



CHAPTER 7: HOW DO ORGANISMS REPRODUCE

Introduction

All living organisms show several life processes such as **nutrition, respiration, excretion, growth and reproduction**. Among these processes, **reproduction is not essential for the survival of an individual organism**, but it is essential for the **continuity of a species**.

If organisms did not reproduce, species would disappear from Earth after the death of existing individuals.

Reproduction also ensures **transfer of genetic information (DNA)** from parents to offspring, which helps maintain species characteristics while also producing **variations**.

Reproduction

Reproduction is the biological process by which living organisms produce new individuals similar to themselves.

Importance of Reproduction

1. Ensures **continuity of species**.
2. Maintains **population stability**.
3. Transfers **genetic information (DNA)** from one generation to the next.
4. Creates **variations** which help organisms adapt to changing environments.
5. Helps in **evolution of species**.

DNA Copying and Variation

During reproduction, the **DNA in the cell nucleus makes copies of itself**.

These copies are passed to the daughter cells during **cell division**.

Why DNA Copying is Important

1. It passes **genetic information** to the next generation.
2. Maintains **body design and characteristics** of organisms.
3. Ensures **similarity between parents and offspring**.

Variation



DNA copying is **not perfectly accurate**, so small differences occur in the copied DNA. These differences are called **variations**.

Importance of Variation

Variations help organisms survive environmental changes.

Example:

If temperature rises suddenly, some bacteria may die but **heat-resistant variants survive**.

Thus variation helps in **survival of species over time**.

Modes of Reproduction

There are two main types of reproduction:

1. Asexual Reproduction

Asexual reproduction is the process in which **a single parent produces offspring without the involvement of gametes**.

Characteristics

- Only **one parent** is involved
- No fusion of gametes
- Offspring are **genetically identical** to the parent
- Faster process
- Occurs mainly in **simple organisms**

Example:

Bacteria, Amoeba, Yeast, Hydra, Plants

Types of Asexual Reproduction

1. Fission

Fission is the process in which a unicellular organism divides to form new individuals.

Types of Fission

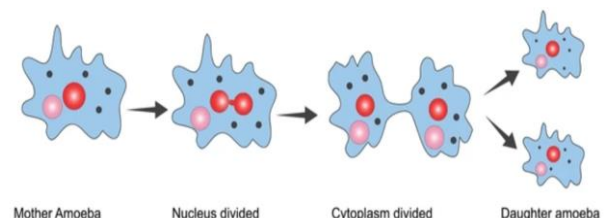
Binary Fission

The parent cell divides into **two daughter cells**.

Example:

- Amoeba
- Bacteria
- Leishmania

Process:





1. DNA duplicates
2. Cell grows
3. Cytoplasm divides
4. Two identical daughter cells form

Multiple Fission

The parent cell divides into **many daughter cells at once**.

Example: Plasmodium (malarial parasite)

Process:

1. Nucleus divides repeatedly
2. Many nuclei form
3. Cytoplasm surrounds each nucleus
4. Many daughter cells are produced

Difference Between Binary and Multiple Fission

BINARY FISSION	MULTIPLE FISSION
ONE CELL DIVIDES INTO TWO	One cell divides into many
EXAMPLE: AMOEBA	Example: Plasmodium

2. Fragmentation

In fragmentation, **the body of an organism breaks into pieces**, and each fragment develops into a new organism.

Example: Spirogyra (algae)

Explanation:

The filament breaks into pieces and each piece grows into a new organism.

3. Regeneration

Regeneration is the ability of some organisms to regrow lost body parts and form a complete organism.



Example:

- Hydra
- Planaria

Explanation:

Special cells divide and differentiate into different tissues.

4. Budding

In budding, a **small outgrowth called a bud develops on the parent body.**

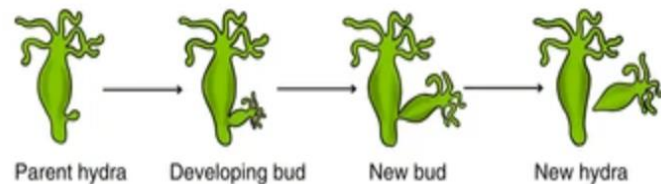
The bud grows and detaches to form a new individual.

Example:

- Hydra
- Yeast

Process:

1. Cells divide at a particular site
2. Bud develops
3. Bud grows
4. Bud separates from parent



5. Vegetative Propagation

Vegetative propagation is **asexual reproduction in plants where new plants grow from roots, stems or leaves.**

PLANT PART	EXAMPLE
STEM	Potato, Sugarcane
ROOT	Sweet Potato
LEAF	Bryophyllum

Advantages

1. Plants grow **faster**.
2. New plants are **genetically identical** to the parent.
3. Used in agriculture for **large scale cultivation**.

Artificial Methods



- Cutting
- Layering
- Grafting
- Tissue Culture

6. Spore Formation

Some organisms reproduce by forming **spores**.

Spores are tiny reproductive cells with **thick protective walls**.

Example: Rhizopus (bread mould)

Process:

1. Sporangium forms at tip of hypha
2. Spores develop inside
3. Sporangium bursts
4. Spores spread and grow into new organisms

Sexual Reproduction

Sexual reproduction is the process in which **two parents (male and female) produce offspring through the fusion of gametes**.

Characteristics

- Two parents involved
- Fusion of male and female gametes
- Offspring show **genetic variation**
- Slower process
- Occurs in **higher plants and animals**

Sexual Reproduction in Flowering Plants

The **flower** is the reproductive organ of flowering plants.

Parts of a Flower

1. Sepals
2. Petals
3. Stamen (Male part)
4. Pistil (Female part)



Male Reproductive Part (Stamen)

Stamen consists of:

- **Anther** – produces pollen grains
- **Filament** – supports anther

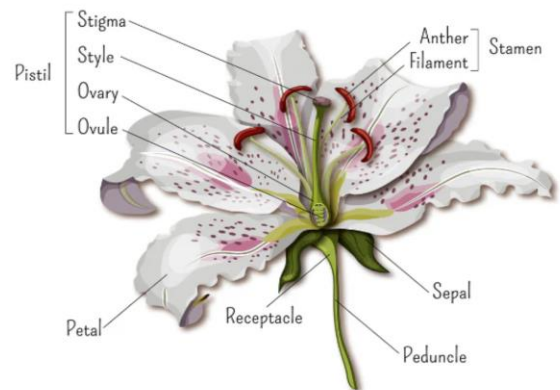
Pollen grains contain **male gametes**.

Female Reproductive Part (Pistil)

Pistil consists of:

- **Stigma** – sticky surface to receive pollen
- **Style** – tube connecting stigma to ovary
- **Ovary** – contains ovules

Each **ovule contains a female gamete (egg)**.



Pollination

Pollination is the **transfer of pollen grains from anther to stigma**.

Types of Pollination

Self Pollination

Transfer of pollen within the **same flower or same plant**.

Example:

Pea plant

Cross Pollination

Transfer of pollen from **one plant to another plant of the same species**.

Agents of pollination:

- Wind
- Water
- Insects
- Animals

Fertilisation in Plants

Fertilisation is the **fusion of male gamete and female gamete** to form a **zygote**.

Process:



1. Pollen grain lands on stigma.
2. Pollen tube grows through style.
3. Male gamete travels through pollen tube.
4. Fertilisation occurs in ovule.
5. Zygote forms.

After fertilisation:

- Ovule → **Seed**
- Ovary → **Fruit**

Human Reproduction

Humans reproduce through **sexual reproduction**.

It involves:

1. Male reproductive system
2. Female reproductive system
3. Fertilisation
4. Development of embryo

Puberty

Puberty is the stage when the body becomes **sexually mature and capable of reproduction**.

Changes in Boys

- Growth of facial hair
- Deep voice
- Development of reproductive organs
- Production of sperms

Changes in Girls

- Breast development
- Growth of body hair
- Beginning of menstruation
- Development of reproductive organs



Male Reproductive System

Main organs:

- Testes
- Scrotum
- Vas deferens
- Seminal vesicles
- Prostate gland
- Urethra
- Penis

Testes

- Produce sperms
- Produce male hormone testosterone

Vas deferens

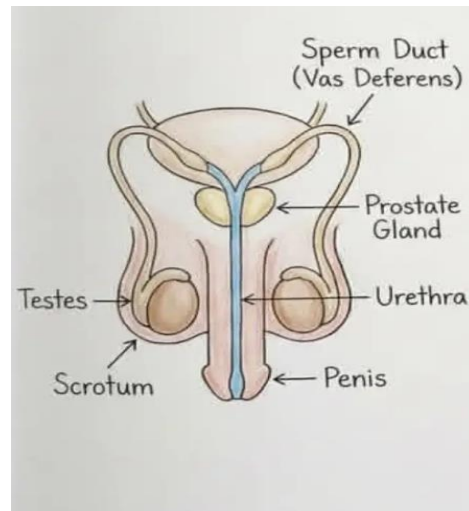
- Transports sperms

Seminal vesicles and prostate gland

- Add fluid to sperms forming **semen**

Penis

- Transfers sperms into female body



Female Reproductive System

Main organs:

Ovaries

- Produce eggs (ova)

Fallopian Tube

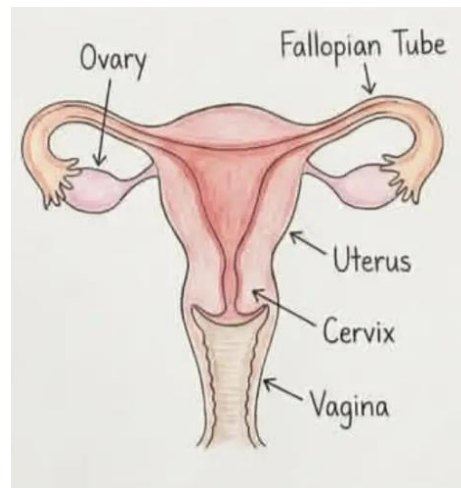
- Site of fertilisation

Uterus

- Development of embryo

Vagina

- Receives sperms during intercourse



Fertilisation in Humans

Process:

1. Sperm enters female body through vagina.
2. Sperms travel to fallopian tube.
3. One sperm fuses with egg.



4. Zygote forms.

Development of Embryo

After fertilisation:

1. Zygote divides repeatedly.
2. Forms **embryo**.
3. Embryo implants in uterus.
4. Placenta develops.

Placenta is a structure that connects **mother and foetus**.

Functions:

- Supplies oxygen
- Provides nutrients
- Removes waste products

The baby develops in uterus for about **9 months**.

Menstruation

If fertilisation does not occur:

- Egg dies after one day.
- Thick uterine lining breaks down.
- Blood and tissues flow out through vagina.

This process is called **menstruation**.

Duration: About **2–8 days every month**.

Reproductive Health

Reproductive health means **maintaining a healthy reproductive system and safe sexual practices**.

Sexually Transmitted Diseases (STDs)

These diseases spread through **sexual contact**.

Examples:



- Gonorrhoea
- Syphilis
- HIV/AIDS
- Genital warts

Prevention

- Safe sex practices
- Use of condoms
- Medical awareness

Contraception (Family Planning)

Contraception refers to **methods used to prevent pregnancy.**

1. Barrier Methods

Prevent sperm from reaching egg.

Example:

- Condoms
- Diaphragm

2. Hormonal Methods

Hormone pills prevent release of eggs.

Example:

- Oral contraceptive pills

3. Intrauterine Devices (IUDs)

Devices placed in uterus.

Example:

- Copper-T
- Loop

4. Surgical Methods

Permanent methods.

Male:

Vasectomy

Female:

Tubectomy