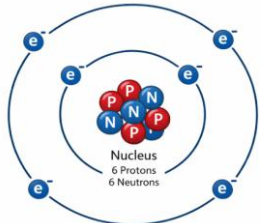


Doggo Cheatsheet - Basic Concepts and Definitions in Chemistry

Chemical Properties	Physical Properties
The ability to react with other substances, e.g., <i>magnesium burns vigorously with oxygen to form magnesium oxide</i>	Can be determined without the substance changing to other substances, e.g., <i>physical state, color, hardness, solubility, boiling point, melting point, conductivity, etc.</i>
Chemical Change	Physical Change
A change in which one or more new substances are produced, e.g., <i>Magnesium react with oxygen to form magnesium oxide</i>	A change in which no new substances are produced, e.g., <i>change of state</i>

Chemical Symbol			
☒ First letter capitalized	☒ Most derived from English name		
☒ Second letter lower case	☒ Some derived from Latin or Greek names		
First 20 Elements			
H - <u>H</u> ydrogen	C - <u>C</u> arbon	Na - Sodium (<u>N</u> atrium)	S - <u>S</u> ulphur
He - <u>H</u> elium	N - <u>N</u> itrogen	Mg - <u>M</u> agnesium	Cl - <u>C</u> hlorine
Li - <u>L</u> ithium	O - <u>O</u> xygen	Al - <u>A</u> luminium	Ar - <u>A</u> rgon
Be - <u>B</u> eryllium	F - <u>F</u> luorine	Si - <u>S</u> ilicon	K - Potassium (<u>K</u> alium)
B - <u>B</u> oron	Ne - <u>N</u> eon	P - <u>P</u> hosphorus	Ca - <u>C</u> alcium
Other Common Metals			
Zn - <u>Z</u> inc	Pb - Lead (<u>P</u> lumbum)	Au - Gold (<u>A</u> urum)	Pt - <u>P</u> latinum
Fe - Iron (<u>F</u> errum)	Cu - Copper (<u>C</u> uprum)	Ag - Silver (<u>A</u> rgentum)	Hg - Mercury (<u>H</u> ydargyrum)
Other Common Halogens			
Br - <u>B</u> romine	I - <u>I</u> odine		

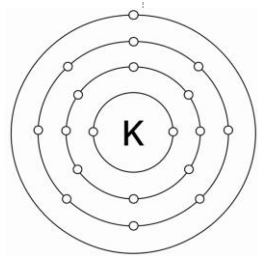
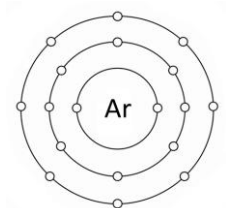
Atomic Structure			
Subatomic Particles	Location	Relative Charge	Relative Mass
Proton	Nucleus	+1	1
Neutron	Nucleus	0	1
Electron	Electron Shells	-1	Negligible
Example: Carbon-12 6 protons + 6 neutrons in nucleus 6 electrons in electrons shells			
			

Basic Concepts and Definition in Chemistry

Overview



Atom	Element	Compound	Pure Substance	Mixture	Molecule
The smallest unit of an element, e.g., Oxygen atom (O) , Sodium atom (Na) or Argon (Ar)	A pure substance composed of only one type of atom, e.g., pure Oxygen gas (O₂) , Sodium (Na) or Argon (Ar)	Substances made of two or more different elements chemically bonded together at fixed ratio, e.g., Carbon Dioxide (CO₂) , Sodium Chloride (NaCl)	A pure substance consists of only one type of element or compound with uniform chemical properties	Two or more substances (can be elements or compounds) physically combined but not chemically bonded, e.g., air, metal alloy	Two or more atoms (can be the same or different) chemically bonded together, e.g., Oxygen molecule (O₂) , Carbon Dioxide (CO₂)

Electronic Arrangement, a.k.a., Electronic Configuration		
☒ Distribution of electrons shells ☒ Maximum no. of electrons for nth shell = $2n^2$ ☒ Outermost shell electrons (valence electrons) determine the chemical properties	Example #1 Potassium (K): 2,8,8,1 >> losing 1 electron: 2,8,8 	Example #2 Argon (Ar): 2,8,8 
Octet / Duplet Rule The octet rule says atoms tend to gain, lose, or share electrons to end up with 8 electrons in their outer shell for stability. The duplet rule is the same idea for hydrogen and helium, which are stable with 2 electrons in their outer shell.		
	K is very reactive because it tends to lose 1 electron to attain octet, i.e., 8 valence electrons	Ag is very stable because it already attains octet, i.e., 8 valence electrons

Atomic Number
☒ Number of protons ☒ Number of electrons in neutral atoms ☒ Unique for each elements, e.g., carbon's atomic number is 6, oxygen's atomic number is 8, etc.

Periodic Table			
☒ Column = Group; Group I to VII = no. of electrons in outermost shell ☒ Row = Period = no. of occupied shells ☒ (From Left) Metal → Semi-Metal → Non-Metal (To Right)			
Group I Alkali metals Highly reactive soft metal Reactivity increase down the group	Group II Alkaline Earth Metals Highly reactive (but less than group I) Reactivity increase down the group	Group VII Halogens Highly reactive non-metals Reactivity decrease down the group	Group 0 Noble gases "Full" valence electrons, very low tendency to react

Doggy the Scientist

Home



Doggo Tutorial



Basic Concepts and Definitions in Chemistry

Doggo Quiz



Chemical Symbols



First 20 Elements