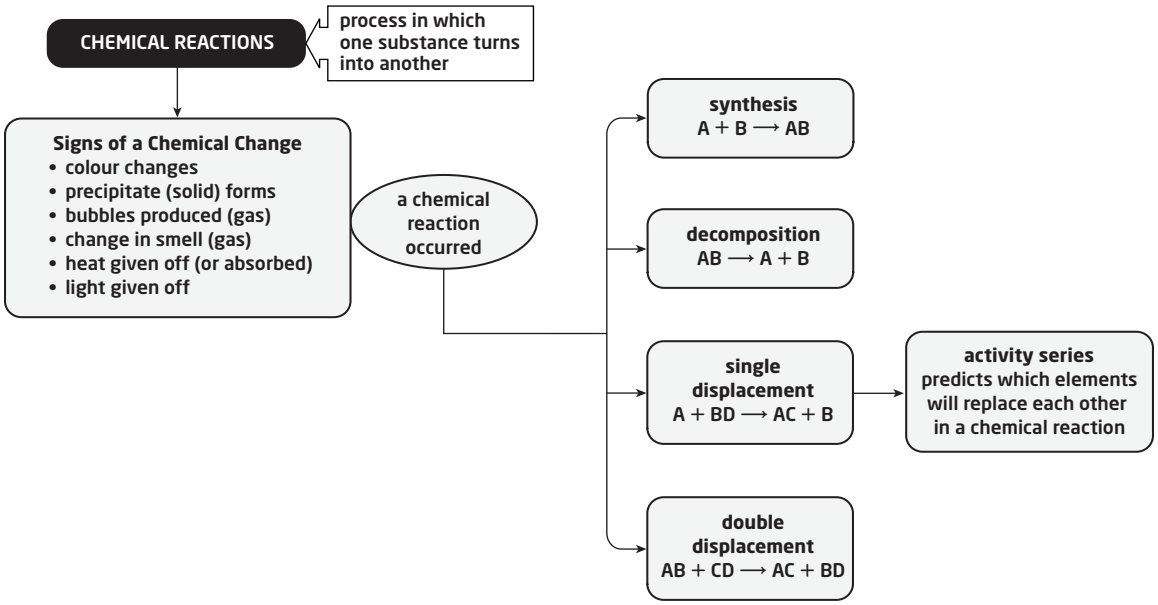
Chapter Review Answers (Student textbook pages 214 to 215)

Please also see **BLM 5-12 Chapter 5 Review (Alternative Format).**

Make Your Own Summary



Reviewing Key Terms

1. single displacement reaction

2. synthesis reaction

3. catalyst

4. decomposition reaction

5. precipitate

6. activity series

7. double displacement reaction

Knowledge and Understanding

8. colour change, heat given off or absorbed, gas produced, light produced, precipitate forms, odour change

9. $2H_2(\ell) + O_2(\ell) \rightarrow 2H_2O(g)$; synthesis reaction

10. a. double displacement

b. decomposition

c. synthesis

d. single displacement

e. decomposition

f. synthesis

11. a. synthesis, single displacement

b. decomposition

c. double displacement

12. a. no reaction

b. $2Al(s) + 3Cu(NO_3)_2(aq) \rightarrow 3Cu(s) + 2Al(NO_3)_3(aq)$

c. no reaction

13. a. single displacement, since an element and a compound are the reactants required for such a reaction

b. synthesis, since the only reaction elements can perform is to join together to make a compound

c. double displacement, since two ionic compounds will usually swap ions

d. decomposition, since the only reaction possible for a single compound is to break down into simpler substances

e. single displacement, since the activity series for metals shows aluminum is more reactive than iron

f. double displacement, since two ionic compounds will usually swap ions

g. double displacement, since two ionic compounds will usually swap ions

h. synthesis, since the only reaction elements can perform is to join together to make a compound

i. single displacement, since an element and a compound are the reactants required for such a reaction

j. synthesis, since the only reaction elements can perform is to join together to make a compound

14. **a.** $2Fe_2O_3(s) \rightarrow 4Fe(s) + 3O_2(g)$

b. $Cl_2(g) + CaBr_2(aq) \rightarrow CaCl_2(aq) + Br_2(\ell)$

c. $6Li(s) + N_2(g) \rightarrow 2Li_3N(s)$

d. $AgNO_3(aq) + NaCl(aq) \rightarrow AgCl(s) + NaNO_3(aq)$

e. $PbO_2(s) \rightarrow Pb(s) + O_2(g)$

f. $3Fe(ClO_4)_2(aq) + 2Al(s) \rightarrow 2Al(ClO_4)_3(aq) + 3Fe(s)$

g. $2NaN_3(s) \rightarrow 2Na(s) + 3N_2(g)$

h. $Ba(NO_3)_2(aq) + MgSO_4(aq) \rightarrow Mg(NO_3)_2(aq) + BaSO_4(s)$

i. $BaCl_2(aq) + Na_2CrO_4(aq) \rightarrow 2NaCl(aq) + BaCrO_4(s)$

j. $4Rb(s) + O_2(g) \rightarrow 2Rb_2O(s)$

15. Example: Without the precipitate there would be no sign of a chemical change as the reactants and products could both be clear.

Thinking and Investigation

16. A reaction between a solid metal and a solution that produces a gas is likely a single displacement reaction.

17. $2C_8H_{18} + 25O_2 \rightarrow 16CO_2 + 18H_2O$. This reaction has neither a single reactant nor a single product, so it can be neither a synthesis reaction nor a decomposition reaction. The reactants are a compound and an element, which prevents the reaction from being a double displacement reaction. The products are two compounds, which prevent the reaction from being a single displacement reaction.

18. single displacement, since zinc is added to a solution to displace gold from the compound

19. Yes, my friend should be concerned because the cleaning products may have reacted, producing a toxic gas.

Communication

20. Instructions should describe how the reactants and products are presented in the model and explain how parts are combined (synthesized) or separated (decomposed).

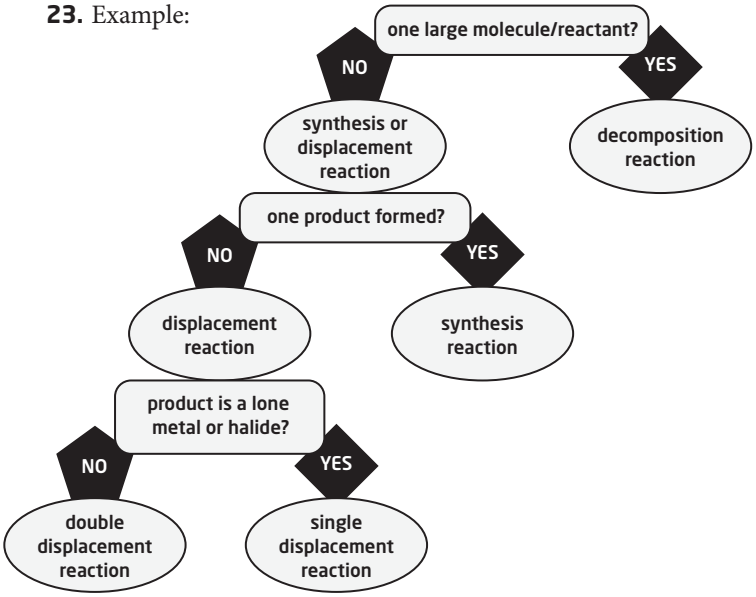
21. Pamphlets should contain the following details:

a. Lye (sodium hydroxide) corrodes human tissue and can cause blindness or death. It should be kept away from metals and acids and is labelled with the corrosive symbol. Safety precautions include wearing protective equipment and flushing affected areas with water, then seeking medical aid.

b. Ammonia (ammonium hydroxide in solution) irritates human tissue including skin, lungs, and eyes. It should be kept away from oxidizers, acids, sodium hydroxide, halogens, silver compounds, copper, iron, and calcium. It is labelled with a toxic (skull and crossbones) symbol. Safety precautions include using it in a ventilated area, wearing safety equipment, and avoiding use with listed substances. Treatment includes flushing the affected area and moving to fresh air, then seeking medical aid.

22. No reaction will occur if the element that is not part of the compound is lower on the activity series than the similar element that is part of the compound.

23. Example:



24. Points should include:

nothing—Pro: no cost; Con: land contaminated, and habitat and organisms destroyed, contamination will spread, long term affects of bioaccumulation and ecosystem damaged for generations

biological agents—Pro: oil broken down into harmless components; Con: cannot control lifespan / reach of organisms, not readily available, cost, time required

burning—Pro: decomposes oil; Con: pollution, hazards of fire and of products, organisms and habitat destroyed

dispersal—Pro: contaminant (oil) diluted; Con: increases contaminated area, additional organism and habitat destroyed

skimming—Pro: fast; Con: costly to process what is collected; slow

Application

25. Example: Explain that knowledge about the product and how best to handle it and provide first aid changes over time. Up-to-date records help keep their most valuable resource (workers) safe.

26. A catalyst is never used up (as a reactant would be, needing replacement).

27. Example: Yes, since the many smaller spills (such as those under a car) may add up to a significant amount.