Lesson 12: Combustion and single replacement reactions

1. Combustion

- Reaction in which a hydrocarbon or alcohol burns in the presence of oxygen.

  A hydrocarbon is a molecule that only contains carbon and hydrogen.

- Generic Equation $C_xH_y + O_2 \rightarrow CO_2 + H_2O$
- Example: $CH_4 + O_2 \rightarrow CO_2 + H_2O$
- ❖ Carbon dioxide and water are always the products

An alcohol is a molecule that contains carbon, hydrogen and oxygen.

CH3OH + O2 → CO2 + H2O (Now balance!)

CH3OH + 2O2 → CO2 + 2H2O

* Note the products are the same as before.

* video link summarizes combustion and incomplete combustion (about 3.5 minutes long)

https://www.youtube.com/watch?v=Nl0bipxyuyk

Single Replacement

- Reaction in which a compound reacts with an element to form a new element and a new compound.

- Generic Equation $AX + B \rightarrow BX + A$
- Example: $NaCl + Zn \rightarrow ZnCl_2 + Na$

- ❖ If two metals (or substances that form cations) are present, they swap places; if two non-metals are present, they swap places.

Rules:

1. For the new element, check the 7 + 1 rule.
2. For the new compounds, use crossing over.

***Orally**: For the purpose of this course, we will assume that these reactions always take place even though this is not actually the case.*

Practice examples: Predict the products and balance the equations.

$2Al + 3Fe(NO_3)_2 \rightarrow 3Fe + 2Al(NO_3)_3$

$Zn + CuCl_2 \rightarrow$

$Mg + Pb(NO_3)_2 \rightarrow$

$K + ZnCl_2 \rightarrow$

Homework: Two worksheets

1. Combustion reactions
2. Single replacement reactions