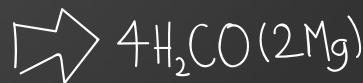
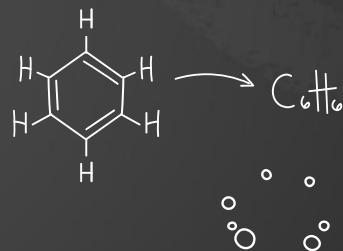
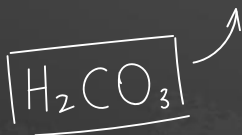
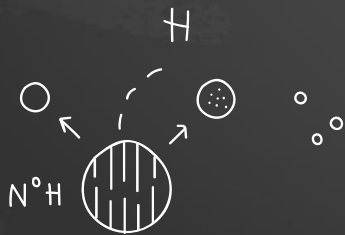
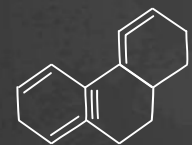




# Chemistry - 101

January 17



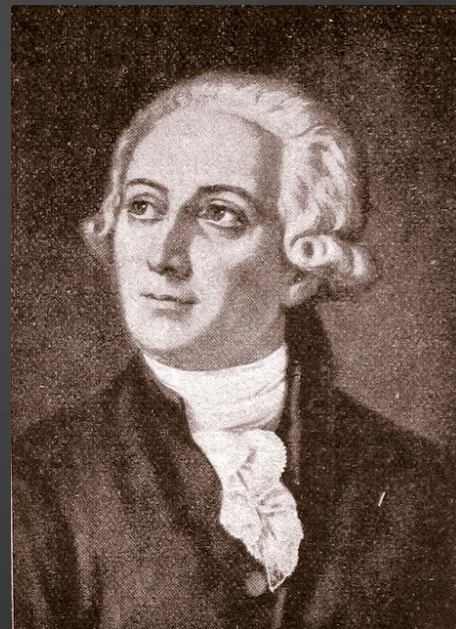
# Chemical reactions

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

Alkali metals

Alkaline-earth metals

Transition metals

Other metals

Other nonmetals

Halogens

Noble gases

Rare-earth elements (21, 39, 57–71) and lanthanoid elements (57–71 only)

Actinoid elements

group

1\*

2

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

period

1

2

3

4

5

6

7

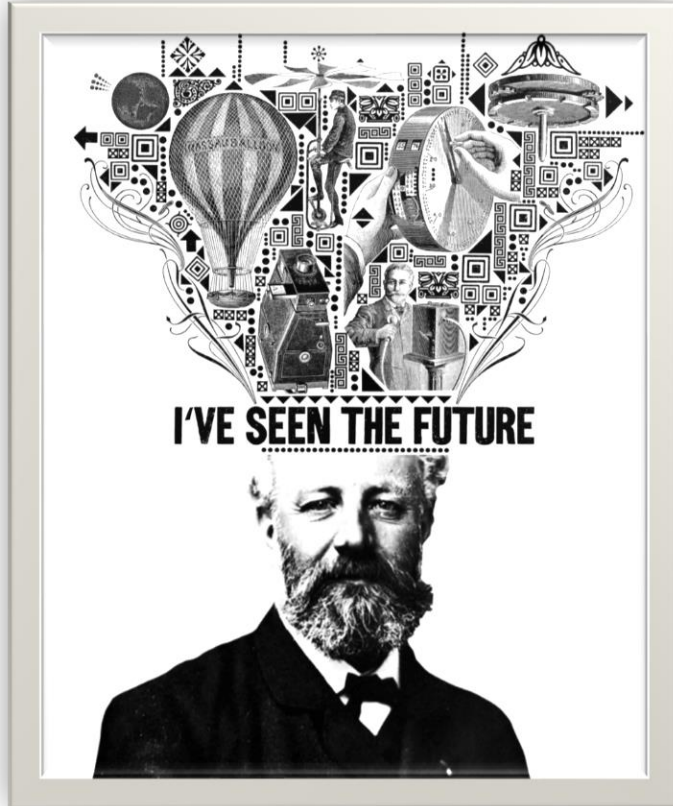
1	H	2																2
3	Li	Be											5	6	7	8	9	10
11	Na	Mg											13	14	15	16	17	18
19	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
37	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
55	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
87	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
lanthanoid series	58	59	60	61	62	63	64	65	66	67	68	69	70	71				
	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
actinoid series	90	91	92	93	94	95	96	97	98	99	100	101	102	103				
	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

\*Numbering system adopted by the International Union of Pure and Applied Chemistry (IUPAC). © Encyclopædia Britannica, Inc.

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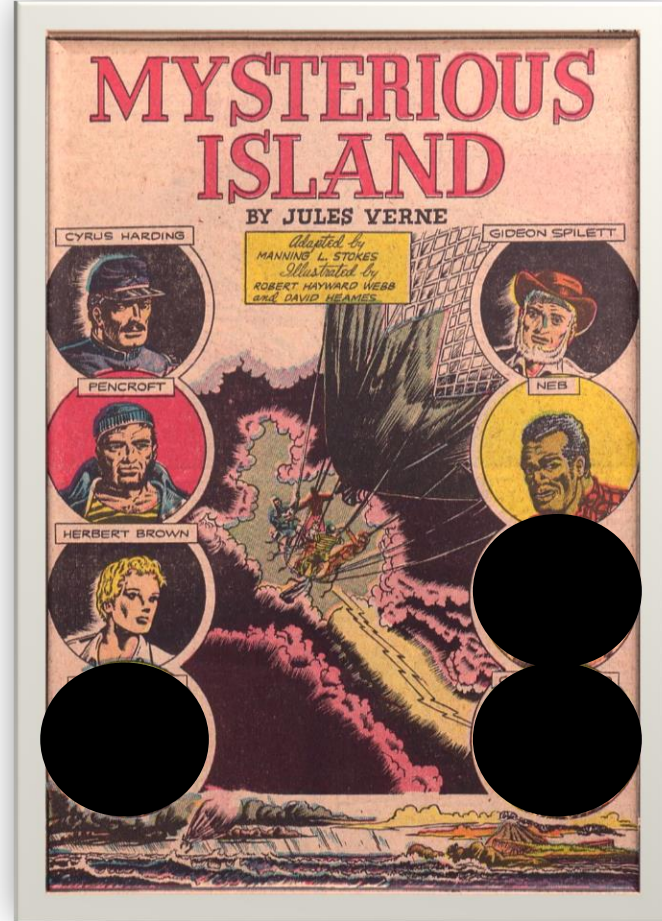
# Jules Verne (1828 – 1905)



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



# The Mysterious Island 1874



# Some achievements of the castaways

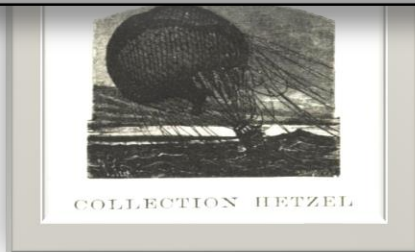
- Fire
- Building materials
- Pottery
- Glass
- Sulfuric acid
- Nitric acid
- Soap
- Explosives

*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...*



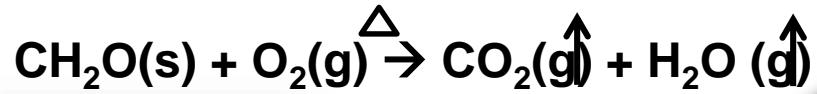
*On a deserted island...*



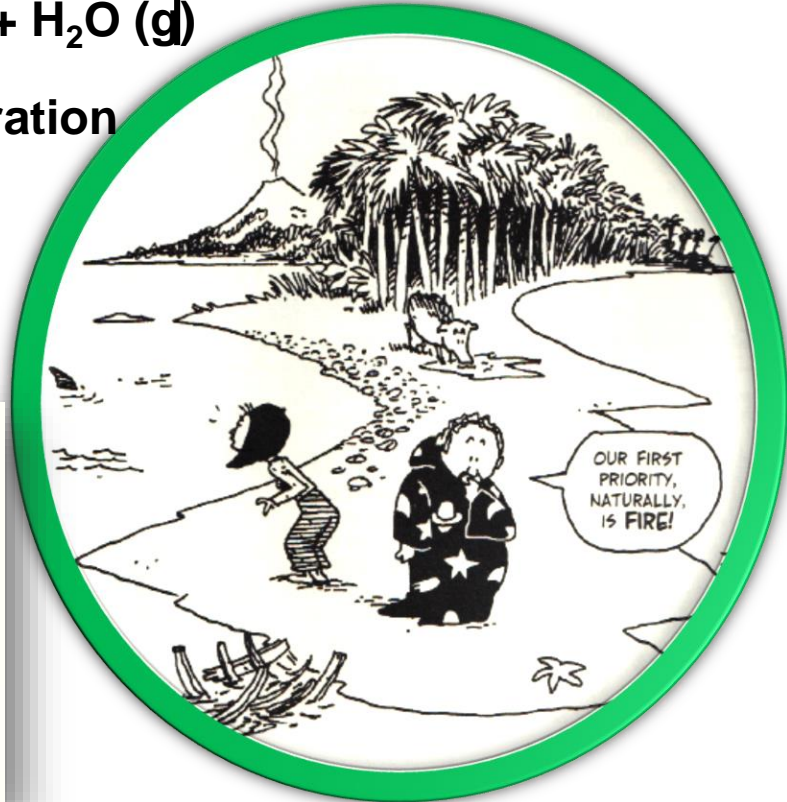


# Combustion

Our priority naturally is Fire!

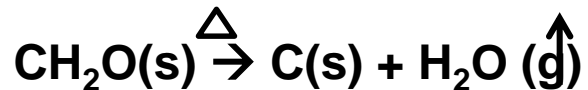


Water evaporation



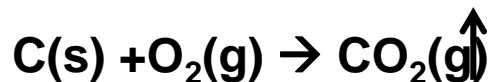
## Let's make a better fuel – charcoal

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



## Let's use charcoal to make our dinner

Build a stove and fuel it with charcoal



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)