

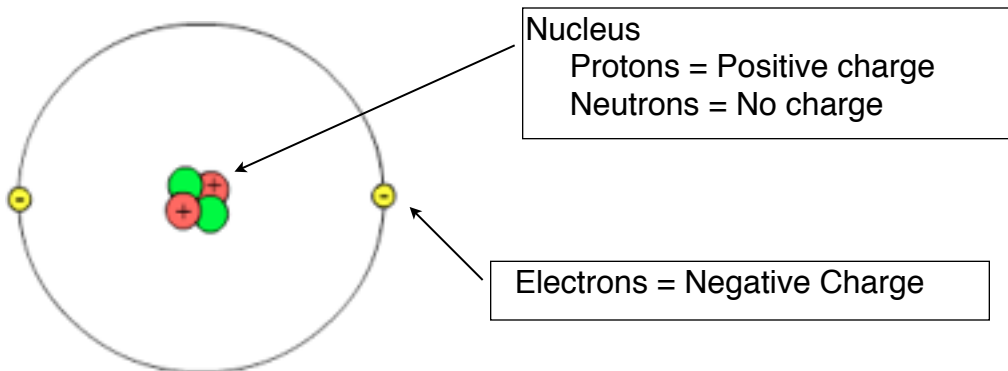
# CHEMISTRY NOTES

## Elements and the periodic table

### A. Element

1. Definition a substance made of one kind of atom

a. Atom smallest particle of an element



2. Elements are represented by chemical symbols; one or two letters from the name of the element.

3. Examples	Carbon <u>C</u>	Gold <u>Au</u>
	Oxygen <u>O</u>	Silver <u>Ag</u>
	Chlorine <u>Cl</u>	Iron <u>Fe</u>

4. When a chemical symbol is written the first letter is always capitalized and the second letter is never capitalized.

5. Atomic Number number of protons in nucleus of an atom

### B. Periodic Table

1. Elements are arranged by atomic number

2. Families groups of atoms with similar properties

a. Chemical Properties reactivity, flammability, pH

b. Physical Properties color, texture, boiling point



**Alkali Metals Family**

- Highly reactive
- Low melting and boiling points
- Soft Metals
- Silvery colored
- Conduct electricity
- Used in salts, batteries

**Alkaline Earth Metals Family**

- Very reactive but less than Alkali metals
- Soft Metals
- White colored
- Conduct electricity

**Transition Metals**

- Good conductors of heat and electricity
- Can bond with many elements

**Rare Earth Metals**

- Silver or grey metals
- Conduct electricity

**Halogen Family**

- Non-metals
- Very reactive, especially with Alkali metals

**Noble Gases**

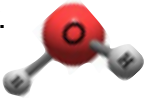
- Found naturally as a gas
- Do not react with other elements

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18																		
H	He											B	C	N	O	F	Ne																		
Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca																		
Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr										
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	Fr	Ra	Ac	Th	Pa	U	Np	Pu	American	Plutonium	Curium	Berkelium	Californium	Einsteinium	Mendelevium	Nobelium	Lanthanum	
Fr	Ra	Ac	Th	Pa	U	Np	Pu	American	Plutonium	Curium	Berkelium	Californium	Einsteinium	Mendelevium	Nobelium	Lanthanum																			

## Molecules

- A. Molecule two or more atoms that are chemically combined
1. can be broken down into can be broken down into simpler substances
  2. the properties of a molecule are very different than the properties of the elements from which they are made.
  3. Chemical Bond force that holds atoms together in a molecule

## Pure Substances

- A. Pure Substances A substance that is made up of only one type of particle.
1. Cannot be separated by physical means, such as filtering, evaporation, etc.  
 Example: The Hydrogen and Oxygen in H<sub>2</sub>O molecules cannot be pulled apart physically.
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2. Each pure substance has its own unique Chemical and Physical properties.
  3. Two types of pure substances are Elements and Molecules

## Mixtures

- A. A mixture is a physical change where substances are mixed but NOT chemically combined



1. Substances in a mixture keep most of their properties
2. Substances in a mixture can be added in any amount
3. All mixtures can be separated based on physical properties.

Types of mixtures	Heterogeneous	Homogeneous
Appearance	Parts appear <u>different</u>	Parts appear <u>the same</u>
Particle Size	<u>Large</u>	<u>Small</u>
Separation	<u>Easy</u>	<u>Difficult</u>
Examples	<u>Pizza, Chex Mix, Salad</u>	<u>Spice mix, toothpaste</u>

## Solutions

- A. A type of mixture where one substance is dissolved in another substance.
1. Solvent = the part that DOES the dissolving Example water
  2. Solute = the part that GETS dissolved Example kool-aid mix
  3. Solubility = The amount of solute that dissolves at a certain temperature
  4. Solubility increases with temperature
  5. Insoluble = Substances that do not dissolve

## Chemical Formulas

A. Definition combinations of chemical symbols

1. Used to represent molecules

a. Examples

Molecule	Formula
Water	H <sub>2</sub> O
Oxygen Molecule	O <sub>2</sub>
Ammonia	NH <sub>3</sub>
Carbon Dioxide	CO <sub>2</sub>
Chlorine Molecule	Cl <sub>2</sub>

b. Subscripts the number of atoms of each element in that molecule

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If there is no subscript there is one atom of that element.

## Chemical Equations

A. Chemical reaction rearranging atoms to form new substances

1. Examples of chemical reactions baking, rusting, burning

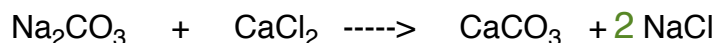
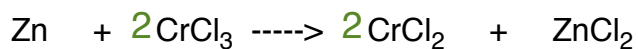
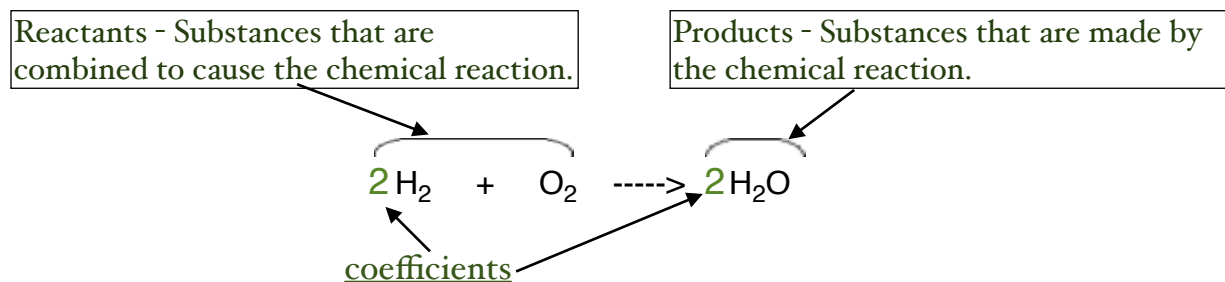
2. Reactions are represented by chemical equations

3. Arrow means produces

4. Balanced by adding coefficients (numbers) before the chemical formulas so there are equal numbers of each type of atom on both sides of the arrow.

a. Balancing equations shows the actual chemical reaction amounts that prove that matter is not Created or Destroyed in a chemical reaction.

Examples:



b. 4 indicators of chemical change

#1 temperature change

#3 gas is given off

#2 color change

#4 a new substance is formed

