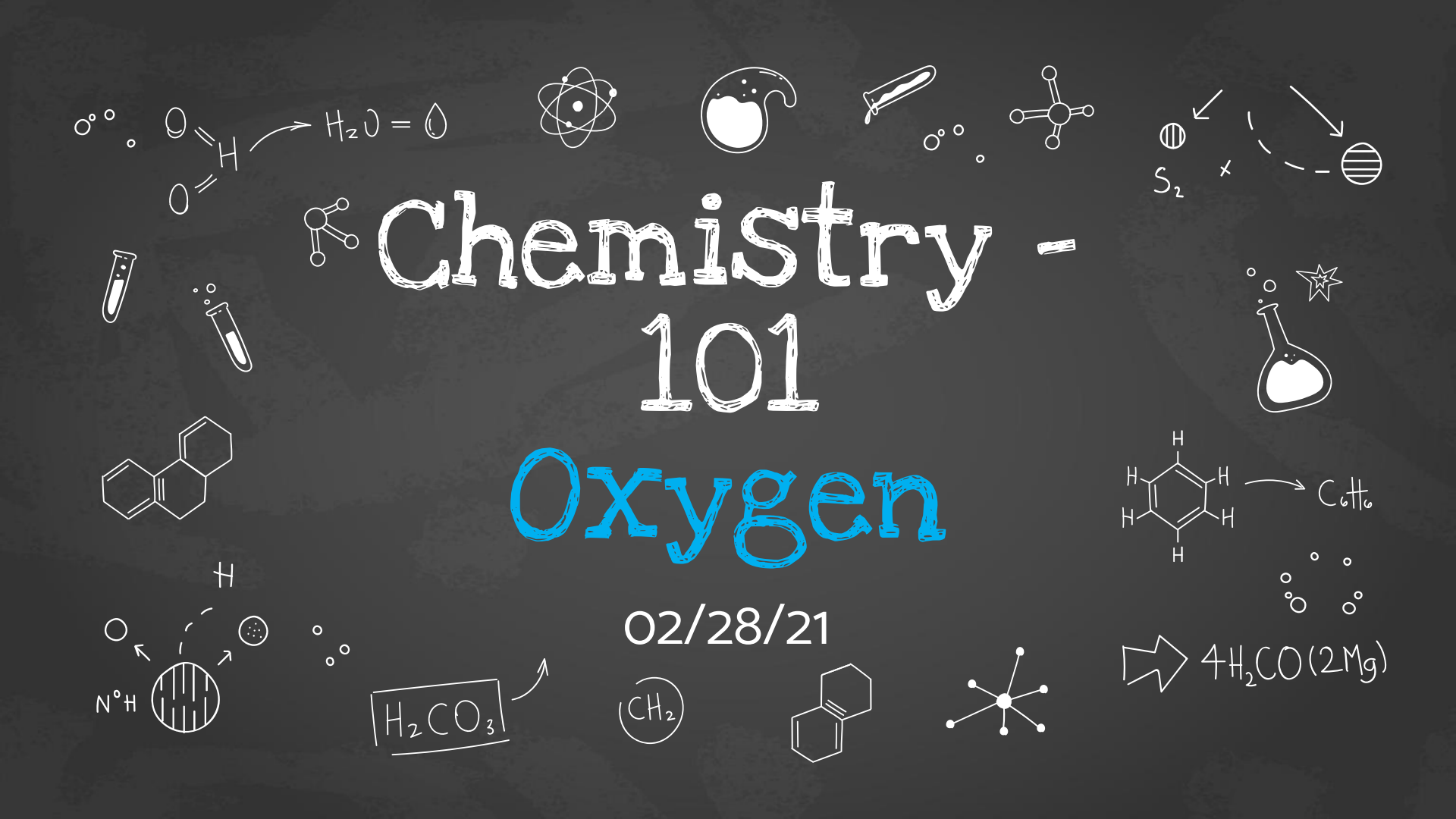
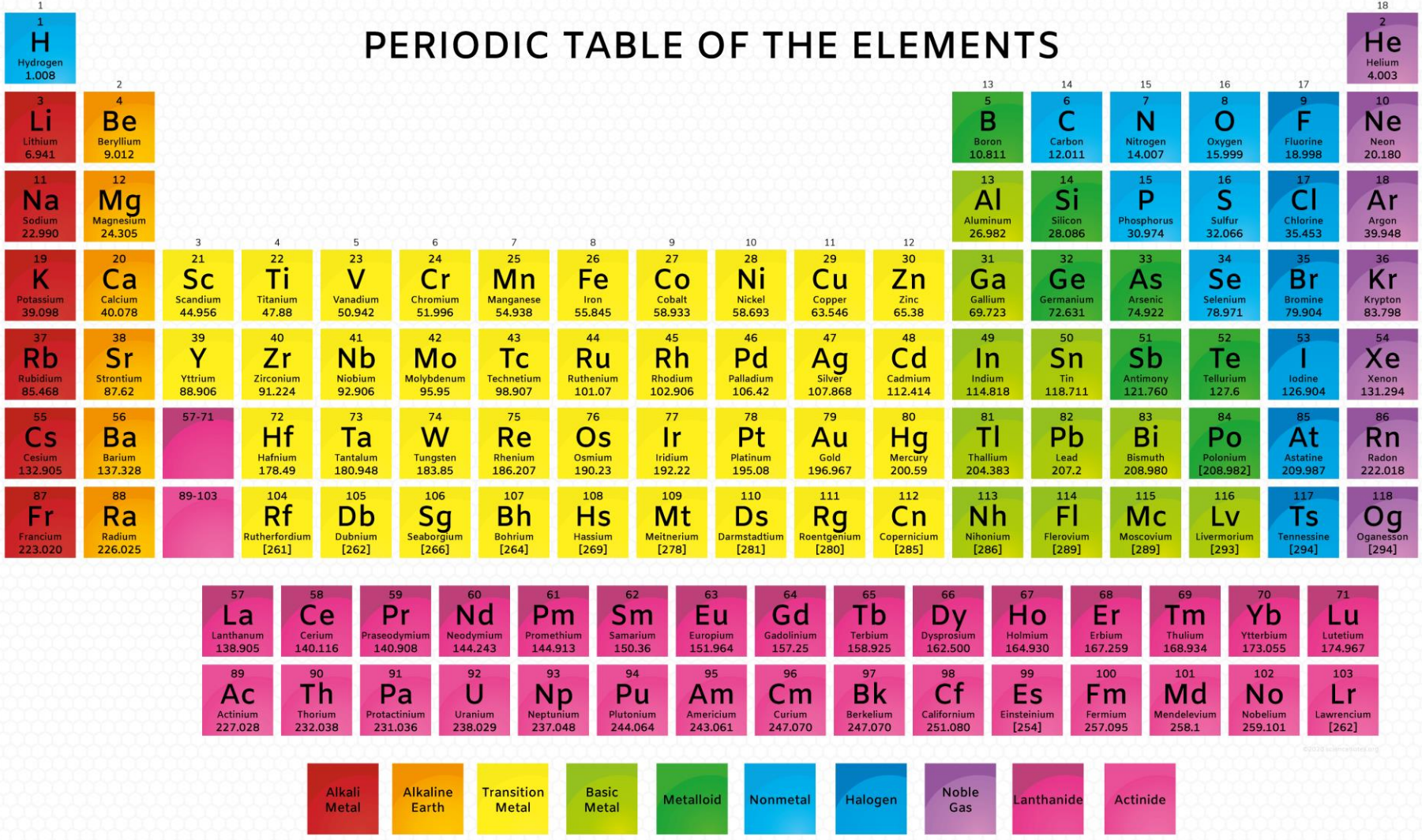

Chemistry - 101
Oxygen
02/28/21

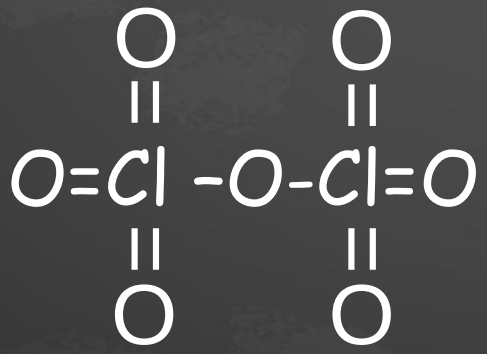
PERIODIC TABLE OF THE ELEMENTS



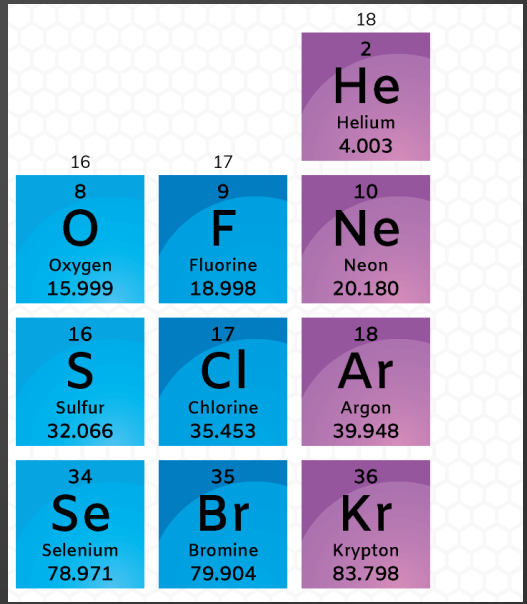
Oxygen properties

$1s^2 2s^2 2p^4$

$S + O_2 \rightarrow O{=}S{=}O\ (SO_2)$

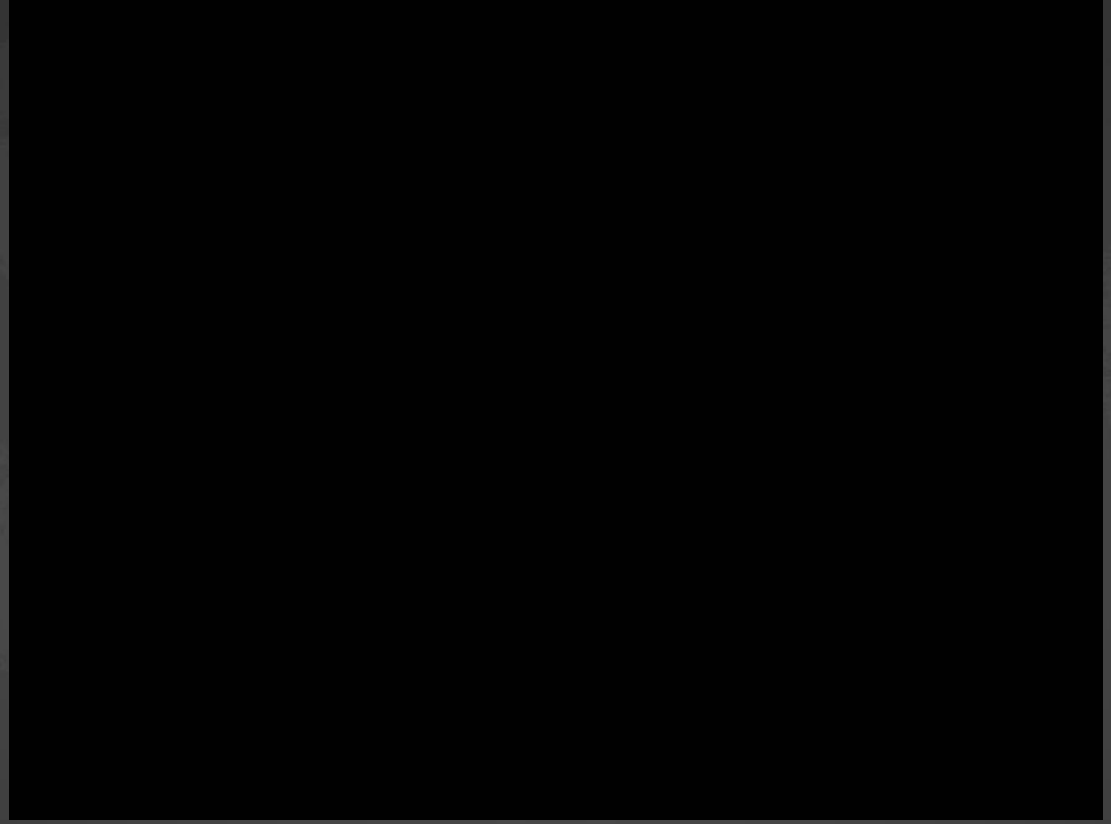


F-O-F



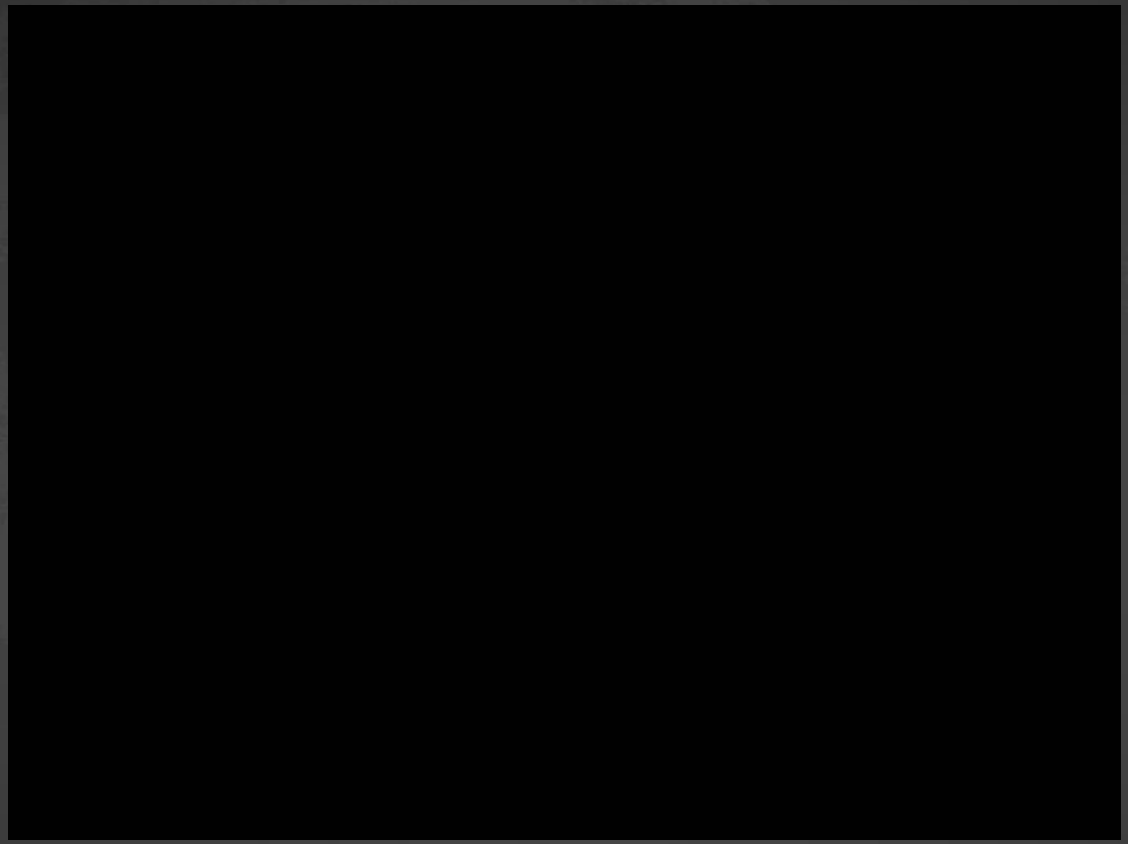
$$S + O_2 = SO_2$$

$$4P + 5O_2 = 2P_2O_5$$



$$C + O_2 = CO_2 \; ; \; Ca(OH)_2 + CO_2 = CaCO_3 + H_2O$$

Burning is a fast oxidation process with the release of heat and usually of light



$3Fe + 2O_2 = Fe_3O_4$ (or $2FeO\ Fe_2O_3$)

Slow oxidation

$$2Cu + O_2 = 2CuO$$

$$4Fe + 3{2O_2} + 2nH_2O = 2\ Fe_2O_3 \cdot n\ H_2O$$

$$O_2 + 2H_2 = 2\ H_2O$$

Compounds of 2 elements with one of them being oxygen are called oxides

There exist oxides of metals and non-metals:

SO_2 - Sulfur oxide (IV)

SO_3 - Sulfur oxide (VI)

Cr_2O_3 - chromium oxide (III)

CrO_3 - chromium oxide (VI)

Oxides' formation

Reactions with oxygen:

$S + O_2 \rightarrow SO_2$

$2Mg + O_2 \rightarrow 2MgO$

$C + O_2 \rightarrow CO_2$

From other compounds:

$2\ H_3BO_3 \rightarrow B_2O_3 + 3H_2O$ (upon heating)

$2SO_2 + O_2 \rightarrow 2\ SO_3$ (with a catalyst)

$CaCO_3 \rightarrow CaO +$ (upon heating)

$2CO + O_2 \rightarrow 2CO_2$

$2H_2S + O_2 \rightarrow 2\ SO_2 + H_2O$

Oxides' reactions

$$Fe_3O_4 + CO \rightarrow 3FeO + CO_2$$
$$FeO + CO \rightarrow Fe + CO_2$$

$$SO_3 + H_2O \rightarrow H_2SO_4$$
$$CaO + H_2O \rightarrow Ca(OH)_2$$

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)