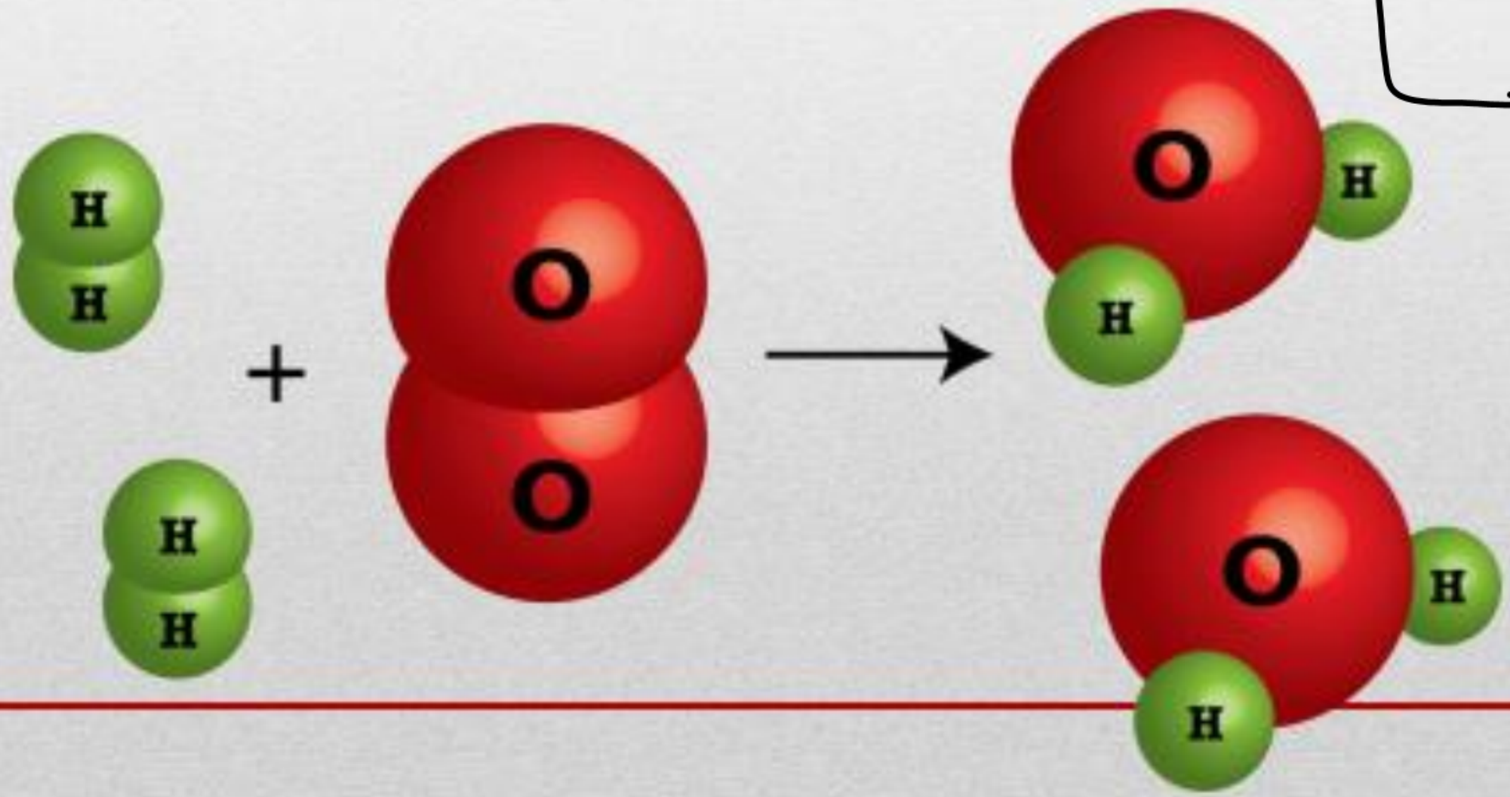
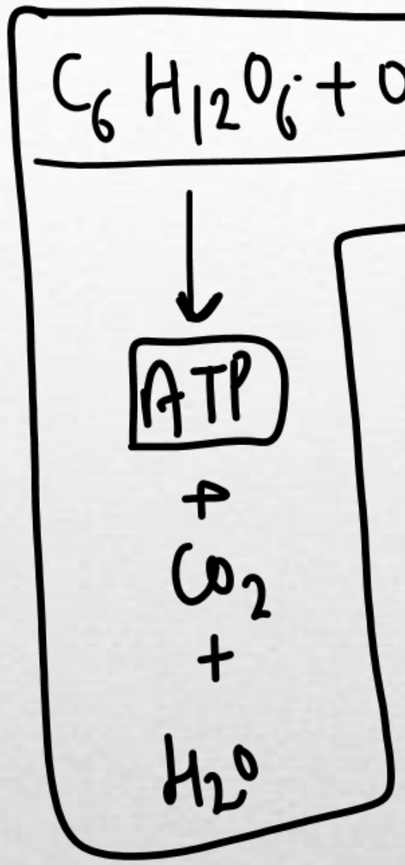
Chemical Reactions and Equations

रासायनिक अभिक्रिया
व
रासायनिक
समीकरण

NCERT : Class 10th , chapter 1





Chemical Equations

समीकरण

समीकरण

रासायनिक अभिक्रिया

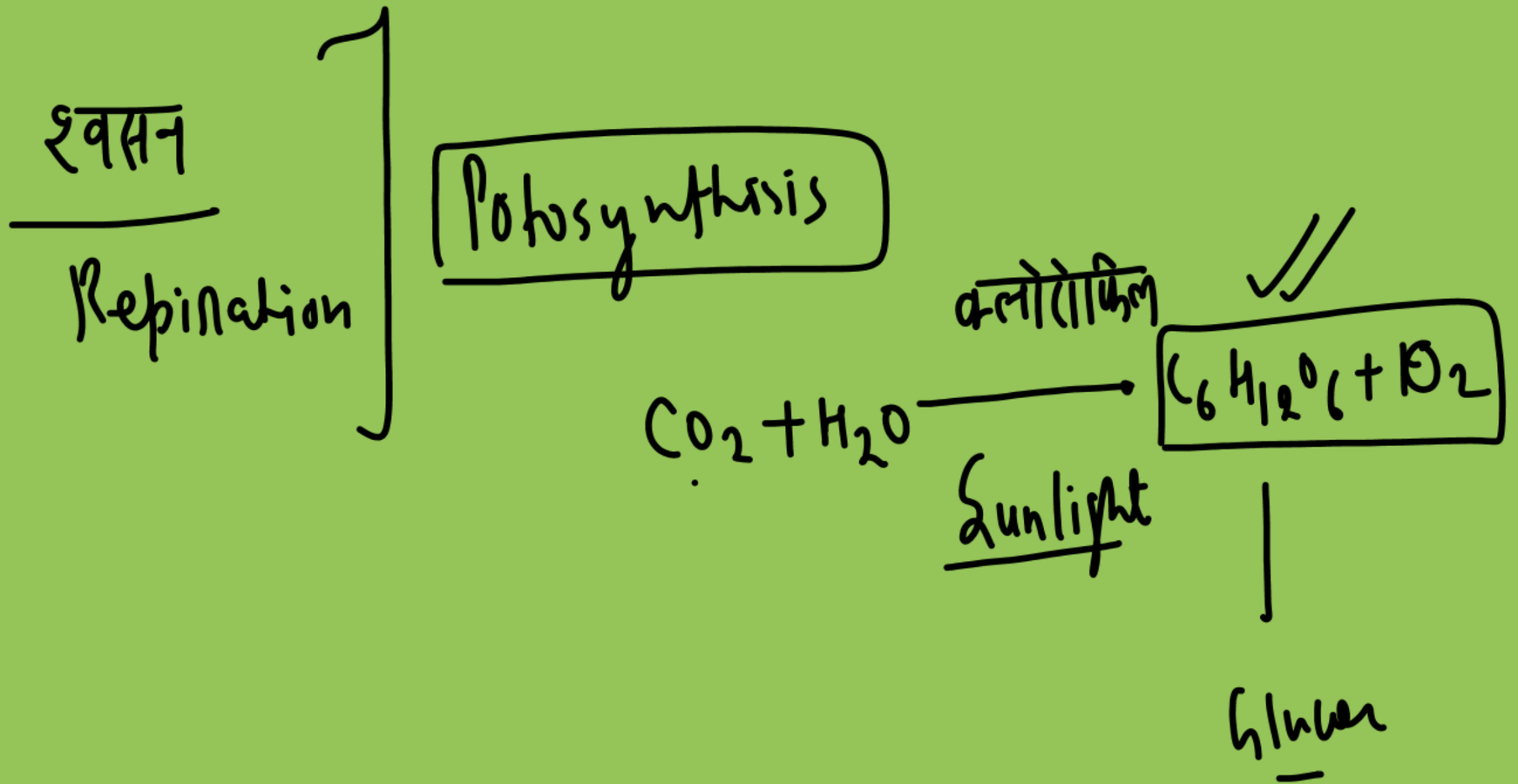
- Chemical equation represent a chemical reaction
- Chemical reaction involve the breaking and making a bonds between atom and produce new substances.
- Example- when a magnesium ribbon in burnt in oxygen it gets converted into magnesium oxide

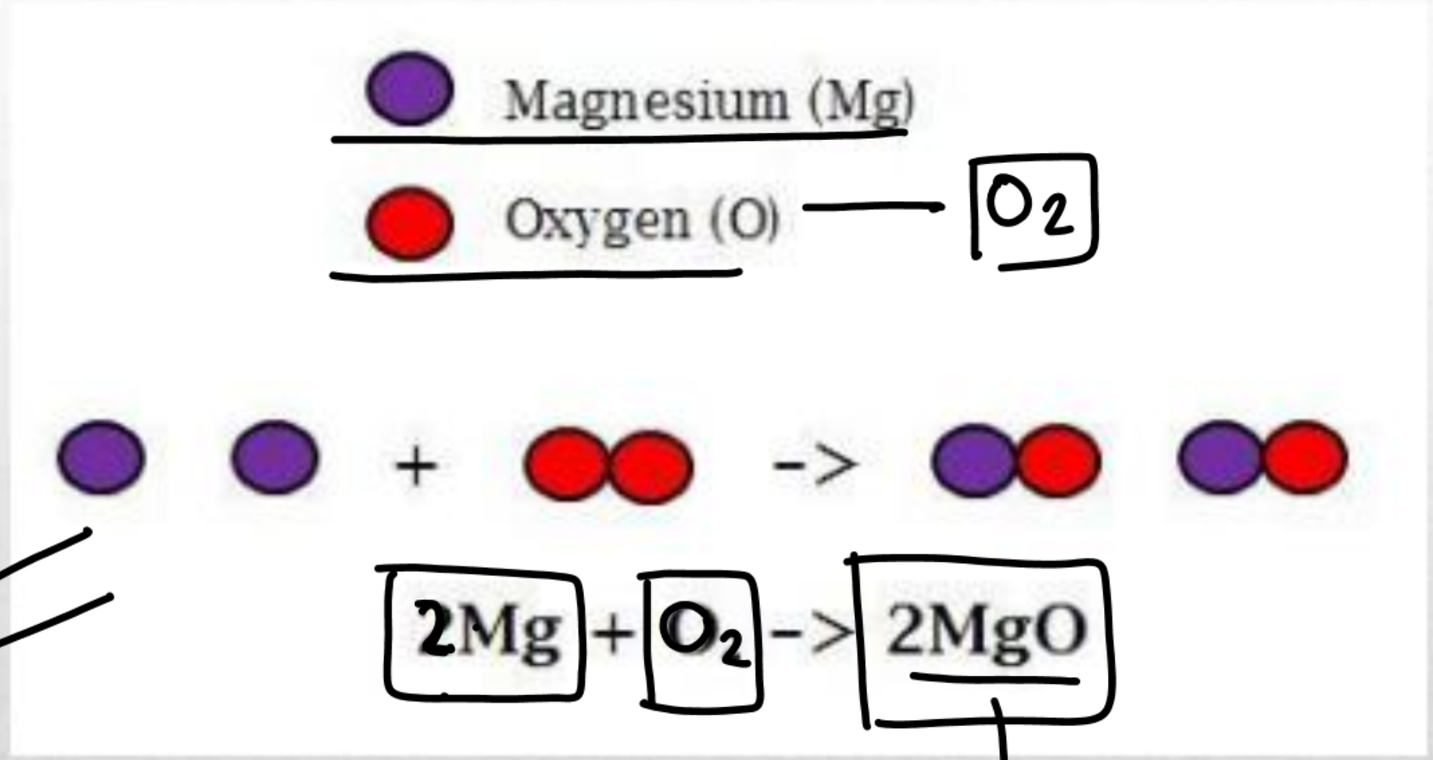
बंध

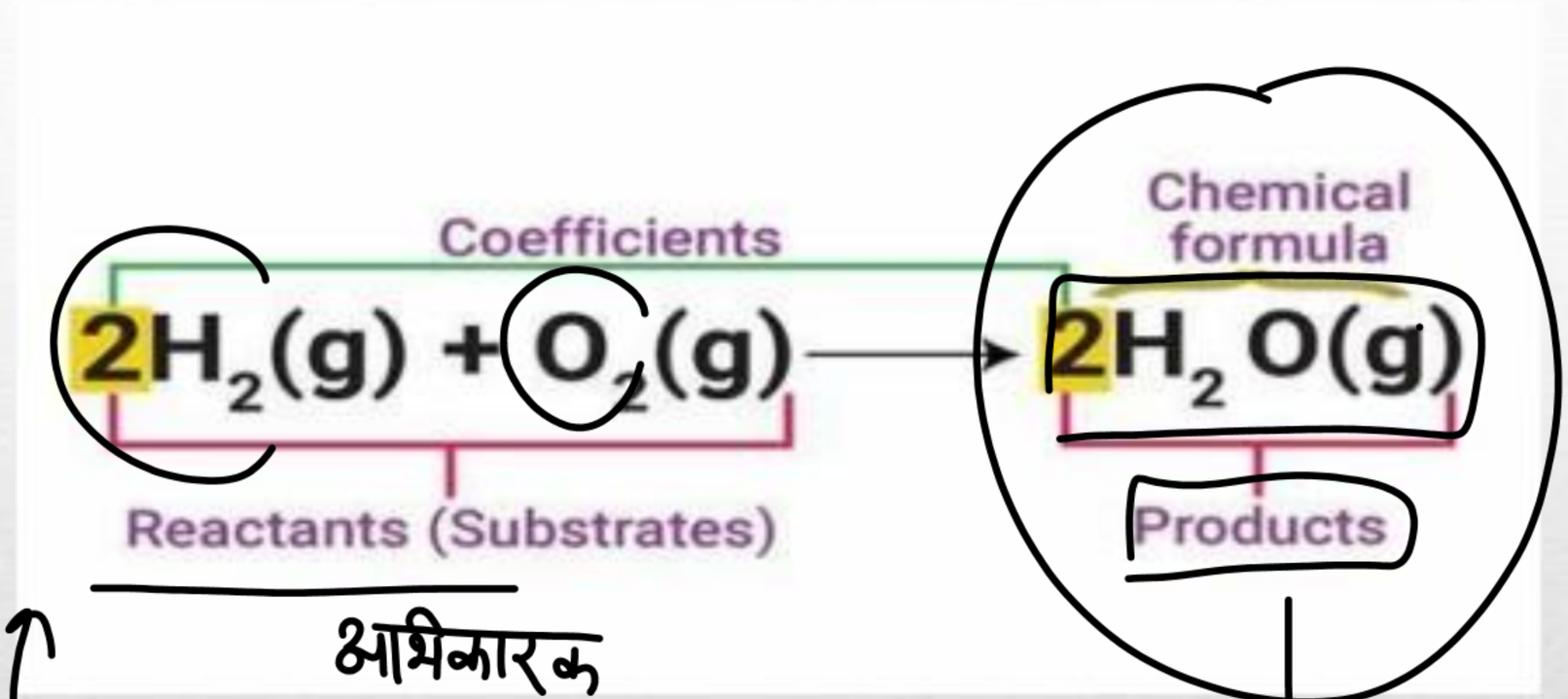
तोड़ना

जोड़ना

नए पदार्थ


श्वसन
Respiration
Photosynthesis
क्लोरोफिल
$CO_2 + H_2O$
$C_6H_{12}O_6 + O_2$
Sunlight
Glucose


Magnesium (Mg)
Oxygen (O)
O2
+
->
2Mg + O2 -> 2MgO
मैग्नीशियम आक्साइड


Coefficients
$2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$
Chemical formula
Reactants (Substrates)
Products
अभिकारक
अभिक्रिया के लिए शामिल
Product (उत्पाद)

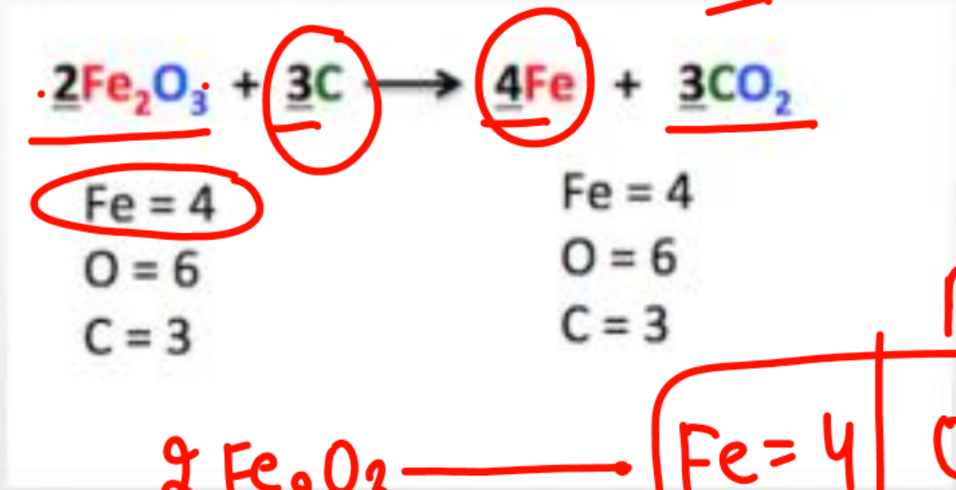
Balanced Chemical Equation

Mass can neither be create nor destroyed in chemical reaction

रासायनिक अभिक्रिया के दौरान, द्रव्यमान न तो उत्पन्न किया जा सकता है और न ही नष्ट किया जा सकता है।

The number of atoms of each atoms remains the same, before and after a chemical reaction . Hence,we need to balance a skeletal chemical equation

रासायनिक अभिक्रिया के प्रारम्भ में तथा अभिक्रिया के बाद की स्थिति में परमाणुओं की संख्या में बदलाव नहीं होगा।



4Fe + 3CO2

Fe=4 | C=3 | O=6 — LHS

RHS

2Fe2O3 — Fe=4 | O=6 | C=3

$$N_2 + 3\,H_2 \rightarrow 2\,NH_3$$

Balancing Chemical Equations #2

1. $2H_2 + O_2 \rightarrow 2H_2O$
2. $S_8 + 12O_2 \rightarrow 8SO_3$
3. $2HgO \rightarrow 2Hg + O_2$
4. $Zn + 2HCl \rightarrow ZnCl_2 + H_2$
5. $2Na + 2H_2O \rightarrow 2NaOH + H_2$

Type of Chemical Reactions → रासायनिक अभिक्रिया के प्रकार

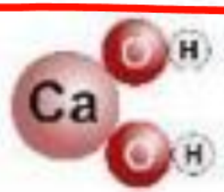
Combination Reaction

"संयोजन"
"जुड़ना"

calcium oxide + water ⟶ calcium hydroxide + HEAT

$CaO + H_2O \longrightarrow Ca(OH)_2$

अभिकारक



Product

$$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$$

कैल्शियम कार्बोनेट

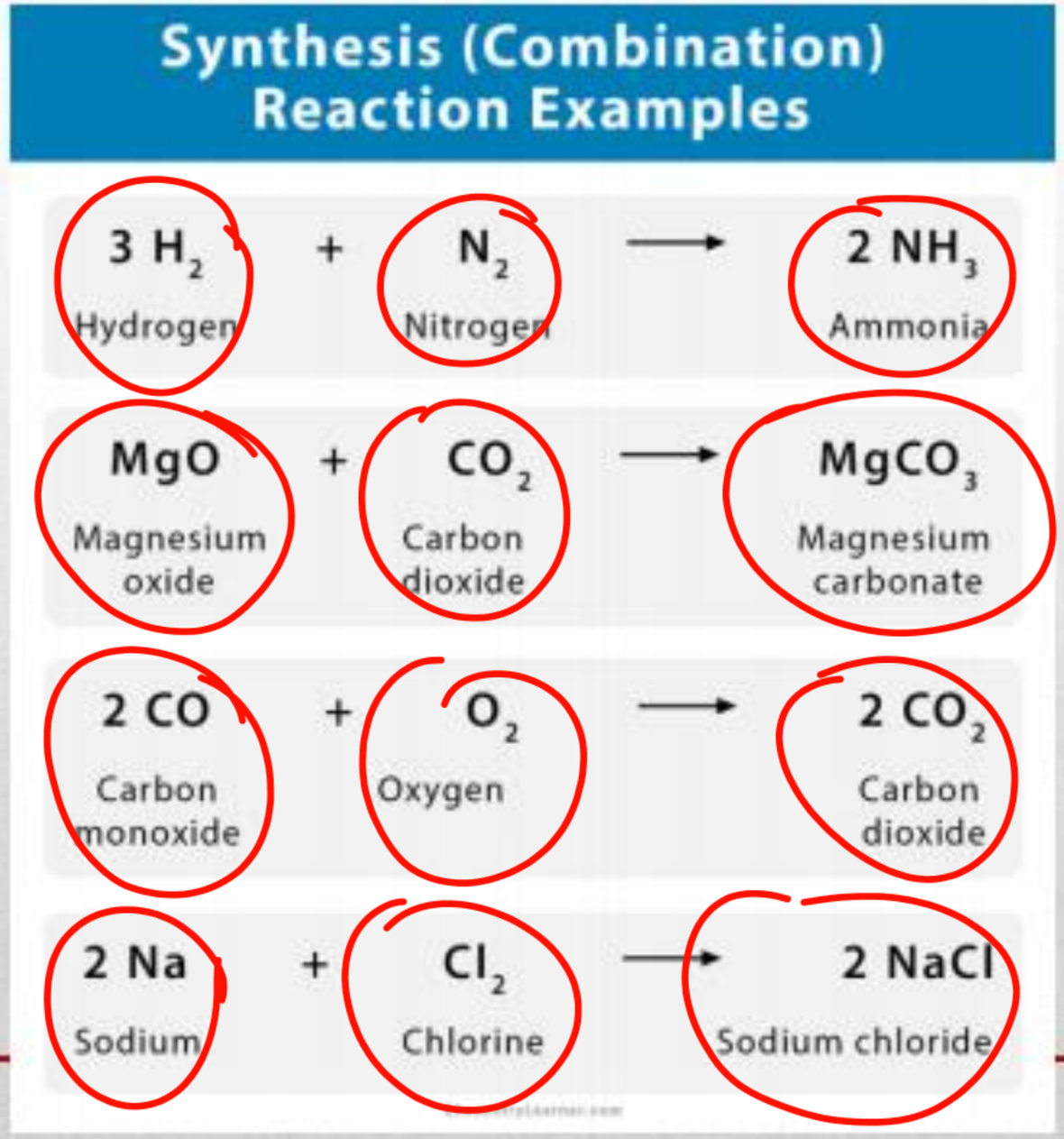
$CaCO_3$

कैल्शीपम कार्बोनेट

संगमरमर/मार्बल

Marble also has the chemical formula calcium carbonate

Synthesis (Combination) Reaction Examples



Exothermic Reaction

ऊष्माक्षेपी अभिक्रिया :-

1. **Reaction in which heat is release along with the formation of product are called exothermic chemical reaction**

जब अभिक्रिया होने के दौरान → उत्पाद के साथ हमे ऊष्मा भी प्राप्त हो तो इस प्रकार की अभिक्रिया के ऊष्माक्षेपी अभिक्रिया कहा जाता है।

Daily Life Examples Of Exothermic Reactions

Since in Exothermic Reactions Heat Energy EXITS the system ,Therefore some examples from daily life are :

1. Combustion

Combustion of Methane - $CH_4 + 2O_2 = CO_2 + 2H_2O\uparrow$

2. Photosynthesis

$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6O_2 + 6H_2O$

3. Formation of Salt

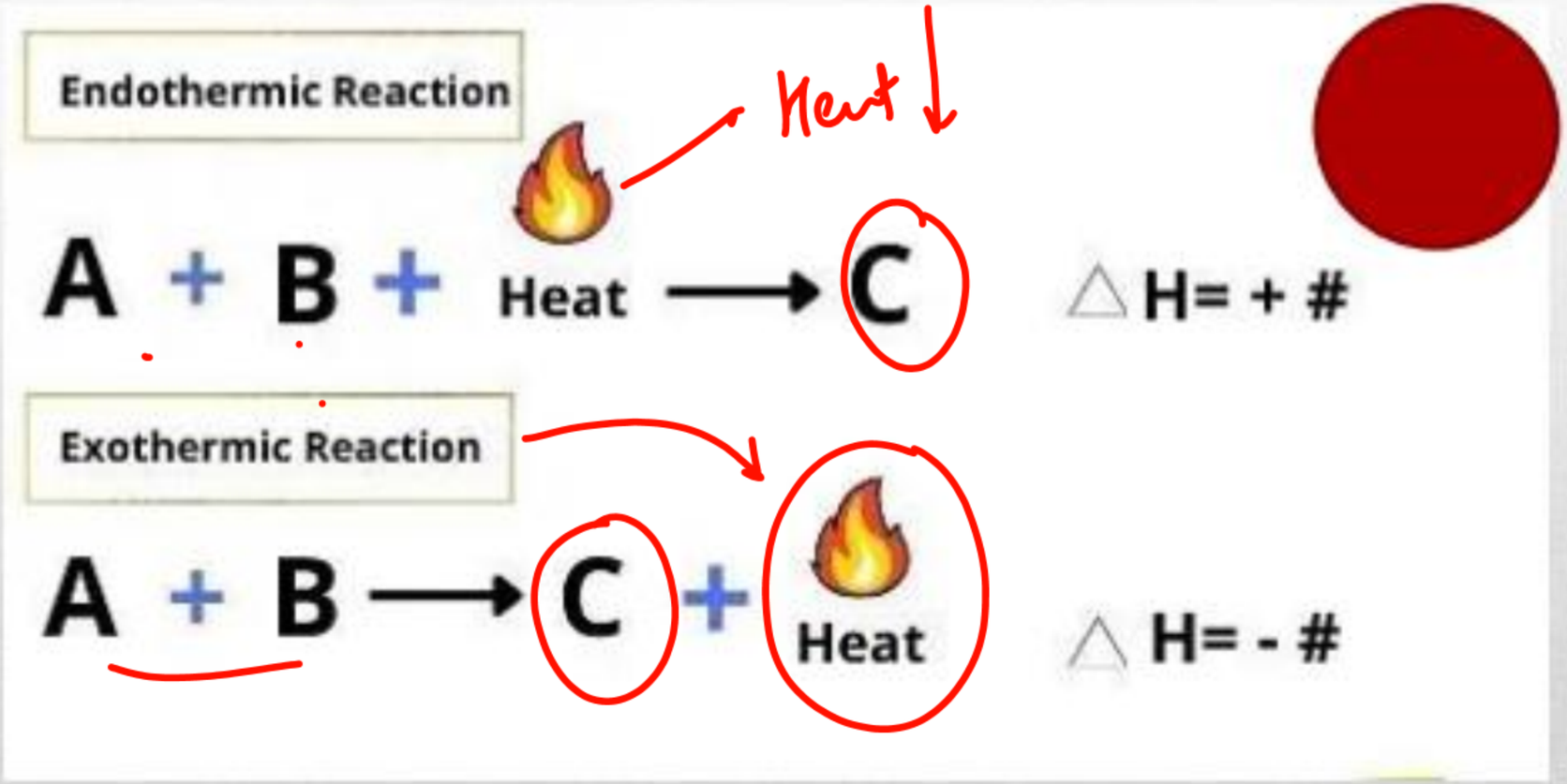
Mixture of sodium metal and chlorine gas which yields table salt.

$2Na(s) + Cl_2(g) \rightarrow 2NaCl(s) + energy\uparrow$

NCERT Book

Exothermic

- Burning of natural gas
- Respiration and photosynthesis
- Decomposition of the vegetable
- Formation of the slaked lime

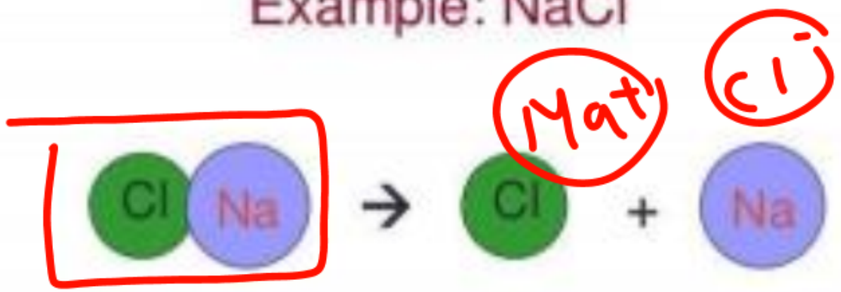

Endothermic Reaction
Heat
A + B + Heat → C
△H= + #
Exothermic Reaction
A + B → C + Heat
△H= - #

Decomposition Reaction

"वियोजन अभिक्रिया"

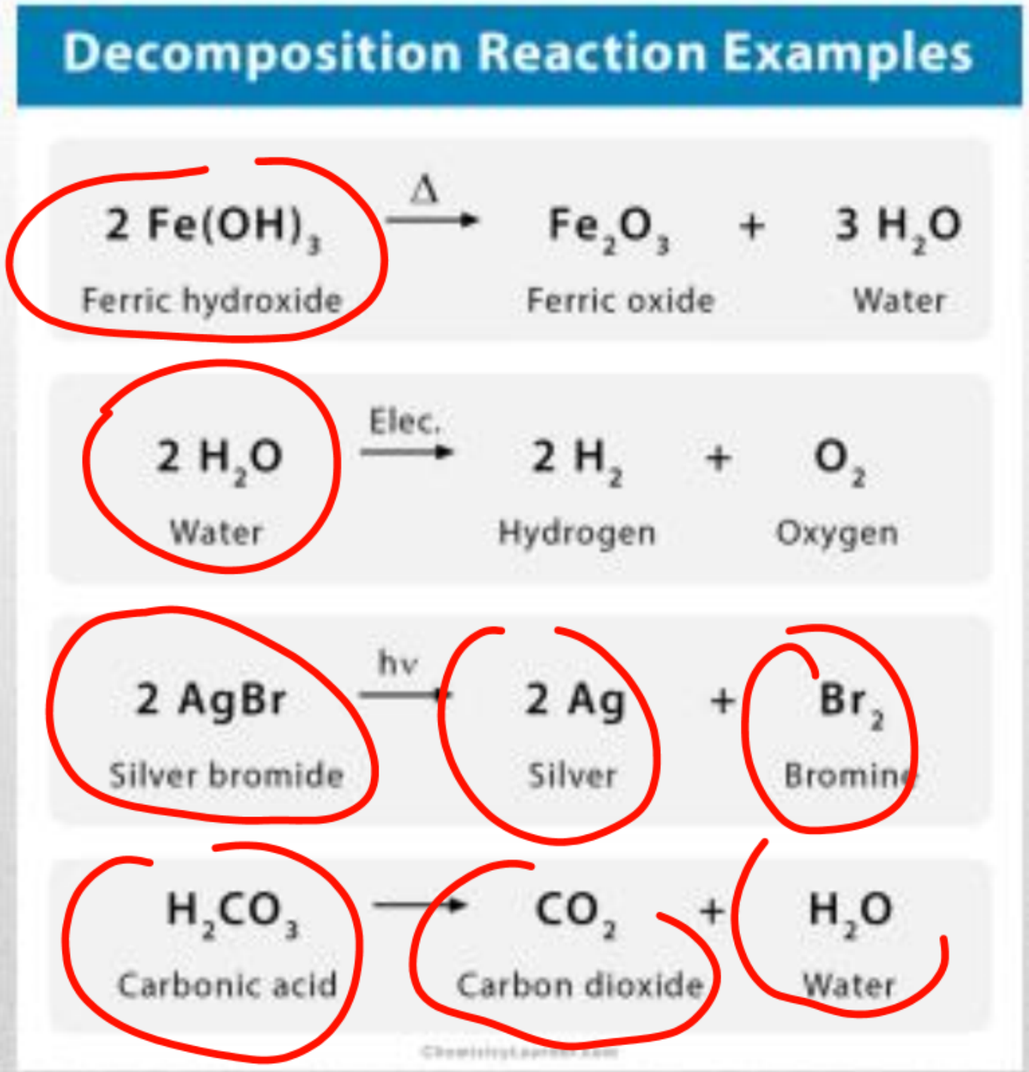
Decomposition

Example: NaCl



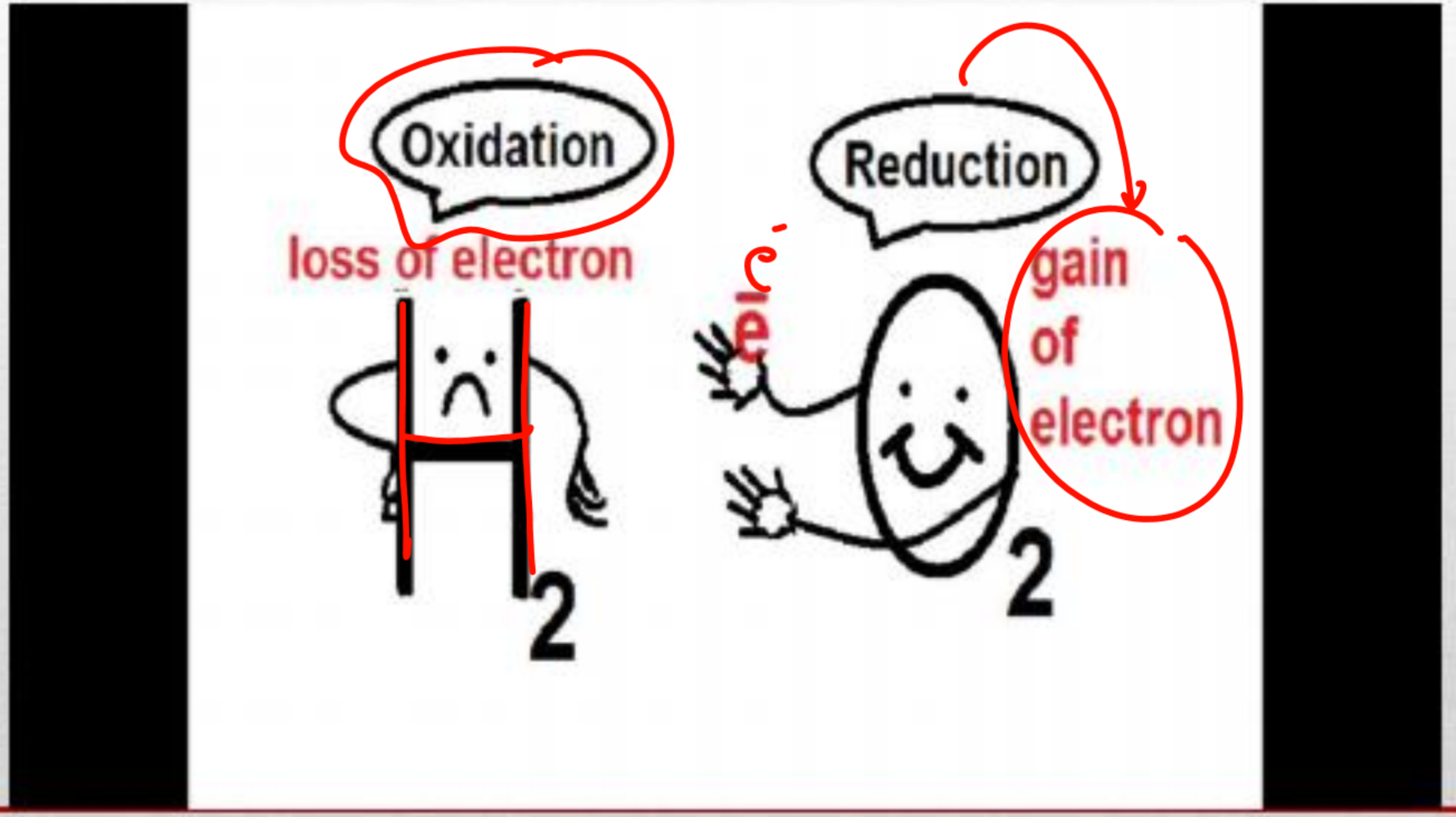
General: AB → A + B

Decomposition Reaction Examples



Oxidation and Reduction

आक्सीकरण व अपचयन



Oxidation–Reduction Reactions

Involves 2 processes:

Oxidation = Loss of electrons

$Na \longrightarrow Na^+ + e^-$ Oxidation Half-Reaction

Reduction = Gain of electrons

$Cl_2 + 2e^- \longrightarrow 2Cl^-$ Reduction Half-Reaction

Net reaction:

$2Na + Cl_2 \longrightarrow 2Na^+ + 2Cl^-$

- Oxidation and reduction always occur together
- Can't have one without the other

Repination

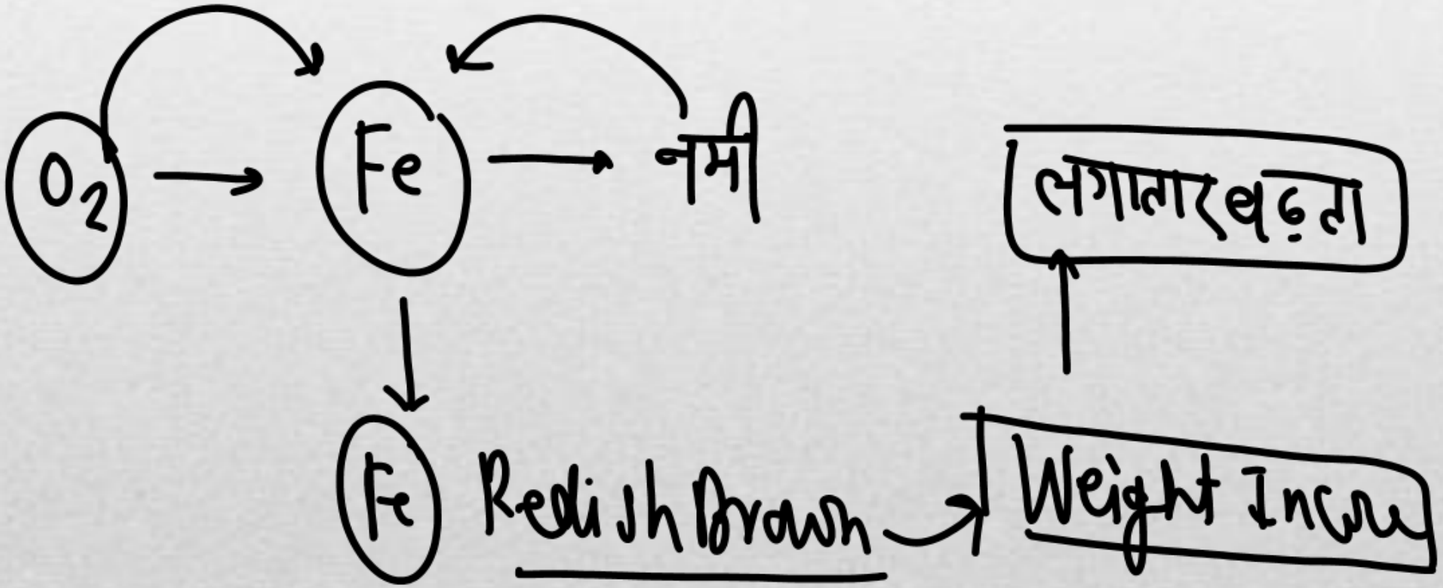
दहन

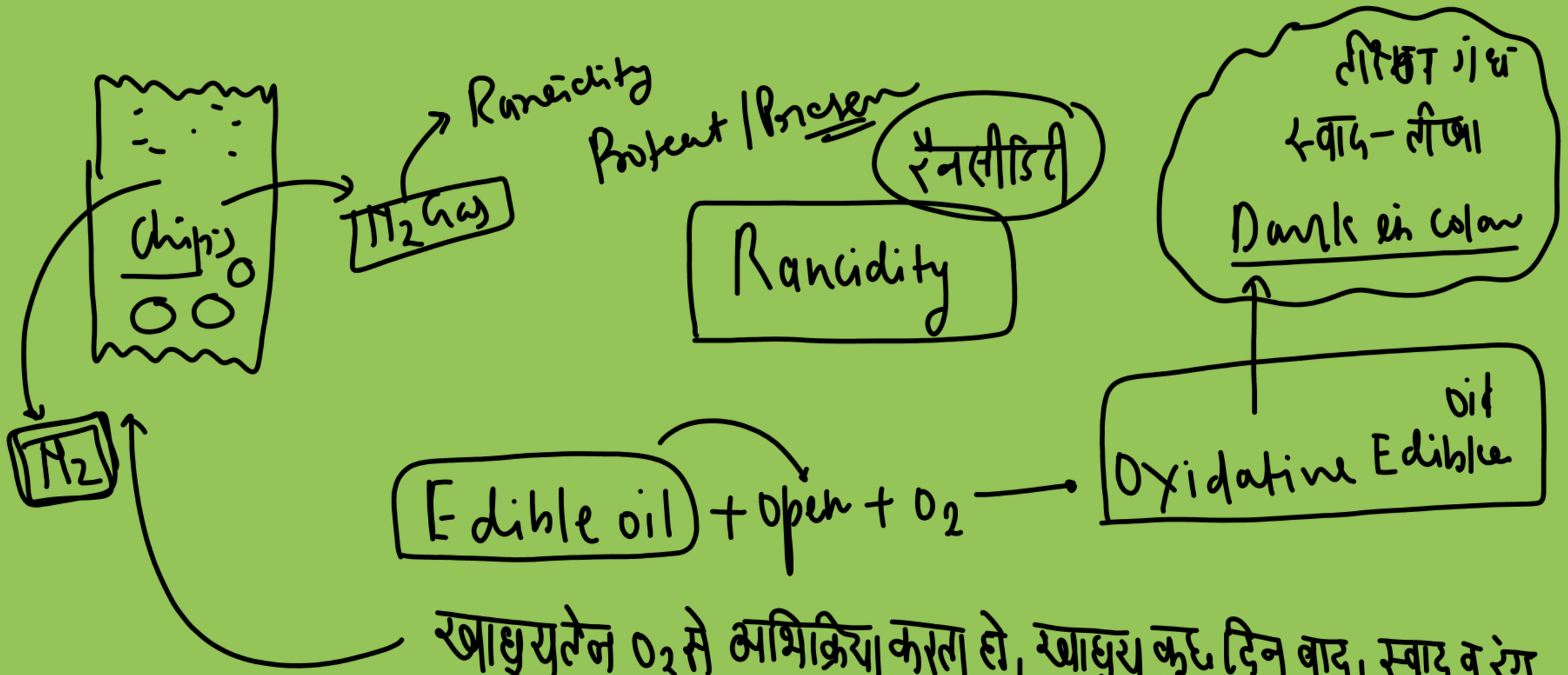
↓

Oxidation

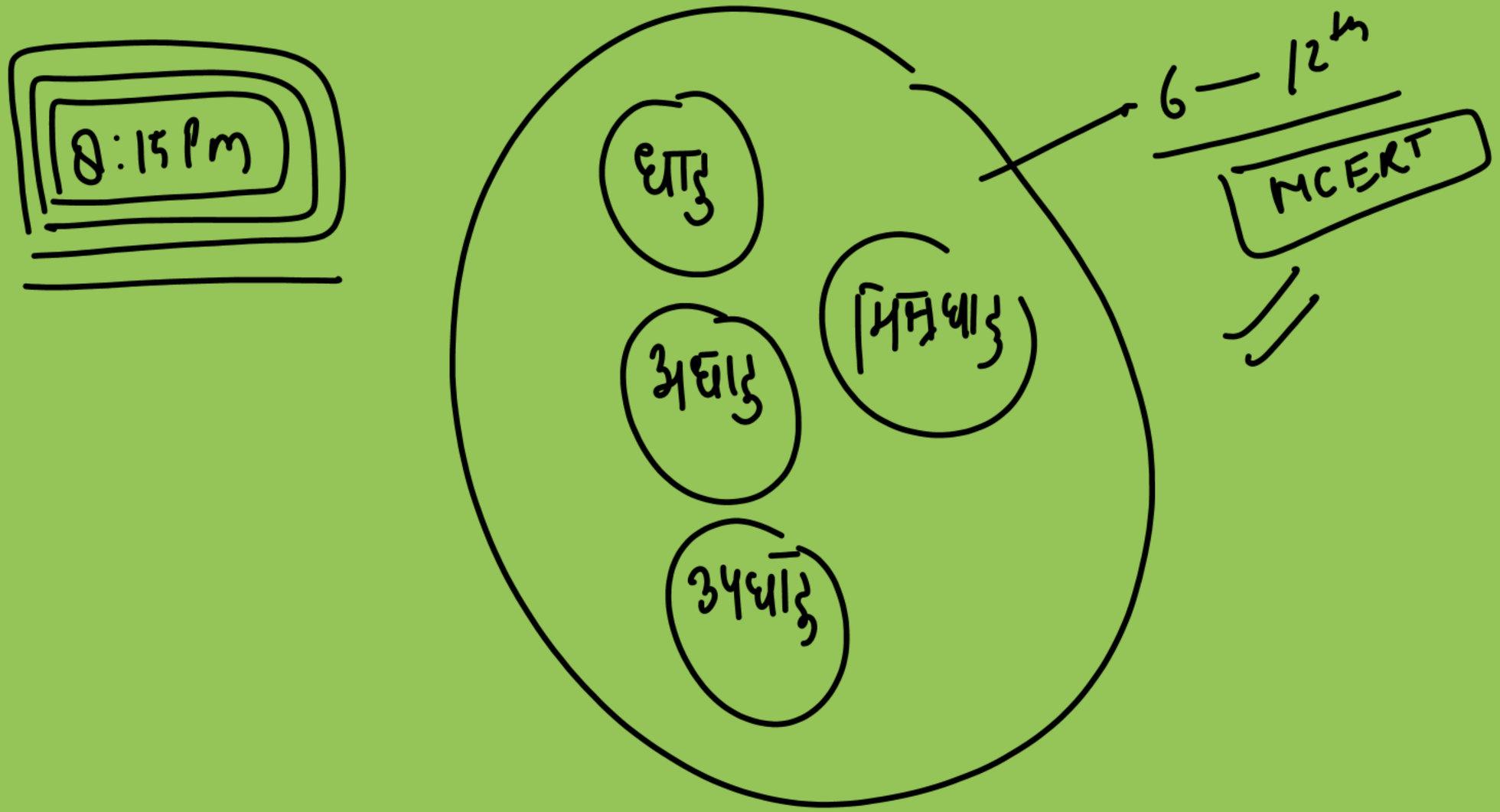
Oxidation and Reduction : Daily Life

Corrosion लगना





खाद्य तेल O_2 से अभिक्रिया करता है, खाद्य कुछ दिन बाद, स्वाद व रंग में खराब हो जाता है यही - Rancidity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धातु
अधातु
उपधातु
मिश्रधातु
6 — 12th
MCERT