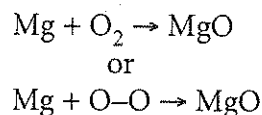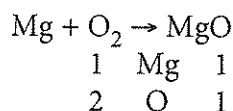# Balancing Chemical Equations

According to the laws of conservation of matter, during a chemical reaction the mass of the reactants equals the mass of the products. At an atomic level, this law means that the number of atoms of each element present before the reaction must equal the number of atoms of each element after the reaction occurs and the products are formed.

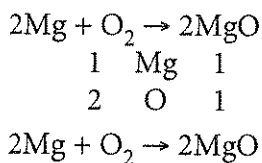**Balance the following equation: $Mg + O_2 \rightarrow MgO$.**

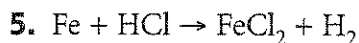**Step 1** You can represent the equation with symbols or individual atoms.

$$Mg + O_2 \rightarrow MgO$$
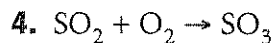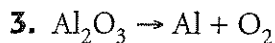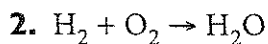$$\text{or}$$
$$Mg + O\text{--}O \rightarrow MgO$$

**Step 2** List each element and count the number of atoms of each element on each side of the arrow.

$$Mg + O_2 \rightarrow MgO$$

| 1 | Mg | 1 |
|---|----|---|
| 2 | O  | 1 |

**Step 3** Place numbers in front of the formulas (called coefficients).

$$2Mg + O_2 \rightarrow 2MgO$$

| 1 | Mg | 1 |
|---|----|---|
| 2 | O  | 1 |

$$2Mg + O_2 \rightarrow 2MgO$$

**Balance the following equations:**

1. $H_2 + N_2 \rightarrow NH_3$

2. $H_2 + O_2 \rightarrow H_2O$

3. $Al_2O_3 \rightarrow Al + O_2$

4. $SO_2 + O_2 \rightarrow SO_3$

5. $Fe + HCl \rightarrow FeCl_2 + H_2$
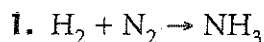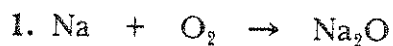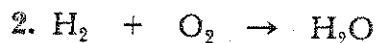
# ACTIVITY ■ Chemical Reactions

Balance the following equations then classify each reaction as either synthesis, decomposition, single or double replacement.
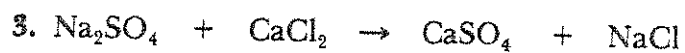
## Balancing Equations

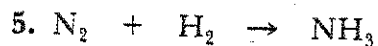1. $Na + O_2 \rightarrow Na_2O$

_____

2. $H_2 + O_2 \rightarrow H_2O$

_____

3. $Na_2SO_4 + CaCl_2 \rightarrow CaSO_4 + NaCl$

_____

4. $Al_2O_3 \rightarrow Al + O_2$

_____

5. $N_2 + H_2 \rightarrow NH_3$

_____

6. $Fe + H_2O \rightarrow Fe_3O_4 + H_2$

_____

7. $P_4 + O_2 \rightarrow P_4O_{10}$

_____

Do last! ※ 8. $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$

_____

9. $SiCl_4 \rightarrow Si + Cl_2$

_____

10. $C + H_2 \rightarrow CH_4$

_____

Extra Credit: $C_3H_5NO + O_2 \longrightarrow CO_2 + NO_2 + H_2O$
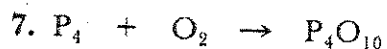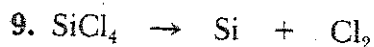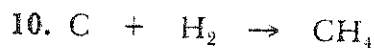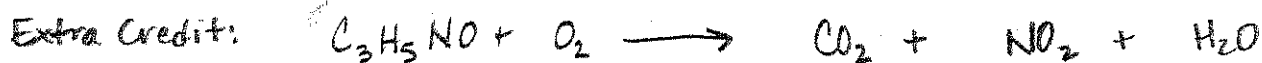
# BALANCING EQUATIONS

Name _____

Balance the following chemical equations.

1. $CH_4 + O_2 \rightarrow CO_2 + H_2O$

2. $Na + I_2 \rightarrow NaI$

3. $N_2 + O_2 \rightarrow N_2O$

4. $N_2 + H_2 \rightarrow NH_3$

5. $KI + Cl_2 \rightarrow KCl + I_2$

6. $HCl + Ca(OH)_2 \rightarrow CaCl_2 + H_2O$

7. $KClO_3 \rightarrow KCl + O_2$

8. $K_3PO_4 + HCl \rightarrow KCl + H_3PO_4$

9. $S + O_2 \rightarrow SO_3$

10. $KI + Pb(NO_3)_2 \rightarrow KNO_3 + PbI_2$

11. $CaSO_4 + AlBr_3 \rightarrow CaBr_2 + Al_2(SO_4)_3$

12. $H_2O_2 \rightarrow H_2O + O_2$

13. $Na + H_2O \rightarrow NaOH + H_2$

14. $C_2H_6 + O_2 \rightarrow CO_2 + H_2O$

15. $Mg(NO_3)_2 + K_3PO_4 \rightarrow Mg_3(PO_4)_2 + KNO_3$