Combustion Reactions—An Example of Change Taking Place in Our World

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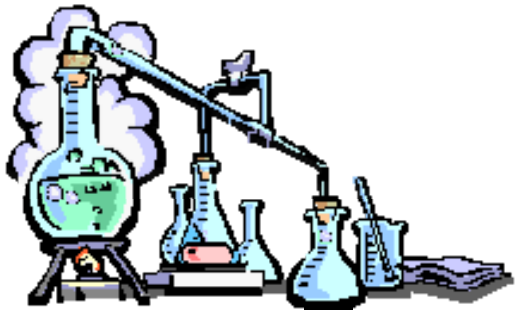
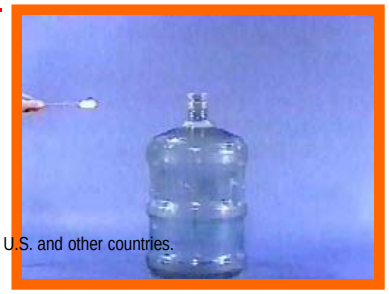
How to...

- Define a combustion reaction
- Recognize and identify a reaction
- Predict the products for a reaction



A Combustion Reaction

- … is a reaction in which oxygen reacts with another element or compound (generally a hydrocarbon) to produce energy in the form of heat and light.
- An example might be the combustion of methanol, www.chem.uiuc.edu/clcwebsite/meth.html



Two Types of Combustion

- **Complete**
- Clean combustion with a hydrocarbon produces carbon dioxide and water

- **Incomplete**
- Dirty combustion With a hydrocarbon produces carbon and/or carbon monoxide as well as carbon dioxide

Identifying Combustion Reactions

- A combustion reaction is a reaction in which one of the reactants is oxygen.
- The other reactant is usually a hydrocarbon.
- The products are either complete or incomplete.

Combustion Experiment

- Combustion reactions require oxygen. When a candle burns, it uses oxygen from the air. Without the oxygen, the flame will not burn.

View a combustion demonstration, www.chem.uiuc.edu/clcwebsite/meth.html

Combustion Experiment

See the video, www.chem.uiuc.edu/clcwebsite/meth.html

- A candle burns in oxygen. One product is water. You can see the moisture forming on the inside of the beaker from the flame. The carbon dioxide formed in the products puts out the flame.
- The HOT candle vapors can reignite the candle wick without touching the flame!

Examples of Reactions

$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g)$$

$$2C_4H_{10}(g) + 13O_2(g) \rightarrow 8CO_2(g) + 10H_2O(g)$$

$$2CH_3OH(g) + 3O_2(g) \rightarrow 2CO_2(g) + 4H_2O(g)$$

$$2C_3H_8(g) + 7O_2(g) \rightarrow 6CO(g) + 8H_2O(g)$$

Practice Reactions

- Predict products for the following
- Balance the reactions

$$C_6H_{12}O_6\ (s) + 6\ O_2\ (g) \rightarrow 6\ CO_2(g) + 6\ H_2O(g)$$

$$2\ C_7H_{14}(l) + 21\ O_2\ (g) \rightarrow 14\ CO_2\ (g) + 14\ H_2O(g)$$

Sources

Methane video clip.

www.chem.uiuc.edu/clcwebsite/meth.html

Equation Balancing Notes.

www.chem.vt.edu/RVGS/ACT/notes/Types_of_Equations.html

http://library.thinkquest.org/10429/text/balequa/balequa.htm