ST. ANDREWS SCOTS SR. SEC. SCHOOL

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Class - IX

Subject : Biology

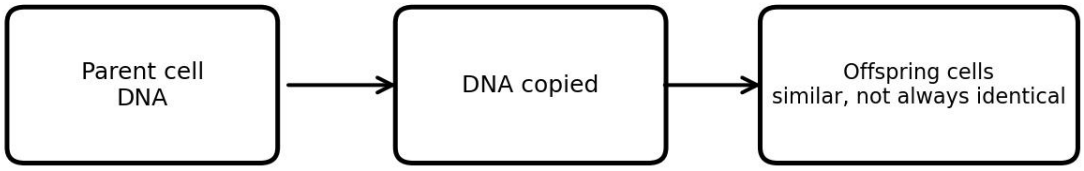
Notes : Chapter 11 : Reproduction: How life Continues

What is reproduction?

Reproduction is the biological process by which living organisms produce new individuals of their own kind. It helps continue a species from one generation to the next.

- It is not essential for the survival of one individual, but it is essential for the continuity of a species.
- DNA (genetic material) is copied and passed from parents to offspring.
- DNA copying is usually very accurate, but small changes can occur. These changes are called variations.
- Variation can help a species survive if the environment changes.

Reproduction: DNA copying and variation



Small copying changes create variations; variation helps populations survive changing conditions.

Types of reproduction

A. Asexual reproduction

Only one parent is involved. There is no fusion of male and female gametes. Offspring are usually very similar to the parent, although small variations may occur.

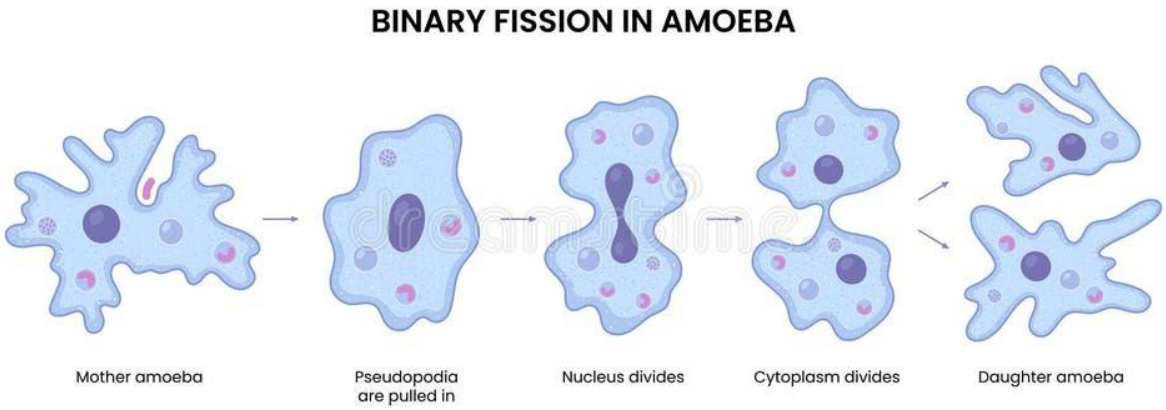
B. Sexual reproduction

Male and female gametes are formed and usually fuse during fertilisation. The offspring receive genetic material from both parents, so they show more variation.

Asexual reproduction and its methods

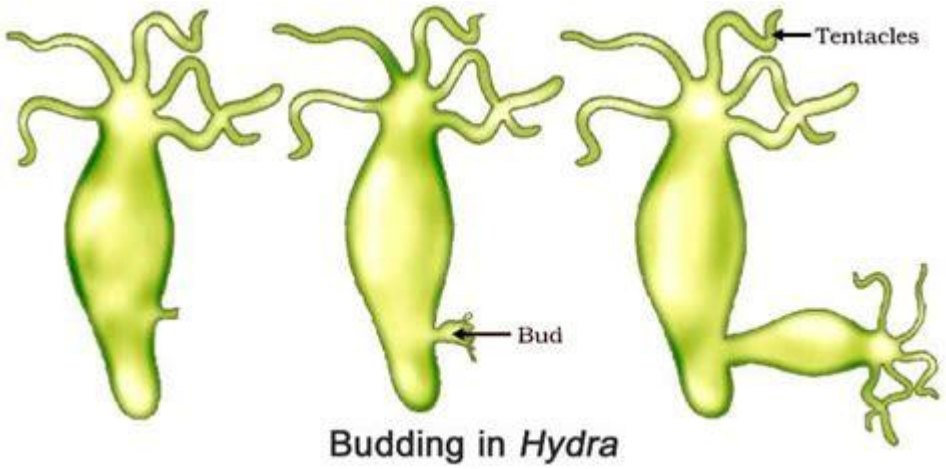
Binary fission

One parent cell divides to form two daughter cells. The nucleus divides first, followed by division of the cell. Examples: Amoeba and many bacteria. In Leishmania, division occurs in a definite direction because of its body organisation.



Budding

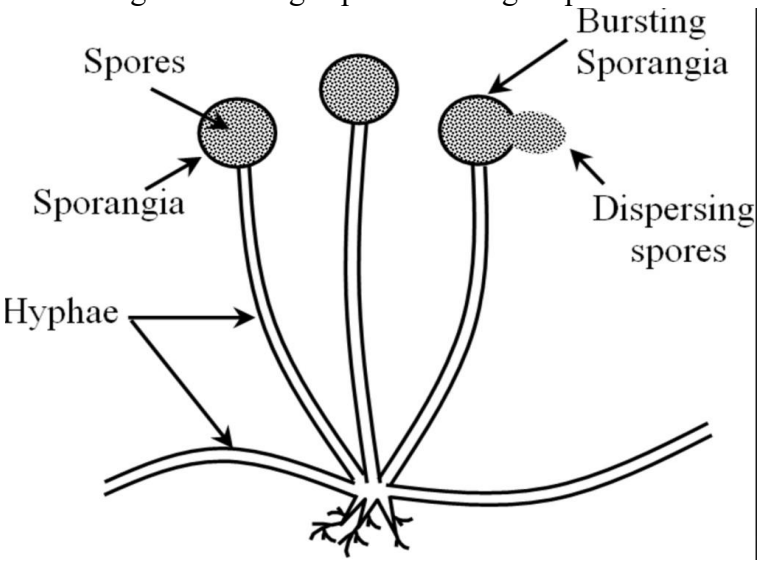
A small outgrowth called a bud develops on the parent. It grows and later separates to live independently. Example: Hydra; yeast also reproduces by budding.



Budding in *Hydra*

Spore formation

Rhizopus (bread mould) forms tiny spores inside structures called sporangia. When the sporangium bursts, spores spread. Under suitable conditions, a spore germinates and grows into a new fungus. The tough spore covering helps it survive unfavourable conditions.



Vegetative propagation

In plants, a new plant can grow from a root, stem, leaf, or bud instead of a seed.

- Natural examples: potato (eyes on stem tuber), ginger (rhizome), onion (bulb), Bryophyllum (buds on leaf margins).
- Artificial methods: cutting, layering, grafting and tissue culture.

- Advantages: rapid multiplication, plants can flower or fruit sooner, and desirable features of the parent can be retained.
- Limitation: little genetic variation may make a population more vulnerable to the same disease or environmental change.

1. CUTTING

A part of stem (or root) with buds is cut from parent plant and planted in moist soil.How it grows? The cut end develops roots and buds develop into shoots. New plant is formed.Example: Rose, Sugarcane, Money plant,

2. LAYERING

A branch of parent plant is bent down to ground and covered with soil. It is still attached to parent.How it grows? After some days, roots develop from covered part. Then it is cut from parent and planted separately.

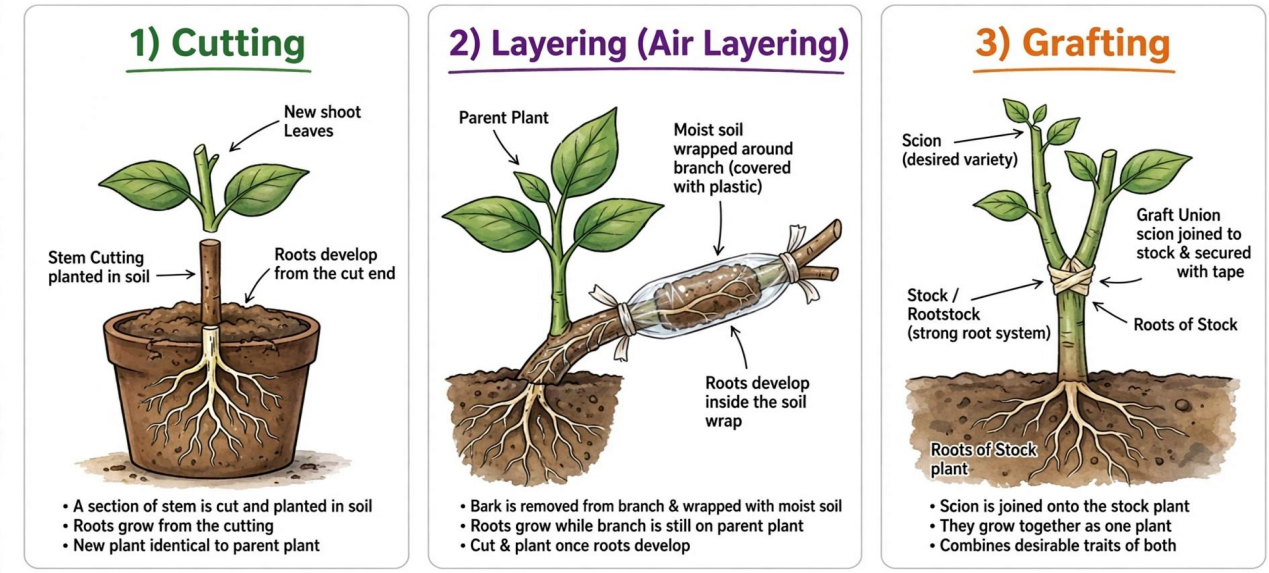
3. GRAFTING:

Two different plants are joined together to grow as one plant.

Stock: Lower part with strong root system

Scion: Upper part with desired fruits/flowers

Both are cut obliquely and joined with tape.Example: Mango, Apple, Rose (to get different coloured flowers in one plant)Features:Combines best qualities of two varieties - strong roots + good fruitsDone for plants which do not root easily by cutting/layeringPlants should be closely related

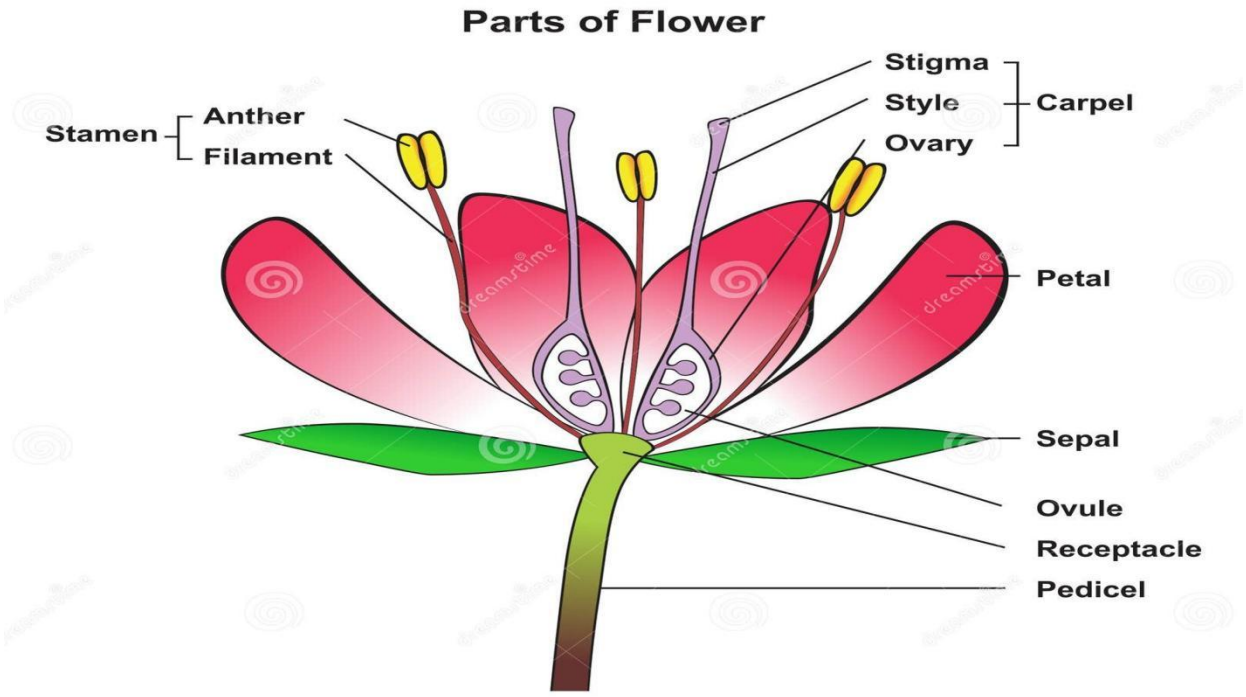


Sexual reproduction in flowering plants

A flower is the reproductive structure of many plants. The male part is the stamen and the female part is the pistil/carpel.

Parts of a flower

- Stamen (male part): anther produces pollen grains; filament supports the anther.
- Pistil/carpel (female part): stigma receives pollen; style connects stigma to ovary; ovary contains ovules.
- Petals often attract pollinators; sepals protect the flower bud.

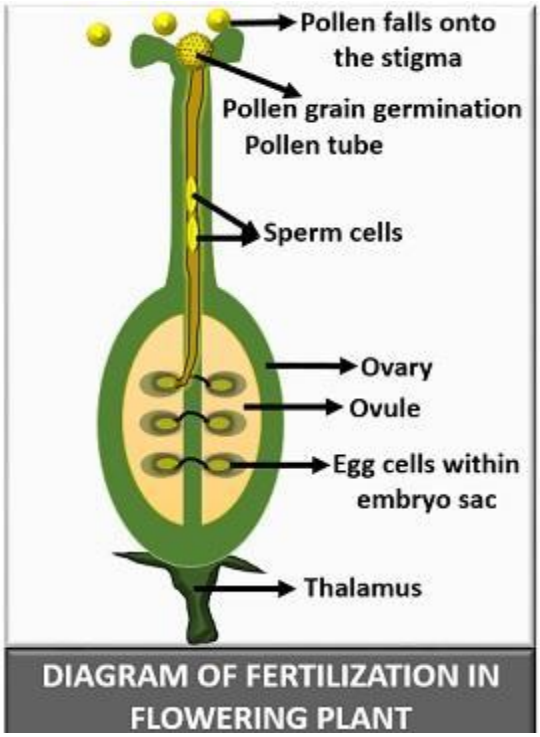


Pollination

Pollination is the transfer of pollen grains from anther to stigma. It may occur within the same flower/plant (self-pollination) or between flowers on different plants of the same species (cross-pollination). Wind, water and animals such as insects can carry pollen.

Fertilisation and seed formation

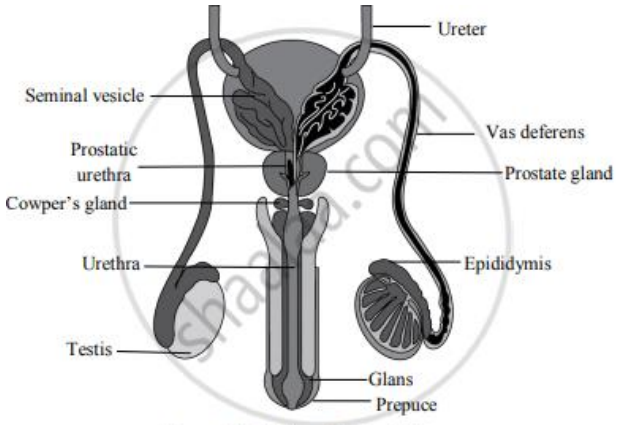
After pollination, a pollen tube grows through the style towards an ovule. The male gamete travels through it and fuses with the female gamete (egg) to form a zygote. The zygote develops into an embryo. The ovule becomes a seed and the ovary usually develops into a fruit.



Human reproduction

Humans reproduce sexually. Puberty is the stage when hormonal changes make the reproductive organs mature and secondary sexual characteristics develop.

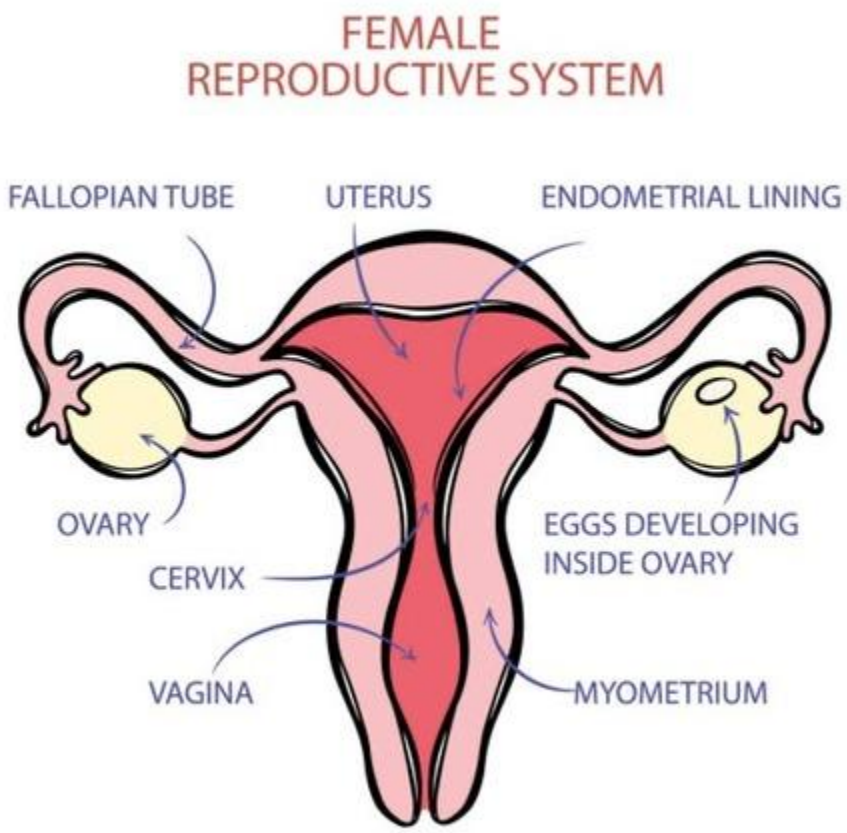
Male reproductive system



Human Male Reproductive System

- Testes produce sperm and the hormone testosterone. They are located in the scrotum, which keeps them at a temperature slightly lower than body temperature.
- Sperm ducts (vas deferens) carry sperm. Glands add fluids that nourish and help transport sperm; this mixture is called semen.
- The urethra carries urine or semen out of the body, but not at the same time.
- The penis transfers semen into the female reproductive tract during sexual intercourse.

Female reproductive system



- Ovaries produce ova (eggs) and hormones such as oestrogen and progesterone.
- Oviducts/fallopian tubes carry the egg; fertilisation usually occurs here.
- The uterus is where the embryo implants and develops during pregnancy. Its lining becomes thick and richly supplied with blood.

- The cervix is the narrow lower part of the uterus; the vagina connects the cervix to the outside of the body.

Menstrual cycle

1. Usually, one ovum matures and is released from an ovary around the middle of a roughly 28-day cycle, although cycle length varies.
2. The lining of the uterus thickens in preparation for a possible pregnancy.
3. If fertilisation and implantation do not occur, the uterine lining breaks down and is shed with blood through the vagina. This is menstruation.
4. If fertilisation occurs, the zygote divides, travels to the uterus and may implant in the uterine lining. Pregnancy begins after implantation.

Fertilisation and development

During fertilisation, a sperm and an egg fuse to form a zygote. The zygote divides repeatedly to form an embryo. The embryo implants in the uterus and develops. The placenta helps exchange oxygen, nutrients and waste between the mother and developing baby. Later in development, the embryo is called a foetus.

Reproductive health and contraception

Contraception helps prevent pregnancy. Different methods suit different needs; no single method is perfect for everyone.

- Barrier methods: condoms help prevent sperm from reaching the egg and also reduce the risk of many sexually transmitted infections (STIs).
- Hormonal methods: pills and some other methods prevent pregnancy mainly by affecting ovulation and/or reproductive processes.
- Intrauterine devices (IUDs): devices placed in the uterus by a trained health professional.
- Surgical methods: vasectomy in males and tubectomy in females are intended to be permanent.
- Abstinence prevents pregnancy and sexual transmission when sexual contact does not occur. Condoms are important for STI risk reduction.

STIs such as HIV infection, gonorrhoea and syphilis can spread through sexual contact. Correct condom use, testing, treatment and reliable health advice reduce risks. Some STIs can also be transmitted in other ways, such as through infected blood.

Asexual vs Sexual reproduction

Feature	Asexual	Sexual
Parents involved	Usually one	Usually two parents contribute gametes
Gametes/fertilisation	Not involved	Gametes fuse during fertilisation
Offspring	Usually very similar to	Show more genetic variation

	parent	
Speed	Often faster	Often slower
Examples	Amoeba, Hydra, Rhizopus	Humans, flowering plants

Important terms to learn

- **Reproduction:** Process of producing new individuals.
- **DNA:** Genetic material carrying hereditary information.
- **Variation:** Differences among individuals of the same species.
- **Gamete:** Reproductive cell, such as sperm or egg.
- **Fertilisation:** Fusion of male and female gametes.
- **Zygote:** Cell formed after fertilisation.
- **Pollination:** Transfer of pollen from anther to stigma.
- **Embryo:** Early developing organism formed from repeated zygote divisions.
- **Placenta:** Organ that supports exchange between mother and developing baby.
- **Menstruation:** Shedding of the uterine lining when pregnancy does not occur.

MOTHER'S HEALTH DURING PREGNANCY

Pregnancy is about 9 months / 280 days. During this period, health of mother is very important for healthy growth of baby.

1. Nutrition: Mother needs extra nutrition - protein, iron, calcium, vitamins.Should eat - milk, green vegetables, fruits, pulses, eggs.Iron and folic acid tablets are given to prevent anaemia.Lack of nutrition can cause low weight of baby and weakness in mother.

2. Medical Care: Regular check-up by doctor - weight, blood pressure, blood test.Two Tetanus injections to mother to protect baby from infection.Ultrasound to check growth of baby.All medicines should be taken only on doctor's advice.

2. **Hygiene and Rest:** Cleanliness to avoid infection.Enough rest and 8 hours sleep.Light exercise / walk as advised by doctor.Avoid heavy work, smoking, alcohol and tobacco - harmful for baby.

4. Emotional Health: Happy and stress-free environment is important.Family support is needed.Stress hormones can affect baby's health.