Life Processes Class 10 Notes Pdf in English and Hindi...

Life Processes Class 10 Notes

WHAT ARE LIFE PROCESSES?

1. Life Processes

- **Life processes** are the basic activities that keep an organism alive.
- These processes continue **even when we are resting or sleeping**.
- They prevent **damage and breakdown** of the body.

2. Need for Energy

- All life processes need **energy**.
- Energy comes from **outside the body**.
- The source of energy is called **food**.

3. Nutrition

- **Nutrition** is the process of taking food from outside and using it inside the body.
- Food provides:
    - **Energy** for life processes
    - **Raw materials** for growth and repair
- Most food is **carbon-based**, because life on Earth is carbon-based.
- Different organisms have **different modes of nutrition** depending on the type of food they use.

4. Respiration

- Food must be broken down to release energy.
- This happens through **chemical reactions** inside the body.
- **Oxidation-reduction reactions** are common.
- Most organisms use **oxygen** for this process.
- **Respiration** is:
    - Taking in oxygen
    - Using it to break down food to release energy

5. Single-celled vs Multi-celled Organisms

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Single-celled organisms:

- Entire body surface is in contact with the environment.
- No special organs needed for:
    - Nutrition
    - Respiration
    - Excretion

Multi-celled organisms:

- Body is large and complex.
- All cells are **not in direct contact** with the environment.
- **Diffusion alone is not sufficient**.

6. Specialisation in Multi-celled Organisms

- Different tissues perform **specific functions**.
- Specialised tissues are present for:
    - Intake of food
    - Intake of oxygen
    - Removal of wastes

7. Transportation System

- Food and oxygen enter the body at **specific places**.
- All cells need food and oxygen.
- Hence, a **transportation system** is required to:
    - Carry food and oxygen to all cells
    - Carry waste products away from cells

8. Excretion

- During respiration and other chemical reactions:
    - **Waste products** are formed
    - These can be **harmful**
- **Excretion** is the process of removing wastes from the body.

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- Specialised excretory tissues remove wastes.
- The transport system carries wastes to excretory organs.

9. Main Life Processes Mentioned

- **Nutrition**
- **Respiration**
- **Transportation**
- **Excretion**

What is Nutrition?

- **Nutrition** is the process by which living organisms obtain **food** and use it for:
    - Energy
    - Growth and development
    - Repair of body tissues
    - Synthesis of proteins and other substances
- Energy is needed even when we are **resting or sleeping**.

How do living organisms obtain food?

- All organisms need energy and raw materials.
- However, the **method of obtaining food differs** among organisms.
- Based on this, organisms are divided into:
    1. **Autotrophs**
    2. **Heterotrophs**

5.2.1 Autotrophic Nutrition

- **Autotrophs** are organisms that **prepare their own food**.
- Examples:
    - Green plants
    - Some bacteria

Photosynthesis

- The process by which autotrophs make food is called **photosynthesis**.

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- In this process:
    - **Carbon dioxide** is taken from air
    - **Water** is taken from soil
    - In the presence of **sunlight and chlorophyll**, they are converted into **carbohydrates**
- Carbohydrates provide **energy** to the plant.

Storage of Food

- Extra carbohydrates are stored as **starch** in plants.
- In humans, excess food energy is stored as **glycogen**.

Steps of Photosynthesis

1. Absorption of light energy by **chlorophyll**
2. Conversion of light energy into **chemical energy** and splitting of water into hydrogen and oxygen
3. Reduction of carbon dioxide to form **carbohydrates**

These steps do not always occur immediately one after the other.
Example: Desert plants take in carbon dioxide at night.

Role of Chlorophyll

- Chlorophyll is present in **chloroplasts** of green plant cells.
- It absorbs sunlight and is **essential for photosynthesis**.
- Only the green parts of the leaf prepare starch.

Role of Stomata

- **Stomata** are tiny pores present on the surface of leaves.
- Functions:
    - Exchange of gases
    - Loss of water through transpiration
- **Guard cells** control opening and closing of stomata:
    - Swollen → stomata open
    - Shrunken → stomata close

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Other Raw Materials for Plants

- Plants also need:
    - Nitrogen
    - Phosphorus
    - Iron
    - Magnesium
- Nitrogen is absorbed as:
    - Nitrates or nitrites
    - Or converted from atmospheric nitrogen by bacteria

5.2.2 Heterotrophic Nutrition

- **Heterotrophs** cannot prepare their own food.
- They depend directly or indirectly on autotrophs.
- Examples:
    - Animals
    - Fungi

Types of Heterotrophic Nutrition

1. **Saprophytic nutrition**
    - Food is digested outside the body
    - Example: Fungi (mushrooms, yeast)
2. **Holozoic nutrition**
    - Food is ingested and digested inside the body
    - Example: Humans
3. **Parasitic nutrition**
    - Nutrition obtained from a living host without killing it
    - Example: Cuscuta, lice, tapeworm

5.2.3 Nutrition in Unicellular Organisms

- In **Amoeba**:

    - Food is taken in by **pseudopodia**
    - A **food vacuole** is formed
    - Digestion occurs inside the vacuole
    - Undigested food is expelled
- In **Paramecium**:
    - Food enters through a fixed spot
    - Cilia help in moving food into the cell

5.2.4 Nutrition in Human Beings

- Humans have a **complete digestive system**.
- It is a long tube called the **alimentary canal**, extending from:
    - Mouth → Anus

Digestion in Mouth

- Food is chewed by teeth.
- Saliva is secreted by salivary glands.
- Saliva contains **salivary amylase**:
    - Breaks down starch into simple sugars

Oesophagus

- Food is pushed into the stomach by **peristaltic movements**.

Digestion in Stomach

- Gastric glands secrete:
    - **Hydrochloric acid (HCl)** – kills germs and provides acidic medium
    - **Pepsin** – digests proteins
    - **Mucus** – protects stomach lining

Digestion in Small Intestine

- Longest part of the alimentary canal.
- Complete digestion of:

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    - Carbohydrates
    - Proteins
    - Fats
- Receives:
    - **Bile** from liver – emulsifies fats
    - **Pancreatic juice** – contains trypsin and lipase
    - **Intestinal juice** – completes digestion

Absorption

- Digested food is absorbed by **villi** in the small intestine.
- Villi increase surface area for absorption.
- Absorbed nutrients are carried by blood to all body cells.

Large Intestine and Egestion

- Water is absorbed in the large intestine.
- Undigested food is expelled through the **anus**.
- Controlled by **anal sphincter**.

RESPIRATION – Easy Notes

What is Respiration?

- Respiration is the process by which **food is broken down inside cells** to release **energy**.
- The energy released is used for:
    - Growth
    - Repair
    - Movement
    - All life processes

Cellular Respiration

- Respiration occurs inside the **cells**, so it is called **cellular respiration**.
- The food molecule used is mainly **glucose**.

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Breakdown of Glucose

- The **first step** of respiration is the breakdown of glucose (6-carbon molecule) into **pyruvate** (3-carbon molecule).
- This step occurs in the **cytoplasm**.
- After this, pyruvate can follow **different pathways** depending on the availability of oxygen.

Types of Respiration

1. Anaerobic Respiration

- Occurs **in the absence of oxygen**.
- Example:
  - Yeast (fermentation)
- Pyruvate is converted into:
  - **Ethanol + Carbon dioxide**
- Produces **less energy**.
- Occurs in **yeast and some bacteria**.

2. Aerobic Respiration

- Occurs **in the presence of oxygen**.
- Takes place in the **mitochondria**.
- Pyruvate is broken down into:
  - **Carbon dioxide + Water**
- Releases **much more energy** than anaerobic respiration.

3. Respiration in Muscles (Lactic Acid Formation)

- During **heavy exercise**, oxygen supply to muscles is insufficient.
- Pyruvate is converted into **lactic acid**.
- Lactic acid build-up causes **muscle cramps**.
- This is a type of **anaerobic respiration** in humans.

Energy Currency – ATP

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- Energy released during respiration is stored in **ATP (Adenosine Triphosphate)**.
- ATP is called the **energy currency of the cell**.
- When ATP breaks down:
    - Energy is released for cellular activities.
- ATP is used for:
    - Muscle contraction
    - Protein synthesis
    - Nerve impulse conduction

Respiration in Plants

- Plants exchange gases through **stomata**.
- Gas exchange occurs by **diffusion**.
- During:
    - **Day** → Oxygen is released (photosynthesis)
    - **Night** → Carbon dioxide is released (respiration)

Respiration in Animals

- Animals have **special respiratory organs**.
- Aquatic animals use **dissolved oxygen** in water.
- Terrestrial animals use **oxygen from air**.

Respiration in Aquatic Animals (Fish)

- Fish breathe through **gills**.
- Water enters through the mouth and passes over the gills.
- Oxygen dissolved in water is absorbed by blood.
- Breathing rate is **faster** because:
    - Oxygen content in water is low compared to air.

Respiration in Terrestrial Animals

- Respiratory organs have:

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    - Large surface area
    - Thin and delicate walls
- These organs are usually inside the body for protection.
- Air passages help in:
    - Bringing oxygen in
    - Removing carbon dioxide

Respiration in Human Beings

Breathing Path

- Air enters through **nostrils**
- Filtered by:
    - Nose hairs
    - Mucus
- Passes through:
    - Throat → Trachea → Lungs
- Trachea has **cartilage rings** to prevent collapse.

Alveoli

- Inside lungs, air tubes end in **alveoli**.
- Alveoli:
    - Are balloon-like structures
    - Have large surface area
    - Are surrounded by blood capillaries
- Exchange of gases occurs here:
    - Oxygen → blood
    - Carbon dioxide → alveoli

Breathing Mechanism

- Inhalation:
    - Ribs move up

    - Diaphragm flattens
    - Chest cavity enlarges
- Exhalation:
    - Ribs move down
    - Diaphragm relaxes
- Lungs always contain **residual air** to allow continuous gas exchange.

Transport of Gases

- Oxygen is transported by **haemoglobin**.
- Haemoglobin:
    - Present in red blood cells
    - Has high affinity for oxygen
- Carbon dioxide:
    - Mostly transported in **dissolved form** in blood.

What is Transportation?

- Transportation is the process by which **food, oxygen, hormones and waste materials** are carried from one part of the body to another.
- In humans, this function is mainly performed by **blood**.
- Transportation requires:
    - A **pumping organ**
    - A **network of tubes**
    - A **repair mechanism** in case of damage

Transportation in Human Beings

Blood

- Blood is a **fluid connective tissue**.
- It consists of:
    - **Plasma** – liquid part
    - **Blood cells** – suspended in plasma

Functions of Blood

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- Plasma transports:
    - Digested food
    - Carbon dioxide
    - Nitrogenous wastes
    - Salts and hormones
- **Red blood cells (RBCs)** transport oxygen.
- **Platelets** help in blood clotting.

The Heart – Pumping Organ

- The heart is a **muscular organ** about the size of a fist.
- It pumps blood throughout the body.
- It has **four chambers**:
    - Left atrium
    - Left ventricle
    - Right atrium
    - Right ventricle

Working of the Heart

1. **Oxygenated blood** from lungs enters the **left atrium**.
2. Left atrium contracts → blood moves to **left ventricle**.
3. Left ventricle contracts → blood is pumped to the **entire body**.
4. **Deoxygenated blood** from body enters the **right atrium**.
5. Right atrium contracts → blood moves to **right ventricle**.
6. Right ventricle pumps blood to the **lungs** for oxygenation.

- **Ventricles** have thicker walls because they pump blood with force.
- **Valves** prevent backward flow of blood.

Double Circulation

- In humans, blood passes through the heart **twice** in one complete cycle.
- This is called **double circulation**.

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- It prevents mixing of oxygenated and deoxygenated blood.
- Seen in birds and mammals.
- Fish have **single circulation** and a **two-chambered heart**.

Blood Pressure

- Blood pressure is the **force exerted by blood on vessel walls**.
- Types:
    - **Systolic pressure** – during heart contraction (≈120 mm Hg)
    - **Diastolic pressure** – during heart relaxation (≈80 mm Hg)
- Measured using **sphygmomanometer**.
- High blood pressure is called **hypertension**.

Blood Vessels

Arteries

- Carry blood **away from the heart**.
- Have **thick and elastic walls**.
- Blood flows under high pressure.

Veins

- Carry blood **towards the heart**.
- Have **thin walls**.
- Contain **valves** to prevent backflow.

Capillaries

- Very thin, one-cell thick walls.
- Connect arteries and veins.
- Exchange of materials occurs here.

Role of Platelets

- Prevent excessive blood loss.
- Help in **blood clotting** at injured sites.
- Maintain pressure in blood vessels.

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Lymph

- Lymph is a colourless fluid formed from plasma.
- Contains fewer proteins than blood plasma.
- Functions:
    - Carries absorbed fats from intestine
    - Returns excess tissue fluid to blood
    - Helps in immunity

5.4.2 Transportation in Plants

Need for Transport in Plants

- Plants need to transport:
    - Water and minerals from roots
    - Food from leaves to other parts
- Diffusion is not sufficient in large plants.

Plant Transport Tissues

Xylem

- Transports:
    - Water
    - Minerals
- Direction: **Roots → Leaves**
- Consists of vessels and tracheids.
- Transport occurs due to:
    - Root pressure
    - Transpiration pull

Transpiration

- Loss of water vapour from aerial parts of plants.
- Occurs through **stomata**.

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- Helps in:
    - Upward movement of water
    - Absorption of minerals
    - Cooling of plant body

Phloem

- Transports food prepared during photosynthesis.
- Process is called **translocation**.
- Food moves:
    - From leaves to roots, fruits, seeds and growing parts
- Occurs through:
    - **Sieve tubes**
    - **Companion cells**
- Requires **energy (ATP)**.

Key Difference: Xylem vs Phloem

Xylem	Phloem
Transports water & minerals	Transports food
Upward movement only	Both upward & downward
No energy required	Energy required

What is Excretion?

- **Excretion** is the biological process of removing **harmful metabolic wastes** from the body.
- These wastes are produced during:
    - Respiration
    - Other metabolic activities
- Main wastes include **nitrogenous wastes** like urea and uric acid.

Excretion in Different Organisms

- **Unicellular organisms** remove wastes by **diffusion** through the body surface.

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- **Multicellular organisms** use **specialised excretory organs**.

5.5.1 Excretion in Human Beings

Human Excretory System

The human excretory system consists of:

1. **Kidneys** (one pair)
2. **Ureters** (one pair)
3. **Urinary bladder**
4. **Urethra**

- Kidneys are located on either side of the backbone.
- Urine formed in kidneys passes through ureters to the urinary bladder.
- Urine is stored in the bladder and expelled through the urethra.

Formation of Urine

- The main function of kidneys is to **filter blood** and remove nitrogenous wastes.
- The basic filtration unit of the kidney is the **nephron**.
- Each kidney contains **millions of nephrons**.

Structure and Function of Nephron

- Each nephron consists of:
    - A cluster of blood capillaries called **glomerulus**
    - A cup-shaped structure called **Bowman's capsule**
    - A long coiled tubule

Steps of Urine Formation

1. **Filtration**
    - Blood is filtered in the glomerulus.
    - Waste substances pass into Bowman's capsule.
2. **Selective Reabsorption**
    - Useful substances like:

        - Glucose
        - Amino acids
        - Salts
        - Most of the water
          are reabsorbed into the blood.

3. **Excretion**
    - Remaining waste forms urine.
    - Urine flows through ureter → bladder → urethra.

Control of Urination

- Urinary bladder is **muscular** and under **nervous control**.
- Therefore, humans can control urination.

Artificial Kidney (Hemodialysis)

- Used when kidneys fail to function properly.
- Removes nitrogenous wastes from blood.
- Blood is passed through a semi-permeable membrane.
- Wastes diffuse into the dialysing fluid.
- Purified blood is returned to the body.
- Unlike kidneys, **no reabsorption occurs**.

5.5.2 Excretion in Plants

- Plants use **different methods** for excretion.
- Oxygen produced during photosynthesis is a waste product.
- Plants remove excess water by **transpiration**.

Waste Removal in Plants

- Wastes are stored in:
    - Vacuoles
    - Leaves (which later fall off)
    - Old xylem (as resins and gums)

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- Some waste products are excreted into the **soil** through roots.
- Plants can also remove wastes by shedding leaves, bark, and fruits.

Life Processes – कक्षा 10 (हिंदी नोट्स)

LIFE PROCESSES क्या हैं?

1. जीवन प्रक्रियाएँ (Life Processes)

- जीवन प्रक्रियाएँ वे **मूल क्रियाएँ** हैं जो किसी जीव को जीवित रखती हैं।
- ये प्रक्रियाएँ **सोते या आराम करते समय भी चलती रहती हैं**।
- ये शरीर को टूटने-फूटने और नुकसान से बचाती हैं।

2. ऊर्जा की आवश्यकता (Need for Energy)

- सभी जीवन प्रक्रियाओं के लिए **ऊर्जा आवश्यक** है।
- ऊर्जा शरीर के बाहर से आती है।
- ऊर्जा का स्रोत **भोजन** होता है।

3. पोषण (Nutrition)

- भोजन को बाहर से लेना और शरीर के अंदर उपयोग करना **पोषण** कहलाता है।
- भोजन से हमें मिलता है:
    - ऊर्जा
    - वृद्धि और मरम्मत के लिए कच्चा माल
- अधिकतर भोजन **कार्बन आधारित** होता है क्योंकि पृथ्वी पर जीवन कार्बन आधारित है।
- विभिन्न जीवों में पोषण के तरीके अलग-अलग होते हैं।

4. श्वसन (Respiration)

- भोजन को तोड़कर ऊर्जा प्राप्त की जाती है।
- यह रासायनिक अभिक्रियाओं द्वारा होता है।
- अधिकतर जीव **ऑक्सीजन** का उपयोग करते हैं।

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- श्वसन में शामिल है:
    - ऑक्सीजन लेना
    - भोजन को तोड़कर ऊर्जा प्राप्त करना

5. एककोशिकीय और बहुकोशिकीय जीव

एककोशिकीय जीव

- पूरा शरीर वातावरण के संपर्क में रहता है।
- विशेष अंगों की आवश्यकता नहीं होती:
    - पोषण
    - श्वसन
    - उत्सर्जन

बहुकोशिकीय जीव

- शरीर बड़ा और जटिल होता है।
- सभी कोशिकाएँ सीधे वातावरण के संपर्क में नहीं होतीं।
- केवल विसरण (diffusion) पर्याप्त नहीं होता।

6. बहुकोशिकीय जीवों में विशिष्टीकरण

- अलग-अलग ऊतक अलग-अलग कार्य करते हैं।
- विशेष ऊतक होते हैं:
    - भोजन ग्रहण करने के लिए
    - ऑक्सीजन लेने के लिए
    - अपशिष्ट हटाने के लिए

7. परिवहन तंत्र (Transportation System)

- भोजन और ऑक्सीजन शरीर में निश्चित स्थानों से प्रवेश करते हैं।
- सभी कोशिकाओं को इनकी आवश्यकता होती है।
- इसलिए परिवहन तंत्र आवश्यक है:

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  - भोजन और ऑक्सीजन पहुँचाने के लिए
  - अपशिष्ट हटाने के लिए

8. उत्सर्जन (Excretion)

- श्वसन और अन्य क्रियाओं से अपशिष्ट बनते हैं।
- ये अपशिष्ट हानिकारक हो सकते हैं।
- अपशिष्ट हटाने की प्रक्रिया को **उत्सर्जन** कहते हैं।

9. मुख्य जीवन प्रक्रियाएँ

- पोषण
- श्वसन
- परिवहन
- उत्सर्जन

पोषण (Nutrition)

- जीव भोजन प्राप्त करके उसका उपयोग करते हैं:
  - ऊर्जा के लिए
  - वृद्धि और विकास के लिए
  - ऊतकों की मरम्मत के लिए
- आराम करते समय भी ऊर्जा की आवश्यकता होती है।

भोजन प्राप्त करने के प्रकार

- सभी जीवों को ऊर्जा और कच्चा माल चाहिए।
- भोजन प्राप्त करने के आधार पर जीव दो प्रकार के होते हैं:
  1. **स्वपोषी (Autotrophs)**
  2. **परपोषी (Heterotrophs)**

5.2.1 स्वपोषी पोषण (Autotrophic Nutrition)

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- जो जीव अपना भोजन स्वयं बनाते हैं।
- उदाहरण:
    - हरे पौधे
    - कुछ बैक्टीरिया

प्रकाश संश्लेषण (Photosynthesis)

- CO_2 (वायु से) + जल (मिट्टी से)
- सूर्य के प्रकाश और क्लोरोफिल की उपस्थिति में
- → कार्बोहाइड्रेट बनते हैं

भोजन का संग्रह

- पौधों में: स्टार्च
- मनुष्यों में: ग्लाइकोजन

प्रकाश संश्लेषण के चरण

1. क्लोरोफिल द्वारा प्रकाश ऊर्जा का अवशोषण
2. प्रकाश ऊर्जा → रासायनिक ऊर्जा
   (जल का अपघटन)
3. CO_2 का अपचयन कर कार्बोहाइड्रेट बनना

मरुस्थलीय पौधे रात में CO_2 लेते हैं।

क्लोरोफिल की भूमिका

- क्लोरोप्लास्ट में पाया जाता है।
- केवल हरे भाग भोजन बनाते हैं।

स्टोमाटा की भूमिका

- पत्तियों पर सूक्ष्म छिद्र
- कार्य:
    - गैसों का आदान-प्रदान
    - वाष्पोत्सर्जन
- रक्षक कोशिकाएँ:
    - फूली → खुले

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    - सिकुड़ी → बंद

अन्य आवश्यक तत्व

- नाइट्रोजन, फॉस्फोरस, लोहा, मैग्नीशियम
- नाइट्रोजन:
    - नाइट्रेट/नाइट्राइट
    - या बैक्टीरिया द्वारा परिवर्तित

5.2.2 परपोषी पोषण (Heterotrophic Nutrition)

- जो जीव अपना भोजन नहीं बना सकते।
- उदाहरण:
    - जानवर
    - कवक

प्रकार

1. **सैप्रोफाइटिक** – कवक
2. **होलोज़ोइक** – मनुष्य
3. **परजीवी** – अमरबेल, फीताकृमि

मानव में पोषण

- पाचन तंत्र: मुख → गुदा

मुख

- दाँत चबाते हैं
- लार में एमाइलेज → स्टार्च को शर्करा में बदलता है

अन्ननलिका

- पेरिस्टाल्टिक गति

आमाशय

- HCl → कीटाणु नाश
- पेप्सिन → प्रोटीन पाचन

Life Processes Class 10 Notes Pdf in English and Hindi...

- म्यूकस → सुरक्षा

छोटी आँत

- पूर्ण पाचन
- पित्त → वसा का इमल्सीकरण
- अवशोषण → विल्ली द्वारा

बड़ी आँत

- जल का अवशोषण
- मल त्याग

श्वसन (Respiration)

श्वसन क्या है?

- कोशिकाओं में भोजन का टूटना
- ऊर्जा प्राप्त होती है

ग्लूकोज़ का अपघटन

- ग्लूकोज़ → पाइरूवेट (साइटोप्लाज़्म)

श्वसन के प्रकार

1. **अवायवीय** – यीस्ट → एथेनॉल + CO_2
2. **वायवीय** – माइटोकॉन्ड्रिया → CO_2 + जल
3. **मांसपेशियों में** – लैक्टिक एसिड → ऐंठन

ATP

- ऊर्जा मुद्रा
- ATP टूटने पर ऊर्जा निकलती है

मानव में श्वसन

- नासिका → श्वासनली → फेफड़े
- एल्वियोली:

Life Processes Class 10 Notes Pdf in English and Hindi...

    - बड़ी सतह
    - गैसों का आदान-प्रदान

परिवहन (Transportation)

रक्त

- प्लाज़्मा
- RBC → ऑक्सीजन
- प्लेटलेट्स → थक्का

हृदय

- चार कक्ष
- दोहरा परिसंचरण

रक्त वाहिकाएँ

- धमनियाँ
- शिराएँ
- केशिकाएँ

लसीका (Lymph)

- वसा का परिवहन
- प्रतिरक्षा

पौधों में परिवहन

- **जाइलम** → जल
- **फ्लोएम** → भोजन

उत्सर्जन (Excretion)

मानव में

- गुर्दे → नेफ्रॉन
- छनन

Life Processes Class 10 Notes Pdf in English and Hindi...

- पुनः अवशोषण
- मूत्र निष्कासन

डायलिसिस

- कृत्रिम गुर्दा
- अपशिष्ट हटाता है

पौधों में उत्सर्जन

- ऑक्सीजन
- वाष्पोत्सर्जन
- रेज़िन, गोंद
- पत्तियाँ गिराना