breathed by 50 people in one day.

1. a. $2C_2H_2(g) + 5O_2 \longrightarrow 4CO_2(g) + 2H_2O(g)$
combustion

b. $Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$
single replacement

c. $Cl_2(aq) + 2KI(aq) \longrightarrow 2KCl(aq) + I_2(aq)$
single replacement

d. $2H_2O_2(l) \longrightarrow 2H_2O(l) + O_2(g)$
decomposition

e. $MgCl_2(s) \longrightarrow Mg(s) + Cl_2$
decomposition

f. $Fe(s) + I_2(s) \longrightarrow FeI_2(s)$
synthesis

g. $16Cu(s) + S_8(l) \longrightarrow 8Cu_2S(s)$
synthesis

h. $C_6H_{12}O_6(aq) + 6O_2(aq) \longrightarrow 6CO_2(aq) + 6H_2O(l)$
combustion

i. $FeCl_2(aq) + K_2S(aq) \longrightarrow FeS(s) + 2KCl(aq)$
double replacement

j. $H_2SO_4(aq) + 2NaOH(aq) \longrightarrow Na_2SO_4(aq) + 2H_2O(l)$
double replacement, water forming

k. $Pb(NO_3)_2(aq) + K_2CrO_4(aq) \longrightarrow PbCrO_4(s) + 2KNO_3(aq)$
double replacement

l. $4Cr(s) + 3SnCl_4(aq) \longrightarrow 4CrCl_3(aq) + 3Sn(s)$
single replacement

Example 5-6

Write the equation f
in aluminum chlor

Suggested solutic

The reactants are r

Table 5-2 shows
aluminum, so magr
nesium chloride an

The equation is t

3M

Example 5-7

Complete and balar
aqueous solutions c

ed solution

e the correct formulas for the reactants, and indicate that dissolved in water:

$$HCl(aq) + Sr(OH)_2(aq) \longrightarrow$$

water, hydrogen replaces strontium to combine with the . The table in Appendix D indicates that the strontium remains dissolved in the water that was present in the and the water formed is in the liquid form:

$$HCl(aq) + Sr(OH)_2(aq) \longrightarrow SrCl_2(aq) + H_2O(l)$$

the equation is balanced by using a coefficient of 2 for HCl

$$2HCl(aq) + Sr(OH)_2(aq) \longrightarrow SrCl_2(aq) + 2H_2O(l)$$

and Practice

the following equations and classify each of the reactions as syn- lecomposition, combustion, single replacement, double replace- water-forming:

$(g) + O_2(g) \longrightarrow CO_2(g) + H_2O(g)$ 2, 5, 4, 2

$+ CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$ 1, 1, 1, 1

$) + KI(aq) \longrightarrow KCl(aq) + I_2(aq)$ 1 2 2 1

$_2(l) \longrightarrow H_2O(l) + O_2(g)$ 2, 2, 1

$I_2(s) \longrightarrow Mg(s) + Cl_2(g)$ 1, 1, 1

$+ I_2(s) \longrightarrow FeI_2(s)$ 1, 1, 1

$+ S_8(l) \longrightarrow Cu_2S(s)$ 16, 1, 8

$_2O_6(aq) + O_2(g) \longrightarrow CO_2(aq) + H_2O(l)$ 1, 6, 6, 6

$_2(aq) + K_2S(aq) \longrightarrow FeS(s) + KCl(aq)$ 1, 1, 1, 2

$)_4(aq) + NaOH(aq) \longrightarrow Na_2SO_4(aq) + H_2O(l)$ 1, 2, 1, 2

$O_3)_2(aq) + K_2CrO_4(aq) \longrightarrow PbCrO_4(s) + KNO_3(aq)$ 1, 1, 1, 2

$+ SnCl_4(aq) \longrightarrow CrCl_3(aq) + Sn(s)$ 4, 3, 4, 3

$OH(l) + O_2(g) \longrightarrow CO_2(g) + H_2O(g)$ 1, 3, 2, 3

e the equation given the reactants:

$+ MgSO_4(aq) \longrightarrow$

$+ O_2(g) \longrightarrow$

$(s) \longrightarrow$

$q) + KOH(aq) \longrightarrow$

$_2(l) + O_2(g) \longrightarrow$

$+ O_2(g) \longrightarrow$

$q) + CaCl_2(aq) \longrightarrow$

$+ Ni(NO_3)_2(aq) \longrightarrow$

$)_4(aq) + SrCl_2(aq) \longrightarrow$

$(aq) + Na_2CO_3(aq) \longrightarrow$

$+ S_8(s) \longrightarrow$

$(l) + O_2(g) \longrightarrow$

$+ KNO_3(aq) \longrightarrow$

$_3(aq) + Sr(OH)_2(aq) \longrightarrow$

each equation in item 2

m. $C_2H_5OH(l) + 3O_2(g) \longrightarrow 2CO_2(g) + 3H_2O(g)$
combustion

2. a. $Zn(s) + MgSO_4(aq) \longrightarrow$ N.R.
b. $Cd(s) + O_2(g) \longrightarrow CdO(s)$
c. $HgO(s) \longrightarrow Hg(l) + O_2(g)$
d. $HCl(aq) + KOH(aq) \longrightarrow KCl(aq) + H_2O(l)$
e. $C_5H_{12}(l) + O_2(g) \longrightarrow CO_2(g) + H_2O(g)$
f. $Sr(s) + O_2(g) \longrightarrow SrO(s)$
g. $Br_2(aq) + CaCl_2(aq) \longrightarrow$ N.R.
h. $Zn(s) + Ni(NO_3)_2(aq) \longrightarrow Zn(NO_3)_2(aq) + Ni(s)$
i. $ZnSO_4(aq) + SrCl_2(aq) \longrightarrow SrSO_4(s) + ZnCl_2(aq)$
j. $AlCl_3(aq) + NaCO_3(aq) \longrightarrow Al_2(CO_3)_3(s) + NaCl(aq)$
k. $Fe(s) + S_8(s) \longrightarrow FeS(s)$
l. $C_6H_6(l) + O_2(g) \longrightarrow CO_2(g) + H_2O(g)$
m. $Pb(s) + KNO_3(aq) \longrightarrow$ N.R.
n. $HNO_3(aq) + Sr(OH)_2(aq) \longrightarrow Sr(NO_3)_2(aq) + H_2O(l)$

3. a. $Zn(s) + MgSO_4(aq) \longrightarrow$ N.R.
b. $2Cd(s) + O_2(g) \longrightarrow 2CdO(s)$
c. $2HgO(s) \longrightarrow 2Hg(l) + O_2(g)$
d. $HCl(aq) + KOH(aq) \longrightarrow KCl(aq) + H_2O(l)$
e. $C_5H_{12}(l) + 8O_2(g) \longrightarrow 5CO_2(g) + 6H_2O(g)$
f. $2Sr(s) + O_2(g) \longrightarrow 2SrO(s)$
g. $Br_2(aq) + CaCl_2(aq) \longrightarrow$ N.R.
h. $Zn(s) + Ni(NO_3)_2(aq) \longrightarrow Zn(NO_3)_2(aq) + Ni(s)$
i. $ZnSO_4(aq) + SrCl_2(aq) \longrightarrow SrSO_4(s) + ZnCl_2(aq)$
j. $2AlCl_3(aq) + 3Na_2CO_3(aq) \longrightarrow Al_2(CO_3)_3(s) + 6NaCl(aq)$
k. $8Fe(s) + S_8(s) \longrightarrow 8FeS(s)$
l. $2C_6H_6(l) + 15O_2(g) \longrightarrow 12CO_2(g) + 6H_2O(g)$
m. $Pb(s) + KNO_3(aq) \longrightarrow$ N.R.
n. $2HNO_3(aq) + Sr(OH)_2(aq) \longrightarrow Sr(NO_3)_2(aq) + 2H_2O(l)$

4. a. single replacement
b. synthesis, combustion
c. decomposition
d. water-forming
e. combustion
f. synthesis, combustion
g. single replacement
h. single replacement
i. double replacement
j. double replacement
k. synthesis
l. combustion
m. single replacement
n. water-forming