Science 10
Chemistry Practice Booklet

Lesson 1: Properties and Classification of Matter/History of Chemistry

1. Pg. 17 # 1, 3, 4, 6. Pg. 25 # 10, 11. Read: Pg. 6-26.

Lesson 2: The Periodic Table and Atomic Structure

Element Name	Symbol	Period	Group	Metal or Non Metal
chromium				
		4	17	
	P			
		1	18	
bohrium		7		
		6	15	Metal
		2	14	Non metal
tin				
	Cl			
	Nb		5	

1. The elements in the periodic table are arranged in _____ and _____. The elements are put into these two categories based on their _____. The columns are called _____ and the rows are called_____.

2. How many groups exist on the periodic table?

3. How many periods exist on the periodic table?

4. What is the first element in group 16?

5. What is the first element in period 4?

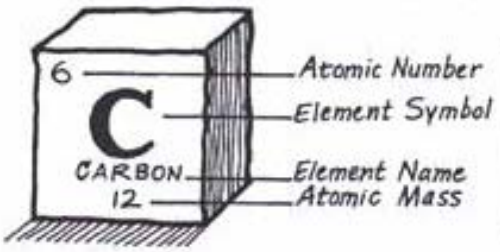
6. According to the periodic table in your databook what does each square contain
    a.
    b.
    c.
    d.
    e.
    f.

11. What on the periodic table separates the metals from the non-metals?

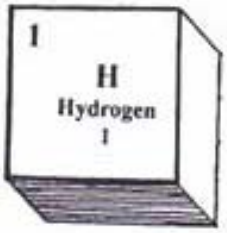
11. Metals are found on the _____side of the table.

12. Non-metals are found on the _____side of the table.

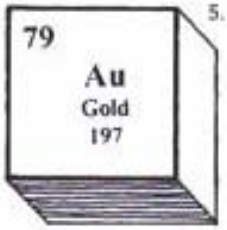
13. Fill in the following missing information:



REMEMBER:
atomic mass = protons + neutrons
atomic number = # protons
protons = # electrons

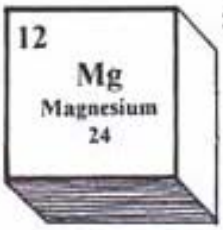


1. a. atomic number _____
   b. atomic mass _____

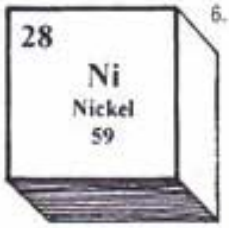


5. a. # electrons _____
   b. # protons _____
   c. atomic number _____
   d. name of element _____

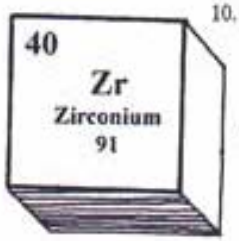
9. a. element name _____
   b. # protons _____



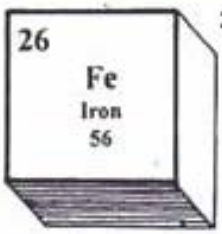
2. a. element name _____
   b. atomic number _____



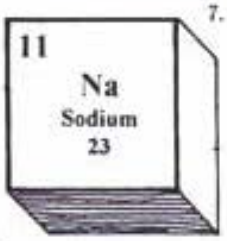
6. a. atomic mass _____
   b. element symbol _____



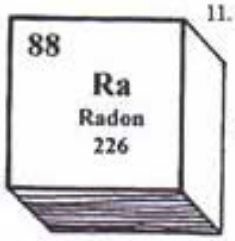
10. a. # electrons _____
    b. atomic mass _____



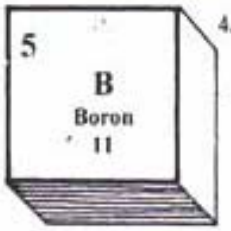
3. a. # protons _____
   b. element symbol _____



7. a. element symbol _____
   b. # neutrons _____
   c. element name _____

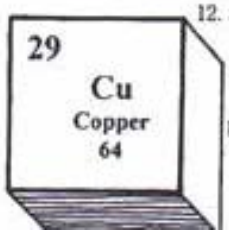


11. a. atomic number _____
    b. # neutrons _____



4. a. atomic number _____
   b. element name _____

8. a. atomic number _____
   b. # neutrons _____



12. a. atomic mass _____
    b. # neutrons _____

Lesson 3: Atomic Theory

Pg. 39 # 1-7.

Lesson 4: Ionic Compounds

Give the formula for each of the following:

1. potassium chloride _____
2. cesium phosphide _____
3. gadolinium oxide _____
4. calcium nitride _____
5. aluminium fluoride _____
6. sodium sulfide _____
7. erbium arsenide _____
8. magnesium selenide _____
9. zinc astatide _____
10. lithium hydride _____
11. barium bromide _____
12. terbium chloride _____
13. francium oxide _____
14. lanthanum phosphide _____
15. hydrogen nitride _____
16. thorium oxide _____
17. scandium fluoride _____
18. strontium sulfide _____
19. beryllium oxide _____

20. californium hydride _____

21. actinium phosphide _____

22. yttrium hydride _____

23. fermium astatide _____

24. neptunium chloride _____

Given the formula, supply the correct name.

1. Ag_2O _____

2. RbCl _____

3. KF _____

4. Ca_3N_2 _____

5. DyP _____

6. MgO _____

7. Na_2S _____

8. Nd_2Se_3 _____

9. CsI _____

10. $BaBr_2$ _____

11. Al_2O_3 _____

12. ZnF_2 _____

13. $HoCl_3$ _____

14. LiH _____

15. H_2S _____

16. $SrAt_2$ _____

17. YI_3 _____

18. Pm_2O_3 _____

19. CmF_3 _____

20. Na_3P _____

21. ScO _____

22. Fr_3N _____

23. Cs_2O _____

24. KCl _____

25. $AlBr_3$ _____

Lesson 5: Multi-Charge Ionic Compounds

Use your data book. Remember that spelling mistakes are ERRORS.

A. Name each of the following:

1. HgF _____ NiO _____

2. $FeCl_3$ _____ Bi_2O_5 _____

3. VCl_4 _____ PbS_2 _____

4. Cu_2O _____ Sn_3P_4 _____

5. CrN _____ Tl_3As _____

6. PtO_2 _____ SmF_3 _____

7. AmO_2 _____ PbO _____

8. PoF_4 _____ Bk_2O_3 _____

9. FeI_3 _____ Au_3P _____

10. SmH_3 _____ $PaCl_5$ _____

11. PuS_2 _____ CuH _____

12. Ni_2S_3 _____ PdSe _____

13. NoN _____ BiP _____

14. $CoBr_3$ _____ Ni_2Te_3 _____

15. PoS _____ AmH_4 _____

B. Give the formula for each.

16. iron (III) telluride _____ copper (II) phosphide _____

17. manganese (IV) oxide _____ bismuth (V) fluoride _____

18. samarium (III) chloride _____ tin (II) fluoride _____

19. gold (I) sulfide _____ berkelium (IV) selenide _____

20. cobalt (II) sulfide _____ manganese (II) iodide _____

21. gold (III) arsenide _____ uranium (VI) oxide _____

22. tin (IV) bromide _____ plutonium (VI) phosphide _____

23. vanadium (IV) hydride _____ iron (II) nitride _____

24. mercury (II) fluoride _____ ruthenium (III) oxide _____

25. platinum (IV) phosphide_____ cobalt (III) telluride _____

26. antimony (III) sulfide_____ niobium (V) nitride_____

27. titanium (III) sulfide _____ gold (I) hydride _____

28. titanium (IV) phosphide _____ bismuth (V) chloride _____

29. niobium (III) arsenide _____ tin (II) chloride _____

30. manganese (IV) sulfide _____ cobalt (III) oxide _____

Lesson 6: Polyatomic Ionic Compounds

Use your data book. Remember that spelling mistakes and missing brackets are ERRORS.

A. Name each of the following:

1. $NaCl$ _____ $Ba(NO_3)_2$ _____

2. SnF_2 _____ $Al(OH)_3$ _____

3. $Fe(NO_3)_3$ _____ SrO _____

4. $CuSO_4$ _____ SnS_2 _____

5. $MgSO_4$ _____ $AgHSO_3$ _____

6. $CuMnO_4$ _____ $AlPO_4$ _____

7. $AuNO_3$ _____ PtO _____

8. $BiCl_3$ _____ MnO_2 _____

9. $Fe(ClO)_3$ _____ ZnO _____

10. $Nb(CN)_5$ _____ $OsBr_4$ _____

11. $Pb(NO_3)_2$ _____ $CuHSO_3$ _____

12. NiO _____ $Pd(NO_2)_2$ _____

13. CsF _____ $Al(OH)_3$ _____

14. $Cr(MnO_4)_2$ _____ $NiPO_4$ _____

15. $Fe(CN)_2$ _____ $Ir(C_6H_5COO)_4$ _____

16. $NaCH_3COO$ _____ $Al_2(SO_4)_3$ _____

17. $(NH_4)_2SO_3$ _____ $Ni(HCO_3)_3$ _____

18. $Mn(CO_3)_2$ _____ $LiClO_3$ _____

19. $Pb(CN)_4$ _____ $(NH_4)_3PO_4$ _____

20. $Fe(ClO)_3$ _____ NaH_2PO_4 _____

21. $KMnO_4$ _____ $Cu_3(PO_4)_2$ _____

22. RbClO _____ $Al(CN)_3$ _____

23. $(NH_4)_2HPO_4$ _____ $Al(NO_3)_3$ _____

24. $CuCrO_4$ _____ $MgCrO_4$ _____

25. KHS _____ AgOH _____

26. Au_2HPO_4 _____ $SnSiO_3$ _____

27. $(NH_4)_2Cr_2O_7$ _____ $AgNO_2$ _____

28. $Ba(OH)_2$ _____ HgOH _____

29. $Cr(CN)_3$ _____ $TlPO_4$ _____

30. $Zn(ClO)_2$ _____ $Pb(C_6H_5COO)_2$ _____

Give the formula for each.

16. potassium sulfate _____ copper (II) chlorate _____

17. zinc bromide _____ bismuth (III) oxide _____

18. aluminium hypochlorite _____ ammonium benzoate _____

19. copper (II) carbonate _____ calcium carbonate _____

20. copper (II) hydrogen sulfide _____ magnesium carbonate _____

21. silver dichromate _____ barium chlorate _____

22. ruthenium (III) sulfide_____strontium bromide _____

23. calcium hydroxide _____iron (III) nitrate _____

24. mercury (II) fluoride_____indium oxide _____

25. platinum (IV) chloride_____rhenium chloride _____

26. polonium (II) sulfite _____platinum (IV) thiosulfate _____

27. titanium (III) sulfate_____silver hydroxide _____

28. zinc phosphate _____ cadmium borate _____

29. gallium hydroxide _____tin (II) acetate _____

30. potassium chromate _____cobalt (III) hydride _____

31. aluminium sulfite _____ tin (II) acetate_____

32. zinc hydrogen sulfide_____ silver dichromate _____

33. aluminium borate _____ sodium benzoate _____

34. copper (II) carbonate _____cobalt (III) nitrate_____

35. ammonium dichromate _____manganese (IV) nitrate _____

36. cesium hydroxide_____ strontium cyanide _____

37. lead (II) carbonate_____germanium hypochlorite _____

38. calcium hydrogencarbonate _____iron (III) chromate _____

39. ammonium cyanide _____vanadium (V) permanganate _____

40. gold (III) nitrite _____ platinum (IV) carbonate _____

41. beryllium silicate _____ potassium hypochlorite_____

42. aluminium hydrogensulfate_____actinium nitrate _____

43. iron (II) phosphate _____ platinum (II) borate _____

44. gold (I) hydroxide _____indium phosphate _____

45. zirconium nitrite _____magnesium silicate _____

Lesson 7: Molecular Compounds

Provide the name or the formula for each.

1. SiC _____ PI_3 _____

2. $TeBr_2$_____ NCl_3 _____

3. P_4S_6 _____ Si_3P_4 _____

4. N_2O _____ $TeBr_4$ _____

5. SiH_4_____ SO_2 _____

6. NO_2 _____ S_2Br_2 _____

7. SiF_4 _____ N_2O_3 _____

8. P_2O_3_____ ClO_3 _____

9. KrF_2_____ NO _____

10. CO_____ CH_4 _____

11. nitrogen trifluoride _____diarsenic pentasulfide _____

12. tetraboron monocarbide _____silicon tetrabromide _____

13. diphosphorous trichloride _____tellurium tetraoxide _____

14. dicarbon hexahydride _____hydrogen dioxide _____

15. carbon monoxide _____hexacarbon hexahydride _____

16. sulfur trioxide _____dinitrogen tetraoxide _____

17. diarsenic trisulfide_____sulfur monochloride _____

18. selenium difluoride_____boron tribromide _____

19. tellurium tetraiodide_____phosphorous dioxide _____

20. trisulfur tetrabromide_____silicon pentaiodide _____

Molecular and Ionic Compounds

Use your data book. Remember that spelling mistakes and missing brackets are ERRORS. Name each of the following:

1. NaF _____ $Ra(NO_2)_2$_____

2. SnF_2 _____ $Bi(OH)_3$_____

3. C_2H_6 _____ $Am(C_6H_5COO)_4$_____

4. $Cu_2(SO_4)$ _____ $SnSO_3$_____

5. $CrSO_4$ _____ $TlHSO_3$_____

6. $KMnO_4$ _____ SeP_5 _____

7. $Au(NO_3)_3$ _____ PbO _____

8. Si_2F_3 _____ MnO_2 _____

9. $Fe(ClO)_3$_____ $Po(CN)_2$_____

10. $IrBr_4$ _____ PI_6 _____

11. $Ba(NO_3)_2$ _____ $CuHSO_3$ _____

12. NiO _____ $Pd(ClO_3)_2$ _____

13. N_2O_5_____ $LaPO_4$ _____

14. $BeCl_2$ _____ $Nd(OH)_3$ _____

15. $Fe(NO_3)_2$ _____ S_6H_3 _____

Give the formula for each.

16. lithium sulfite_____ copper (II) hypochlorite_____

17. strontium bromide _____ bismuth (V) oxide_____

18. ammonium fluoride _____ dinitrogen monoxide _____

19. silver carbonate _____ calcium carbonate _____

20. cobalt (II) sulfide _____ magnesium carbonate _____

21. oxygen difluoride _____ sulfur trichloride _____

22. tin (II) iodide_____ strontium bromide _____

23. vanadium (IV) hydroxide_____ iron (II) nitrite _____

24. tricarbon difluoride _____ krypton dihydride _____

25. platinum (IV) phosphide_____ rhenium chloride _____

26. antimony (III) sulfite _____ triphosphorous monoxide _____

27. titanium (III) sulfide _____ pentasulfur tetrachloride _____

28. zinc hydrogen phosphate _____scandium borate _____

29. gallium silicate _____ nitrogen dichloride _____

30. ammonium sulfate _____ cobalt (III) oxide _____

Lesson 8: Solubility Table

Use your textbook p. 54 -75 to answer the following questions.

1. Ionic compounds share many properties. Define the following terms.
    a. High Melting Point
    b. Crystal Shape
    c. Solubility in Water
    d. Conductivity in Solution
    e. Solubility

2. Determine the solubility of the following using the table on p. 57. Use the subscript $_{(aq)}$ for those very soluble and the subscript $_{(s)}$ for those slightly soluble.

$(NH_4)_2S$	$AgCl$	$PbSO_4$	$Sr(OH)_2$	$Fe(OH)_3$
$Au(NO_3)_3$	PbI_4	Na_3PO_4	CuS	$AgCH_3COO$

3. Determine the chemical formula for each of the following and if it is soluble or slightly soluble in water.
4.

Chemical	Formula and Solubility
potassium carbonate	
iron (II) nitrate	

Copper (I) chloride	
barium hydroxide	
ammonium sulfite	
calcium sulfite	
lead (IV) bromide	

5. Describe these properties of molecular compounds:
    a. Covalent bonds

    b. Melting points

    c. Crystalline shape

    d. Conduct electricity

6. Read the section on p. 60 and describe how a water molecule is formed.

7. How does water act during the summer and winter months?

8. Describe how ice is formed.

9. An acid has a pH _____ than 7 and a base has a pH _____ than 7.

10. pH measures _____ in a solution.

11. Why is your saliva slightly basic?

12. Your stomach makes hydrochloric acid. What does this acid do?

13. What does the pancreas produce and why is it important?

14. Define buffer.

15. Using litmus paper acids turn the paper _____ and bases turn the paper _____.

16. What is a universal indicator?

17. A solution of pH 9 is _____ times more basic than a solution of pH _____.

18. A solution of pH 1 is _____ times more acidic than a solution of ph _____.

19. Fill in the following chart.

Property	Acid	Base
Taste		
Touch		
Reaction with Metals		

Litmus Indicator		
Electrical Conductivity		
pH of solution		

20. How are acids named?

21. How are bases named?

22. List 2 examples of common household acids and 2 examples of common household bases.

    Acids: Bases:

23. Describe what neutralization is.

24. Determine whether the following substances are an acid, base, or neither.

Substance	Type
$KOH_{(aq)}$	
$H_2SO_{4(aq)}$	
$NaCl_{(aq)}$	
$CH_3COOH_{(aq)}$	
$HCl_{(aq)}$	
$Mg(OH)_{2(aq)}$	
$C_6H_5COOH_{(aq)}$	

25. Mercury is used in batteries. How is mercury harmful to our environment?

26. What are chlorofluorocarbons (CFC) and how are they harmful to our environment?

27. Alcohol can be a chemical toxin.

a. What type of alcohol do people drink, name and formula?

b. What does alcohol destroy?

c. Alcohol use can become an addiction; describe the physical and psychological effects an alcohol addiction can have on a person.

28. Nicotine and other tobacco products:

a. What is the most common source of nicotine?

b. Cigarette smoke contains _____, which is more dangerous than polluted air.

c. How many chemicals are in cigarette smoke? _____

29. List 3 things benzene is used for.

Lesson 9: Chemical Change

No questions.

Lesson 10: Chemical Equations

1. Balance the following chemical equations:

a) _____ $Na_{(s)}$ + _____ $O_{2(g)}$ → _____ $Na_2O_{(s)}$

b) _____ $Al_{(s)}$ + _____ $Cl_{2(g)}$ → _____ $AlCl_{3(s)}$

c) _____ $N_{2(g)}$ + _____ $O_{2(g)}$ → _____ $NO_{2(g)}$

d) _____ $HI_{(g)}$ → _____ $H_{2(g)}$ + _____ $I_{2(s)}$

e) _____ $NH_{3(g)}$ → _____ $H_{2(g)}$ + _____ $N_{2(g)}$

f) _____ $Al_2S_{3(s)}$ → _____ $Al_{(s)}$ + _____ $S_{8(s)}$

g) _____ $BN_{(s)}$ + _____ $Cl_{2(g)}$ → _____ $BCl_{3(g)}$ + _____ $N_{2(g)}$

h) _____ $SnF_{4(aq)}$ + _____ $Cr_{(s)}$ → _____ $CrF_{3(aq)}$ + _____ $Sn_{(s)}$

i) _____ $Mg_{(s)}$ + _____ $HCl_{(aq)}$ → _____ $MgCl_{2(aq)}$ + _____ $H_{2(g)}$

j) _____ $(NH_4)_3PO_{4(aq)}$ + _____ $CaBr_{2(aq)}$ → _____ $Ca_3(PO_4)_{2(s)}$ + _____ $NH_4Br_{(aq)}$

k) _____ $Pb(NO_3)_{4(aq)}$ + _____ $K_2Cr_2O_{7(aq)}$ → _____ $Pb(Cr_2O_7)_{2(s)}$ + _____ $KNO_{3(aq)}$

l) _____ $AgClO_{4(aq)}$ + _____ $Na_3PO_{4(aq)}$ → _____ $NaClO_{4(aq)}$ + _____ $Ag_3PO_{4(s)}$

m) _____ $HCl_{(aq)}$ + _____ $Ca(OH)_{2(s)}$ → _____ $CaCl_{2(aq)}$ + _____ $H_2O_{(l)}$

n) _____ $CH_3COOH_{(aq)}$ + _____ $Ba(OH)_{2(aq)}$ → _____ $Ba(CH_3COO)_{2(aq)}$ + __$H_2O_{(l)}$

o) _____ $C_3H_{8(g)}$ + _____ $O_{2(g)}$ → _____ $CO_{2(g)}$ + _____ $H_2O_{(g)}$

p) _____ $C_6H_{14(l)}$ + _____ $O_{2(g)}$ → _____ $CO_{2(g)}$ + _____ $H_2O_{(g)}$

q) _____ $C_3H_6OS_{2(s)}$ + _____ $O_{2(g)}$ → _____ $CO_{2(g)}$ + _____ $H_2O_{(g)}$ + _____ $SO_{2(g)}$

2. Balance the following chemical equations:

a) _____ $Pb_{(s)}$ + _____ $O_{2(g)}$ → _____ $PbO_{(s)}$

b) _____ $N_{2(g)}$ + _____ $H_{2(g)}$ → _____ $NH_{3(g)}$

c) _____ $Na_{(s)}$ + _____ $H_2O_{(l)}$ → _____ $NaOH_{(aq)}$ + _____ $H_{2(g)}$

d) _____ $C_4H_{10(g)}$ + _____ $O_{2(g)}$ → _____ $CO_{2(g)}$ + _____ $H_2O_{(g)}$

e) _____ $H_3PO_{4(aq)}$ + _____ $KOH_{(aq)}$ → _____ $K_3PO_{4(aq)}$ + _____ $H_2O_{(l)}$

f) _____ $C_5H_{12(l)}$ + _____ $O_{2(g)}$ → _____ $CO_{2(g)}$ + _____ $H_2O_{(g)}$

g) _____ $Zn_3N_{2(s)}$ + _____ $H_2O_{(l)}$ → _____ $Zn(OH)_{2(aq)}$ + _____ $NH_{3(g)}$

h) _____ $Fe_3O_{4(s)}$ + _____ $H_{2(g)}$ → _____ $Fe_{(s)}$ + _____ $H_2O_{(l)}$

i) _____ $Al_{(s)}$ + _____ $H_2SO_{4(aq)}$ → _____ $H_{2(g)}$ + _____ $Al_2(SO_4)_{3(aq)}$

j) _____ $CrS_{(s)}$ + _____ $O_{2(g)}$ → _____ $CrO_{(s)}$ + _____ $SO_{2(g)}$

k) _____ $HClO_{3(aq)}$ + _____ $HCl_{(aq)}$ → _____ $H_2O_{(l)}$ + _____ $Cl_{2(g)}$

l) _____ $CaC_{2(s)}$ + _____ $AsBr_{3(aq)}$ → _____ $C_{(s)}$ + _____ $As_{(s)}$ + _____ $CaBr_{2(aq)}$

m) _____ $NH_{3(g)}$ + _____ $O_{2(g)}$ → _____ $NO_{(g)}$ + _____ $H_2O_{(l)}$

n) _____ $HNO_{3(aq)}$ + _____ $NO_{(g)}$ → _____ $NO_{2(g)}$ + _____ $H_2O_{(l)}$

o) _____ $Al(NO_3)_{3(aq)}$ + _____ $NaOH_{(aq)}$ → _____ $NaNO_{3(aq)}$ + _____ $Al(OH)_{3(s)}$

p) _____ $C_2H_5OH_{(l)}$ + _____ $O_{2(g)}$ → _____ $CO_{2(g)}$ + _____ $H_2O_{(g)}$

q) _____ $NaIO_{3(s)}$ → _____ $NaI_{(s)}$ + _____ $O_{2(g)}$

Lesson 11: Formation Reactions

Provide either the balanced reaction using symbols or provide the word equation.

1. sodium and chlorine make sodium chloride

2. manganese, carbon and oxygen make manganese (II) carbonate

3. lithium, nitrogen and oxygen make lithium nitrite

4. chromium, carbon and nitrogen make chromium (III) cyanide

5. iron, phosphorus, and oxygen make iron (III) phosphate

6. zinc, silicon and oxygen make zinc silicate

7. magnesium, hydrogen and sulfur make magnesium hydrogen sulfide

8. nickel, oxygen, and hydrogen make nickel (III) hydroxide

9. potassium, sulfur and oxygen make potassium sulfite

10. copper, chromium, and oxygen make copper (I) chromate

11. ____ $Na_{(s)}$ + ___ $Cl_{2(g)}$ → ___ $NaCl_{(s)}$

12. ___ $V_{(s)}$ + ___ $B_{(s)}$ + ___ $O_{2(g)}$ → ____ $V_3(BO_3)_{4(s)}$

13. ____ $Ag_{(s)}$ + ____ $N_{2(g)}$ + ___ $O_{2(g)}$ → ___ $AgNO_{3(s)}$

14. ____ $S_{8(s)}$ + ____ $O_{2(g)}$ → ___ $SO_{3(g)}$

15. ____ $Au_{(s)}$ + ___ $H_{2(g)}$ + ___ $P_{4(s)}$ + ___ $O_{2(g)}$ → ____$AuH_2PO_{4(s)}$

16. ___ $Sn_{(s)}$ + ____ $Cl_{2(g)}$ + ___ $O_{2(g)}$ → ____ $Sn(ClO_3)_{4(s)}$

Lesson 12: Decomposition Reactions

Provide either the balanced reaction using symbols or provide the word equation.

1. barium hydroxide decomposes to barium, hydrogen and oxygen

2. aluminium carbonate decomposes to aluminium, carbon and oxygen

3. mercury (II) nitrite decomposes to mercury, nitrogen and oxygen

4. antimony (V) cyanide decomposes to antimony, carbon and nitrogen

5. scandium borate decomposes to scandium, boron and oxygen

6. sodium dichromate decomposes to sodium, chromium and oxygen

7. francium chloride decomposes to francium and chlorine

8. propane decomposes to carbon and hydrogen

9. _____ $C_6H_{6(l)}$ → _____ $C_{(s)}$ + _____ $H_{2(g)}$

10. _____$H_2O_{(l)}$ → ____ $H_{2(g)}$ +_____ $O_{2(g)}$

11. ____ $Mg(NO_3)_{2(s)}$ → ___ $Mg_{(s)}$ + ____ $N_{2(g)}$ + ____ $O_{2(g)}$

12. ___ $C_6H_{12}O_{6(s)}$ → ___ $C_{(s)}$ + ___ $O_{2(g)}$ + ____ $H_{2(g)}$

13. ____ $AuOH_{(s)}$ → ___ $Au_{(s)}$ + ___ $O_{2(g}$ + ____ $H_{2(g)}$

14. ____ $FeSO_{4(s)}$ → ____ $O_{2(g)}$ + ___ $Fe_{(s)}$ + ____ $S_{8(s)}$

15. ____ $Zn_3(PO_4)_{2(s)}$ → ___ $P_{4(s)}$ + ___ $O_{2(g)}$ + ____$Zn_{(s)}$

16. ___ $Sn(CN)_{2(s)}$ → ____ $N_{2(g)}$ + ___ $Sn_{(s)}$ + _____ $C_{(s)}$

Lesson 13: Single Replacement Reactions

Provide the balanced reaction using symbols.

1. tin reacts with copper (II) sulfate to form copper and tin (IV) sulfate

2. aluminium reacts with iron (III) nitrate to form iron and aluminium nitrate

3. nitrogen reacts with lithium fluoride to form fluorine and lithium nitride

4. chromium reacts with manganese (II) oxide to form manganese and chromium (III) oxide

5. mercury reacts with calcium chlorate to form calcium and mercury (II) chlorate

6. gold reacts with barium silicate to form barium and gold (III) silicate

7. magnesium chloride reacts with oxygen to form magnesium oxide and chlorine

8. zinc reacts with nickel (III) hydroxide to form nickel and zinc hydroxide

9. _____ $Zn_{(s)}$ + ____ $Mg(OH)_{2(s)}$ → _____ $Mg_{(s)}$ + _____ $Zn(OH)_{2(s)}$

10. _____$P_{4(s)}$ +_____ $Na_2O_{(s)}$ → ____ $O_{2(g)}$ +_____ $Na_3P_{(s)}$

11. ____ $Mg_{(s)}$ + _____$AgNO_{3(s)}$→ ___ $Ag_{(s)}$ + ____ $Mg(NO_3)_{2(s)}$

12. ___ $Cr_{(s)}$ + ____$SnO_{2(s)}$ → ___ $Sn_{(s)}$ + ___ $Cr_2O_{3(s)}$

13. ____ $AuH_{3(s)}$ +_____ $Cl_{2(g)}$ → ___ $AuCl_{3(s)}$ + ____ $H_{2(g)}$

14. ____ $FeSO_{4(s)}$ + _____$Zn_{(s)}$ → ____ $ZnSO_{4(s)}$ + ___ $Fe_{(s)}$

15. ____ $V(NO_3)_{5(s)}$ + _____$Ag_{(s)}$ → ___ $V_{(s)}$ + ___ $AgNO_{3(s)}$

16. ___ $S_{8(s)}$ +_____ $LiF_{(s)}$ → ____ $F_{2(g)}$ + ___ $Li_2S_{(s)}$

Lesson 14: Double Replacement Reactions

Provide the balanced reaction using symbols.

1. tin (IV) oxide reacts with nickel (II) sulfate to form tin (IV) sulfate and nickel (II) oxide

2. aluminium hydroxide reacts with iron (III) nitrate to form iron (III) hydroxide and aluminium nitrate

3. manganese (II) nitride reacts with lithium fluoride to form manganese (II) fluoride and lithium nitride

4. chromium (II) nitrite reacts with manganese (IV) oxide to form manganese (IV) nitrite and chromium (II) oxide

5. mercury (I) hydrogen sulfate reacts with calcium chlorate to form calcium hydrogen sulfate and mercury (I) chlorate

6. gold (III) acetate reacts with barium silicate to form barium acetate and gold (III) silicate

7. magnesium chloride reacts with aluminium borate to form magnesium borate and aluminium chloride

8. zinc phosphate reacts with nickel (III) hydroxide to form nickel (III) phosphate and zinc hydroxide

9. _____ $AlPO_{4(s)}$ + ____ $Mg(OH)_{2(s)}$ → _____ $Mg_3(PO_4)_{2(s)}$ + _____ $Al(OH)_{3(s)}$

10. _____$Sr(NO_3)_{2(s)}$ +_____ $K_2O_{(s)}$ → ____$SrO_{(g)}$ +_____ $KNO_{3(s)}$

11. ____ $HgH_{(s)}$ _____$AgNO_{3(s)}$→ ___ $AgH_{s)}$ + ____ $HgNO_{3(s)}$

12. ___ $AuF_{3(s)}$ + ____$SnO_{2(s)}$ → ___ $SnF_{4(s)}$ + ___ $Au_2O_{3(s)}$

13. ____ $AuH_{3(s)}$ +_____ $Cl_{2(g)}$ → ___ $AuCl_{3(s)}$ + ____ $H_{2(g)}$

14. ____ $Fe_2(SO_4)_{3\ (s)}$ + _____$ZnBr_{2(s)}$ → ____ $ZnSO_{4(s)}$ + ___ $FeBr_{3(s)}$

15. ____ $V(NO_3)_{5(s)}$ + _____$FeCl_{2(s)}$ → ___ $VCl_{5(s)}$ + ___ $Fe(NO_3)_{2\ (s)}$

16. ___ $MgS_{(s)}$ +_____ $LiF_{(s)}$ → ____ $MgF_{2(s)}$ + ___ $Li_2S_{(s)}$

Lesson 15: Combustion Reactions

Write and balance the combustion equations for the following.

1. Methane

2. Ethane

3. Propane

4. Butane

5. Pentane

6. Hexane

7. Octane

8. Glucose

9. Ethanol

10. Methanol

Lesson 16: The Mole

Fill in the missing values below:

	Formula	Name	Molar Mass
1	C_3H_{10}		
2		Sodium chloride	
3		methane	
4	$Mg(CN)_{2(s)}$		
5		Manganese (IV) oxide	
6	$Ca(NO_3)_{2(s)}$		
7		Nitrogen trioxide	
8	$KBr_{(s)}$		
9		Nickel (II) chloride	
10	$ZnCO_3$		

2. Fill in the missing information using the formula $n = \frac{m}{M}$

						DEFINED	MEASURED	MEASURED
	Formula	**Name**				M (g\mol)	mass (g)	Moles (mol)
1		**lithium carbonate**	Li				**25.0**	
			C					
			O					
2	**$MgSO_4$**		Mg				**300**	
			S					
			O					
3		**benzene**	C					**1.50**
			H					
4		**nickel (III) chloride**	Ni					**2.5**
			Cl					
5	**$Na_2OOCCOO$**	**sodium oxalate**	Na				**500**	
			O					
			C					
6	**H_2O**		H					**3.60**
			O					
7	**HNO_3**		H				**100**	
			N					
			O					
8	**$Sn(ClO)_4$**		Sn				**150**	
			Cl					
			O					
9		**lead (IV) carbonate**	Pb					**1.50**
			C					
			O					
10	**K_3PO_4**		K				**50**	
			P					
			O					