

Cats are liquids.



**“Liquids ... take the shape of the container while maintaining a constant volume”.
That’s it. So cats are liquid.**

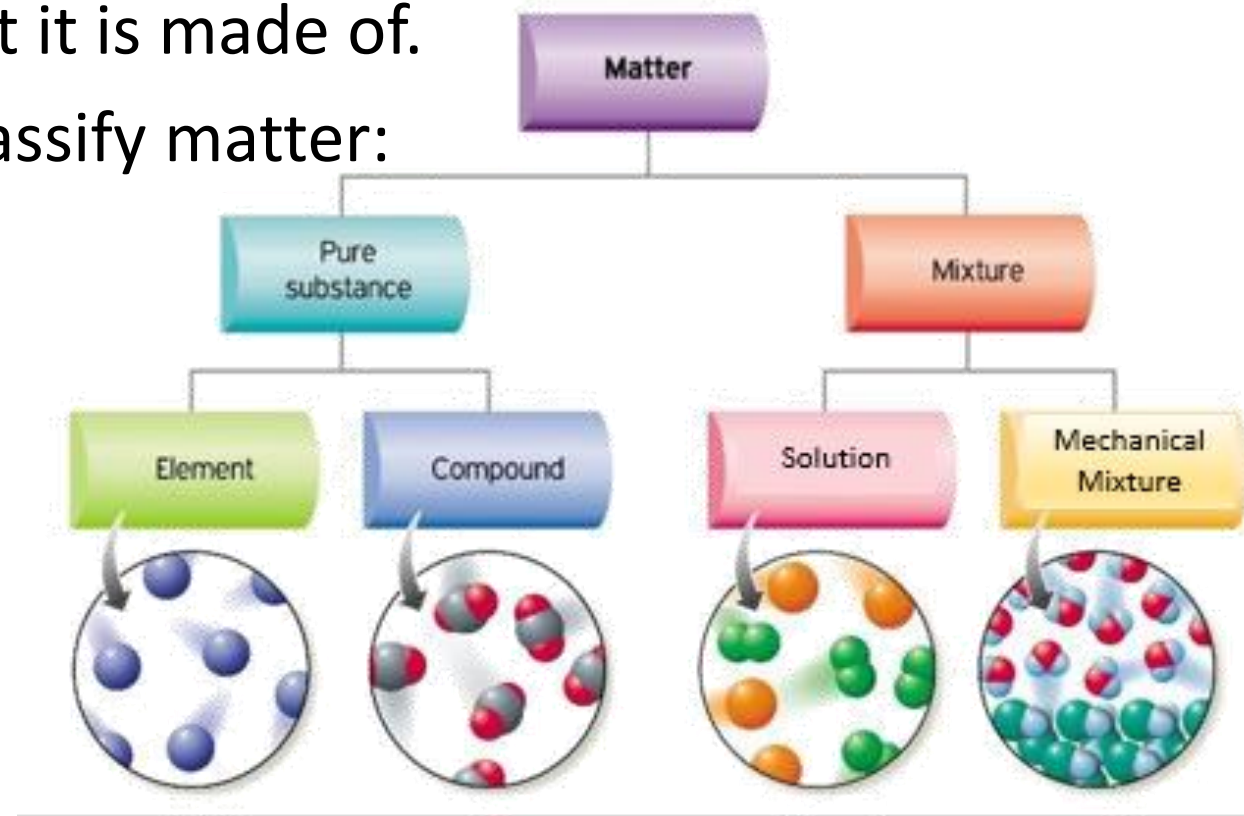


Unit 3: Chemistry

Topic 3: Classifying Matter

In this lesson you will learn

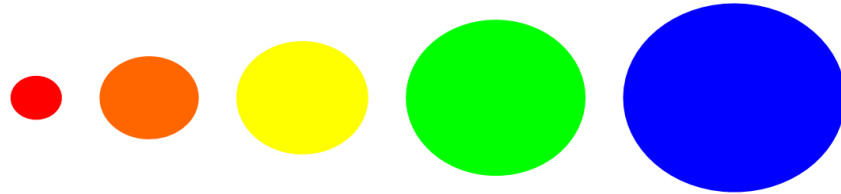
- how to **classify** matter based on what it is made of.
- how to use the following words to classify matter:
 - pure substance
 - mixture
 - element
 - compound
 - solution
 - mechanical mixture



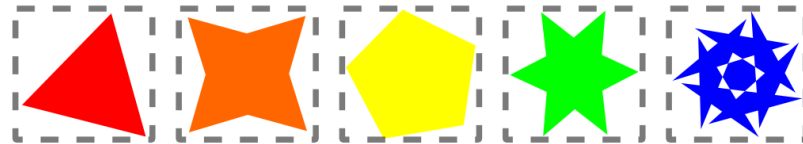
Classify

- In science, “**classify**” means group things together that are the **same** in some way.
- Objects can be classified in different ways, for example, by:

Shape

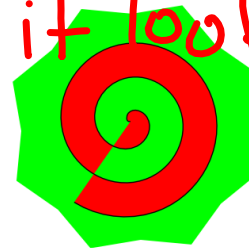
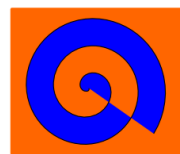


Size



Appearance




(the way it looks)



Classification of Matter

- We have already classified matter by its **state** as a solid, liquid, or gas.

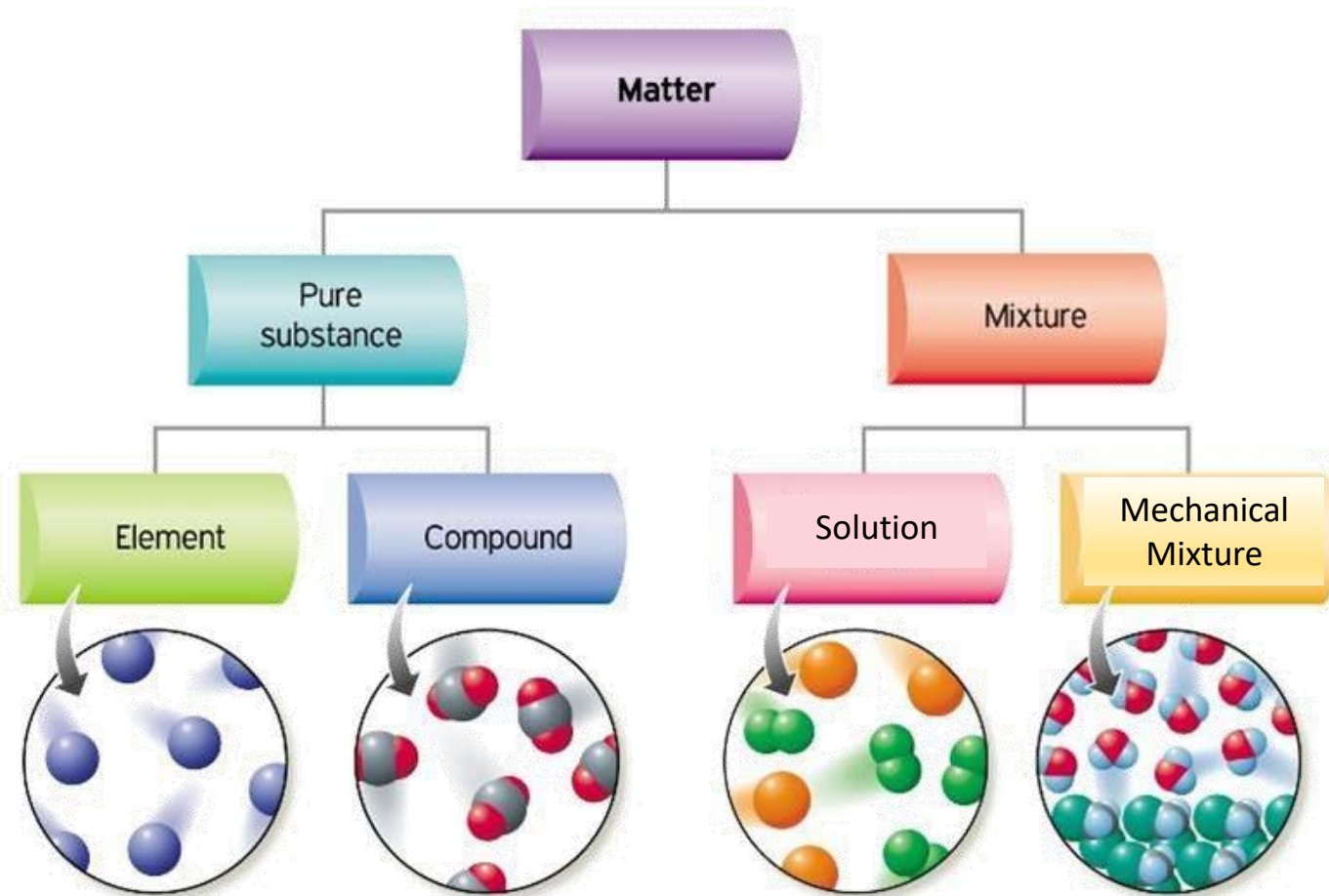
water	air	oxygen	tea	ice
soil	person	coffee	cup	carbon dioxide

solid	liquid	gas
		
Person soil cup ice solid	water coffee tea blood	air oxygen carbon dioxide

4

Classification of Matter

- Scientists also classify matter by what it is **made** of.

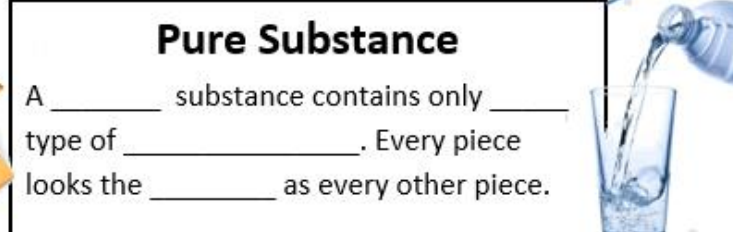


Topic 3: Classifying Matter

Matter

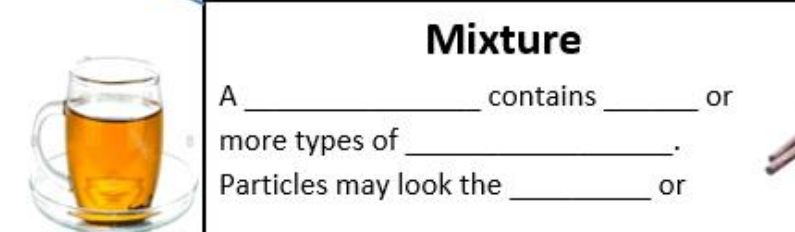
Pure Substance

A _____ substance contains only _____ type of _____. Every piece looks the _____ as every other piece.



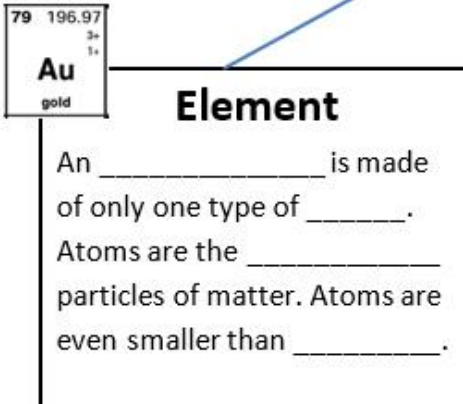
Mixture

A _____ contains _____ or more types of _____. Particles may look the _____ or _____.



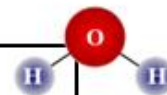
Element

An _____ is made of only one type of _____. Atoms are the _____ particles of matter. Atoms are even smaller than _____.




Compound

A _____ is made of _____ or more atoms chemically _____ together.




Solution

A _____ looks like a pure substance but it is _____. Usually, a solution is made of _____ with another chemical _____ in.

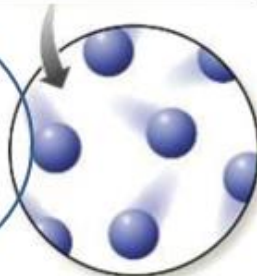


Mechanical Mixture

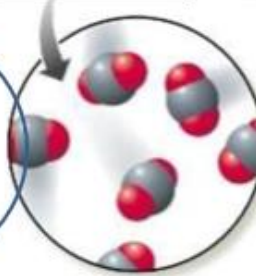
A _____ mixture is one in which you can easily _____ the _____ parts.



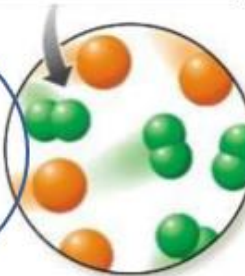
Example:



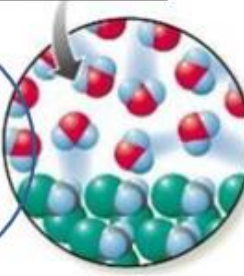
Example:



Example:



Example:



UNIT 3: CHEMISTRY

Topic 3: Classifying Matter



anything
that has
mass and
takes up space



Pure Substance

A pure substance contains only one type of particle. Every piece looks the same as every other piece.



Mixture

A mixture contains two or more types of particles.

Particles may look the same or different.



tea



Soup

Pure Substances



iron (Fe)



glucose ($C_6H_{12}O_6$)
sugar
carbon
hydrogen
oxygen

Mixtures

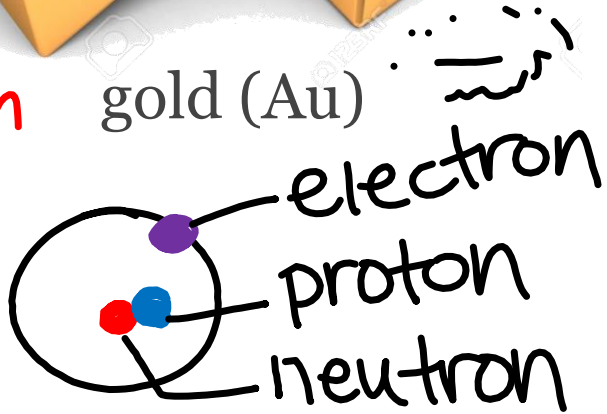


Chocolate chip cookies and milk



atom

gold (Au)



electron
proton
neutron

1 atom of Hydrogen



79	196.97
3+	
1+	
Au	
gold	

118 elements

Element

An element is made of only one type of atom.
 Atoms are the Smallest particles of matter. Atoms are even smaller than cells.



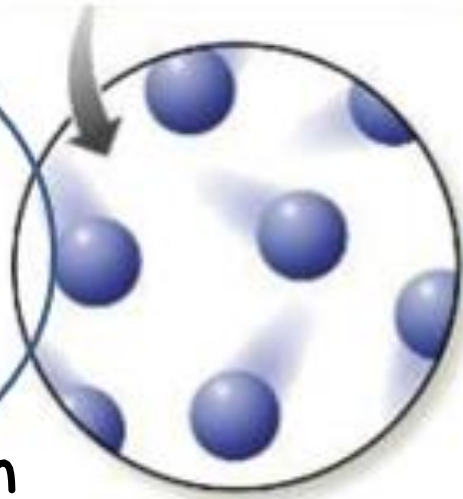
atom

iron (Fe)

26	55.85
3+	
2+	
Fe	
iron	

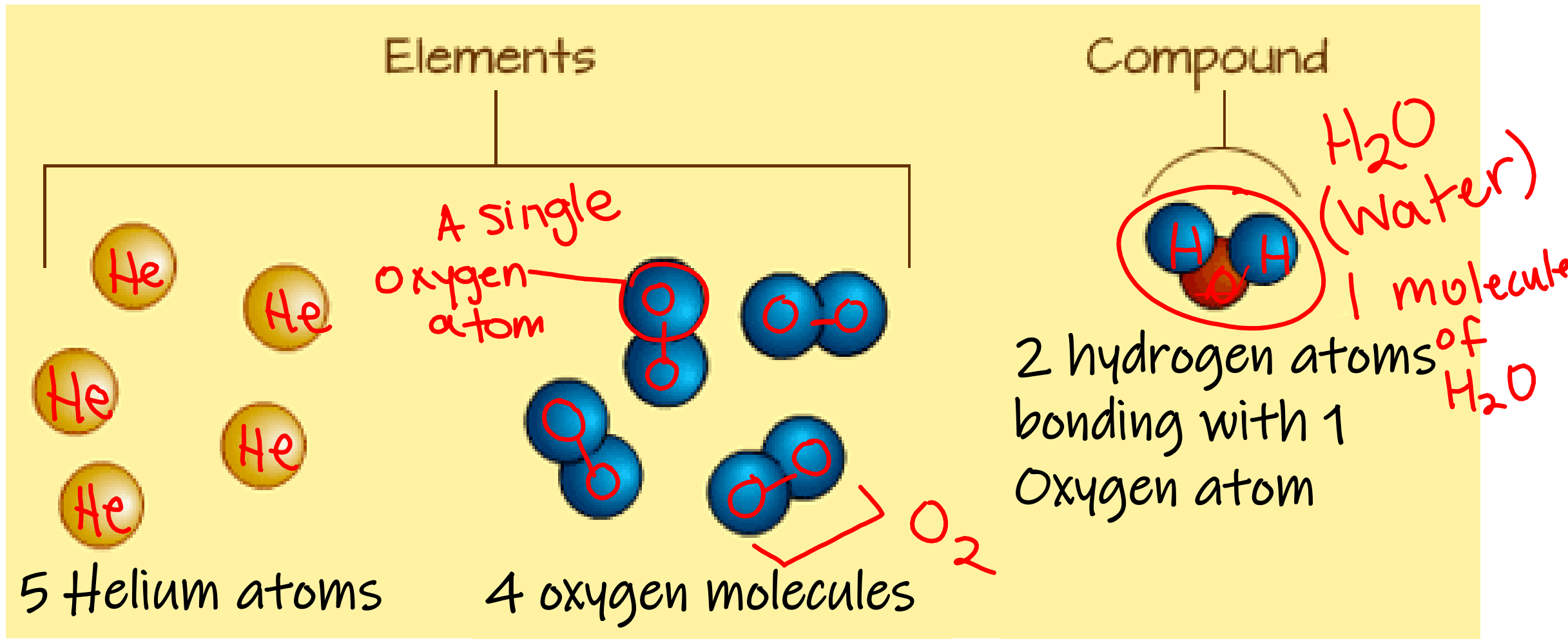
Example:

- Oxygen
- hydrogen
- calcium
- Sodium
- Potassium
- Zinc



Pure Substances

- Each circle is a model for one atom. An atom is the smallest particle of matter.



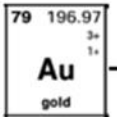
Topic 3: Classifying Matter

Matter

Pure Substance

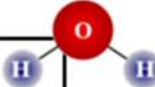


Mixture

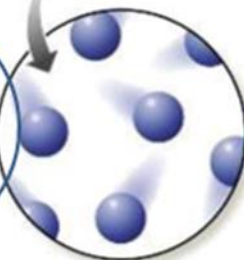


Element

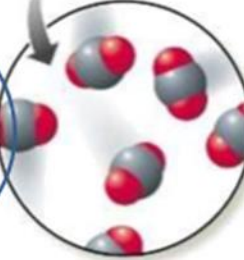
Compound



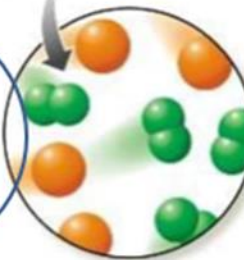
Example:



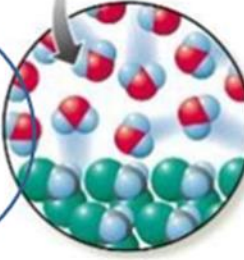
Example:



Example:



Example:



Key

Info

The Periodic Table of the Elements, in Pictures and Words

Click it!

Key

- Solid
- Liquid
- Gas
- Human Body (top ten elements by weight)
- Earth's Crust (top eight elements by weight)
- Magnetic (ferromagnetic at room temperature)
- Noble Metals (corrosion-resistant)
- Radioactive (all isotopes are radioactive)
- Only Traces Found in Nature (less than a millionth percent of earth's crust)
- Never Found in Nature (only made by people)

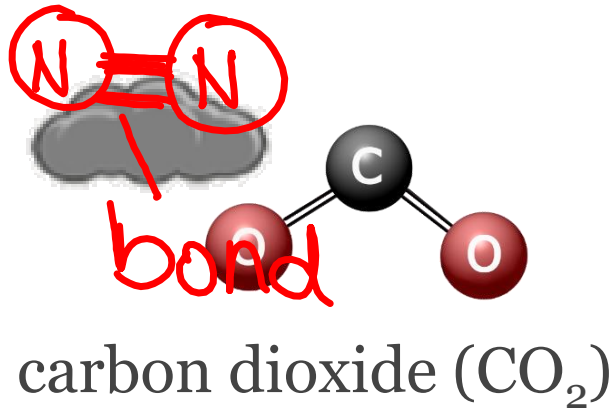
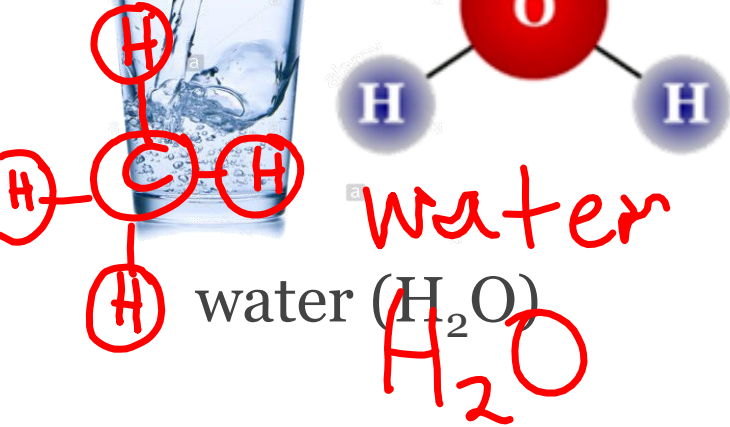
Info

How it is (or was) used or where it occurs in nature

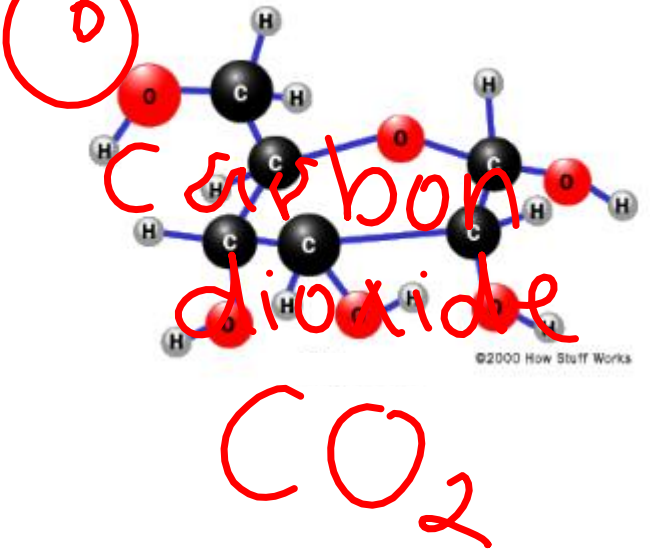
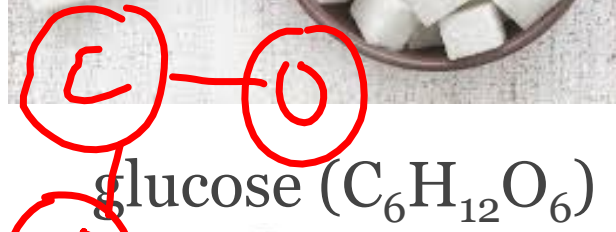
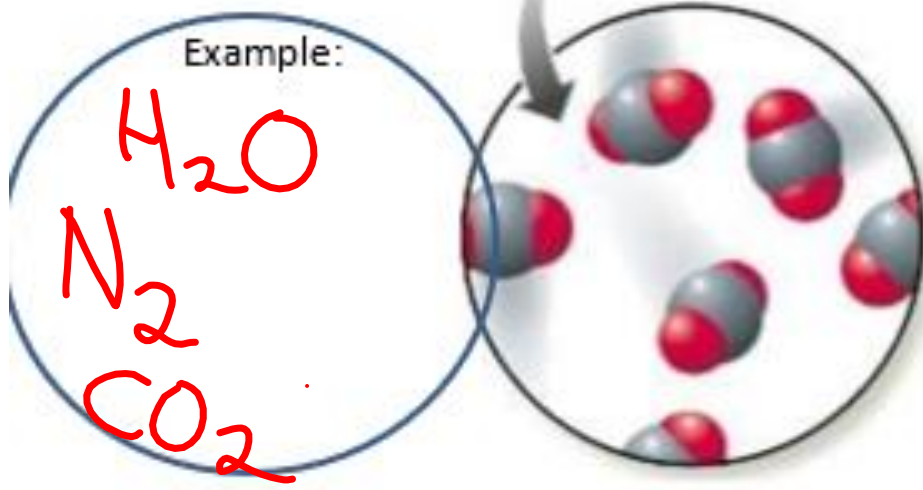
The color of the symbol is the color of the element in its most common pure form.

H 1 Hydrogen Sun and Stars	He 2 Helium Balloons																		
Li 3 Lithium Batteries	Be 4 Beryllium Emeralds																		
Na 11 Sodium Salt	Mg 12 Magnesium Chlorophyll																		
K 19 Potassium Fruits and Vegetables	Ca 20 Calcium Shells and Bones	Sc 21 Scandium Bicycles	Ti 22 Titanium Aerospace	V 23 Vanadium Springs	Cr 24 Chromium Stainless Steel	Mn 25 Manganese Earthmovers	Fe 26 Iron Steel Structures	Co 27 Cobalt Magnets	Ni 28 Nickel Coins	Cu 29 Copper Electric Wires	Zn 30 Zinc Brass Instruments	Ga 31 Gallium Light-Emitting Diodes (LEDs)	Ge 32 Germanium Semiconductor Electronics	As 33 Arsenic Poison	Se 34 Selenium Copiers	Br 35 Bromine Photography Film	Kr 36 Krypton Flashlights		
Rb 37 Rubidium Global Navigation	Sr 38 Strontium Fireworks	Y 39 Yttrium Lasers	Zr 40 Zirconium Chemical Pipelines	Nb 41 Niobium Mag Lev Trains	Mo 42 Molybdenum Cutting Tools	Tc 43 Technetium Radioactive Diagnosis	Ru 44 Ruthenium Electric Switches	Rh 45 Rhodium Searchlight Reflectors	Pd 46 Palladium Pollution Control	Ag 47 Silver Jewelry	Cd 48 Cadmium Paint	In 49 Indium Liquid Crystal Displays (LCDs)	Sn 50 Tin Plated Food Cans	Sb 51 Antimony Car Batteries	Te 52 Tellurium Thermoelectric Coolers	I 53 Iodine Disinfectant	Xe 54 Xenon High Intensity Lamps		
Cs 55 Cesium Atomic Clocks	Ba 56 Barium X-Ray Diagnosis	57 - 71			Hf 72 Hafnium Nuclear Submarines	Ta 73 Tantalum Mobile Phones	W 74 Tungsten Lamp Filaments	Re 75 Rhenium Rocket Engines	Os 76 Osmium Pen Points	Ir 77 Iridium Spark Plugs	Pt 78 Platinum Labware	Au 79 Gold Jewelry	Hg 80 Mercury Thermometers	Tl 81 Thallium Low-Temperature Thermometers	Pb 82 Lead Weights	Bi 83 Bismuth Fire Sprinklers	Po 84 Polonium Anti-Static Brushes	At 85 Astatine Radioactive Medicine	Rn 86 Radon Surgical Implants
Fr 87 Francium Laser Atom Traps	Ra 88 Radium Luminous Watches	89 - 103			Rf 104 Rutherfordium	Db 105 Dubnium	Sg 106 Seaborgium	Bh 107 Bohrium	Hs 108 Hassium	Mt 109 Meitnerium	Ds 110 Darmstadtium	Rg 111 Roentgenium	Cn 112 Copernicium	Nh 113 Nihonium	Fl 114 Flerovium	Mc 115 Moscovium	Lv 116 Livermorium	Ts 117 Tennesine	Og 118 Oganesson
La 57 Lanthanum Telescope Lenses	Ce 58 Cerium Lighter Flints	Pr 59 Praseodymium Torchworkers' Eyeglasses	Nd 60 Neodymium Electric Motor Magnets	Pm 61 Promethium Luminous Dials	Sm 62 Samarium Electric Motor Magnets	Eu 63 Europium Color Televisions	Gd 64 Gadolinium MRI Diagnosis	Tb 65 Terbium Fluorescent Lamps	Dy 66 Dysprosium Smart Material Actuators	Ho 67 Holmium Laser Surgery	Er 68 Erbium Optical Fiber Communications	Tm 69 Thulium Laser Surgery	Yb 70 Ytterbium Scientific Fiber Lasers	Lu 71 Lutetium Photodynamic Medicine					
Ac 89 Actinium Radioactive Medicine	Th 90 Thorium Gas Lamp Mantles	Pa 91 Protactinium Radioactive Waste	U 92 Uranium Nuclear Power	Np 93 Neptunium Radioactive Waste	Pu 94 Plutonium Nuclear Weapons	Am 95 Americium Smoke Detectors	Cm 96 Curium Mineral Analyzers	Bk 97 Berkelium Radioactive Waste	Cf 98 Californium Mineral Analyzers	Es 99 Einsteinium	Fm 100 Fermium	Md 101 Mendelevium	No 102 Nobelium	Lr 103 Lawrencium					

methane









Compound
A Compound is made of two or more atoms chemically joined together.



Compounds

Use your periodic table to determine the elements that make up each of the following compounds.

compound name	chemical formula	elements in the compound
carbon dioxide 	CO ₂	C = carbon O = oxygen
baking soda 	<u>Na</u> HCO ₃	
glucose 	C ₆ H ₁₂ O ₆	
table salt 	NaCl	
caffeine 	C ₈ H ₁₀ O ₂	
ammonium phosphate (in fertilizer) 	(NH ₄) ₃ PO ₄	



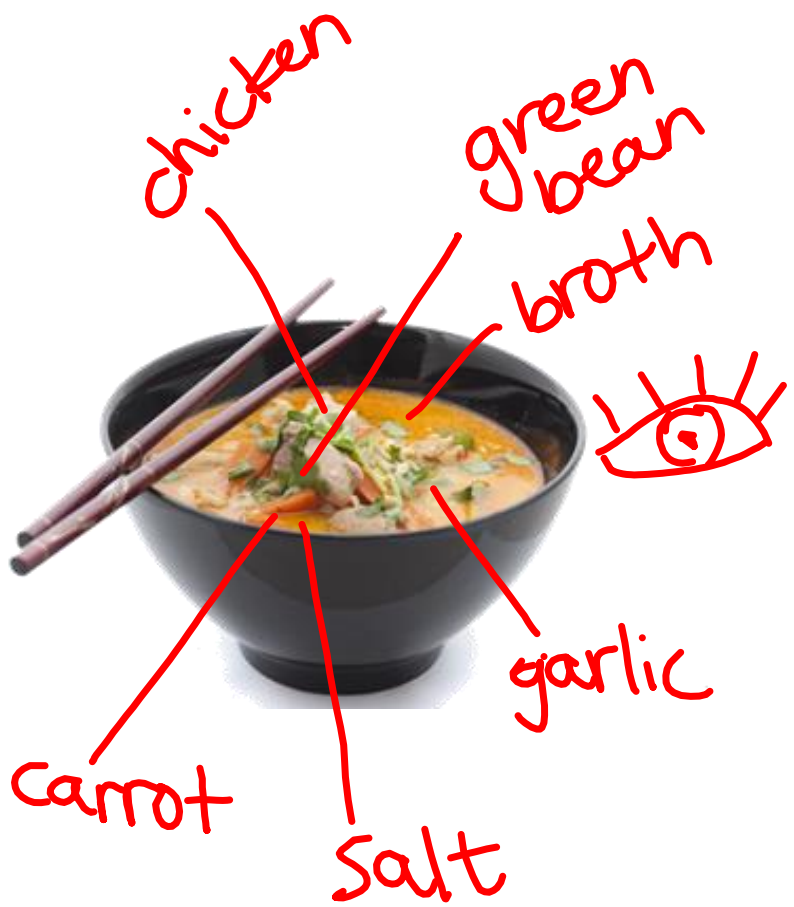
Solution

A Solution looks like a pure substance but it is not. Usually, a solution is made of water with another chemical mixed in.

Example:

tea
coffee
juice
redbull if
no bubbles





Mechanical Mixture



A Mechanical mixture is one in which you can easily see the different parts.



Example:

- Soup
- cake
- falafel
- Shwarma

Solution or Mechanical Mixture?

You can see different stuff



apple juice

S



salad dressing

M



chocolate
milk

S



chocolate
pudding

S



pizza

M

Lab - Practice Classifying Matter

- Choose 8 of the items shown around the room and do your best to classify what type of matter it is: element, compound, solution, or mechanical mixture. [16 marks]

Item	Observations (What does it look like?)	Classification