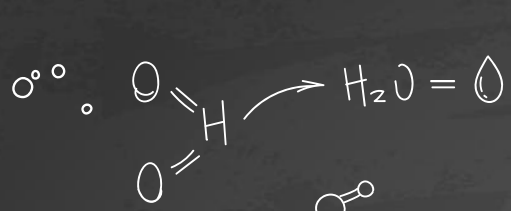
Chemistry - 101

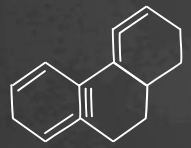
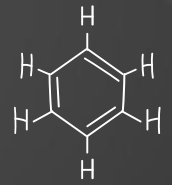
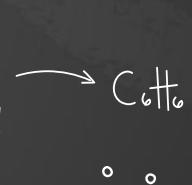
January 17

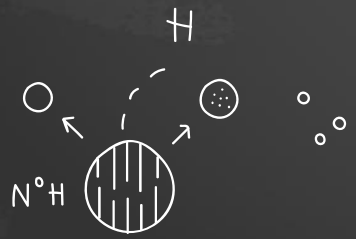


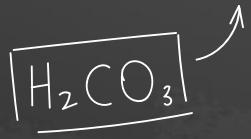




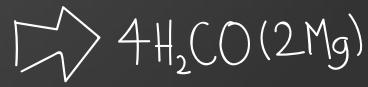










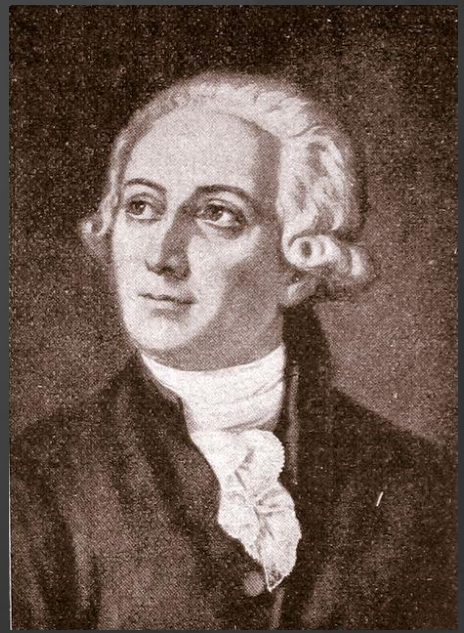
Chemical reactions

In chemical reactions substances with certain compositions and properties turn into different substances with different compositions and properties BUT the nuclei of atoms DO NOT change.

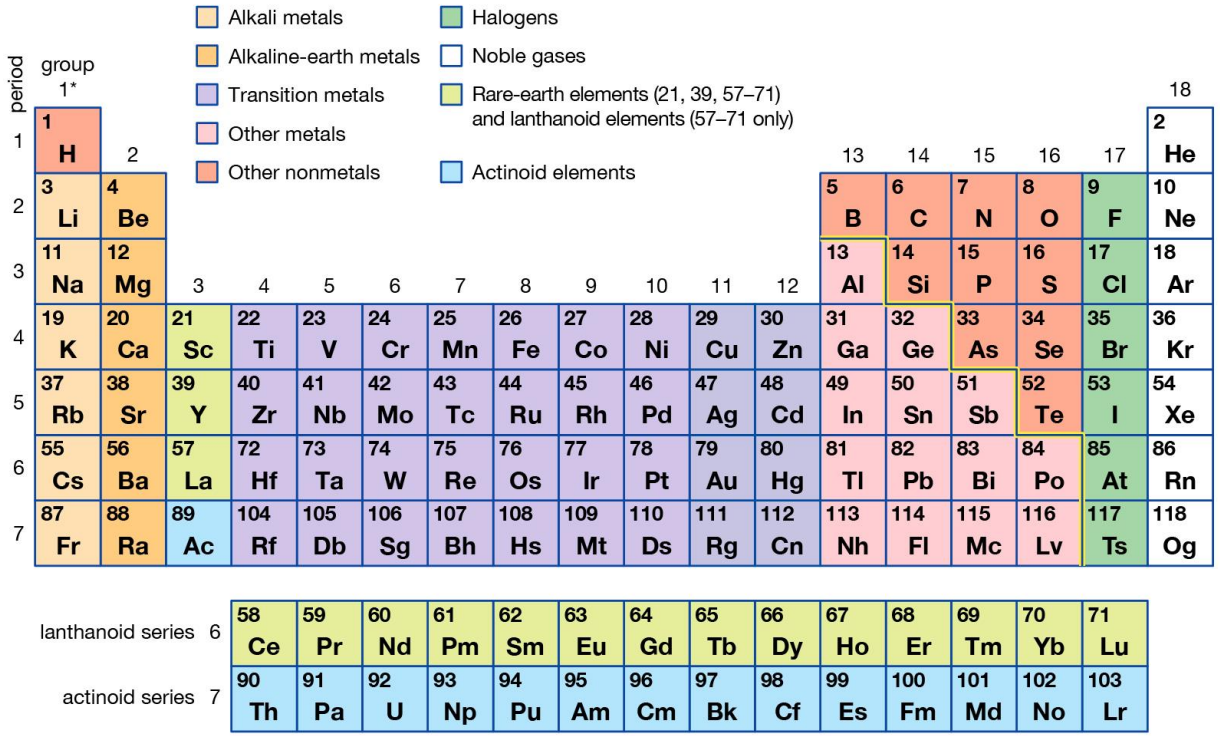
LOMONOSOV - LAVOISIER LAW

- The **Law** of **Conservation** of **Mass/Matter** (also known as the **Lomonosov**-Lavoisier **Law**) states that **mass** in a closed system will remain the same. Hence, **matter** cannot be created nor destroyed but can be rearranged.

- Mass of the reactants (substances that react) is equal to the mass of reaction products (substances that form in the reaction)



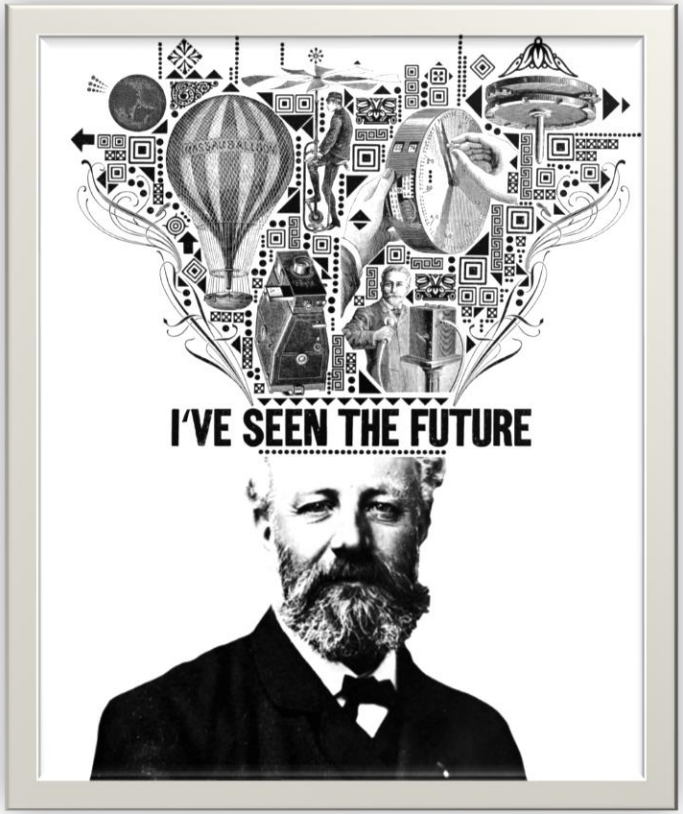
Periodic table of the elements



*Numbering system adopted by the International Union of Pure and Applied Chemistry (IUPAC).

$$KI + Pb(NO_3)_2 \rightarrow KNO_3 + PbI_2$$

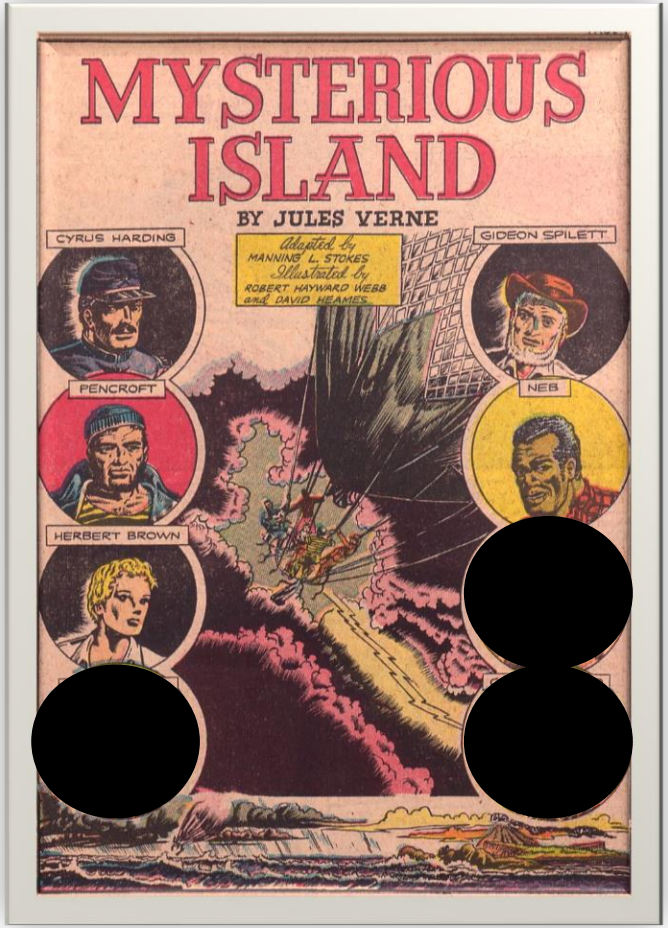
Jules Verne (1828 – 1905)



Silhouette de Jules Verne dessinée, peu de temps avant

1898, 70 years old, more volumes of *Extraordinary Voyages* are still to come

The Mysterious Island 1874

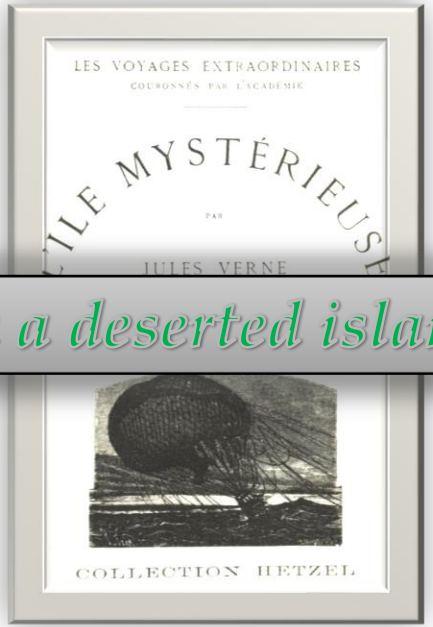


Some achievements of the castaways

- Fire
- Building materials
- Pottery
- Glass
- Sulfuric acid
- Nitric acid
- Soap
- Explosives

Some terms the reader needs to know:

Pyrites, coal, flint, sulphuret of iron, sulphate of iron, sulphate of alumina, azote of potash, salt of niter, saltpeter, carbonate of lime, quick lime, glycerine, slacking, calcination, decant, evaporated, crystallization…



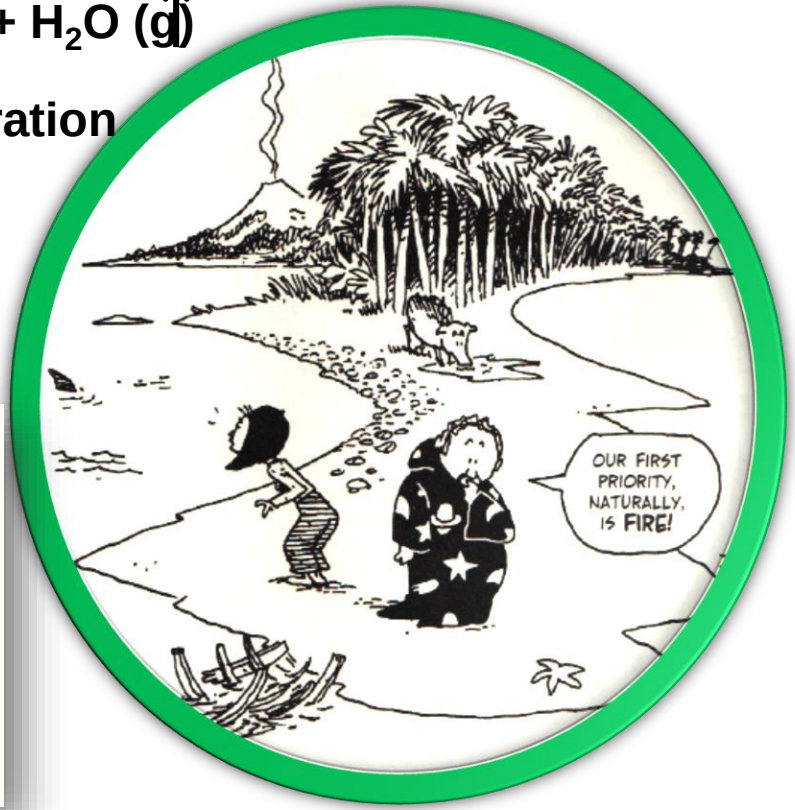
On a deserted island…

Combustion

Our priority naturally is Fire!

$$CH_2O(s) + O_2(g) \xrightarrow{\Delta} CO_2(g)\uparrow + H_2O\,(g)\uparrow$$

Water evaporation



Let's make a better fuel – charcoal

Limit access of oxygen – burn in a pit using wood and coconut shells

$$CH_2O(s) \xrightarrow{\Delta} C(s) + H_2O\,(g)\uparrow$$

Let's use charcoal to make our dinner

Build a stove and fuel it with charcoal

$$C(s) + O_2(g) \rightarrow CO_2(g)\uparrow$$

This class uses the materials from the following books:
Larry Gonick and Graig Criddle “The cartoon guide to chemistry”
Manyuilov and Rodionov “Chemistry for children and adults”
Kuzmenko, Eremin, Popkov “Beginnings of chemistry”
http://school-collection.edu.ru (experiments)