Complete this with the review ppt. Not all blanks are underlined in the ppt!

2 pts ec printing

Atoms & the Periodic Table Review

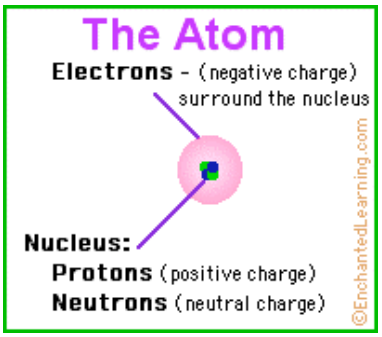
Draw the: "It's like this" illustration:

Matter has mass and takes up space. Atoms are basic building blocks of matter, and cannot be chemically subdivided by ordinary means. What's an atom made of? Even though an atom is really small, it is made of even smaller particles. It's basically made of 3 tiny subatomic particles:

_____ _____ _____

Parts of an Atom

_____ : in the nucleus + (positive) charge 1 amu
_____: in the nucleus 0 (no) charge 1 amu
_____: in the electron cloud - (negative) charge 0 amu
The center of an atom is called the _____
The nucleus contains 2 types of particles:
_____ = positive (+) charge _____ = no charge, neutral
This means the nucleus is always positive.
The Outside of the Atom: Surrounding the nucleus is a cloud of electrons.
_____ spin quickly. Are negatively (-) charged are very small.
Have a mass of 0 AMU.

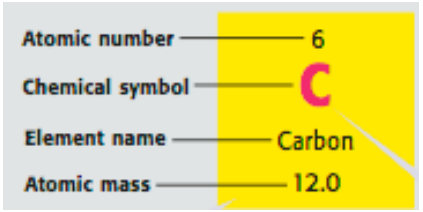


Overall Balance

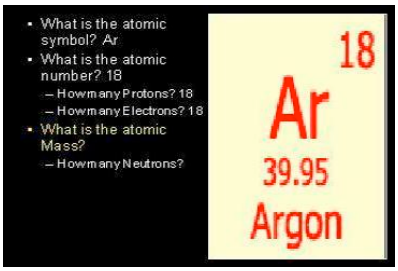
To review, an atom is made up of 3 types of particles which are:

_____ _____ _____

Notice that the protons and electrons have opposite charges…
what does this mean about the overall balance of an atom?
_____ (+ charge) = _____(- charge)
The smallest piece of an element which still has the properties of that element is called an _____ Central core is called a _____ , and has a + charge. It is surrounded by an _____ Cloud which has a - charge. These 2 parts balance each other out so that the atom is electrically neutral (or has NO electric charge) The _____ in an atom is called
the atomic number.

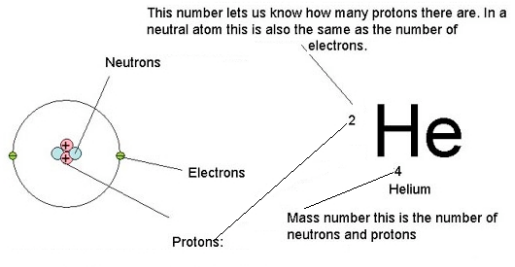


The elements in the periodic table are arranged according to increasing atomic number. It is the number of _____ that determines the atomic number: H (element hydrogen) = 1. The number of protons in an element is constant (H=1,for 1 proton, 2= He helium, for 2 protons… and so on. Argon: Ar is number 18).
This procedure NEVER changes. The protons are the _____. They identify the element. The number of protons is equal to the number of electrons so that the element is electrically stable (or balanced).



The number of protons IS the Atomic Number

_____ : the sum of protons ADDED to the neutrons. Mass number can vary for the same element, if the element has different numbers of neutrons. When this happens, these forms of an element are called isotopes.



Atomic Mass is the weighted AVERAGE of the masses of ALL the natural occurring isotopes _____ The mass of an atom depends on the number of protons & neutrons it contains.
It is the weighted **AVERAGE.**
AMU = Atomic mass unit
Mass number it is the sum of the protons + neutrons.
Neutrons = mass number - atomic number
Remember:
Atomic Number = NUMBER of _____, which = NUMBER of _____

What about electrons & shells?

The region around the nucleus is called the electron cloud. The electrons occupy certain energy levels.

The farther an energy level from the nucleus, the more energy the electrons will have in it.
1st level = _____ electrons
2nd level= _____ electrons
3rd level= _____ electrons
Although the 3rd level CAN hold 18, it really only holds 8 to complete the octet and then goes to the 4th level.

Electron Shells

The orbits that electrons take around the nucleus fall into distinct orbital shells. These shells exist even when they are not occupied.

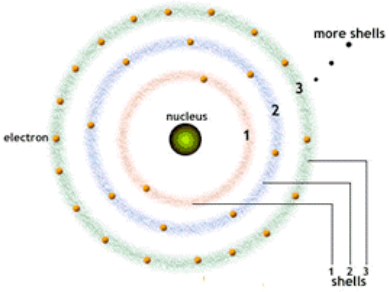
The shell nearest the nucleus (shell 1) has the tightest grip on its electron(s). The shell furthest from the nucleus has the weakest grip on its electron(s).

The number of electrons that can occupy a given shell increases with the distance of the shell from the nucleus.

The outermost occupied shell typically has fewer than its maximum number of electrons. Electrons in such under-occupied shells often pass between nearby atoms.

The number of electrons in the outer most occupied shell of an atom tends to determine many of the physical properties of substances composed of that atom.

Electrons can jump from one shell to the next but can never occupy a position between shells.



Shell 1 can hold up to 2 electrons.

Shell 2 can hold up to 8 electrons.

Shell 3 can hold up to up 18 electrons.

And so on.

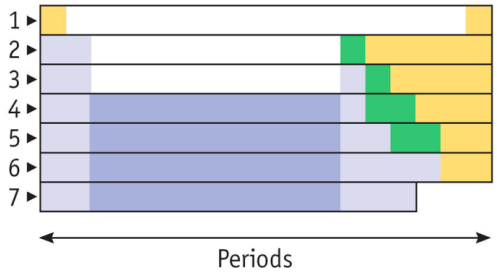
The shells fill with electrons from the inside out. That is, given the total number of electrons associated with a particular atom in its neutral state, the shells nearer to the nucleus fill to their maximums before any surplus goes to the next shell.

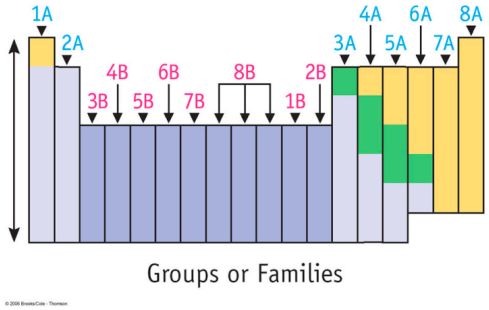
Example

The Periodic Table Review

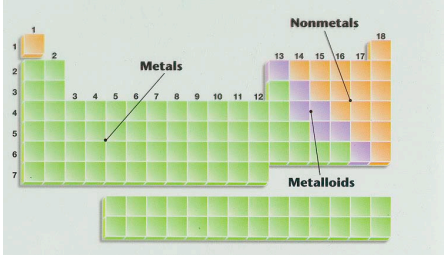
You've got your _____
Periods = rows
From left to right
What do elements in a row have in common?
the same number of electron shells
Every element in Period 1 (1st row) has 1 shell for its electrons (H & He) All of the elements in period 2 have two shells for their electrons.
It continues like this all the way down the table

And You've got your _____
Column = group = families
What do elements in a group have in common?
same number of valence electrons (electrons in the outer shell)
Every element in group 1 (1st column) has 1 valence electron
Every element in group 2 has 2 valence electrons.
In fact, if you know the group's number, you automatically know how many valence electrons it has!

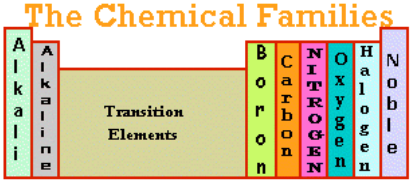




Metals, Metalloids, & Nonmetals

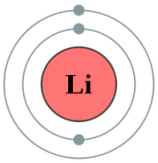


The Chemical Families



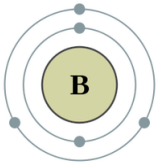
The Lanthanoid Series
The Actinoid Series

Family #1 or 1A:
_____Metals
1 valence electron
Very Reactive Li, Na, K, Rb, Cs, Fr



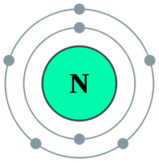
this is a Bohr model of Li

Group 13: The _____ Group
3 valence electrons in the outer energy level
One metalloid and 4 metals
Reactive
Solid at room temperature
Most common element in this group is aluminum B, Al, Ga, In, Tl



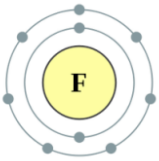
this is a Bohr model of B

#15 or 5A: _____ Family
5 valence electrons
2 nonmetals, 2 metalloids,
1 metal Reactivity varies
N, P, As, Sb, Bi



this is a Bohr model of N

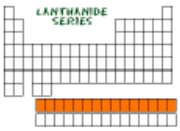
Family #17 or 7B: _____
7 valence electrons
F, Cl, Br, I, At
very reactive Nonmetals
They are very reactive because have 7 valence electrons,
this means they are ALMOST full and can combine with
many elements. Halogen elements combine with metals to
form compounds called salts.



this is a Bohr model of F

Family #3-12 (1B-8B):
_____ Metals
1-2 valence electrons
Less reactive than alkaline earth metals because they don't give away their electrons as easily
Bottom 2 rows are the Lanthanide & Actinide series

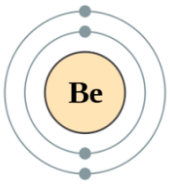
_____ Series:
shiny reactive metals
Most found in nature



_____ Series:
radioactive and unstable
Most are man-made &
not stable in nature

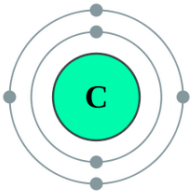
Space for Bohr Model Drawings

Family #2 or 2A:
_____ Metals
2 valence electrons
very reactive, but less than alkali metals Be, Mg, Ca, Sr, Ba, Ra



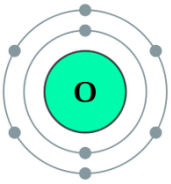
this is a Bohr model of Be

#14 or 4A: _____ Family
4 valence electrons
1 metal, 1 metalloid, 2 nonmetals.
This family is incredibly important in the field of technology.
C, Si, Ge, Sn, Pb

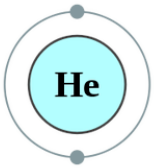


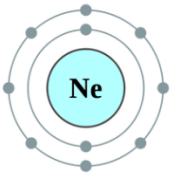
this is a Bohr model of C

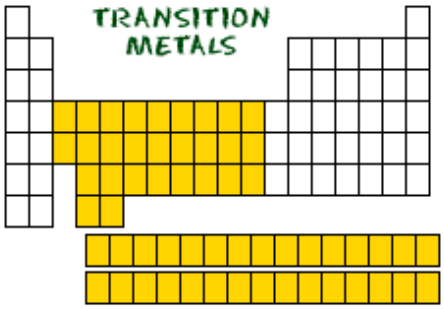
#16 or 6A: _____ Family
6 valence electrons O, S, Se, Te, Po
3 nonmetals, 1 metalloid, 1 metal
Reactive. Most members form covalent (sharing bonds) compounds. Must share 2 electrons with other elements to form compounds.



Family #18 or 8A:
_____Gases
8 valence electrons (except He which only has 2)
"Happy" because their outer electron shell is filled! NON REACTIVE
(inert) gases. Nonmetals
NO bonding with other elements
He, Ne, Ar, Kr, Xe







Hydrogen: stands alone
Gas, reactive,
1 electron in outer level.
Hydrogen does not match properties of any single group so it is placed above Group 1.
It can **give it's electron** away with **ionic bonding**, or **share** it's electron in **covalent bonding**

Quiz Next Class

You need to KNOW this basic information This "quiz" will be with NO NOTES I will provide a periodic table to be used YOU need to understand the periodic table There will be NO questions on the history of the atom & atomic model. You will need to know what makes up an atom and how the periodic table is arranged.

1-6: Fill in the blank. Circle the correct answers for charge, where it's found, what the mass is.

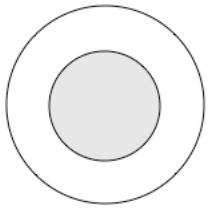
1. Proton: + - 0 charge. In or outside the nucleus, 1 or 0 amu (atomic mass unit)
2. Neutron: + - 0 charge. In or outside the nucleus, 1 or 0 amu (atomic mass unit)
3. Electron: + - 0 charge. In or outside the nucleus, 1 or 0 amu (atomic mass unit)
4. Atomic number is the number of _____
5. Isotopes are the same number of *protons*, different number of _____
6. The Mass number is equal to the number of _____ + (number of) _____

Part 2) Complete the table.

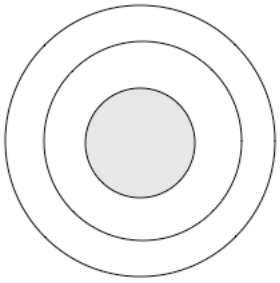
Element	Protons	Neutrons	Total Electrons		Electrons in 1st shell	Electrons in 2nd shell	Electrons in 3rd shell
Carbon							
Copper							
Calcium							
Krypton							
Neon							
Arsenic							
Sodium							
Potassium							

Part 3) Draw each Bohr Diagram for these elements in the space below.

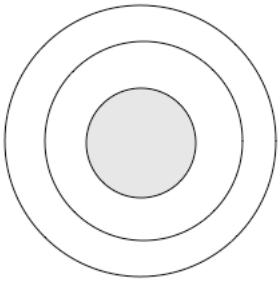
Hydrogen
Atomic # _____
P+ _____ E-_____ N _____



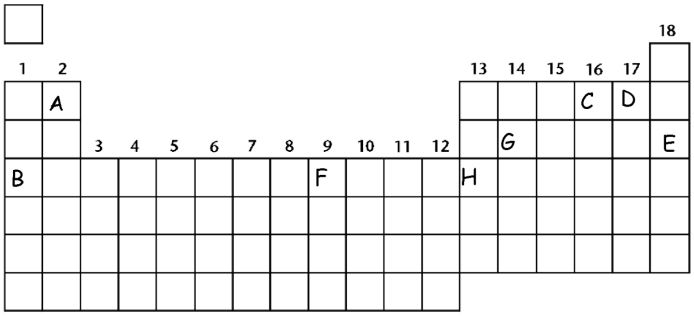
Beryllium
Atomic # _____
P+ _____ E-_____ N _____



Fluorine
Atomic # _____
P+ _____ E-_____ N _____



Argon
Atomic # _____
P+ ____ E-_____ N _____



Choose the correct letter that corresponds:

Choices:

____ Lanthanoid Series
____ Metalloid
____ Carbon
____ Alkaline Earth
____ Halogens
____ Transition Metal
____ Noble Gas
____ Boron Group
____ Actinoid Series
____ Oxygen Group
____ Alkali Metals

In addition:
Label Hydrogen

Shade a "period"

Shade "family/group" 4B