

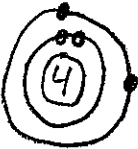

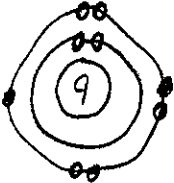
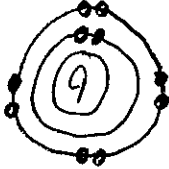
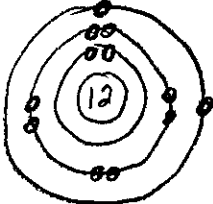
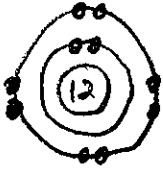
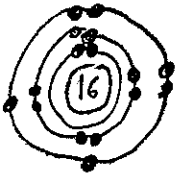
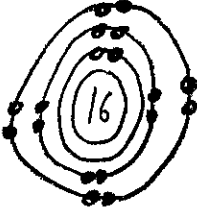


Periodic Table WS

Use the periodic table on the inside front cover of your textbook to complete the following table
Table 1 Properties and Descriptions of Elements

| Element name | Chemical symbol | Atomic number | Group number | Period number | Metal (m) or nonmetal (nm) | State at SATP |
|---------------|-----------------|---------------|--------------|---------------|----------------------------|---------------|
| 1. chlorine | Cl | 17 | 17 | 3 | nm | g |
| 2. magnesium | Mg | 12 | 2 | 3 | m | s |
| 3. zinc | Zn | 30 | 12 | 4 | m | s |
| 4. nitrogen | N | 7 | 15 | 2 | nm | g |
| 5. iodine | I | 53 | 17 | 5 | nm | s |
| 6. gold | Au | 79 | 11 | 6 | m | s |
| 7. scandium | Sc | 21 | 4 | 3 | m | s |
| 8. thorium | Th | 90 | — | 7 | m | s |
| 9. mercury | Hg | 80 | 12 | 6 | m | liquid l |
| 10. bromine | Br | 35 | 17 | 4 | nm | l |
| 11. argon | Ar | 18 | 18 | 3 | nm | g |
| 12. silver | Ag | 47 | 11 | 5 | m | s |
| 13. potassium | k | 19 | 1 | 4 | m | s |
| 14. calcium | Ca | 20 | 2 | 4 | m | s |
| 15. hydrogen | H | 1 | 1 | 1 | nm | gas |
| 16. cerium | Ce | 58 | — | 6 | m | s |

Bohr Models of Atoms and Ions WS

| Element name and symbol | Bohr diagram of atom | # of valence electrons | Bohr diagram of ion | Ionic charge |
|-------------------------|---|------------------------|---|--------------|
| lithium |  | 1 |  | +1 |
| beryllium |  | 2 |  | +2 |
| F |  | 7 |  | -1 |
| magnesium |  | 2 |  | +2 |
| sulfur |  | 6 |  | -2 |

Atoms vs Ions WS

no charge, # of protons and electrons are equal

have charges

| Symbol | Atom or Ion | Number of Protons | Number of Electrons | Electric Charge |
|------------------|-------------|-------------------|---------------------|-----------------|
| Li ⁺ | ion | 3 | 2 | 1+ |
| C | atom | 6 | 6 | 0 |
| F ⁻ | ion | 9 | 10 | 1- |
| Mg ²⁺ | ion | 12 | 10 | 2+ |
| K ⁺ | ion | 19 | 18 | 1+ |
| Li | atom | 3 | 3 | 0 |
| S ²⁻ | ion | 16 | 18 | 2- |
| He | atom | 2 | 2 | 0 |
| Ar | atom | 18 | 18 | 0 |
| O ²⁻ | ion | 8 | 10 | 2- |
| Cl ⁻ | ion | 17 | 18 | 1- |
| Na | atom | 11 | 11 | 0 |
| Ca ²⁺ | ion | 20 | 18 | 2+ |
| Fe ³⁺ | ion | 26 | 23 | 3+ |
| Fe ²⁺ | ion | 26 | 24 | 2+ |
| Au ⁺ | ion | 79 | 78 | 1+ |
| Hg ²⁺ | ion | 80 | 78 | 2+ |
| Pb ⁴⁺ | ion | 82 | 78 | 4+ |
| Zn | atom | 30 | 30 | 0 |

Naming Ionic Compounds WS

1. Write the formulas for the following compounds.

- (a) magnesium oxide MgO
- (b) sodium fluoride NaF
- (c) aluminium nitride AlN
- (d) potassium sulfide K₂S
- (e) lithium iodide LiI
- (f) calcium bromide CaBr₂
- (g) beryllium oxide BeO
- (h) nickel (II) chloride NiCl₂
- (i) magnesium nitride Mg₃N₂
- (j) aluminium sulfite Al₂(SO₃)₃
- (k) copper(I) bromide CuBr
- (l) tin(II) iodide SnI₂
- (m) iron(III) chloride FeCl₃
- (n) calcium phosphate Ca₃(PO₄)₂
- (o) lead(II) oxide PbO
- (p) lead(IV) fluoride PbF₄
- (q) tin(IV) bromide SnBr₄
- (r) copper(II) sulfide CuS
- (s) iron(II) oxide FeO
- (t) calcium nitrate Ca(NO₃)₂

2. Write the names for the following compounds.

- (a) Li₂O lithium oxide
- (b) AlCl₃ aluminium chloride
- (c) MgS magnesium sulfide
- (d) Ca(NO₃)₂ calcium nitrate
- (e) KBr potassium bromide
- (f) BeF₂ beryllium fluoride
- (g) Na₃N sodium nitride
- (h) Al₂O₃ aluminum oxide
- (i) CuCl₂ copper (II) chloride
- (j) FeBr₃ iron (III) bromide
- (k) PbSO₃ lead (II) sulfite
- (l) SnO₂ tin (IV) oxide
- (m) Na₂S sodium sulfide
- (n) Mg₃P₂ magnesium phosphide
- (o) NiO nickel (II) oxide
- (p) CuI copper (I) iodide
- (q) PbCl₄ lead (IV) chloride
- (r) FeP iron (III) phosphide
- (s) CaF₂ calcium fluoride
- (t) K₃PO₄ potassium phosphate

Naming Molecular Compounds WS

1. Write the formulas for the following compounds.

- (a) carbon dioxide CO₂
(b) silicon dioxide SiO₂
(c) water H₂O
(d) carbon disulfide CS₂
(e) sulfur trioxide SO₃
(f) ammonia NH₃
(g) carbon tetrachloride CCl₄
(h) hydrogen peroxide H₂O₂
(i) methane CH₄
(j) ozone O₃
(k) diphosphorus trioxide P₂O₃
(l) nitrogen monoxide NO
(m) chlorine dioxide ClO₂
(n) dinitrogen monoxide N₂O
(o) carbon monoxide CO
(p) arsenic tribromide AsBr₃
(q) phosphorus pentabromide PBr₅
(r) dinitrogen tetroxide N₂O₄
(s) silicon carbide SiC
(t) sulfur dioxide SO₂

2. Write the names for the following compounds.

- (a) CF₄ carbon tetrafluoride
(b) NH₃ ammonia
(c) PBr₃ phosphorous tribromide
(d) O₃ ozone
(e) F₂(g) fluorine
(f) CS₂ carbon disulfide
(g) N₂O₄ dinitrogen tetroxide
(h) H₂O₂ hydrogen peroxide
(i) CO carbon monoxide
(j) SiC silicon carbide
(k) P₂O₅ diphosphorous pentoxide
(l) CH₄ methane
(m) SO₃ sulfur trioxide
(n) H₂O water
(o) SiO₂ silicon dioxide
(p) PCl₅ phosphorous pentachloride
(q) I₂(g) iodine
(r) NO₂ nitrogen dioxide
(s) SF₄ sulfur tetrafluoride
(t) H₂(g) hydrogen

Molecular and Acid Naming WS

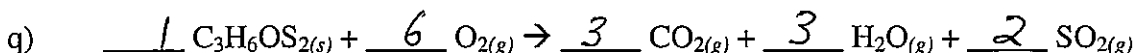
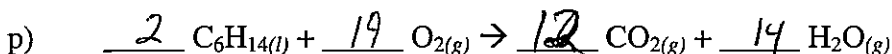
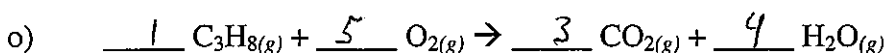
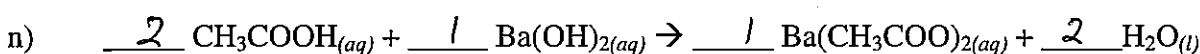
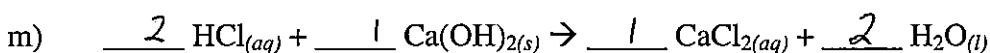
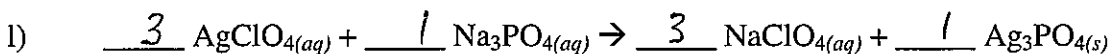
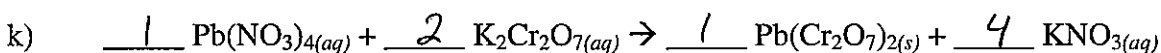
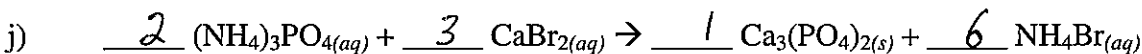
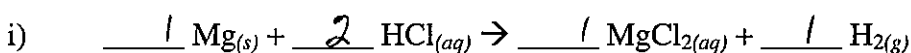
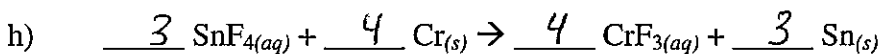
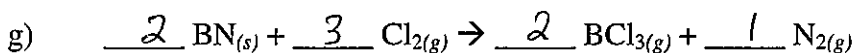
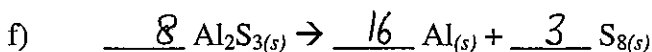
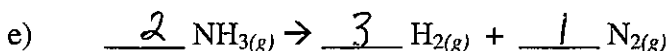
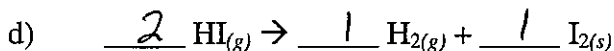
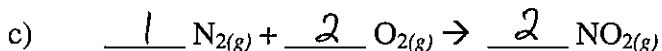
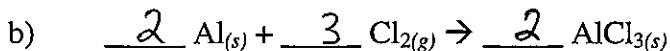
| | Formula | IUPAC Name |
|-----|---|---------------------------|
| 1. | $\text{NO}_3(\text{g})$ | nitrogen trioxide |
| 2. | $\text{NH}_3(\text{g})$ | ammonia |
| 3. | $\text{H}_2\text{S}(\text{g})$ | hydrogen sulfide |
| 4. | OF_2 | oxygen difluoride |
| 5. | CH_4 | methane |
| 6. | $\text{CH}_3\text{OH}(\text{l})$ | methanol |
| 7. | $\text{HBr}(\text{aq})$ | hydrobromic acid |
| 8. | $\text{H}_2\text{SO}_3(\text{aq})$ | sulphurous acid |
| 9. | $\text{CS}_2(\text{l})$ | carbon disulfide |
| 10. | $\text{H}_2\text{S}(\text{aq})$ | hydrosulphuric acid |
| 11. | $\text{SO}_2(\text{g})$ | sulfur dioxide |
| 12. | N_2O_4 | dinitrogen tetraoxide |
| 13. | $\text{HNO}_2(\text{aq})$ | nitrous acid |
| 14. | $\text{CO}(\text{g})$ | carbon monoxide |
| 15. | $\text{C}_{12}\text{H}_{22}\text{O}_{11}(\text{s})$ | Sucrose |
| 16. | $\text{HOCl}(\text{aq})$ | hypochlorous acid |
| 17. | As_2O_3 | diarsenic trioxide |
| 18. | $\text{C}_2\text{H}_5\text{OH}(\text{l})$ | ethanol |
| 19. | $\text{H}_2\text{CO}_3(\text{aq})$ | carbonic acid |
| 20. | $\text{HClO}_4(\text{aq})$ | perchloric acid |
| 21. | $\text{P}_4\text{O}_{10}(\text{s})$ | tetraphosphorous decoxide |
| 22. | $\text{SO}_3(\text{g})$ | sulphur trioxide |
| 23. | $\text{CF}_4(\text{l})$ | carbon tetrafluoride |
| 24. | SiO_2 SiO_2 | silicon dioxide |
| 25. | $\text{CH}_3\text{COOH}(\text{aq})$ | acetic (ethanoic) acid |

Acids, Molecular and Ionic Naming WS

| | Class A, M or I | Formula | IUPAC Name |
|-----|--------------------|-------------------|---|
| 1. | A | $H_3PO_4(aq)$ | phosphoric acid |
| 2. | A | $HClO_2(aq)$ | chlorous acid |
| 3. | Element | $Mg(s)$ | magnesium |
| 4. | I | $Al_2(SO_4)_3(s)$ | aluminum sulfate |
| 5. | I | $MgCl_2(s)$ | magnesium chloride |
| 6. | I | $NH_4NO_2(s)$ | ammonium nitrite |
| 7. | M | $PH_3(l)$ | phosphorus trihydride |
| 8. | I | $KNO_3(s)$ | potassium nitrate |
| 9. | I | $NaNO_3(l)$ | sodium nitrate |
| 10. | A | $HNO_2(aq)$ | nitrous acid |
| 11. | I | $Al(OH)_3(s)$ | aluminum hydroxide |
| 12. | I | $Na_2SO_4(l)$ | sodium sulphate |
| 13. | I | $(NH_4)_2SO_4(s)$ | ammonium sulfate |
| 14. | I | $PbF_4(s)$ | lead (IV) fluoride |
| 15. | M | $H_2O_2(l)$ | hydrogen peroxide |
| 16. | I | $PbO(s)$ | lead (II) oxide |
| 17. | A | $HF(aq)$ | hydrofluoric acid |
| 18. | I | $KClO(s)$ | potassium hypochlorite |
| 19. | element | $Br_2(l)$ | bromine |
| 20. | M | $N_2O_3(g)$ | dinitrogen trioxide |
| 21. | I | K_2CO_3 | potassium carbonate |
| 22. | A | $HNO_3(aq)$ | nitric acid |
| 23. | M | $HF(g)$ | hydrofluoric hydrogen fluoride |
| 24. | I | $NaOH(l)$ | sodium hydroxide |
| 25. | I | $NaHSO_3(s)$ | sodium hydrogen sulfite |

Balancing Reactions WS

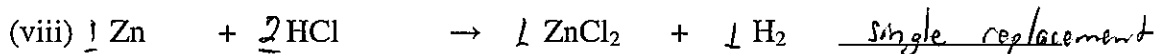
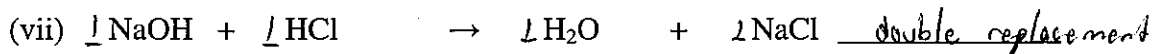
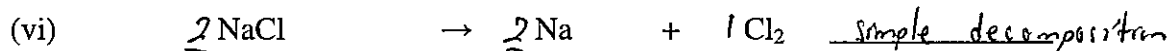
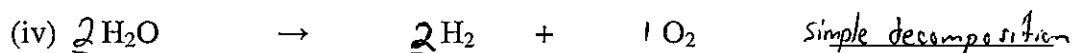
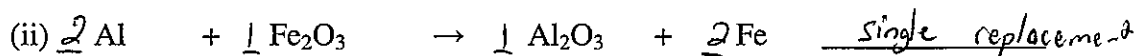
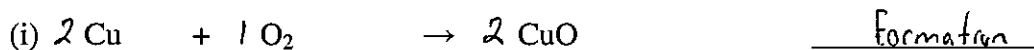
Balance the following chemical equations



Classifying Chemical Reactions WS

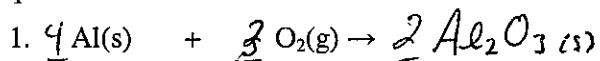
1. (a) Classify each of the following reactions as formation, simple decomposition, single replacement, or double replacement reactions.

(b) Balance each equation.

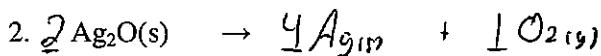


Predicting Chemical Reactions WS

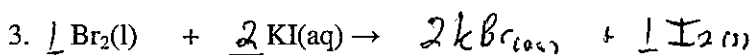
For each of the following questions, classify the reaction type (formation, simple decomposition, combustion, single replacement, double replacement, or other), and predict the balanced chemical equation.



Formation (F)

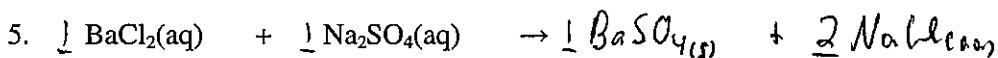
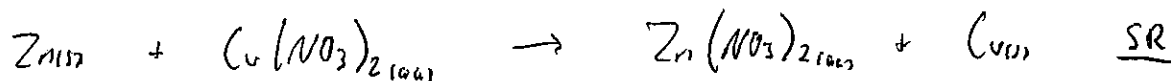


simple decomposition (SD)



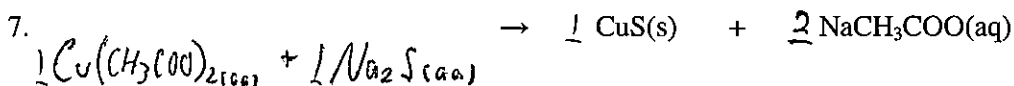
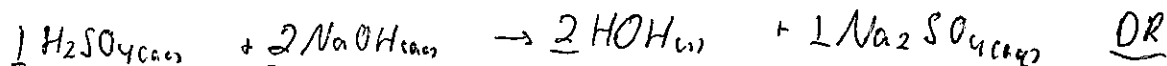
single replacement (SR)

4. A strip of zinc metal is placed into a copper(II) nitrate solution.

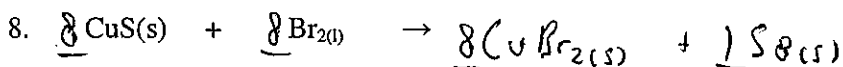


DR

6. Sulfuric acid is neutralized by aqueous sodium hydroxide.

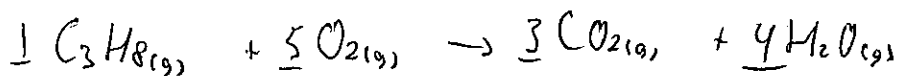


DR

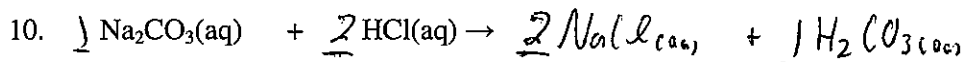


SR

9. Propane burns in air.



hydrocarbon combustion (HC)



DR

Amount, Mass and Molar Mass WS

1. Determine the molar mass of each of the following substances:

(a) $\text{MgI}_2(\text{s})$

$$452.1 \text{ g/mol}$$

(b) $\text{Al}(\text{OH})_3(\text{s})$

$$78.01 \text{ g/mol}$$

(c) $(\text{NH}_4)_2\text{CO}_3(\text{s})$

$$96.11 \text{ g/mol}$$

(d) $\text{CoCl}_2(\text{s})$

$$129.83 \text{ g/mol}$$

2. Convert each of the following masses into its chemical amount:

(a) 8.40 g of $\text{NaOH}(\text{s})$

$$n = \frac{m}{M} = \frac{8.40 \text{ g}}{40.00 \text{ g/mol}} = \boxed{0.210 \text{ mol}}$$

(b) 4.2 kg of $\text{H}_2\text{O}(\text{l})$

$$n = \frac{m}{M} = \frac{4200 \text{ g}}{18.02 \text{ g/mol}} = 233.074 \dots \text{ mol} = \boxed{2.3 \times 10^2 \text{ mol}}$$

3. Convert each of the following amounts into a mass in grams of the given substance:

(a) 0.456 mol of $\text{Al}_2(\text{SO}_4)_3(\text{s})$

$$m = nM = (0.456 \text{ mol})(342.17 \text{ g/mol}) \\ = 156.029 \dots \text{ g} = \boxed{156 \text{ g}}$$

(b) 18.0 mol of $\text{CuSO}_4(\text{s})$

$$m = nM = (18.0 \text{ mol})(159.62 \text{ g/mol}) = 2873.16 \text{ g} = \boxed{2.87 \times 10^3 \text{ g}} \\ \text{or} \\ \boxed{2.87 \text{ kg}}$$

4. Complete the following table.

Table 1 Molar Calculations

| Substance | Molar mass (g/mol) | Mass (g) | Chemical amount (mol) |
|------------------------------------|--------------------|----------|-----------------------|
| $\text{CaCl}_2(\text{s})$ | 110.98 | 18.6 | 0.168 |
| $\text{Al}_2\text{O}_3(\text{s})$ | 101.96 | 27.2 | 0.267 |
| $\text{Mg}(\text{OH})_2(\text{s})$ | 58.33 | 35.00 | 0.6000 |
| $\text{Na}_2\text{CO}_3(\text{s})$ | 105.99 | 15.9 | 0.150 |