

# Today's Plan...

- Pass in Case Study
- Begin study on Periodic Table
- Bohr Diagrams
- Exercise p.187

Periodic Table of the Elements

IA	IIA	IIIA	IVA	VA	VIA	VIIA	VIIIA	0									
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	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe
55 Cs	56 Ba	57 La	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	
87 Fr	88 Ra	89 Ac	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr	

\* Lanthanide Series  
+ Actinide Series

Elements in the same column (down) are called a group. Ex: Li, Na, K, Rb, Cs and Fr are in a group.

Rows on a periodic table (across) are called periods. Ex. Going across from lithium to neon

In your textbook periodic table, gases (g) are red, liquids (l) are blue and solids (s) are black.

What state are most elements on the periodic table??

# Review of the Periodic Table

Periodic table - a structured arrangement of elements that help us explain and predict physical and chemical properties.

Metals are generally located on the left, while the non-metals are located on the right side of the table.  
(staircase line)

Periodic Table of the Elements

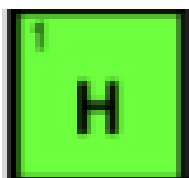
1	2																	10
1	H																	He
2	3	4											5	6	7	8	9	10
2	Li	Be											B	C	N	O	F	Ne
3	11	12											13	14	15	16	17	18
3	Na	Mg											Al	Si	P	S	Cl	Ar
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
4	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
5	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
6	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
6	Cs	Ba	*La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
7	87	88	89	104	105	106	107	108	109	110	111	112	113					
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



*Hydrogen*, the lightest element, is the exception to almost every rule in chemistry. Although it is located on the left side of the staircase, it behaves mostly as a **nonmetal**.

Metals are normally shiny, malleable, conductors, react with acid, and are mostly solids at room temperature.



Non-metals are generally dull, brittle, good insulators, do not react with acid, and can be solid, liquids or gas at room temperature.

Chemical Families (groups) are vertical columns in the periodic table. They tend to have similar physical and chemical properties.

Alkali Metals										Noble Gases									
Alkaline Earth										Halogens									
H																			He
Li	Be									B	C	N	O	F	Ne				
Na	Mg									Al	Si	P	S	Cl	Ar				
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr		
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe		
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuq	Uub								

*Alkali metals* (group 1) are shiny, silvery metals and form compounds that are mostly white solids and soluble in water. i.e. H, Li etc

*Alkaline earth metals* (group 2) are shiny, silvery metals, but they form compounds that are not soluble in water. i.e. Mg, Ca etc

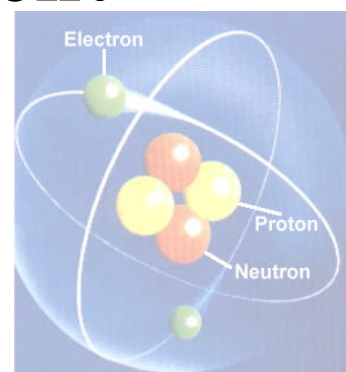
The *halogens* (group 17) generally react with alkali metals. i.e. F, Cl, Br etc

*Noble gases* (group 18) generally do not form compounds. i.e. He, Ne etc

## Parts of an Element

The smallest part of an element is called the atom.

The atom has 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

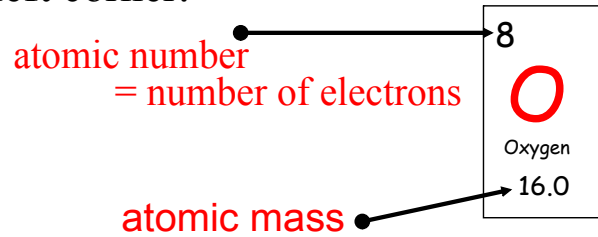
Neutrons: are neutral particles that have the same mass as a proton and are found in the nucleus.

**What does neutral mean??**

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

# Bohr Diagrams

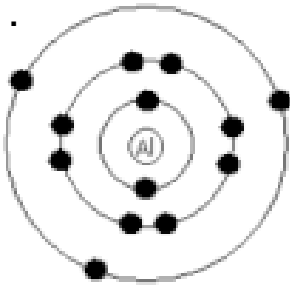
- can be drawn to represent the arrangement of electrons in various levels or orbits
- to find the number of electrons look at the periodic table. The number in the upper left corner.



- each orbit of the Bohr diagram has a definite number of electrons
  - the first level can have two
  - the second can have eight
  - the third can have eight

## Examples of Bohr Diagrams

1.



Aluminum Al  
atomic number = 13  
so 2 in first orbit  
8 in second orbit  
3 in third orbit

# **Exercise p.187**

**#1-4**

## Attachments

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S10 answers pg 187 #1-4.doc