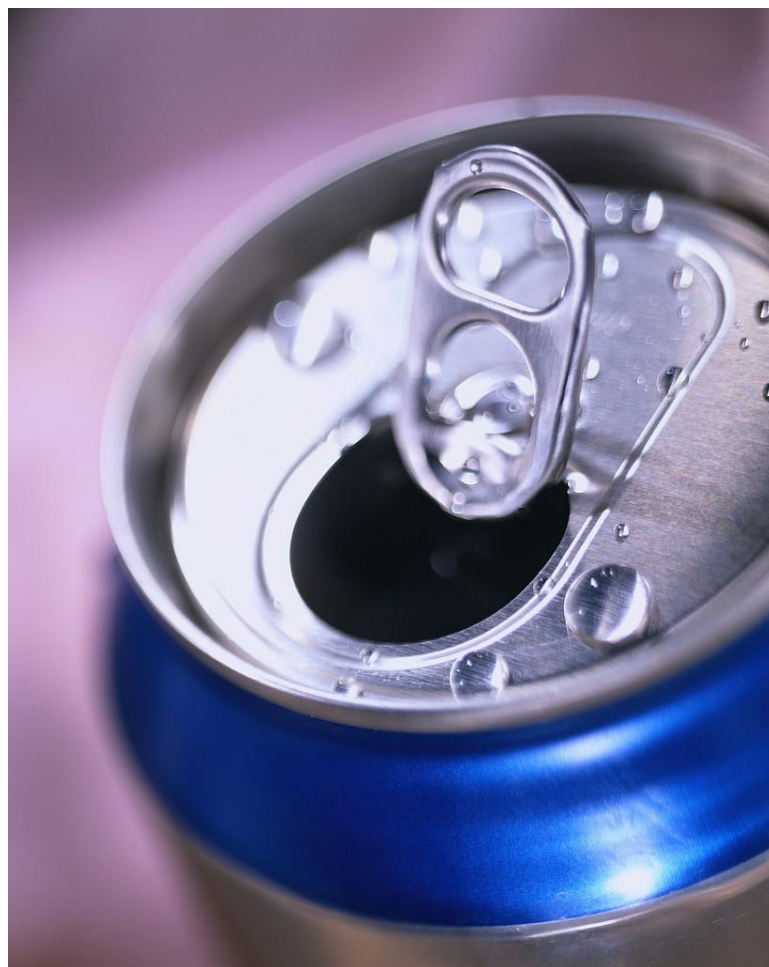
Aluminum



Element, Compound, or Mixture?

Aluminum

Al



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



