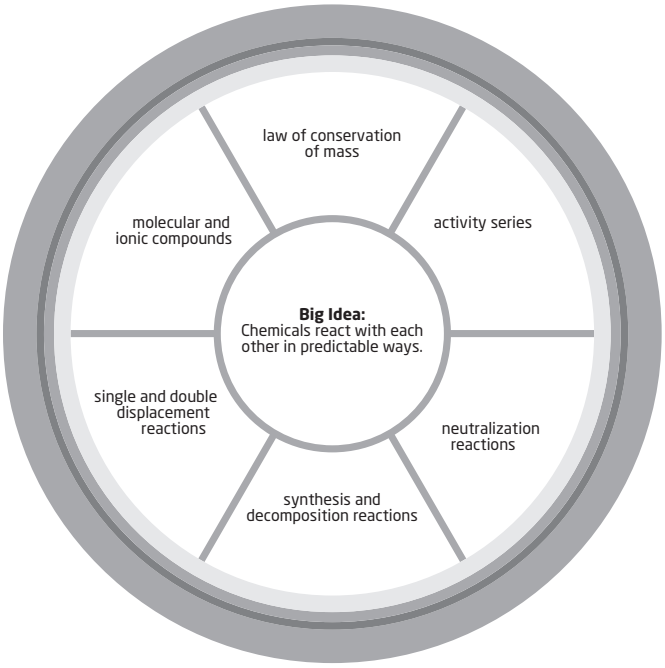
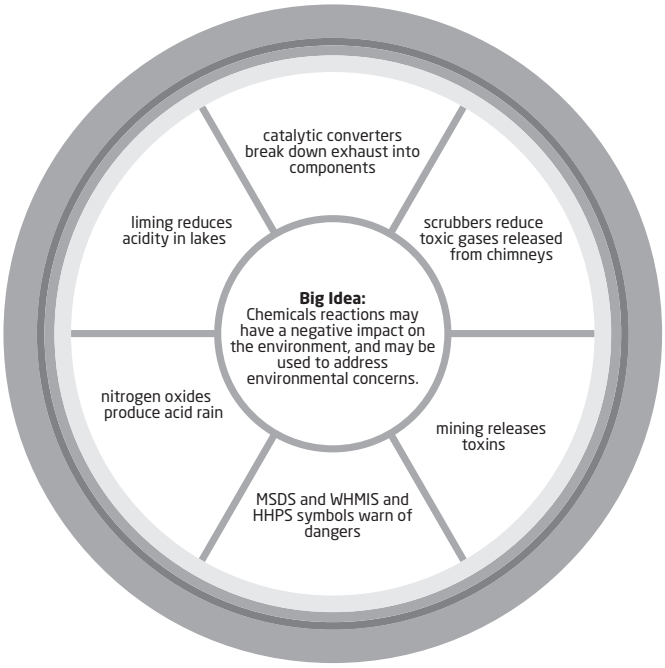
Unit 2 Review Answers (Student textbook pages 258 to 261)

Connect to the Big Ideas

Connect to the Big Ideas answers are also available as a Blackline master on the accompanying CD.





Knowledge and Understanding

1. b.

2. c.

3. b.

4. a.

5. d.

6. Because the total mass of the products must be the same as the total mass of the reactants.

7. a. synthesis, $S_8(s) + 8O_2(g) \rightarrow 8SO_2(g)$

b. decomposition, $2HF(g) \rightarrow H_2(g) + F_2(g)$

c. double displacement or neutralization, $H_2SO_4(aq) + 2NaOH(aq) \rightarrow Na_2SO_4(aq) + 2H_2O(\ell)$

d. double displacement, $Fe(NO_3)_3(aq) + 3KOH(aq) \rightarrow FeOH_3(s) + 3KNO_3(aq)$

e. single displacement, $2Al(s) + 3CuCl_2(aq) \rightarrow 2AlCl_3(aq) + 3Cu(s)$

8. a. sodium + oxygen → sodium oxide, $Na(s) + O_2(g) \rightarrow Na_2O(s)$, $4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$

b. magnesium + copper(II) chloride copper → copper + magnesium chloride, $Mg(s) + CuCl_2(aq) \rightarrow Cu(s) + MgCl_2(aq)$, $Mg(s) + CuCl_2(aq) \rightarrow Cu(s) + MgCl_2(aq)$

c. magnesium carbonate → magnesium oxide + carbon dioxide, $MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$, $MgCO_3(s) \rightarrow MgO(s) + CO_2(g)$

d. chromium(III) chloride + potassium hydroxide → potassium chloride + chromium(III) hydroxide, $CrCl_3(aq) + KOH(aq) \rightarrow KCl(aq) + Cr(OH)_3(s)$, $CrCl_3(aq) + 3KOH(aq) \rightarrow 3KCl(aq) + Cr(OH)_3(s)$

e. aluminum + sulfuric acid → hydrogen + aluminum sulfate, $Al(s) + H_2SO_4(aq) \rightarrow H_2(g) + Al_2(SO_4)_3(aq)$, $2Al(s) + 3H_2SO_4(aq) \rightarrow 3H_2(g) + Al_2(SO_4)_3(aq)$

9. a. synthesis; two elements formed a single product

b. single displacement; magnesium replaced copper in the compound

c. decomposition; the single compound broke down into two products

d. double displacement; the compounds swapped ions

e. single displacement; aluminum replaced hydrogen in the compound

10. a. 4 **b.** 13 **c.** 6

11. increased; lower by a factor of 10

12. a salt

Thinking and Investigation

13. The copper reaction gains mass as it absorbs oxygen from the air, and the calcium carbonate loses mass when carbon dioxide escapes as a gas.

14. **a.** $2CO(g) + O_2(g) \rightarrow 2CO_2(g)$

b. acting as a catalyst

15. 4.5

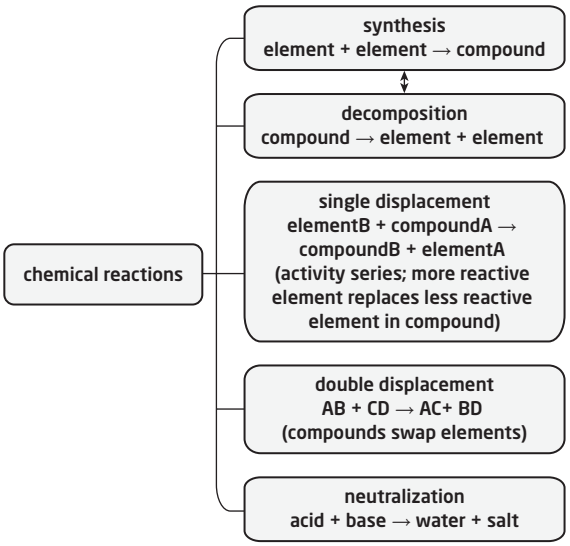
16. colourless

17. chlorine levels and pH

Communication

18. Example: A formula with both a metal and a non-metal is ionic, and a formula with two non-metals is covalent. Covalent compounds can be identified by names containing prefixes and the suffix *–ide*.

19.



20. See Figure 6.21 on page 242 of the student textbook.

21. Example: No, because greener practices should be a selling point, not an additional cost. I think consumers in a capitalist economy will always opt for the cheaper alternative. In order for green technology to go global and mainstream, the price of products that pollute should be increased to include the cost of clean-up, a cost currently invisible as it is paid by government (taxpayers).

Application

22. Copper is less reactive than these other metals, resulting in longer-lasting pipes and less copper contamination of the water.

23. **a.** $Hg(NO_3)_2$, Na_2SO_4

b. double displacement, $Hg(NO_3)_2 + Na_2SO_4 \rightarrow 2NaNO_3 + HgSO_4$

c. solid; filter the solid out of the mixture

24. Example: Pollution sources include industrial plants, power plants, and vehicles

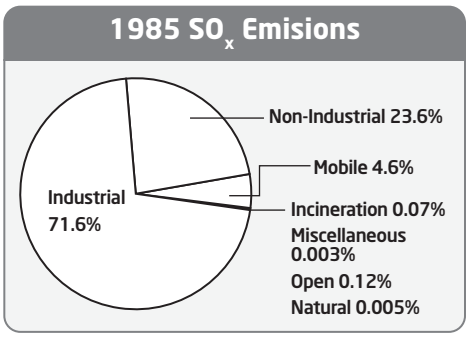
25. Example: The lake basin or surroundings may contain basic compounds (e.g., carbonates such as limestone) that neutralized the acid.

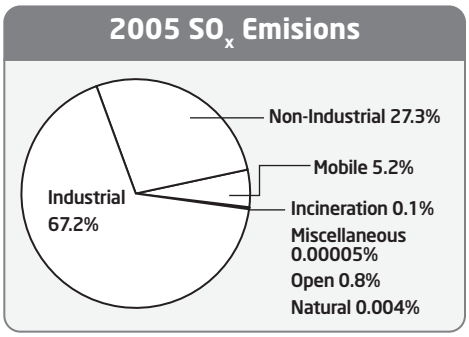
26. Emissions from every source were lower in 2005 than in 1985. Industrial sources were the only source that did not increase during any of the intervals recorded in the table.

27. **a.** natural sources

b. Examples: How much SO_x was emitted from this source? Was this source a major contributor to SO_x emissions? What happened to the emissions from other sources during that time?

28. **a.**





b. The percentages of total SO_x emissions from non-industrial, mobile, and incineration sources increased. The percentage emitted from each other source decreased.

Literacy Test Prep

Multiple Choice

29. b.

30. d.

31. a.

32. a.

33. c.

Written Answer

34. Example: Magnesium is important to daily life, playing a role in a number of important processes from body processes to transportation.