How Do Organisms Reproduce?

Reproduction

Reproduction is the biological process by which living organisms produce new individuals of their own kind. It is essential for the survival and continuation of species on Earth.

Example: Humans produce babies, plants grow from seeds.

Importance of Reproduction

Reproduction helps in maintaining the population of a species and ensures the transfer of genetic information (DNA) from parents to offspring.

Example: A child inherits traits like hair color and height from parents.

DNA Copying

The most important step in reproduction is the copying of DNA. DNA contains hereditary information, and its accurate copying ensures similarity between parents and offspring.

Example: Children resemble their parents due to DNA.

Variation

Small differences that occur during DNA copying are called variations. These variations are useful for survival in changing environments.

Example: Some organisms survive better in harsh conditions due to variation.

Modes of Reproduction

There are two main modes of reproduction:

1. Asexual reproduction
2. Sexual reproduction

1. Asexual reproduction

A type of reproduction in which only one parent is involved and no gametes are formed. The offspring are identical to the parent.

Example: Amoeba, Hydra

(I)Fission

A process in which a single cell divides into two or more new individuals.

Types:

(i)Binary fission – One cell divides into two

Example: Amoeba

(ii)Multiple fission – One cell divides into many

Example: Plasmodium

(II)Regeneration

The process by which an organism can regrow lost parts or form a complete organism from body fragments.

Example: Planaria, Hydra

(III)Budding

A small outgrowth called a bud forms on the parent body, grows, and detaches to form a new organism.

Example: Hydra

(IV)Vegetative Propagation

A type of reproduction in plants where new plants develop from roots, stems, or leaves. Examples:

- Bryophyllum (leaf buds)
- Potato (stem)
- Banana (without seeds)

(V)Tissue Culture

A method of growing new plants from a small piece of plant tissue in a laboratory under controlled conditions.

Example: Used for growing ornamental plants

(VI)Spore Formation

Reproduction through spores, which can grow into new organisms in favorable conditions.

Example: Rhizopus (bread mold)

Sexual Reproduction

2. Sexual reproduction

A type of reproduction in which two parents are involved and male and female gametes fuse to form a zygote.

Example: Humans, flowering plants

Gametes

Reproductive cells (sperm in males and egg in females) that fuse during fertilization.

Fertilization

The fusion of male and female gametes to form a zygote.

Example: Sperm + egg → zygote

Zygote

The fertilized egg that develops into a new individual.

Example: Human embryo begins from a zygote

Advantages of Sexual Reproduction

- Produces variation
- Helps in evolution
- Increases chances of survival

Structure of Flower

Parts of Flower and Their Functions

1. Pedicel – Connects the flower to the plant

2. Thalamus – Base of the flower

3. Calyx – Protects the bud

4. Corolla – Attracts insects

5. Stamen – Male part (produces pollen)

6. Carpel (Pistil) – Female part (forms seeds and fruit)

Types of Flowers

1. Unisexual Flower

Flower has only male or female reproductive part

Example: Papaya, Watermelon

2. Bisexual Flower

Flower has both male and female parts

Example: Hibiscus, Mustard

Pollination

Transfer of pollen grains from anther to stigma.

Types:

Self-pollination – Same flower

Example: Pea

Cross-pollination – Different flowers

Example: By insects, wind, water

Changes After Fertilization

- Ovule becomes seed
- Ovary becomes fruit
- Other parts dry up

Example: Mango develops from a fertilized flower

Human Reproduction

Puberty

The stage when reproductive organs become mature and the body becomes capable of reproduction.

Example: Beard growth in boys, breast development in girls

Male Reproductive System

Organs that produce and transport sperm.

Parts:

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

Female Reproductive System

Organs that produce eggs and support development of embryo.

Parts:

- Ovary
- Oviduct (Fallopian tube)
- Uterus

- Vagina

Fertilization in Humans

Sperm enters through vagina and fuses with egg in the oviduct to form a zygote.

Placenta

A special structure that connects the embryo to the mother and provides nutrition and oxygen.

Example: Baby gets nutrients from mother

Menstruation

If fertilization does not occur, the uterine lining breaks and comes out as blood.

Occurs every 28–30 days

Sexually Transmitted Diseases (STDs)

Diseases spread through sexual contact.

Examples:

- Gonorrhoea
- Syphilis
- AIDS

Birth Control Methods

Methods used to prevent pregnancy.

Examples:

- Condoms
- Oral pills
- Copper-T

Surgical Methods

Vasectomy – Male sterilization

Tubectomy – Female sterilization