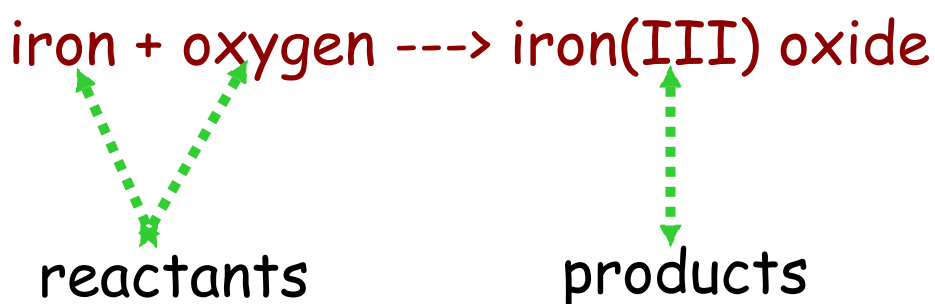


## Chemical Reactions

When writing a word equation, we see how reactants give us products



Note that the plus sign (+) separates chemical formulas on either side of the reaction.

## Chemical Equations

A chemical equation replaces the words by their symbols.



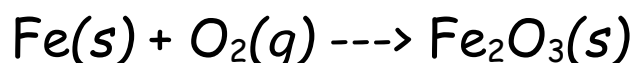
A skeleton equation is a chemical equation that does not indicate the relative amounts of the reactants and products.

To add more information to the equation, we can indicate the physical states of substances by putting a symbol after each formula.

(s) for solid    (l) for liquid    (g) for gas

(aq) for a substance in a aqueous solution (a substance dissolved in water)

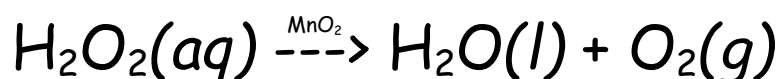
So, the chemical equation above to show how iron rusts now can be given as



In many chemical reactions, a **catalyst** is added to the reaction mixture. A catalyst is a substance that speeds up the reaction but is not used up in the reaction.

Where it is neither reactant nor product, it gets written above the arrow in the chemical reaction.

Ex:



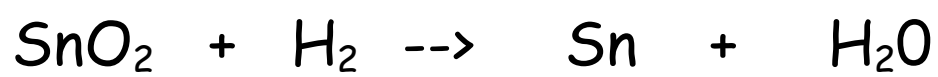
A  $\xrightarrow{\Delta}$  or  $\xrightarrow{\text{heat}}$  above the reaction arrow indicates that heat is being supplied to the reaction.

## Balancing Equations

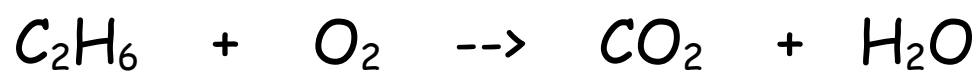
When we balance a chemical equation, there are a few guidelines to help along the way.

 Handout Sheet

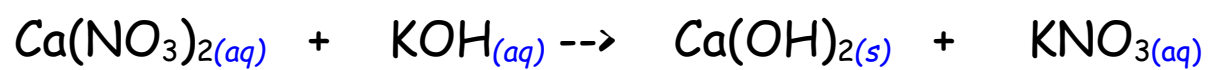
Example 1



Example 2



### Example 3



### Example 4:

Carbon dioxide and water react with sunlight to give glucose (sugar) and oxygen gas.

- Write a skeleton equation for this reaction.
- Balance the reaction.
- What kind of reaction is this?



Try questions #1-12 on page 324-329

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