**ALT 4:** I can predict products of a chemical reaction and use chemical equations to solve real world problems.

**Purpose**
To review and practice writing, interpreting, and balancing chemical equations.

**Directions** In each blank write the word or phrase that best completes the following passage.
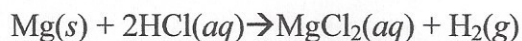
**Word Bank:**

| | | |
|---|---|---|
| chemical equation | energy or heat | product |
| chemical reaction | law of conservation of mass | reactant |
| coefficients | precipitate | temperature |

When a piece of magnesium metal is added to dilute hydrochloric acid, fizzing occurs and hydrogen gas is released from the mixture. The fizzing is evidence that a(n) (1)_____ has occurred between magnesium and hydrochloric acid. The name given to either magnesium or hydrochloric acid in this case is (2) _____, and the hydrogen gas that is released is called a(n) (3) _____ of the reaction. Some other signs that chemical reactions have occurred might be change of color or (4)_____, or formation of a solid(5) _____. If a thermometer is placed into a mixture undergoing a reaction, you might observe that the temperature has gone up or down, indicating that (6) _____ was being released or absorbed. The shorthand form by which a reaction is represented is called a(n) (7) _____. In using this method of representation, you must satisfy the (8) _____, a principle that states that matter is neither created nor destroyed. In order to satisfy this principle, you normally select the proper numerical (9)_____ to indicate the number of units or molecules of each substance taking part in the chemical change.

**Directions** In the space provided, express in words each of the numbered terms or symbols in the following equation.

$$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

10. Mg _____

11. (s) _____

12. + _____

13. 2 _____

14. HCl (aq)_____

15. (aq) _____

16. → _____

17. MgCl$_2$(aq)_____

18. H$_2$ _____

19. (g) _____

Write a word equation and a balanced chemical equation for each of the reactions described below.

20. Aluminum metal burns in pure oxygen gas to produce solid aluminum oxide.

word equation: _____

chemical equation: _____

21. When solid mercury(II) oxide is heated, it breaks down to form liquid mercury and oxygen gas.

word equation: _____

chemical equation: _____

22. The addition of a solution of ammonium sulfate to a solution of lead(II) nitrate results in the formation of ammonium nitrate, which remains in solution, and lead(II) sulfate, which settles out of solution as a solid.

word equation: _____

_____

chemical equation: _____

23. Copper metal and iron(II) nitrate in solution are formed when iron metal is added to a solution of copper (II) nitrate.
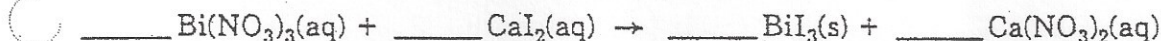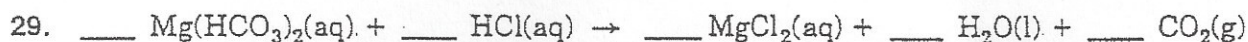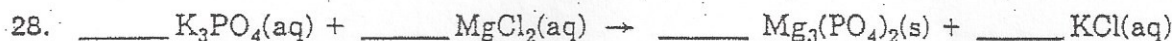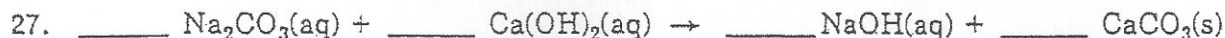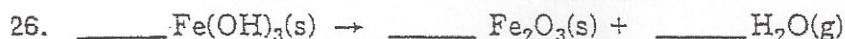
word equation: _____

chemical equation: _____

24. Hydrogen sulfide gas reacts with pure oxygen gas to form water vapor and solid particles of sulfur.

word equation: _____

chemical equation: _____

Balance each of the following chemical equations.

25. _____ $P(s)$ + _____ $O_2(g)$ → _____ $P_4O_{10}(s)$

26. _____ $Fe(OH)_3(s)$ → _____ $Fe_2O_3(s)$ + _____ $H_2O(g)$

27. _____ $Na_2CO_3(aq)$ + _____ $Ca(OH)_2(aq)$ → _____ $NaOH(aq)$ + _____ $CaCO_3(s)$

28. _____ $K_3PO_4(aq)$ + _____ $MgCl_2(aq)$ → _____ $Mg_3(PO_4)_2(s)$ + _____ $KCl(aq)$

29. _____ $Mg(HCO_3)_2(aq)$ + _____ $HCl(aq)$ → _____ $MgCl_2(aq)$ + _____ $H_2O(l)$ + _____ $CO_2(g)$

30. _____ $Bi(NO_3)_3(aq)$ + _____ $CaI_2(aq)$ → _____ $BiI_3(s)$ + _____ $Ca(NO_3)_2(aq)$

31. _____ $Cu(s)$ + _____ $H_2SO_4(aq)$ → _____ $CuSO_4(aq)$ + _____ $H_2O(l)$ + _____ $SO_2(g)$

# 6.1 Chemical Equations

## CHAPTER 6

**In each blank, write the word or phrase that best completes the following passage.**

When a piece of magnesium metal is added to dilute hydrochloric acid, fizzing occurs and hydrogen gas is released from the mixture. The fizzing is evidence that a(n) (1) _chemical reaction_ has occurred between magnesium and hydrochloric acid. The name given to either magnesium or hydrochloric acid in this case is (2) _reactant_, and the hydrogen gas that is released is called a(n) (3) _product_ of the reaction. Some other indications that reactions have occurred might be change of color or (4) _temperature_, or formation of a solid (5) _precipitate_. If a thermometer is placed into a mixture undergoing a reaction, you might observe that the temperature has gone up or down, indicating that (6) _energy or heat_ was being released or absorbed. The shorthand form by which a reaction is represented is called a(n) (7) _chemical equation_. In using this method of representation, you must satisfy the (8) _law of conservation of matter_, a principle that states that matter is neither created nor destroyed. In order to satisfy this principle, you normally select the proper numerical (9) _coefficients_ to indicate the number of units of each substance taking part in the chemical change.

**In the space provided, express in words each of the numbered terms or symbols in the following chemical equation.**

$$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

10. Mg _Magnesium_

11. (s) _solid_

12. + _adding reactants_

13. 2 _two HCl molecules_

14. HCl(aq) _hydrochloric acid dissolved in water_

15. (aq) _dissolved in water_

16. → _chemical reaction_

17. MgCl₂(aq) _magnesium chloride dissolved in water_

18. H₂ _hydrogen_

19. (g) _gas_

Write a word equation and a balanced chemical equation for each of the reactions described below.

20. Aluminum metal burns in pure oxygen gas to produce solid aluminum oxide.

word equation: _Aluminum + oxygen → Aluminum oxide_

chemical equation: $Al_{(s)} + O_{2(g)} → Al_2O_{3(s)}$

21. When solid mercury(II) oxide is heated, it breaks down to form liquid mercury and oxygen gas.

word equation: _Mercury (II) oxide $\xrightarrow{\Delta}$ Mercury + oxygen_

chemical equation: $2HgO_{(s)} \xrightarrow{\Delta} 2Hg_{(l)} + O_{2(g)}$

22. The addition of a solution of ammonium sulfate to a solution of lead(II) nitrate results in the formation of ammonium nitrate, which remains in solution, and lead(II) sulfate, which settles out of solution as a solid.

word equation: _ammonium sulfate + lead (II) nitrate → ammonium nitrate + lead (II) sulfate_

chemical equation: $(NH_4)_2SO_{4(aq)} + Pb(NO_3)_{2(aq)} → PbSO_{4(s)} + NH_4NO_{3(aq)}$

23. Copper metal and iron(II) nitrate in solution are formed when iron metal is added to a solution of copper (II) nitrate.

word equation: _Iron + copper (II) nitrate → copper + iron (II) nitrate_

chemical equation: $Fe_{(s)} + Cu(NO_3)_{2(aq)} → Cu_{(s)} + Fe(NO_3)_{2(aq)}$

24. Hydrogen sulfide gas reacts with pure oxygen gas to form water vapor and solid particles of sulfur.

word equation: _Hydrogen sulfide + oxygen → water + S_

chemical equation: $H_2S_{(g)} + O_{2(g)} → H_2O_{(g)} + S_{(s)}$

Balance each of the following chemical equations.

25. __4__ P(s) + __5__ O₂(g) → __1__ P₄O₁₀(s)

26. __2__ Fe(OH)₃(s) → __1__ Fe₂O₃(s) + __3__ H₂O(g)

27. __1__ Na₂CO₃(aq) + __1__ Ca(OH)₂(aq) → __2__ NaOH(aq) + __1__ CaCO₃(s)

28. __2__ K₃PO₄(aq) + __3__ MgCl₂(aq) → __1__ Mg₃(PO₄)₂(s) + __6__ KCl(aq)

29. __1__ Mg(HCO₃)₂(aq) + __2__ HCl(aq) → __1__ MgCl₂(aq) + __2__ H₂O(l) + __2__ CO₂(g)

30. __2__ Bi(NO₃)₃(aq) + __3__ CaI₂(aq) → __2__ BiI₃(s) + __3__ Ca(NO₃)₂(aq)

31. __1__ Cu(s) + __2__ H₂SO₄(aq) → __1__ CuSO₄(aq) + __2__ H₂O(l) + __1__ SO₂(g)