South Pasadena • AP Chemistry 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