

STUDY COURSE MATERIAL

BIOLOGY

SESSION-2020-21

CLASS-X

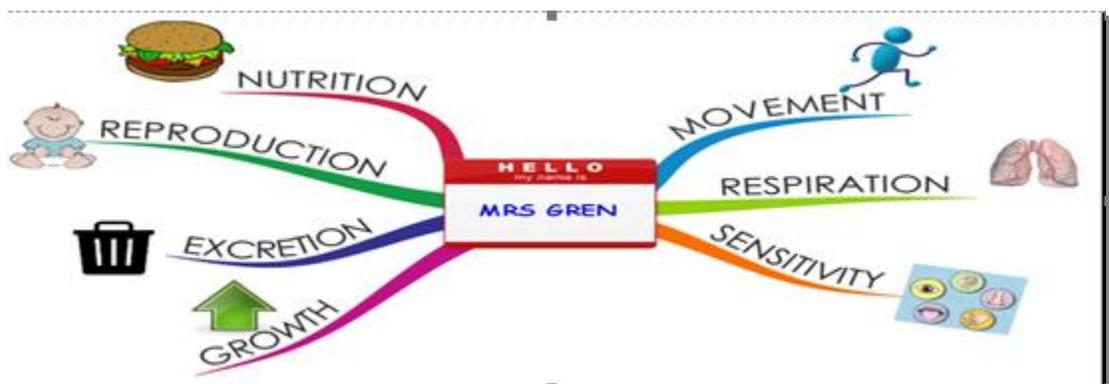
TOPIC: LIFE PROCESS

DAY-1

TEACHING MATERIAL :- Life process - An introduction

- The existence of life on the planet earth is mainly based on certain functions and processes.
- There are certain basic vital processes which are essential for an organism to stay healthy and to maintain the proper functioning of the body organ system, which all are necessary for survival.
- These basic essential activities performed by an organism are called as life processes.
- Life processes include growth , movement ,nutrition, , respiration, transportation and excretion.

Types of life processes



Growth

Growth as defined as a permanent or irreversible increase in dry weight, size mass or volume of a cell, organ, organism. During growth anabolic process exit catabolic process or growth is final and product of successful metabolism.

Movement

Movement is defined as any visible change of position executed either by the whole organism or any part of the body .Some of the movements that result in a change of place or location are called locomotion.

Nutrition

The process of providing or obtaining the food necessary for health and growth.

Respiration

Respiration is defined as the exchange of environmental oxygen with carbon dioxide produced in the cells during oxidation of food.

Transportation

Transportation can be defined as the movement of any substance from one place to another. Water and nutrients required for all metabolic activities should be transported in the body of plants and animals. The waste material or excretory products should also move to the region of excretion.

Excretion

Excretion is a biological process by which an organism get rid of excess or toxic waste products of metabolism.Excretion removes unwanted by-products of metabolism,toxic chemical substances,regulate the ionic concentration of body fluids,regulates water content of body,regulate pH of body fluids.

❖ **NCERT MATERIAL**

<http://ncert.nic.in/ebooks.html>

❖ **VIDEO-LINKS**

LINK-1

<https://youtu.be/VV7-s745Zuc>

LINK-2

<https://youtu.be/hGSNHbDguEO>

❖ DOCUMENTS LINKS

<https://ncerthelp.com/text.php?ques=1076+Life+Processes+Class+10+Notes+Biology+science+Chapter+6+>

<https://examupdates.in/cbse-class-10-science-syllabus/>

❖ OTHER LINKS

<http://epathshala.nic.in/>

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❖ ASSIGNMENTS

Q.1. What criteria do we use to decide whether something is alive?

Q.2. What processes would you consider essential for maintaining life?

❖ MULTIPLE CHOICE QUESTION

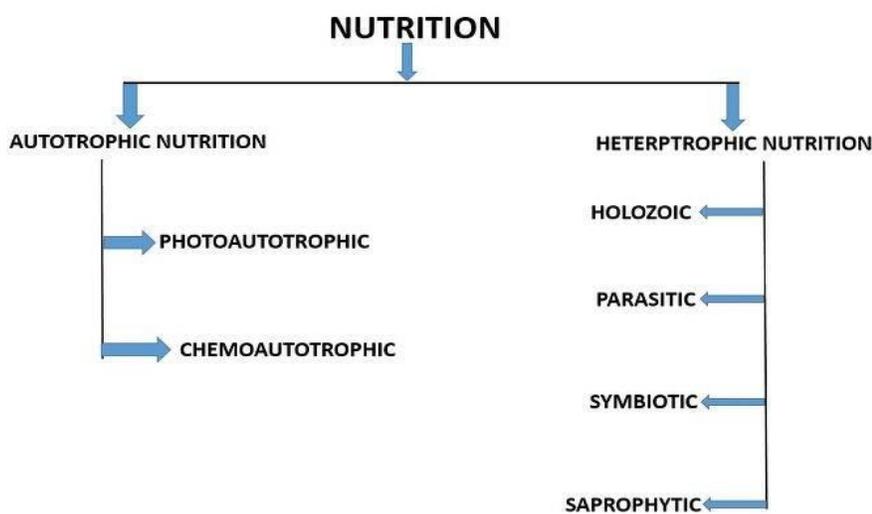
Q.1. Which of the following describes the characteristic of a living being?

- A. Nutrition
- B. Excretion
- C. Respiration
- D. All the above

DAY-2

TEACHING MATERIAL :- NUTRITION

- Nutrition is a process by which living organism obtain food for their proper metabolism.
- It is the process of taking food and using it for obtaining energy, growth and repair of the body. Animals depend on other organisms for getting their food. They cannot make their own food, so they are heterotrophs.



❖ MODES OF NUTRITION

Autotrophic nutrition - It is a mode of nutrition in which living organisms can manufacture their own food with the help of simpler raw materials.

Ex: green plants , some bacteria.

Photosynthetic nutrition -

(photon - light ; synthesis - to manufacture)

It is a type of autotrophic nutrition in which green plans manufacturer their own organic food with the help of inorganic raw materials in the presence of light.

Chemosynthetic nutrition -

(chemo - chemicals ; synthesis - to manufacture)

It is a type of autotrophic nutrition in which some bacteria like sulphur bacteria manufacture their food with the help of chemicals .

Heterotrophic nutrition- It is a mode of nutrition in which living organisms cannot manufacture their food but depend on other living organisms for food.

Ex : most of the animals and non green plants.

- **Saprophytic nutrition** - This is a type of heterotrophic nutrition in which organisms obtain food from dead and decaying organic matter. They discharge some extra cellular enzymes which breakdown the complex organic compounds into simpler forms.

Ex: fungi and bacteria

- **Parasitic nutrition** - This is a type of nutrition in which organisms with live on or inside other living organisms called hosts and obtain their food from them.

Ex: tapeworm , Cuscuta.

- **Holozoic nutrition** - This is a type of heterotrophic nutrition which involves the ingestion of some complex organic substances that may be in the solid or liquid state, digestion, absorption and assimilation of it to utilize it. It includes taking in the complex substances and converting them into simpler forms.

Ex: amoeba, human beings .

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❖ **VIDEO-LINKS**

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https://youtu.be/-4OuB_AlUbc

LINK-2

<https://youtu.be/ooVBJWE7tHw>

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❖ **ASSIGNMENTS**

Q.1. Differentiate between autotrophs and heterotrophs.

Q.2. Classify different types of heterotrophic nutrition. Write in brief about any one type

Q.3. Compare the modes of parasitic and saprophytic nutrition.

❖ **MULTIPLE CHOICE QUESTION**

Q.1. The mode of nutrition in a green plant is

- A. Heterotrophic
- B. Saprophytic
- C. Autotrophic
- D. Holozoic

Q.2. HETEROTROPHIC NUTRITION IS

- A. The utilisation of energy obtained by the plants.
- B. Breakdown of Glucose into energy
- C. Oxidation of Glucose
- D. All

Q.3. Which organisms and set of characteristics are correctly paired?

- A. fungi - carry out photosynthesis and heterotrophic nutrition
- B. plants - carry out respiration and autotrophic nutrition
- C. decomposers - carry out photosynthesis and autotrophic nutrition
- D. animals - carry out autotrophic nutrition and heterotrophic nutrition

DAY-3

❖ TEACING MATERIAL :- NUTRITION IN PLANTS (PHOTOSYNTHESIS)

Green plants synthesize their own food by the process of photosynthesis.

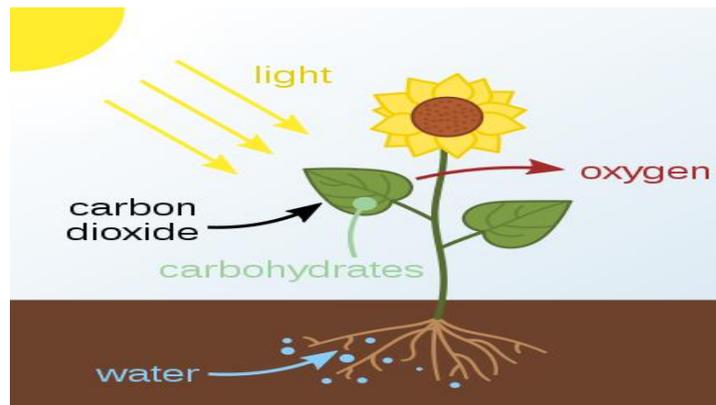
Photosynthesis

(*Photon - light , synthesis - to manufacture*)

It is a process by which green plants manufacture their organic food with the help of inorganic raw materials in the presence of sunlight and chlorophyll.

Equation : $6\text{CO}_2 + 12\text{H}_2\text{O} + \text{Light Energy} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$

Site of photosynthesis : Chloroplast



The raw materials for photosynthesis are as

follows:

- Carbon dioxide - through gaseous exchange carried out by stomata
- Water - roots absorb water from the soil provided by irrigation or even rains
- Sunlight - chlorophyll, the green pigment present in green plants traps solar energy

❖ NCERT MATERIAL

<http://ncert.nic.in/ebooks.html>

❖ VIDEO-LINKS :- PRACTICAL

LINK-1

Carbon dioxide is necessary for photosynthesis - <https://youtu.be/Sc4efTPQpL0>

LINK-2

Sunlight is necessary for photosynthesis <https://youtu.be/Yqo6-qDQoMA>

LINK-3

<https://youtu.be/UkKHfoH4KzU>

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❖ ASSIGNMENTS

Q.1. Define photosynthesis. Write balanced equation for photosynthesis.

Q.2. What are the raw materials required for photosynthesis.

Q.3. How green plants acquire raw materials required for photosynthesis.

❖ PRACTICAL BASED QUESTIONS : -

Q.1. What is the use of light in photosynthesis?

Q.2. Why do we boil the leaves in alcohol solution?

Q.3. Why do we need to decolourise the leaf?

Q.4. Why should we always use water bath while boiling the leaf in alcohol solution?

Q.5. What is meant by de-starching? Why do plants get de-starched when kept in continuous darkness for about forty eight hours?

Q.6. The steps, necessary for setting up the experiment "To demonstrate that light is necessary for photosynthesis" are not given here in proper sequence. The correct order is:

I. keep the potted plant in sunlight for 3 to 4 hours

II. keep the potted plant in darkness for about 48 hours

III. cover a leaf of the plant with a strip of black paper

IV. pluck the leaf and test it for starch.

(a) I, III, IV, II

(b) I, IV, III, II

(c) II, IV, III, I

(d) II, III, I, IV.

❖ IN PRACTICAL FILE

Q.1. Write an activity to show Carbon dioxide is necessary for photosynthesis.

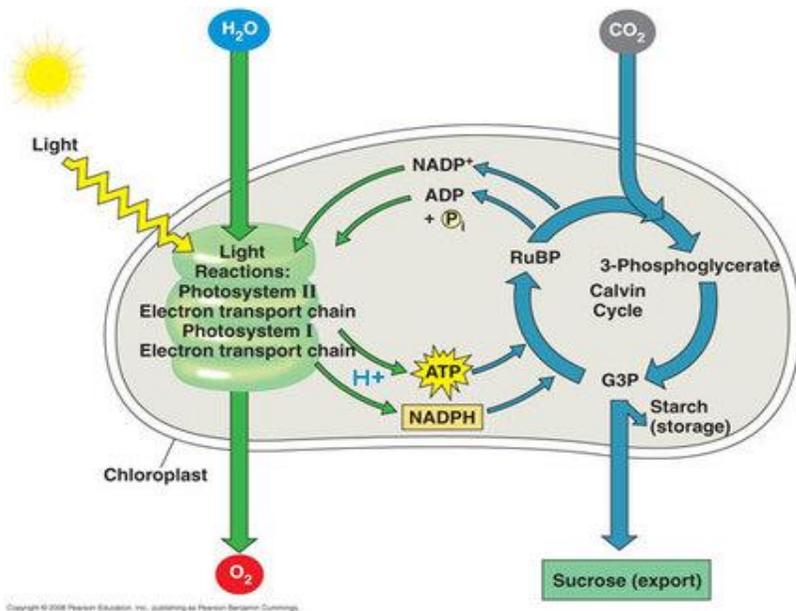
Q.2. Write an activity to show sunlight is necessary for photosynthesis.

DAY-4

❖ TEACING MATERIAL : - MECHANISM OF PHOTOSYNTHESIS

Mechanism of photosynthesis: There are two major phases found in photosynthesis.

They are light reaction and dark reaction.



1) Light reaction :

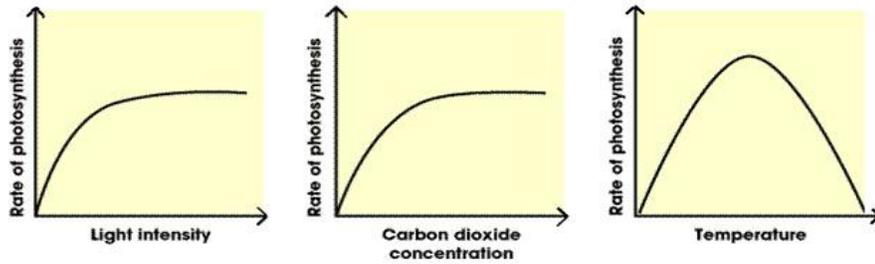
- The light reaction takes place in chlorophyll containing thylakoids called grana of chloroplasts.
- The chlorophyll on exposure to light energy becomes activated by absorbing photons.
- The energy is used in splitting the water molecule into its two component ions. This is known as photolysis of water.
- OH⁻ ions through a series of steps produce water and oxygen.
- ATP and NADPH are formed at the end of the light reaction are called assimilatory powers. .

2) Dark reaction :

- Dark reactions do not depend on light. These reactions occur in stroma of chloroplast.
- H⁺ ions produced in photolysis are immediately picked up by special compound NADP to form NADPH.
- In the dark phase, the hydrogen of the NADPH is used to combine it with CO₂ by utilising ATP energy and to ultimately produce glucose.
- The synthesis of glucose occurs in number of steps using certain special intermediate compounds (mainly ribulose biphosphate) and enzymes.
- The glucose is converted to starch.

Factors affecting photosynthesis :

The factors are: 1. Temperature 2. Carbon Dioxide Concentrations 3. Light 4. Intensity 5. Quality 6. Duration 7. Oxygen 8. Water 9. Mineral Elements 10. Air Pollutants 11. Chemical Compounds 12. Chlorophyll Contents 13. Protoplasmic Factor 14. Accumulation of Carbohydrates 15. Blackman's Principle of Limiting Factors.



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❖ VIDEO-LINKS

LINK-1

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LINK-2

<https://youtu.be/faM4dMNHxh0>

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❖ **ASSIGNMENTS**

- Q.1. List the events that occur during the process of photosynthesis.
- Q.2. List the factors that affect photosynthesis.
- Q.3. When do the desert plants take carbon dioxide and perform photosynthesis.

❖ **MULTIPLE CHOICE QUESTION**

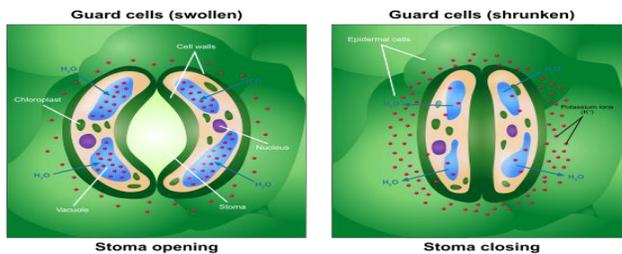
- Q.1. Photosynthesis is a _____ process.
- A. Catabolic
 - B. Anabolic
 - C. Exothermic
 - D. Metabolic
- Q.2. In photosynthesis dark reaction, is called so because-
- A. It occurs in dark.
 - B. It does not require light energy.
 - C. It cannot occur during daytime.
 - D. It occurs more rapidly at night.
- Q.3. During light reaction in photosynthesis the following are formed:
- A. ATP and sugar
 - B. Hydrogen, O₂ and sugar
 - C. ATP, hydrogen donor and O₂
 - D. ATP, hydrogen and O₂ donor
- Q.4. Oxygen liberated during photosynthesis come from
- A. Water
 - B. Carbon dioxide
 - C. Glucose
 - D. Chlorophyll

DAY-5

❖ TEACING MATERIAL :- OPENING AND CLOSING OF STOMATA

- The stomata are very minute apertures, usually found on the epidermis of the leaves. Each stoma is surrounded by two kidney-shaped special epidermal cells, known as guard cells.
- The stomata may be found in all the aerial parts of the plant. They are never found on its roots. The epidermal cells surrounding the guard cells of the stoma are known as accessory or subsidiary cells.

● Mechanism of opening and closing of stomata



Opening of stomata:

- Solutes from neighbouring epidermal and mesophyll cells enter the guard cells lowering its osmotic potential and water potential.
- This lowered water potential and osmotic potential will allow movement of water into guard cells from neighbouring cells.
- Guard cells become turgid due to water accumulation in them which results in the opening of the guard cells.

Closing of stomata:

- As the somata open the solute concentration is reduced.
- This makes the water from the guard cells to move away into neighbouring cells.
- Now, guard cells becom flaccid with no water. They collapse against each other and result in the closing of stomata.

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❖ VIDEO-LINKS

LINK-1

<https://youtu.be/ACXXQFyNOEg>

LINK-2

https://youtu.be/uvxSRqE_x4w

❖ **PRACTICAL : - TO PREPARE TEMPORARY MOUNT OF LEAF PEEL CELL TO SHOW ITS STOMATA**

<https://youtu.be/FOLDv1JLzeE>

❖ **DOCUMENTS LINKS**

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❖ **ASSIGNMENTS**

Q.1. Draw a well labelled diagram of stomata.

Q.2. State two functions of stomata.

Q.3. How do guard cells regulate opening and closing of stomatal pore?

❖ **PRACTICAL BASED QUESTIONS : -**

Q.1. What influences the opening of stomata?

Q.2. Name the layer of tissue in which stomatas are seen.

Q.3. Name the stain used for preparing slide for stomata.

Q.4. Desert plants cannot afford to lose water through stomata. How do they exchange gases?

Q.5. What is the shape of guard cells in stoma of grass leaf?

Q.6. While preparing the stomatal slide, glycerine is used to

- (a) prevent air bubbles
- (b) avoid drying of peel
- (c) to stain the peel
- (d) make it visible

Q.7. To remove the extra stain, water or glycerine collected on the slide, the correct method is

- (a) wash the sides of the slide
- (b) clean it with handkerchief
- (c) use cotton swabs to collect it
- (d) use filter/blotting paper to clean it.

Q.8. The steps involved in making a slide of epidermal peel of leaf are as follows:

I Put out a thin peel from the lower surface of the leaf.

II Place a drop of glycerine on the slide.

III Stain the peel in safranin.

IV Place the stained peel on the glycerine.

V Remove the extra stain by washing with water. VI Place the coverslip over the peel.

Which one is the correct sequence of steps to be followed?

- (a) I, II, III, IV, V, VI
- (b) I, III, V, II, IV, VI
- (c) I, III, IV, II, V, VI
- (d) I, II, IV, III, V, VI.

Q.9. A student focussed the epidermal peel of leaf under the low power of a microscope but could not see the parts. He should

- (a) use the coarse adjustment knob again to focus the slide.
- (b) use the fine adjustment knob to increase magnification.
- (c) focus under high power using coarse adjustment knob.
- (d) focus under high power using fine adjustment knob.

❖ **IN PRACTICAL FILE**

Q. Write an activity to prepare temporary mount of leaf peel cells to show stomata .