

# How do Organisms Reproduce

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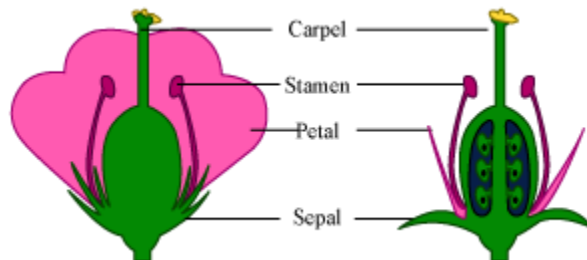
- **Reproduction**

- Biological process by which a living organism produces offspring similar to itself.
- Not essential for survival, helps in the perpetuation of species.
- Information is transferred from the parents to the offspring in the form of DNA.
- DNA (Deoxyribonucleic acid)- a genetic material found in chromosomes present in the nucleus of the cell.
- Two types of reproduction-sexual and asexual.

- **Sexual reproduction**

- Requires two parents.
- Involves fusion of male and female gametes.
- Allows more variations in offsprings.

- **Sexual**



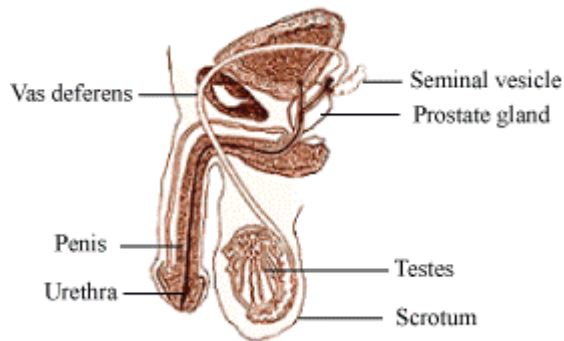
- Angiosperms- flowering plants
- Flower is the reproductive part of angiosperms.
- Four parts of flowers- sepals, petals, stamens, and carpels/pistils
- Sepals- green in colour, protect flower buds, collectively called calyx
- Petals- colourful structures, help in attracting pollinators, collectively called corolla
- Stamens- male reproductive parts of flowers, consists of anther and filament
- Carpels- female reproductive parts of flowers, consists of style, stigma, and ovary
- **Bisexual** flowers- both stamens and carpels are present e.g. *Hibiscus*
- **Unisexual** flowers- either stamens or carpels are present e.g. corn
- Pollen or male gamete are released from the bursting of anther.
- Each ovule contains one egg cell or female gamete.
- **Pollination**- transfer of pollen from the anther of one flower to the stigma of the same or different flower.
- **Fertilization**- fusion of male and female gametes
- After fertilization- zygote forms embryo, ovule forms seed and ovary forms fruit.

- **Sexual reproduction in humans**

- Development into an adult or reaching maturity is essential for reproduction. The period of life where changes set in for the development of a young individual into an adult is called **puberty**.

- **Male Reproductive System**

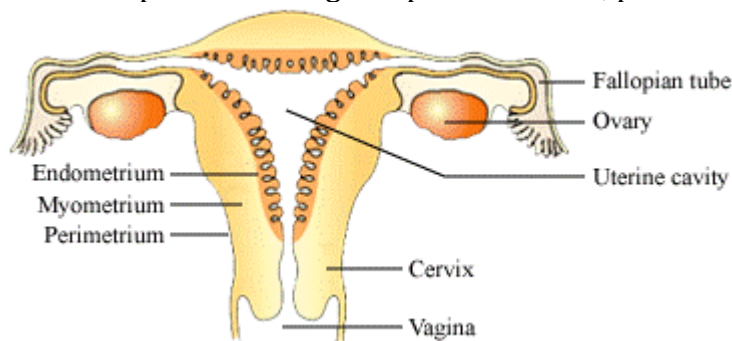
- Male reproductive organs- pair of testes, vas deferens, prostate gland, seminal vesicles



- Testes- produce sperms, testosterone
- Sperms- male gametes

- **Female reproductive System**

- Female reproductive organs- pair of ovaries, pair of oviducts, uterus, and vagina



- Ovaries contain thousands of eggs
- Sperms enter the female body through the vagina
- **Menstruation**- if the egg is not fertilized, then the uterus lining breaks down and is released in the form of blood and mucous through the vagina. It usually lasts for 2 to 8 days.
- **Development of the embryo**
  - The **zygote** repeatedly divides to form a ball of cells.
  - The ball of cells then starts differentiating into tissues and organs. At this stage, it is called **embryo**.
  - Embryo gets attached to the wall of the uterus and develops various body parts such as hands and legs.
  - **Foetus** is a stage of embryo that shows main recognizable feature of mature organism.
  - Foetus develops for nine months inside the mother's womb and is finally delivered.
  - **Fertilization**- fusion of the nucleus of the sperm with the ovum to form a zygote. It occurs in the fallopian tube of females.
  - Zygote divides to form an embryo.

- Embryo is implanted in the uterus.
- Foetus develops inside the mother's body for nine months (gestation period).
- **Vegetative propagation**-in plants, new plants are formed from vegetative parts like root, stem, leaves. e.g. *Bryophyllum* propagates vegetatively by leaf buds.



### **Natural Methods of Vegetative Propagation**

- **Stem propagation** – The surface of potato has several buds called eyes that develop into new plants.
- **Propagation by leaf** – The leaves of *Bryophyllum* have several buds at their margins that develop into tiny plants.
- **Propagation by roots** – The roots of sweet potato, dahlia get detached from parent plant and give rise to a new plant.
- Sugarcane, rose, money plant, etc. reproduce by stem cutting.
- Advantages of vegetative propagation
- Method of propagation for seedless plants such as sugarcane, potato, rose, etc.
- Exact copies of parent plant are produced.
- Large numbers of offsprings are produced.
- Disease free plants can be propagated.

### **Artificial Methods of Vegetative Propagation**

- **Cutting** – The artificial methods of vegetative propagation are
- **Stem cutting** – Short lengths of the plant to be propagated are cut and planted in soil and they develop adventitious roots, leaves grow into individual plants.  
Eg. – Rose, Coleus and Begonia are propagated by this method.
- **Root Cutting** – In some plants, cutting of root are placed in soil and they develop into individual plants.  
Eg. – Lime, Tamarind.
- **Layering** – It consists of two methods they are
- **Mound layering** – In this method, branches of plants to be propagated are bent to touch the soil and the bent portion is covered by soil and roots grow at this node.
- **Air layering** – Used for plants having thick stems. In these plants a part of the stem is removed and is covered with moist cotton and enclosed in a bag, when roots appear after some time, the branch is cut off and is planted. Eg. – Rubber.
- **Grafting** – In this method, two individual plants are used to derive a new plant. The plant whose root portion is used is called stock and the plant whose stem portion is used is called

the scion. The grafted end of the stock and the scion are cut obliquely and placed one upon the other. This is bound tightly. Grafting may be done in two ways they are

- **Bud grafting** – the scion of a dormant bud is grafted on to a stock.  
Eg. – Rose
- **Stem grafting** – It is usually done on closely related plants. In this method, either the stock is cut or slitted where the scion is inserted and bound tightly.  
Eg. – Mango, citrus, apple, etc.
- **Micro propagation or tissue culture** – In this method, usually the meristematic tissue is grown in a suitable medium and developed into callus and then the callus is propagated into a new plant.
- **Hybridization** – In this method, mating of two individuals of different genotype is carried out. The new individual thus formed is called hybrid.

The process involves

- Selection of male and female parents.
- The female flower is emasculated (anthers are removed).
- Emasculation is followed by bagging (to prevent cross pollination).
- Pollens from male plant are dusted on to the stigma of the female plant.

This method is used to get better varieties of crop plants.

#### **Advantages of Hybridization**

1. Higher yielding, better quality seeds are produced.
2. Disease and drought resistant varieties can be developed
3. Adaptations to wider range of habitats and
4. Insect and pest resistance.

#### **Asexual reproduction**

- Does not involve the fusion of gametes.
- Requires only one parent.
- Offsprings produced are the exact copies of their parents.

#### **Modes of asexual reproduction**

- **Fission**- involves cell division or splitting of cells e.g., *Amoeba*
- **Multiple fission**: In multiple fission, a single cell divides into many daughter cells simultaneously. Examples: *Plasmodium* and *Amoeba*
- **Fragmentation**- new organisms formed from fragments of parents e.g., lichens
- **Regeneration**- new organisms formed from body parts e.g., *Planaria*, *Hydra*
- **Budding**- new individuals from protrusion called buds e.g., *Hydra*
  
- **Sexually transmitted diseases**- infections that get transferred through sexual contact e.g., herpes, HIV-AIDS, syphilis, gonorrhea etc.
- **Contraceptive methods to avoid pregnancy**
  - natural methods- abstinence
  - barrier methods- condoms
  - oral contraceptives- hormonal drugs
  - implants- loop or copper-T
  - surgical methods- Vasectomy and tubectomy