Unit 04 Outcomes

LPT

Identify the features of Dalton's Atomic Theory;
state whether each feature is still considered to be valid.

Each element composed of tiny particles called atoms.

Atoms are indivisible; they cannot be created or destroyed (No!)
Nuclear processes can convert matter to energy

Element atoms are identical in every respect. (No!)
Isotopes are elemental atoms of different atomic mass

Element atoms are unique
All atoms of one element have the same mass.
Atoms of two different elements have different masses

Atoms of one element combine with atoms of another element to form chemical compounds (ratio of small, whole numbers)
This is known as Law of Multiple Proportions

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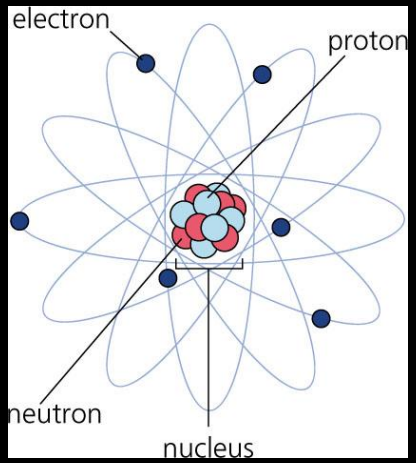
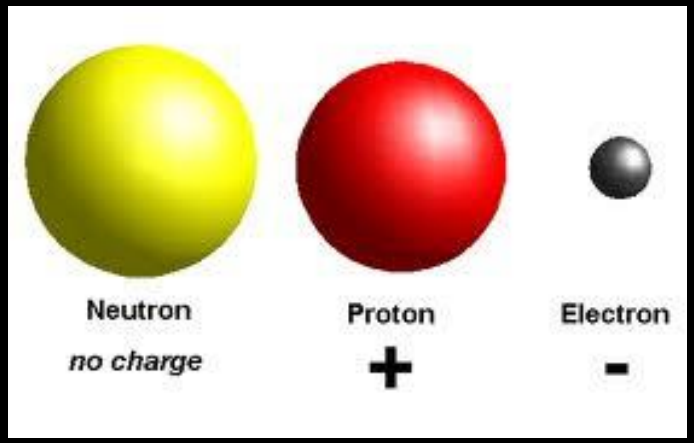
Identify the 3 basic subatomic particles by charge & approximate atomic mass.

Particle	Location (Nucleus)	Charge	Mass (amu)
Proton (p^+)	Inside	+1	1.00728 (~ 1)
Neutron (n^0)	Inside	0	1.00867 (~1)
Electron (e^-)	Outside	-1	0.000549 (~0)





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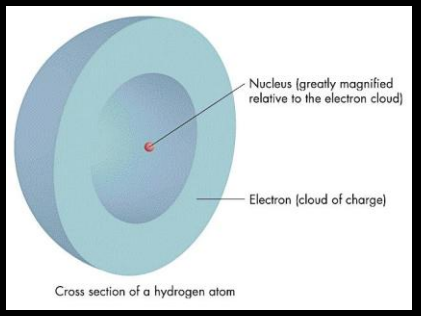
Describe the nuclear model of the atom.

Atoms have small, dense core containing protons & neutrons

Large volume of empty space

Electrons found in volume surrounding the nucleus



Identify that like charges repel & unlike charges attract.

The identity of an element is determined by # of protons in the nucleus

Atomic Number (Z) = # of protons in the nucleus

Mass Number (A) = sum of nuclear protons & neutrons

The number of electrons = Z, the # of protons

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Define isotopes of an element and how they differ from each other.

Atoms having the same atomic number (Z), but different mass numbers (A)

For an isotope of any element, given one of the following, state the other two:
nuclear symbol
number of protons and neutrons in the nucleus
atomic number and mass number

Mass Number (A) **Charge**

symbol for the element

$$X$$

Atomic Number (Z) **# Atoms**

A = Sum of the # of protons + # of neutrons

 # neutrons = A - Z

 # neutrons = A (#p^+ + #n^0) - Z (#p^+)

No relationship between number of n & p

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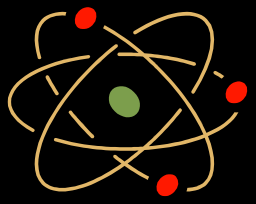
Determine Sub atomic particles for the following

	Protons	Neutrons	Electrons
17 O 8	8	9	8
32 S 16	16	16	16
60 Co 27	27	33	27



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Write symbols for isotopes given the mass number.

Either of these is acceptable

Element name – atomic mass

mass number

Symbol

atomic number

Define Atomic Mass of an element

The weighed average of all of the masses of the atoms in a naturally occurring sample of that element

Define the atomic mass unit (amu)

Exactly 1/12 the mass of a carbon-12 atom

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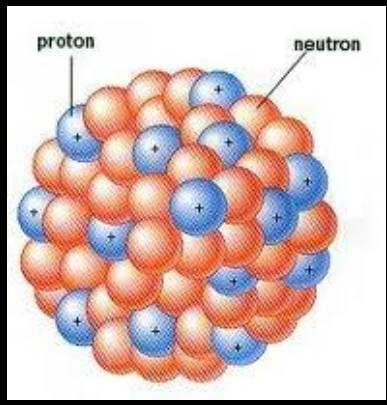
Name the following atoms:

Z = 6, A =14 Carbon-14

Z = 9, A = 19 Fluorine-19

Z = 53, A = 131 Iodine-131



How many electrons, protons and neutrons are represented by

	Protons	Neutrons	Electrons
a. carbon – 13	6	7	6
b. iron – 56	26	30	26

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Given name or formula of an element shown below, write the other

Element	Formula	Element	Formula
Aluminum	Al	Lead	Pb
Argon	Ar	Lithium	Li
Barium	Ba	Magnesium	Mg
Beryllium	Be	Manganese	Mn
Boron	B	Mercury	Hg
Bromine	Br_2	Neon	Ne
Calcium	Ca	Nickel	Ni
Carbon	C	Nitrogen	N_2
Chlorine	Cl_2	Oxygen	O_2
Chromium	Cr	Phosphorus	P
Cobalt	Co	Potassium	K
Copper	Cu	Silicon	Si
Fluorine	F_2	Silver	Ag
Helium	He	Sodium	Na
Hydrogen	H_2	Sulfur	S
Iodine	I_2	Tin	Sn
Iron	Fe	Zinc	Zn
Krypton	Kr		

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The Common Elements

Common Elements

Atomic Number	Symbol	Element	Atomic Number	Symbol	Element	Atomic Number	Symbol	Element
1	H	Hydrogen	13	Al	Aluminum	28	Ni	Nickel
2	He	Helium	14	Si	Silicon	29	Cu	Copper
3	Li	Lithium	15	P	Phosphorus	30	Zn	Zinc
4	Be	Beryllium	16	S	Sulfur	35	Br	Bromine
5	B	Boron	17	Cl	Chlorine	36	Kr	Krypton
6	C	Carbon	18	Ar	Argon	47	Ag	Silver
7	N	Nitrogen	19	K	Potassium	50	Sn	Tin
8	O	Oxygen	20	Ca	Calcium	53	I	Iodine
9	F	Fluorine	24	Cr	Chromium	56	Ba	Barium
10	Ne	Neon	25	Mn	Manganese	80	Hg	Mercury
11	Na	Sodium	26	Fe	Iron	82	Pb	Lead
12	Mg	Magnesium	27	Co	Cobalt			

1A 1	2A 2	3B 3	4B 4	5B 5	6B 6	7B 7	8B 8	8B 9	8B 10	1B 11	2B 12	3A 13	4A 14	5A 15	6A 16	7A 17	8A 18
1 H																1 H	2 He
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca				24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn					35 Br	36 Kr
										47 Ag			50 Sn			53 I	
	56 Ba										80 Hg		82 Pb				

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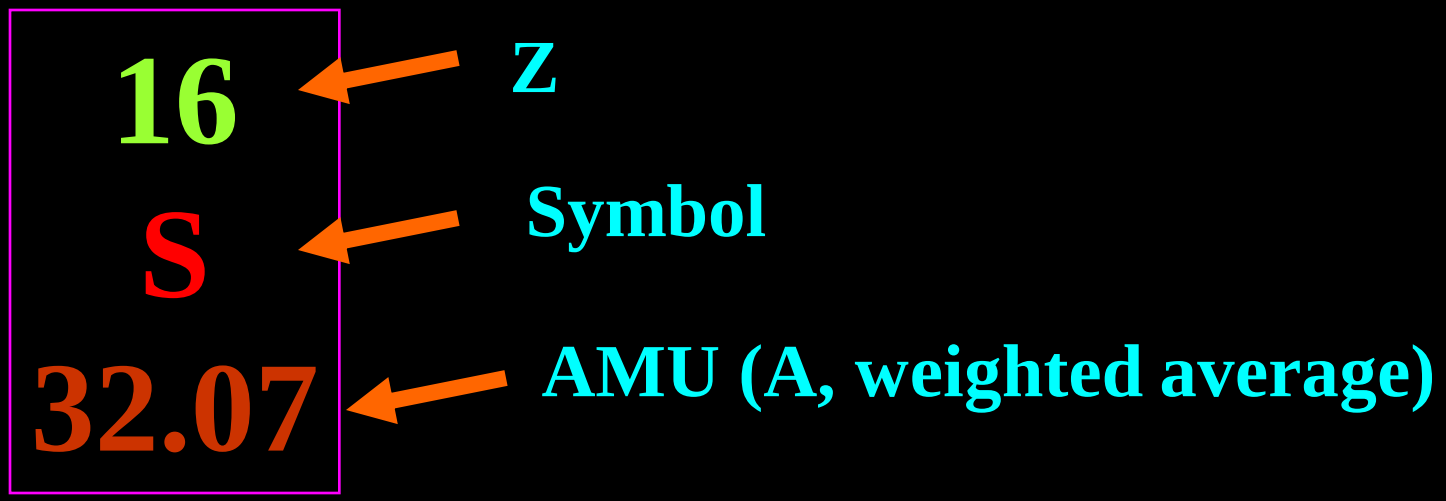
Using Periodic Table, identify the Symbol, Z, & A of the common elements



Z & Atomic Mass placement varies, but mass > number (Z)

Describe "periodic" as applied to the Periodic Table

Periodic – having repeated cycles
Elements in vertical rows share similar chemical behavior

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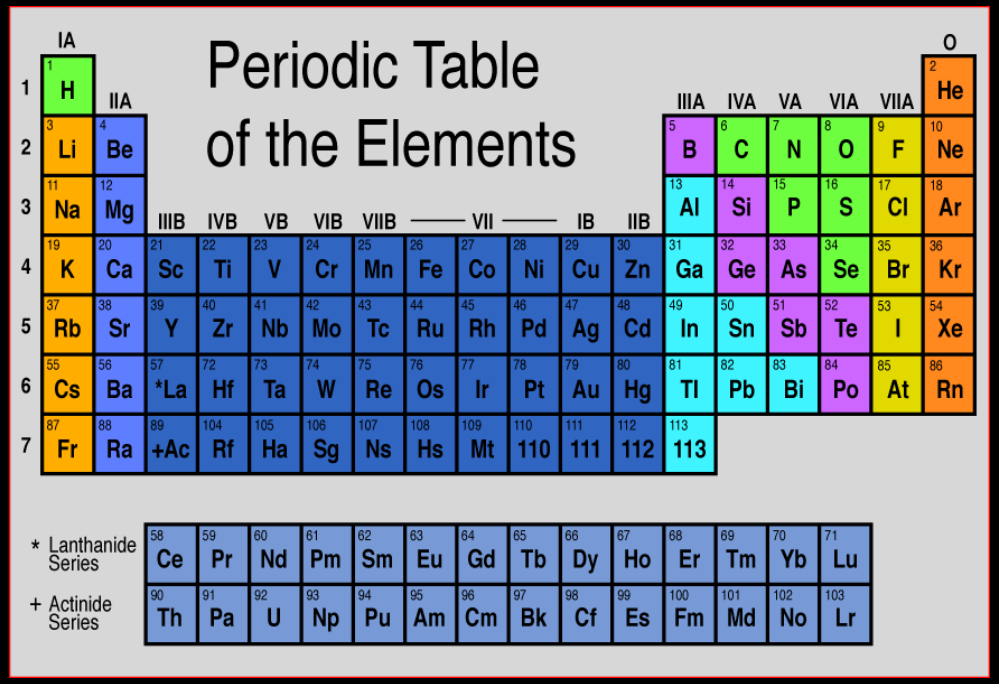
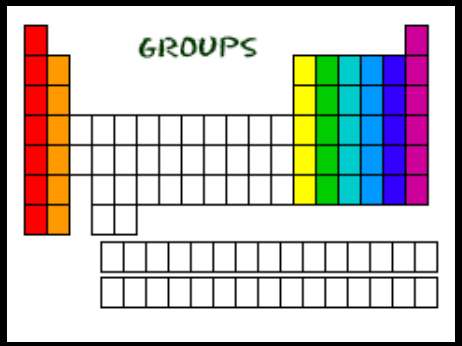
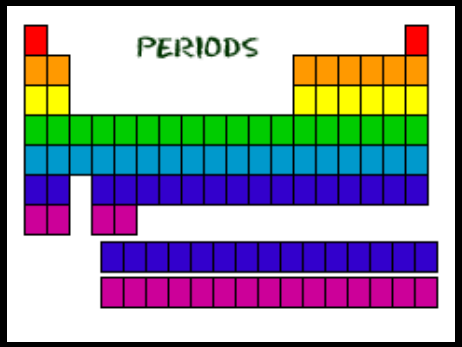
Identify the horizontal rows on the Periodic Table as periods.

Identify the vertical columns of the Periodic Table as Groups or families

Recognize that elements in the same group have similar chemical properties.







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Use the Periodic Table to classify an element as:

Representative Element

Transition Element

Lanthanide Element

Actinide Element

Group 1A (1): alkali metals

Group 2A (2): alkaline earth metals

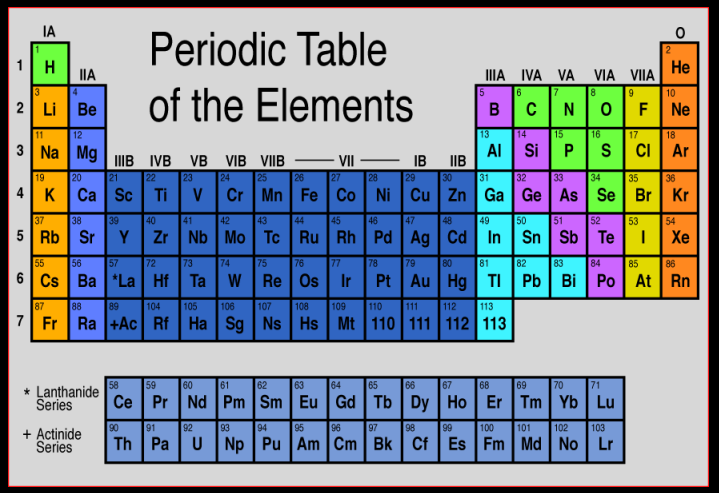
Group 7A (17): halogens

Group 8A (18): noble (inert) gases

Representative (1-2; 13-18): A Groups (the Edges)

Transition Metals (3-12) : B Groups (the Center)

Metalloids: "Staircase" B,Si, Ge, As, Sb, Te, Po



Lanthanides = upper, of lower rows

Actinides = lower, of lower row

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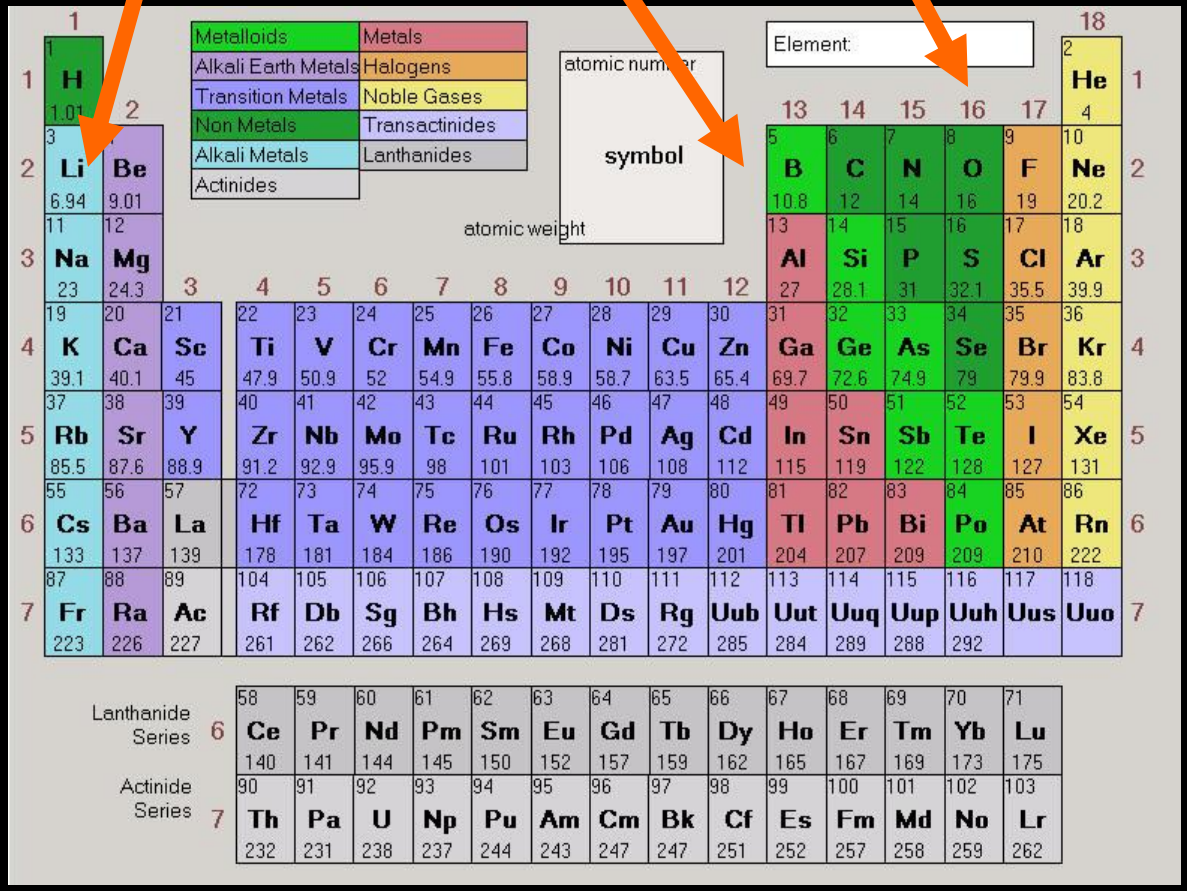
Using Periodic Table, classify an element as a metal, nonmetal, or metalloid.

Metals **Metalloids (Semimetals)** **Nonmetals**



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