

1. Fill in the table:

Group/family	Example of an element in the group	Number of valence electrons
Alkali metals		
Halogens		
Noble Gases		
Alkaline Earth metals		
Transition Metals		

2. Draw the lewis dot diagram for the following:

Element	Lewis dot	Element	Lewis Dot
Ca		Ne	
Al		C	
S		K	
Cl		N	
He		Sb	

3. draw a bohr diagram for the following:

a) Beryllium

b) Silicon

4. Fill in the table for the following atoms/ions:

Atom/ion	Atomic Number	Atomic Mass	# of Protons	#of electrons	# of Neutrons	Atom or ion?
Mg						
P						
F						
Ar						
Ca <sup>2+</sup>						
Al <sup>3+</sup>						
O <sup>2-</sup>						
N <sup>3-</sup>						

5. What is the difference between an atom and an ion?

6. State 2 differences between ionic and covalent bonds.

7. Identify the following as ionic or covalent compounds:

Compound	Ionic or covalent	Compound	Ionic or covalent
CaCl <sub>2</sub>		S <sub>2</sub> O <sub>3</sub>	
CO		PbCl <sub>4</sub>	
H <sub>2</sub> O		CH <sub>4</sub>	
NaCl		C <sub>2</sub> H <sub>5</sub> OH	
Na <sub>2</sub> O		NO <sub>3</sub>	
LiF		S <sub>8</sub>	
HBr		Fe <sub>2</sub> O <sub>3</sub>	

8. Metals \_\_\_\_\_ (lose/gain) electrons to become \_\_\_\_\_ (positive/negative) ions. Non-metals \_\_\_\_\_ (lose/gain) electrons to become \_\_\_\_\_ (positive/negative) ions.

9. Identify the following compounds as ionic or covalent, then draw a proper lewis dot diagram showing the bonding of each:

a) Ca + Cl

b) Al + O

c) H<sub>2</sub>O

d) CCl<sub>4</sub>

10. What does HOFBrINCl mean?

11. Naming/Formula Writing

**Binary Ionic**

MgS

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KBr

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Ba<sub>3</sub>N<sub>2</sub>

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Al<sub>2</sub>O<sub>3</sub>

---

NaI

---

SrF<sub>2</sub>

---

Li<sub>2</sub>S

---

RaCl<sub>2</sub>

---

magnesium oxide

---

lithium bromide

---

calcium nitride

---

aluminum sulfide

---

potassium iodide

---

strontium chloride

---

sodium sulfide

---

radium bromide

---

magnesium sulfide

---

**Ionic With Transition Metals**

CuS

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PbBr<sub>4</sub>

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Pb<sub>3</sub>N<sub>2</sub>

---

Fe<sub>2</sub>O<sub>3</sub>

---

FeI<sub>2</sub>

---

Sn<sub>3</sub>P<sub>4</sub>

---

Cu<sub>2</sub>S

---

SnCl<sub>2</sub>

---

HgO

---

CuCl<sub>2</sub>

---

copper(I) sulfide

---

lead(IV) iodide

---

tin(II) fluoride

---

mercury(I) bromide

---

tin(II) oxide

---

chromium(III) oxide

---

gold(I) iodide

---

**Covalent**

chlorine monoxide

---

oxygen difluoride

---

boron phosphide

---

dinitrogen monoxide

---

nitrogen trifluoride

---

sulfur tetrachloride

---

carbon dioxide

---

diphosphorous  
pentoxide

---

$As_4O_6$

---

$BrO_3$

---

BN

---

$N_2O_3$

---

$NI_3$

---

$SF_6$

---

$PCl_3$

---

CO

---

$PCl_5$

---

12. State the law of conservation of mass.

13. A student puts 2g of zinc in 10g of HCl acid. After the reaction takes place, the remaining solution weighs 9g. How many grams of gas were produced?

14. What are reactants? Where are they found in a chemical reaction?

15. What are products? Where are they found in a chemical reaction?

15. Balance the following reactions and state the type of reaction:

Reaction	Type
$\text{___ C}_4\text{H}_{10} + \text{___ O}_2 \rightarrow \text{___ CO}_2 + \text{___ H}_2\text{O}$	
$\text{___ MgF}_2 + \text{___ Li}_2\text{CO}_3 \rightarrow \text{___ MgCO}_3 + \text{___ LiF}$	
$\text{___ N}_2 + \text{___ H}_2 \rightarrow \text{___ NH}_3$	
$\text{___ CH}_4 + \text{___ O}_2 \rightarrow \text{___ CO}_2 + \text{___ H}_2\text{O}$	
$\text{___ Al} + \text{___ HCl} \rightarrow \text{___ H}_2 + \text{___ AlCl}_3$	
$\text{___ P}_2\text{O}_3 \rightarrow \text{___ P}_4 + \text{___ O}_2$	
$\text{___ NaF} + \text{___ Br}_2 \rightarrow \text{___ NaBr} + \text{___ F}_2$	
$\text{___ Na}_3\text{PO}_4 + \text{___ CaCl}_2 \rightarrow \text{___ NaCl} + \text{___ Ca}_3(\text{PO}_4)_2$	
$\text{___ CF}_4 + \text{___ Br}_2 \rightarrow \text{___ CBr}_4 + \text{___ F}_2$	

16. From the following word equations, write the balanced reaction:

- a) Hydrogen gas reacts with oxygen gas to produce water
  
- b) Iron(III) chloride reacts with oxygen gas to produce Iron(III) oxide and chlorine gas
  
- c) Propane ( $C_3H_8$ ) burns in oxygen to produce carbon dioxide and water.
  
- d) Lead(IV) sulphide reacts with aluminum oxide to produce Lead(IV) oxide and aluminum sulphide
  
- e) Potassium chlorate ( $KClO_3$ ) breaks down into potassium chloride and oxygen gas when heated.

17. How do we test for the following gases?

- a) Hydrogen
  
- b) Oxygen
  
- c) Carbon dioxide

18. Identify the following as acids, bases or neither:

- a)  $H_2SO_4$
- b) HCl
- c) NaOH
- d)  $H_2O$
- e)  $Mg(OH)_2$



19. List the properties of acids and bases:

Acids	Bases

20. Complete the table of pH indicators:

Indicator	Colour in Acid	Colour in Base
Red litmus Paper		
Blue Litmus Paper		
Phenolphthalein		

21. Given the following pH scale, Identify where you would find acids, bases and neutral substances:

0 \_\_\_\_\_ 7 \_\_\_\_\_ 14

22. Identify the following as strong acids, weak acids, strong bases, weak bases, or neutral:

a) pH = 1

d) pH = 9

b) pH = 6

e) pH = 13.5

c) pH = 7

23. What is a neutralization reaction? What other type of reaction could it be called?

24. What are the products of a neutralization reaction?

28. Write a balanced chemical equation showing a neutralization reaction.