Science10 Name:_____

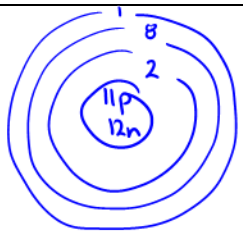
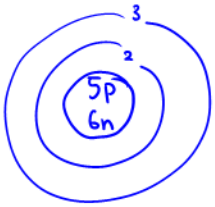
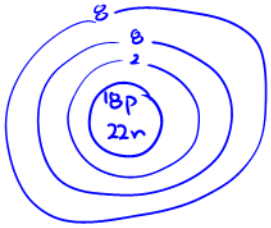
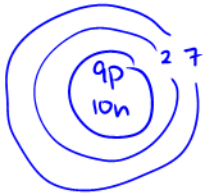
Block:____ Date:_____

CHAPTER 4 REVIEW:
Atomic Theory & Bonding, Names & Formulas of Compounds

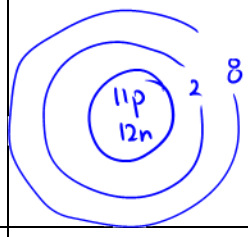
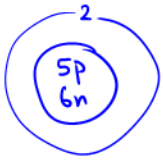
1. What is meant by the term chemical family?
   elements with similar valence electrons → similar properties
2. How can you tell if two elements belong to the same chemical family?
   - same column on periodic table / similar electron configurations
3. On the periodic table, what is a period?
   a row
4. How many electrons are in the valence shell of:
   Na = 1 Cl = 7 Ne = 8
5. A full valence shell is called a stable octet
6. The members of which family have full valence electrons? noble gases
7. In an atom, which has more volume, the nucleus or the electron cloud? electron cloud
8. Which has more mass, the nucleus or the electron cloud? nucleus
9. Nitrogen, phosphorous, arsenic, antimony and bismuth all belong to the same chemical family. Which member is probably the best conductor of electricity? Explain your answer.
   Bismuth - closest to the metals
10. Fill in the following table:

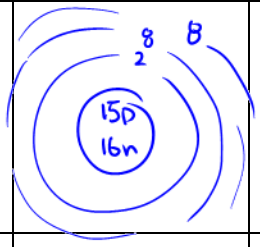
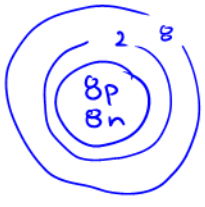
Element Name	Element symbol	Group # & Family	protons	neutrons	electrons	valence electrons	Ion Charge
Lithium	Li	Group 1 Alkali Metals	3	4	3	1	+1
Neon	Ne	18 Noble Gases	10	10	10	8	0
Cesium	Cs	Group 1 Alkali Metals	55	78	55	1	+1
Magnesium	Mg	Group 2 Alkaline Earth	12	12	12	2	+2
Fluorine	F	Group 17 Halogens	9	10	9	7	-1
Hydrogen	H	1/17	1	0	1	1	+1/-1
Oxygen	O	Group 16	8	8	8	6	-2
Iodine	I	Group 17 Halogens	53	74	53	7	-1
Carbon	C	Group 14	6	6	6	4	+4/-4

11. Draw Bohr Models and Lewis Diagrams for the following elements and use them to predict the ion charge.

Element	Bohr Model	Lewis Diagram	Ion Charge
Sodium (Na)		Na	+1
Boron (B)		B	+3
Argon (Ar)		:Ar:	0
Fluorine (F)		:F:	-1

12. Draw Bohr Models and Lewis Diagrams for the following ions.

Element	Bohr Model	Lewis Diagram
Na^{+}		[Na]$^{+}$
B^{+3}		[B]$^{3+}$

Element	Bohr Model	Lewis Diagram
P^{-3}		[:P:]$^{3-}$
O^{-2}		[:O:]$^{2-}$

13. Find three differences between ionic bonding and covalent bonding.

IONIC BONDING	COVALENT BONDING
cation to anion (metal) (non metal)	non-metal to non metal
metal gives nonmetal electrons	nobody gives away electrons / sharing.
molecule forms as	

14. What is a diatomic molecule? a molecule formed between 2 atoms of the same element

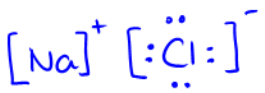
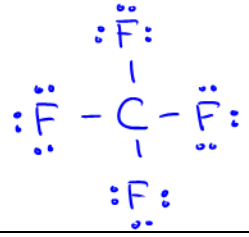
15. List all the diatomic molecules you have learned.

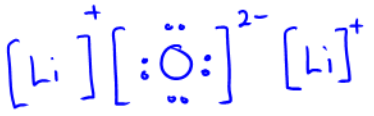
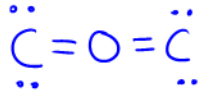
H_2 N_2 O_2 F_2 Cl_2 I_2 Br_2 (and maybe At_2)

16. Why doesn't electron transfer take place in diatomic molecules?

Both atoms want to gain electrons

17. State whether the following compounds are ionic or covalent and then draw Lewis Diagrams for them.

Element	Ionic / Covalent	Lewis Diagram
NaCl	ionic	
CF_4	covalent	

Element	Ionic / Covalent	Lewis Diagram
Li_2O	ionic	
CO_2	covalent	

18. Circle the ionic compounds below and underline the covalent ones:

Cs_3N C_3N_4 $SrAt_2$ BaO NH_3

19. Write names for the following ionic compounds. Remember, the rules are different for ionic and covalent compounds. Before you can name a compound, you have to decide whether it is ionic or covalent

a. As_2O_3 covalent diarsenic trioxide
b. CBr_2 covalent carbon dibromide
c. H_2S ionic hydrogen sulfide
d. NO_2 covalent nitrogen dioxide
e. N_2O_4 covalent dinitrogen tetraoxide
f. $CuCl_2$ ionic copper(II) chloride
g. $Al(OH)_3$ ionic aluminum hydroxide
h. CO covalent carbon monoxide
i. PF_5 covalent phosphorous pentafluoride
j. MgS ionic magnesium sulfide
k. Fe_2O_3 ionic iron (III) oxide
l. NH_4Cl ionic ammonium chloride

20. Give the formulas for the following compounds:

a. silicon disulphide SiS_2
b. oxygen gas O_2
c. hydrogen sulphate H_2SO_4
d. carbon dioxide CO_2
e. silver oxide Ag_2O
f. mercury I phosphide Hg_3P
g. iron II nitrate $Fe(NO_3)_2$
h. phosphorus pentachloride PCl_5
i. ammonium phosphate $(NH_4)_3PO_4$
j. carbon tetrahydride CH_4
k. bromine liquid Br_2
l. magnesium hydroxide $Mg(OH)_2$