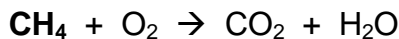


Combustion Reactions Worksheet

When a fuel burns completely, it reacts with oxygen (O₂) to produce carbon dioxide (CO₂) and water vapor (H₂O). In this activity, you will write and balance chemical equations for combustion reactions. The steps are listed below:

1. Write the general form of the equation. For methane (CH₄), the equation would be:



2. The number of atoms of each element on the left side of the equation must equal the number of atoms of each element on the right side of the equation. To “balance” the equation, we use **coefficients**, which are placed in front of each reactant or product. **Always balance the carbon atoms first, hydrogen atoms second, and oxygen atoms last.**

Example:

Carbons are already balanced (1 on each side) $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

There are 4 hydrogens on the left and 2 on the right. Put a coefficient of 2 in front of the H₂O. $\text{CH}_4 + \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$

There are 2 oxygens on the left and 4 on the right. Put a coefficient of 2 in front of the O₂. $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$

Now the equation is balanced! $\text{CH}_4 + 2 \text{O}_2 \rightarrow \text{CO}_2 + 2 \text{H}_2\text{O}$

3. If you end up with an odd number of oxygens on one side and an even number of oxygens on another side, **double all of the coefficients**. This will give you whole-number ratios for all of the reactants and products.

Write balanced equations for each of the following fuels:

1. Propane

2. Pentane

3. Hexane

4. Octane

5. Kerosene ($C_{13}H_{28}$)

6. Paraffin Wax ($C_{25}H_{52}$)

7. Acetylene (C_2H_2)

8. Isopropyl Alcohol (C_3H_8O)

9. Diethyl Ether ($C_4H_{10}O$)

10. MTBE ($C_5H_{12}O$)