

WEDNESDAY, JANUARY 2nd

DO NOW

Know: Electrical energy is caused by moving electric charges and is often transferred to the surroundings as light or heat.

Asked: What are examples of electrical energy turning into light and heat energy?

A: An electric fan causing the air to move

B: A battery powered light warming a page

C: A computer short circuiting, sparking, and causing a fire

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!

▪ Today's **QP** = QP QUIZ PREP =
Using Pg. 160-161 of your book,
SKETCH a timeline of the evolution
of the ATOM and then DESCRIBE
who contributed to each one!

2. Open books, **WORK** on today's **AO**!

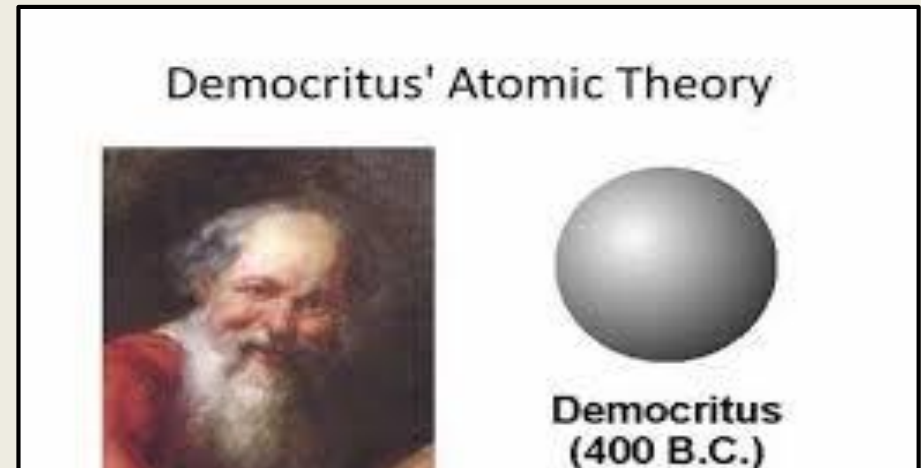
3. ***HW** = Read & Do Pg. 164-167!

TODAY'S ACADEMIC OBJECTIVE


Today you will **DISCOVER** what Matter is composed of and **DETERMINE** how it is quantified!

Atomic Theory– Jot This Down!

- The current accepted MODEL of an Atom took many years to develop!
 - 400-300 BC = DEMOCRITUS created the first Atomic Model, modeling Atoms as SOLID SPHERES and also naming them!
 - 1808 = JOHN DALTON expanded on these ideas, also viewing Atoms as tiny, solid spheres, while creating the first 4 parts of “Atomic Theory”!



Dalton's Atomic Theory - Summary




John Dalton, F.R.S.

1. matter is composed of indivisible particles (atoms)
2. all atoms of a particular element are identical
3. different elements have different atoms
4. atoms combine in certain whole-number ratios

Dalton's Model

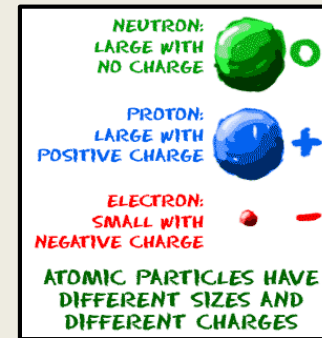
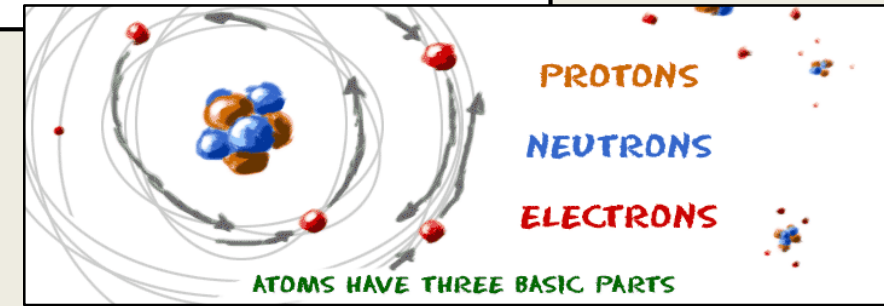
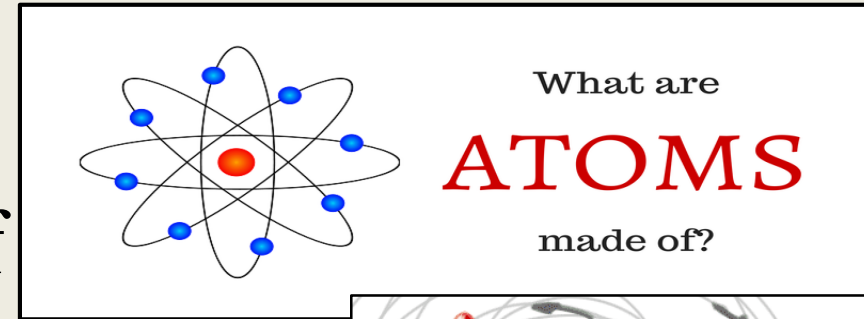
- Solid Sphere Model or Bowling Ball Model
- Proposed by John Dalton



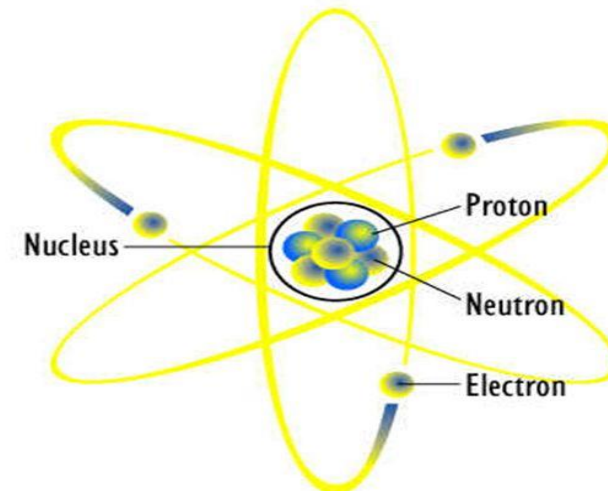
A blue sphere representing Dalton's atomic model is shown at the bottom left of the summary box.

Proton VS Neutron VS Electron – Jot This Down!

- Atoms are the smallest unit of Matter, in that an individual Atom **SHARES** the properties of what it composes!
- Atoms are **STILL** made up of **THREE** smaller particles though!
 - Protons, positively charged particles found in the “Nucleus”!
 - Neutrons, charge-less particles also found in the “Nucleus”!
 - Electrons, negatively charged particles found orbiting around the “Nucleus” in the “electron cloud”!



Subatomic Particles



Electrons:
negatively charged
subatomic particles.

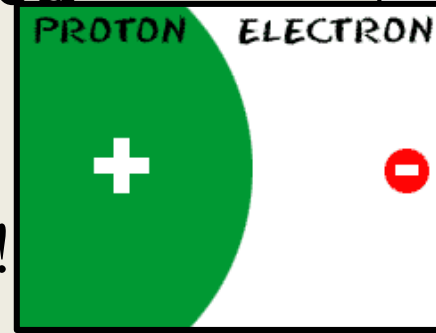
Protons: positively
charged
subatomic particles.

Neutrons:
subatomic particles
with no charge.

Chemical Numbers & The Element Box – Jot This Down!

- There are several NUMBERS used to describe an Atom!

- The “Atomic Number” denotes the number of PROTONS in the Atom!
- The “Mass Number” denotes the number of PROTONS + NEUTRONS in the Atom!
 - To find the number of NEUTRONS just SUBTRACT!
 - Mass Number – Atomic Number = Neutrons!
- In a NEUTRAL Atom, the number of ELECTRONS always equals the PROTONS (to balance out!)



Atomic Symbol

Mass Number
(# of protons + # of neutrons)

A

X — Element

Atomic Number
(# of protons)

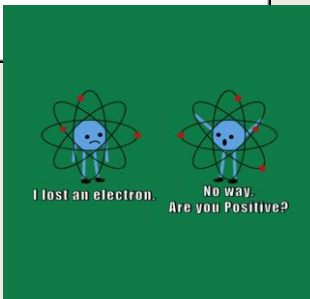
Z

revision science

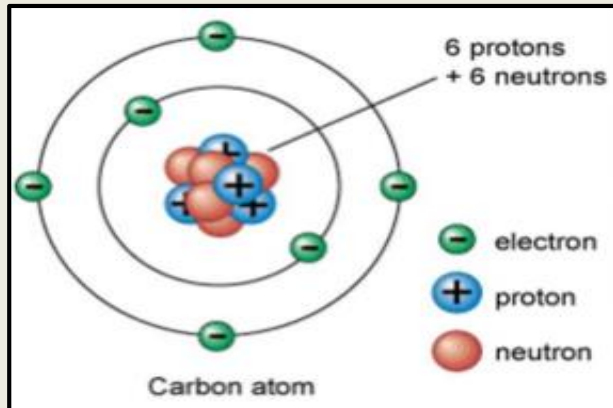
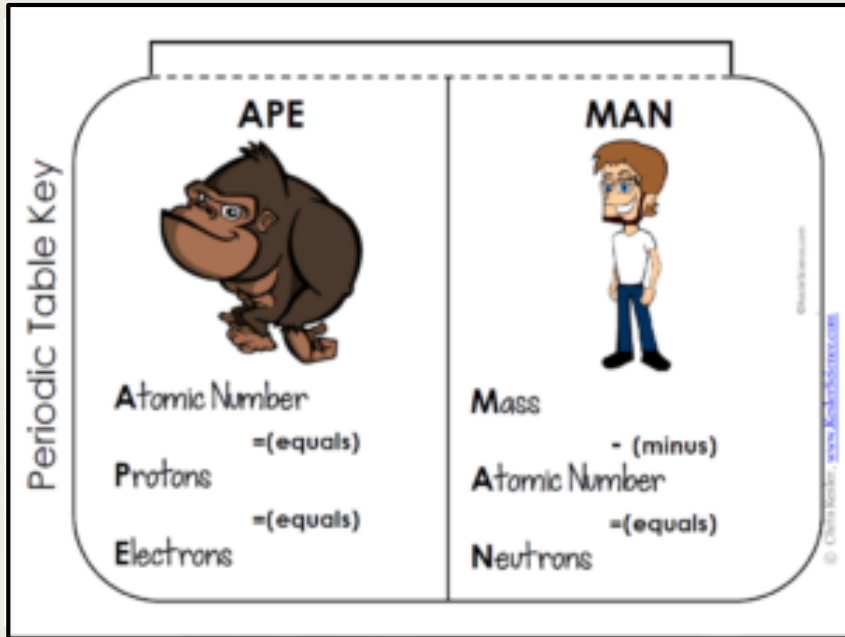
mass number \dashrightarrow 4

atomic number \dashrightarrow 2

He \leftarrow Element Symbol

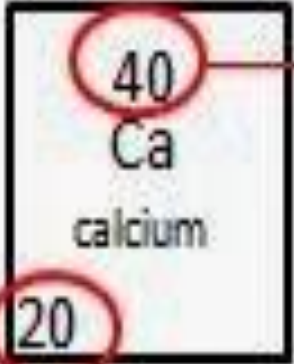


How To Interpret An Element Box!



$$\# \text{ neutrons} = \text{mass number} - \# \text{ protons}$$

Mass number \approx Atomic Weight



Mass number
(always the bigger number)

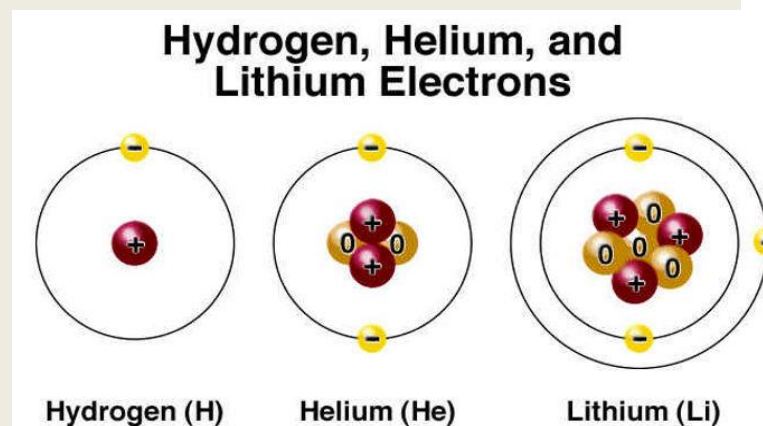
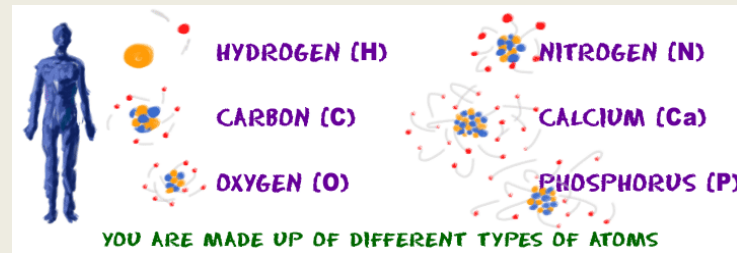
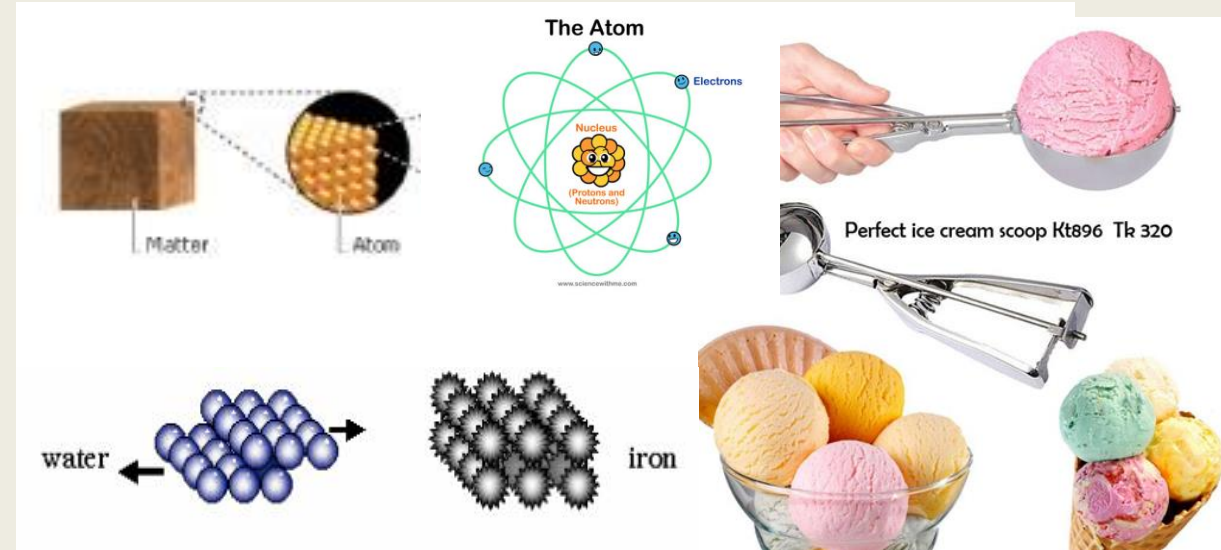
Atomic number
(always the smaller number)

Atomic number equals the number of protons or electrons.

Mass number equals the number of protons + neutrons.

Atoms VS Elements – Jot This Down!

- All Matter is composed of small particles called **ATOMS**!
 - Atoms are the smallest, most basic **UNIT** of Matter!
 - If Matter was Ice Cream, then Atoms would be a **SCOOP**; the smallest unit!
- Elements are just “specific types” of Atoms!
 - Since Atoms vary in the number of “Protons” they have, they are not all the same!
 - If Matter was Ice Cream, then Elements would be the **FLAVORS**; the specific types of Ice Cream Scoops!



Americans' Favorite Ice Cream Flavors



25%	Chocolate
25%	Vanilla
8%	Strawberry
5%	Mint chocolate chip
5%	Butter pecan
3%	Coffee/Coffee fudge
3%	Chocolate chip
2%	Praline and cream
2%	Rocky road
1%	Cookies-n-cream
1%	Cherry
1%	Peanut butter cup
1%	Cookie dough
1%	Pistachio
1%	Nothing (Vol.)
15%	Other
3%	Don't know/No answer

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Molecules VS Compounds – Jot This Down!




- Atoms are often found **BONDED** to one another!
 - Whenever two or more Atoms bonds together, we call the product a **MOLECULE!**
- If there are 2 or more **DIFFERENT** types of Atoms (aka **ELEMENTS**) in a Molecule, we can **ALSO** call our Molecule a **COMPOUND!**
 - We use a system of symbols and conventions to show the **NUMBER** of Atoms of each Element in a Compound!
 - Ex: H_2O , CO_2 , $\text{C}_2\text{H}_6\text{O}_6$

Molecules
Definition- combinations of atoms bonded together



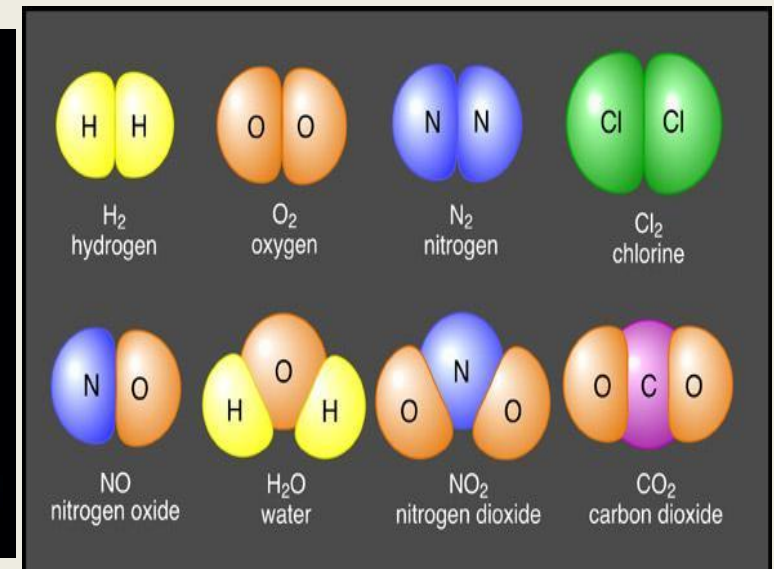
MOLECULE & compound

COMPOUND



Molecule

Compound



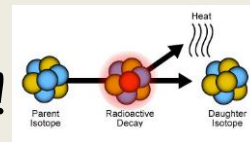
Ions VS Isotopes – Jot This Down!

- Elements are SPECIFIC types of Atoms, and we specify each different Element by the unique number of PROTONS one Atom of the Element has!
- In nature, Atoms are can sometimes be found with MORE or LESS Electrons OR Neutrons than “usually” though!
 - We call Atoms that have more or less Electrons than they do Protons “Ions”!
 - Ions are thus positively or negatively CHARGED!
 - We call Atoms with more of less Neutrons than “usual” Isotopes!
 - Isotopes are often RADIOACTIVE!

A Carbon Atom	A Magnesium Atom	A Calcium Atom
<ul style="list-style-type: none"> • 6 Protons • 6 Neutrons • 6 Electrons 	<ul style="list-style-type: none"> • 12 Protons • 12 Neutrons • 12 Electrons 	<ul style="list-style-type: none"> • 20 Protons • 20 Neutrons • 20 Electrons

Element Key

1	←	atomic number
H	←	element symbol
Hydrogen	←	element name
1.008	←	atomic weight



Ions vs. Isotopes

Ions

- Gain or lose electrons

Na⁺
H⁺
Cl⁻

Be²⁺
O²⁻
N³⁻

Al³⁺
K⁺

Isotopes

- Gain or lose neutrons

Isotopes of Carbon

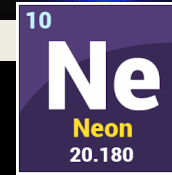
¹²C
Carbon-12
6 protons
6 neutrons

¹³C
Carbon-13
6 protons
7 neutrons

¹⁴C
Carbon-14
6 protons
8 neutrons

Periodic Table: Chemical Notation & Numbers – Jot This Down!

- Due to having different numbers of Protons, Electrons, and Neutrons each ELEMENT displays unique properties!
 - The properties of Elements follows a pattern though, and in 1869 scientist Dimitri Mendeleev created the Periodic Table to ORGANIZE and DISPLAY these Elemental patterns!
- This single table holds a TON of information, such as an Element's Chemical Symbol (X), Atomic Number (Z, the # of Protons), AND the Mass Number (A, the # of Protons + Neutrons)!
 - The Periodic Table ALSO organizes the Elements into Groups/Families and Periods based on their shared chemical properties!



Mendeleev's Periodic Table

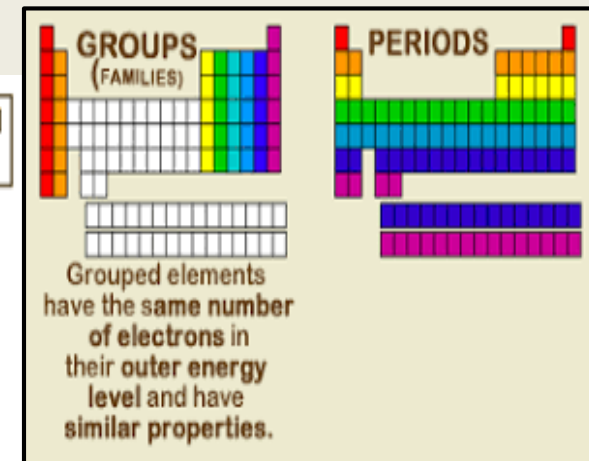
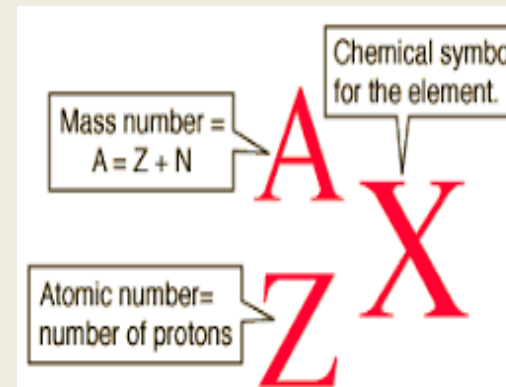
Periodic Table of the Elements

1	H																	He
2	Li	Be											B	C	N	O	F	Ne
3	Na	Mg											Al	Si	P	S	Cl	Ar
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	Cs	Ba	La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Rn
7	Fr	Ra																

* Lanthanide Series: Ce, Pr, Nd, Pm, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu
* Actinide Series: Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr



Dmitri Mendeleev



THURSDAY, JANUARY 3rd

DO NOW

- In your notebooks, to be checked, solve this problem...
There are 12 inches in 1 foot and 3 feet in 1 yard. These are units of length!

Know:

$$12in = 1ft \quad 3ft = 1yd$$

Asked: How many yards are in 5940 inches?

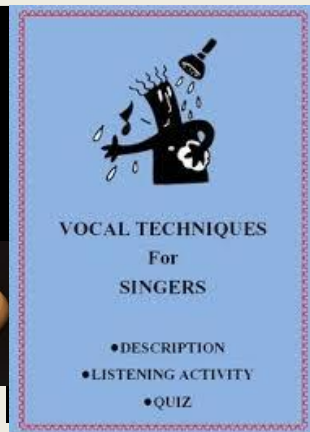
TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
 - Today's **QP** = QP BOOK REVIEW =
Using Pg. 162-165 of your book,
SKETCH the relative sizes of a
Neutron, Proton, and Electron and
then COMPUTE the Mass Number of
an Atom with p= 45 and n = 37!
2. Open books, **WORK** on today's **AO**!
3. ***HW** = Read & Do Pg. 168 - 169!

TODAY'S ACADEMIC OBJECTIVE

Today you will **DISCOVER** what Matter is composed of and **DETERMINE** how it is quantified!

SCIENCE QUIZ ALERT



- Students, listen UP!!!

- We will be having a **VOCAL QUIZ** soon to help us LEARN the Chemical Symbols for some COMMON Chemical Elements!

- This quiz will require you to STUDY your Periodic Tables!

- You are responsible for learning the NAME that goes with these 21 Chemical Element SYMBOLS!

- H, Na, K, Mg, Ca, Fe, Ni, Cu, Zn, Al, C, Si, N, P, O, S, F, Cl, He, Ne, Ar!

A periodic table with a title 'PERIODIC TABLE: ELEMENT NAME ORIGINS'. The table is color-coded by groups and includes various labels for element categories and origins.

12	←	ATOMIC NUMBER
Mg	←	CHEMICAL SYMBOL
Magnesium	←	CHEMICAL NAME
24.305	←	ATOMIC MASS

SCIENCE QUIZ ALERT



VOCAL TECHNIQUES

Periodic Table of the Elements

1 H Hydrogen 1.008																	18 He Helium 4.0026
3 Li Lithium 6.941	4 Be Beryllium 9.0122											5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180
11 Na Sodium 22.990	12 Mg Magnesium 24.305											13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.613	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.710	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium [209]	85 At Astatine [209]	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides	104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [293]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown

57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.242	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.500	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.055	71 Lu Lutetium 174.967
89 Ac Actinium 227.028	90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium [254]	100 Fm Fermium 257.095	101 Md Mendelevium 258.1	102 No Nobelium 259.101	103 Lr Lawrencium [262]

FRIDAY, JANUARY 4th

DO NOW

- In your notebooks, to be checked, solve this problem...

There are 12 Atomic Mass Units in 1 Carbon-12 Atom. These are units of Atomic Mass!

Know:

$$12\text{amu} = 1^{12}\text{C}$$

Asked: How many Atomic Mass Units are in 192 atoms of Carbon-12?

TODAY'S PLAN

1. Do and review the **DO NOW** and **Qualitative Prompt (QP)**!
 - Today's **QP** = QP QUIZ PREP = Using Pg. 162-165 of your book, DRAW and LABEL an Atom with p = 17, n = 18, & e = 17 and then REDEFINE the terms "Atomic Number" & "Mass Number"!
2. Open books, **WORK** on today's **AO**!
3. ***HW** = Read & Do Pg. 170-173!

TODAY'S ACADEMIC OBJECTIVE

Today you will **ENVISION** the structure of the Periodic Table in order to **DECIPHER** its scientific language!