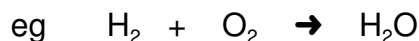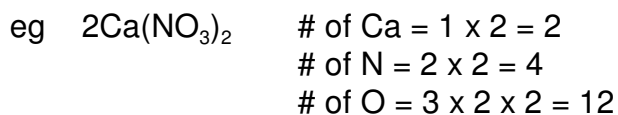# Balanced Chemical Equations

Law of Conservation of Mass: matter cannot be created nor destroyed in a normal
chemical reaction.

In addition, it is not normally possible to change one type of atom into a different type of
atom. What this means is the number of each type of atom in the reactant side of an
equation must equal the number of each type of atom in the product side of an
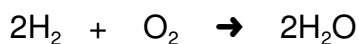equation.

Balancing is best done by trial and error. Good idea to start with the most complex
formula.

Careful placement of "stoichiometric coefficients" is all that is required to balance a
chemical equation. (Stoichiometric coefficients come before chemical formula)
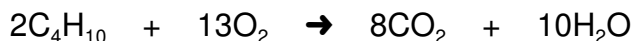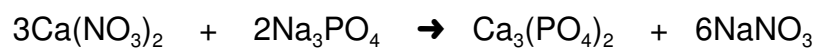
> eg $2Ca(NO_3)_2$ # of Ca = 1 x 2 = 2
> # of N = 2 x 2 = 4
> # of O = 3 x 2 x 2 = 12

eg H_2 + O_2 ➜ H_2O

as is, the following inventory applies:

	Reactants	Products
H	2	2
O	2	1 ∴ not balanced

$2H_2$ + O_2 ➜ $2H_2O$

	Reactants	Products
H	4	4
O	2	2

$2C_4H_{10}$ + $13O_2$ ➜ $8CO_2$ + $10H_2O$

$3Ca(NO_3)_2 \;+\; 2Na_3PO_4 \;\rightarrow\; Ca_3(PO_4)_2 \;+\; 6NaNO_3$

	Reactants	Products
Ca	3	3
N	6	6
O	26	26
Na	6	6
P	2	2

Your final balanced chemical equation must be in lowest terms. Check to see if you can reduce your answer:

eg $4PbO \;+\; 2O_2 \;\rightarrow\; 4PbO_2$

can be reduced to

$2PbO \;+\; O_2 \;\rightarrow\; 2PbO_2$