 Name_____
Period __ Date __/__/__

# 4 • Chemical Equations and Stoichiometry

## COMBUSTION EQUATIONS

For burning to occur, you need a fuel, an oxidizer, and heat. When hydrocarbons are the fuel and $O_2$ in the air is the oxidizer, then $CO_2$ and $H_2O$ are the products.

**Example**: Write the balanced equation for the complete combustion of propane, $C_3H_8$, in air.

**Solution**: First, set up the basic equation. You memorize the "+ $O_2 \rightarrow CO_2 + H_2O$" part.

$$C_3H_8 + O_2 \rightarrow CO_2 + H_2O$$

Next, balance. 3 C's in $C_3H_8$ result in $3CO_2$'s; 8 H's in $C_3H_8$ result in 4 $H_2O$'s;

$$C_3H_8 + \_\_ O_2 \rightarrow 3\ CO_2 + 4\ H_2O$$

Total O's on the product side = 10 [(3 x 2) + (4 x 1)] = total O's on the reactant side.

This would mean that 5 $O_2$'s were involved.

Tip: If an UNEVEN number of O's need to be represented, a fraction should be used. 7 O's = $^7/_2\ O_2$

Tip: Take into account fuels that contain oxygen. Subtract the O's from that represented as $O_2$'s

**Practice:** Write the balanced combustion equations for the following substances.

1. $CH_4$
2. $C_5H_{12}$
3. $C_9H_{20}$
4. $C_2H_6$
5. $C_8H_{18}$
6. $C_4H_{10}$
7. $C_2H_5OH$
8. $C_3H_7OH$
9. $HC_2H_3O_2$
10. $CH_3COCH_3$