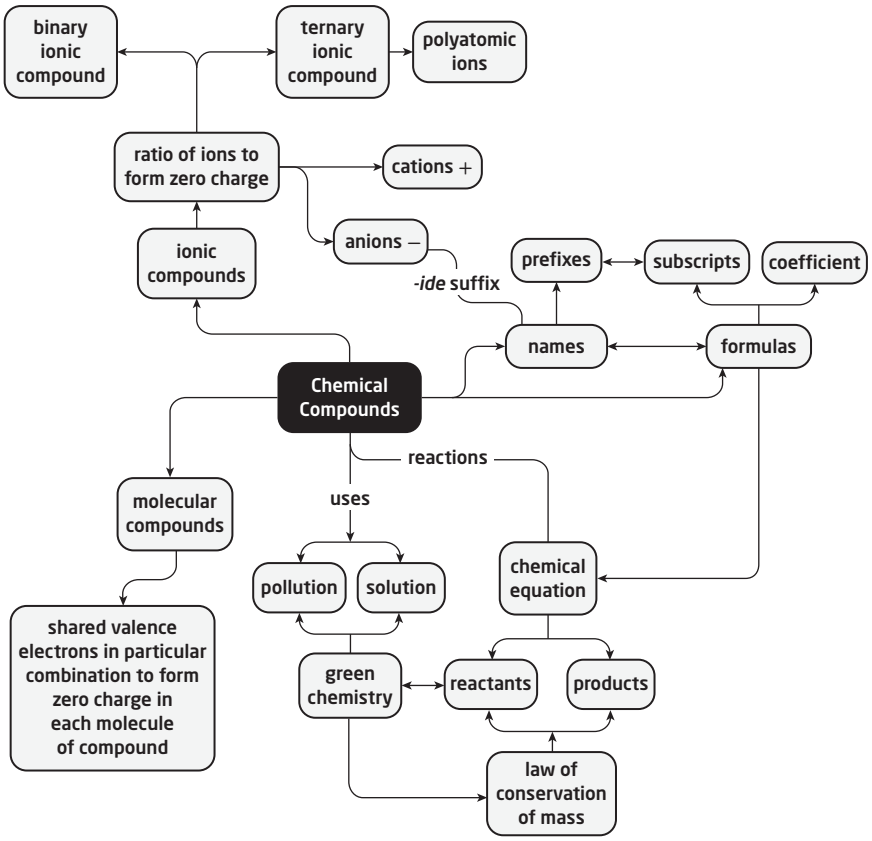
Chapter Review Answers (Student textbook pages 174 and 175)

Please see also **BLM 4-17 Chapter 4 Review (Alternative Format).**

Make Your Own Summary



Reviewing Key Terms

1. coefficient

2. ionic compound

3. molecular bond

4. products

5. ion

6. reactants

7. polyatomic ion

Knowledge and Understanding

8. **a.** tri– 3 **b.** octa– 8

9. **a.** ionic, Na_2S **b.** molecular, CCl_4
c. molecular, SO_3 **d.** ionic, $CaCO_3$
e. molecular, PCl_5 **f.** ionic, $(NH_4)_3PO_4$
g. ionic, $Al_2(SO_4)_3$ **h.** ionic, $Cu(NO_2)_2$
i. ionic, AuF_3

10. **a.** molecular, dichlorine monoxide
b. ionic, lithium oxide
c. molecular, potassium phosphate
d. ionic, iron(II) hydroxide
e. ionic, tin(IV) chloride
f. ionic, iron(III) Iodide
g. ionic, aluminum sulphate
h. molecular, carbon dioxide

11. **a.** 4H, 2O, 2Na, 2F
b. 6Br, 2Fe, 6I
c. 1Pb, 2N, 6O, 2Na, 2I
d. 6K, 2P, 20O, 6N, 24H, 3S

12. **a.** $Mg_3N_2(s) \rightarrow 3Mg(s) + N_2(g)$
b. $4Mn(s) + 3O_2(g) \rightarrow 2Mn_2O_3(s)$
c. $CO_2(g) + 4H_2(g) \rightarrow CH_4(g) + 2H_2O$
d. $2PbO(s) \rightarrow 2Pb(s) + O_2(g)$
e. $C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$
f. $Cu(s) + 2AgNO_3(aq) \rightarrow 2Ag(s) + Cu(NO_3)_2(aq)$
g. $C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$
h. $3PbCl_4(aq) + 4K_3PO_4(aq) \rightarrow 12KCl(aq) + Pb_3(PO_4)_4(s)$

13. a. nitrogen + hydrogen → ammonia; $N_2 + H_2 \rightarrow NH_3$; $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$

b. calcium carbonate → calcium oxide + carbon dioxide; $CaCO_3 \rightarrow CaO + CO_2$; $CaCO_3(s) \rightarrow CaO(s) + CO_2(g)$

c. aluminum + oxygen → aluminum oxide; $Al + O_2 \rightarrow Al_2O_3$; $2Al(s) + O_2(g) \rightarrow Al_2O_3(s)$

d. water + carbon dioxide → oxygen + glucose; $H_2O + CO_2 \rightarrow O_2 + C_6H_{12}O_6$; $6H_2O + 6CO_2(g) \rightarrow C_6H_{12}O_6(aq) + 6O_2(g)$

e. calcium chloride + fluorine → calcium fluoride + chlorine; $CaCl_2 + F_2 \rightarrow CaF_2(aq) + Cl(g)$; $CaCl_2 + F_2 \rightarrow CaF_2(aq) + Cl_2(g)$

f. barium sulfate + sodium hydroxide → sodium sulfate + barium hydroxide; $BaSO_4 + NaOH \rightarrow Na_2SO_4 + Ba(OH)_2$; $BaSO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + Ba(OH)^2(s)$

g. titanium(IV) chloride + magnesium → titanium + magnesium chloride; $TiCl_4 + Mg \rightarrow Ti + MgCl_2$; $TiCl_4(g) + 2Mg \rightarrow Ti(s) + 2MgCl_2$

Thinking and Investigating

14. Example: If a formula is incorrect in the skeleton equation, the equation does not correctly represent the substances involved in the reaction. Many times the equation will not balance if the formulas are incorrect.

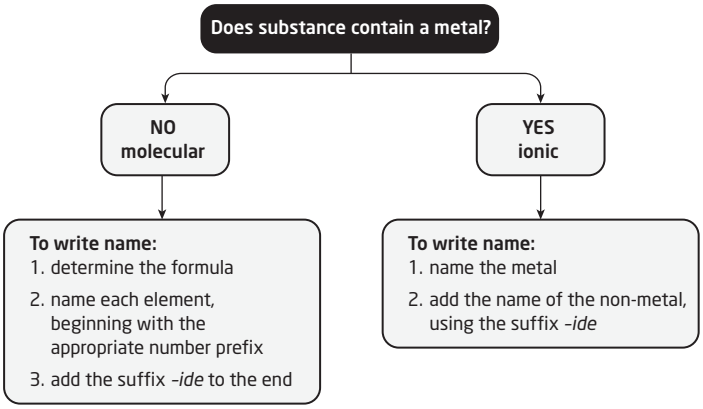
15. Example: A gas from the air was a reactant, adding to the mass of the products.

16. a. Nitrogen and hydrogen are diatomic elements. $2NH_3 \rightarrow N_2 + 3H_2$

b. The coefficients are not in the lowest ratio. $C + O_2 \rightarrow CO_2$

Communication

17. Example:



18. Example:

Form Described	Advantage	Disadvantage
word equations use chemical names	understood by non-scientists	not detailed
skeleton equations use formulas	short and detailed	must be able to read formulas
balanced equations show the ratio of substances/ elements involved	short and precise	must be able to read formulas

19. Example: Green chemistry is a phrase used to describe any process which reduces waste, energy/resource consumption, or the use/production of hazardous substances. Such savings help the environment by reducing pollution and demand for resources.

Application

20. a. magnesium oxide, MgO

b. $2Mg(s) + O_2(g) \rightarrow 2MgO(s)$

c. 16 g; Example: The law of conservation of mass means that the mass of products equals the mass of reactants. We know 24 g of reactant, so the remaining reactant must have a mass of 16 g (40 – 24 = 16).

21. Example: Lab technician, so that they can select/use/ order appropriate substances.