Topic: Reproduction

Subtopics:

1. **Asexual Reproduction – Fission, Budding, Vegetative Propagation**
2. **Sexual Reproduction – Conjugation, Gamete Fusion**
3. **Mitosis and Gamete Functions**

Class: SS1

Term: First Term

Duration: 40 Minutes

Lesson Objectives:

By the end of this lesson, students should be able to:

1. Define **reproduction** and state its importance.
2. Explain the different forms of **asexual reproduction** (fission, budding, vegetative propagation).
3. Discuss **sexual reproduction**, including **conjugation and gamete fusion**.
4. Describe the role of **mitosis** and **gametes** in reproduction.

Introduction (5 minutes):

Reproduction is a **life process** by which living organisms **produce offspring** to maintain the continuity of life.
Without reproduction, species would become extinct.

Reproduction can be:

- **Asexual** (involving only one parent)
- **Sexual** (involving two parents)

---

1. Asexual Reproduction

Definition:

Asexual reproduction is the **production of offspring from a single parent** without the fusion of gametes.
The offspring are **genetically identical** to the parent (clones).

Types of Asexual Reproduction:

A. Fission

Definition:

Fission is the process where an organism **divides into two or more new individuals**.

Types of Fission:

Type	Description	Examples
Binary Fission	One cell splits into **two equal daughter cells**	Amoeba, Paramecium
Multiple Fission	One cell divides into **many daughter cells at once**	Plasmodium (malaria parasite)

B. Budding

Definition:

Budding is when a **small outgrowth (bud)** forms on the parent organism.
The bud may:

- Remain attached, forming a **colony**
- Break off and grow into a **new individual**

Examples:

- **Hydra** (in animals)
- **Yeast** (in fungi)

C. Vegetative Propagation

Definition:

Vegetative propagation is the **production of new plants from parts of the parent plant** (such as stem, root, or leaf) without seeds.

Examples:

Plant Part	Example
Stem (runner)	Strawberry
Root (tuber)	Yam, Sweet potato
Leaf	Bryophyllum (sprouts new plants from leaf edges)

Advantages of Asexual Reproduction:

- **Fast and simple**
- **No need for a mate**
- Produces **many offspring quickly**

Disadvantages:

- **No genetic variation** (all offspring are identical)
- **Diseases can easily spread** among clones

---

2. Sexual Reproduction

Definition:

Sexual reproduction involves **two parents** and the **fusion of male and female gametes** to produce offspring.

The offspring are **genetically different** from the parents.

A. Gametes

Gametes are **sex cells**:

Male Gamete	Female Gamete
Sperm (in animals)	**Egg (Ovum)**
Pollen grain (in plants)	**Ovule**

B. Types of Sexual Reproduction:

i. Conjugation

Definition:

Conjugation is a form of sexual reproduction where **genetic material is exchanged** between two similar unicellular organisms.

Process:

- Two organisms come together and form a **bridge-like connection**.
- They **exchange genetic material** through this bridge.
- After conjugation, they separate with **new combinations of genes**.

Examples:

- **Paramecium**
- **Bacteria**

---

ii. Gamete Fusion (Fertilization)

Definition:

Fertilization is the **fusion of male and female gametes** to form a **zygote**.

Types of Fertilization:

Type	Description	Example
External Fertilization	Fusion happens **outside the body**	Frogs, Fish
Internal Fertilization	Fusion happens **inside the female body**	Humans, Birds

---

Advantages of Sexual Reproduction:

- Produces **genetic variation**
- Helps organisms **adapt to changes**
- Reduces the spread of **genetic diseases**

Disadvantages:

- **Slower process** compared to asexual reproduction
- Requires **two parents**

---

3. Mitosis and Gamete Functions

Role of Mitosis in Reproduction:

- In **asexual reproduction**, **mitosis** creates **identical offspring**.
- Mitosis also helps in **growth and repair** after sexual reproduction (e.g., zygote dividing to form an embryo).

Role of Gametes:

Gamete	Function
Sperm	Carries male genetic material; swims to the egg for fertilization
Egg (Ovum)	Carries female genetic material; provides nutrients for early development
Pollen grain	Transfers male genes to the ovule in plants
Ovule	Contains female genetic material in plants

Comparison of Asexual and Sexual Reproduction:

Feature	Asexual	Sexual
Parents	One	Two

Feature	Asexual	Sexual
Gametes	Not involved	Involved
Genetic variation	No (offspring identical)	Yes (offspring different)
Examples	Fission, budding, vegetative propagation	Conjugation, gamete fusion

---

Conclusion:

Reproduction is essential for the **continuation of life**.
Organisms reproduce **asexually** for speed and simplicity and **sexually** for variation and adaptation.