

# **Case Study**

**Collected in 5 minutes**

# Periodic Table Review

## Metals vs. Nonmetals

**Periodic Table of the Elements**

1	IA	H																	O	He						
2		Li	IIA	Be																	B	C	N	O	F	Ne
3		Na	Mg	IIIB	IVB	VB	VIB	VII B	VII	IB	IIB	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	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn							
7		Fr	Ra	+Ac	Rf	Ha	Sg	Ns	Hs	Mt	110	111	112	113												

* Lanthanide Series	58	59	60	61	62	63	64	65	66	67	68	69	70	71
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu
+ Actinide Series	90	91	92	93	94	95	96	97	98	99	100	101	102	103
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr

# Parts of an Atom

The smallest part of an element is called the atom.

The atom is comprised of three types of subatomic particles:  
**protons, neutrons and electrons** .

**Protons**: are 'heavy', positively charged ( $p^+$ ) particles found in the **nucleus**

- **the number of protons is equal to the atomic number**

**Neutrons**: are neutral particles that have the same mass as a proton and are found in the nucleus.

What does neutral mean??

**Electrons**: are negatively charged ( $e^-$ ) particles that circle or orbit the nucleus at different energy levels.

- The particles have almost no mass.
- The farther away from the nucleus an electron is, the higher the energy level.
- **atoms are electrically neutral,  
so the number of  $p^+$  equals the number of  $e^-$**

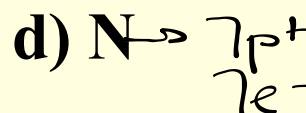
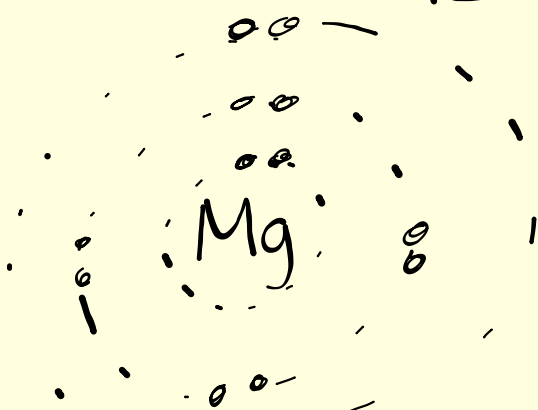
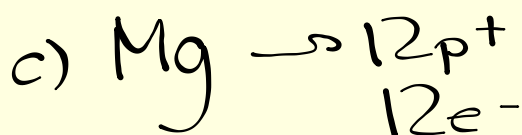
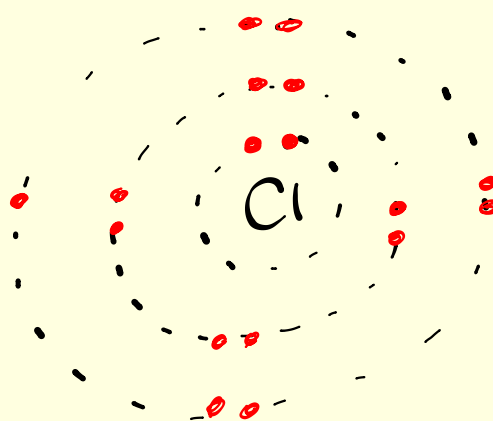
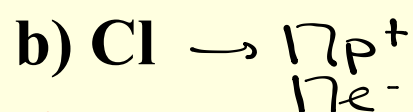
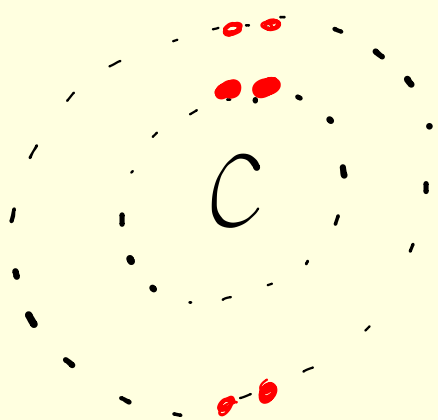
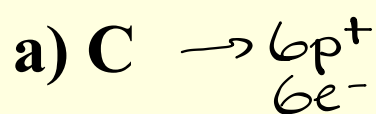
- Bohr diagrams can be drawn to represent the arrangement of electrons in various levels or orbits
- each orbit has a definite number of electrons

**the first level can have two  
the second can have eight  
the third can have eight**

	Location	Charge	Relative Size
Protons	Nucleus	+ive positive	BIG
Neutrons	Nucleus	neutral	BIG
Electrons	Outside Nucleus	negative -ive	"massless"

# Atomic Models

Draw a Bohr diagram for:





**Bohr Diagram  
worksheets  
Chart 1, 2**

# Bohr Worksheets



## **Valence Electrons**

Those electrons that are found in the highest energy level (outside orbit) are called valence electrons. These are the subatomic particles used in forming compounds.

# Ions

- elements are willing to give up or gain ein order to have the appearance of a filled outermost orbital
- when e<sup>-</sup> are gained or lost, an atom is then called **anion**
- **an ion is an atom with a positive or negative charge**
- the ionic charge is the numerical value of the electric charge with a plus or minus sign

Ex. Li atom has 3p<sup>+</sup> and 3e<sup>-</sup>

Li ion has 3p<sup>+</sup> and 2e<sup>-</sup> and is written Li<sup>+</sup>

Which groups would tend to lose electrons? Gain electrons?

- metals lose electrons to become stable  
Ex. magnesium will lose two e<sup>-</sup> and become positively charged  
Mg atom → Mg<sup>2+</sup>
- nonmetals gain electrons to become stable  
Ex. oxygen will gain two e<sup>-</sup> and become  
O atom → O<sup>2-</sup>

# Compounds

Compounds are made by elements transferring or sharing electrons.

- the further an e- is away from the nucleus, the greater the possibility of it making a compound with another element
- the **outermost electrons** are involved in making compounds