REPRODUCTION

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GAURAV SUTHAR

Reproduction

The production of new organism form the already existing organism of the same species is known as Reproduction.

Significance of Reproduction :-

- The process of reproduction ensures continuity of life on earth.
- Reproduction is essential for the survival of a species on this earth.

Types of Reproduction :-

1. Asexual Reproduction -

- The production of a new organism from a single parent without the involvement of sex cells (or gametes) is called asexual reproduction.

2) Sexual Reproduction -

- The production of a new organism from two parents by making use of their Sex cells (or gametes) is called Sexual reproduction.

Ques - Differentiate between Asexual Reproduction and Sexual Reproduction.

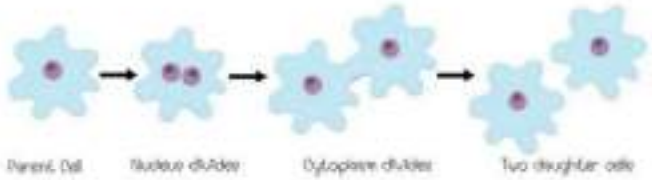
Asexual Reproduction	Sexual Reproduction
1) Only one parent is needed to produce a new organism.	1) Two parents are needed to produce a new organism.
2) No Sex cells (or gametes) are involved.	2) Sex cells (or gametes) take part in sexual reproduction.
3) No fusion of gametes takes place. Thus, zygote is not formed.	3) Fusion of gametes results in the formation of zygote.

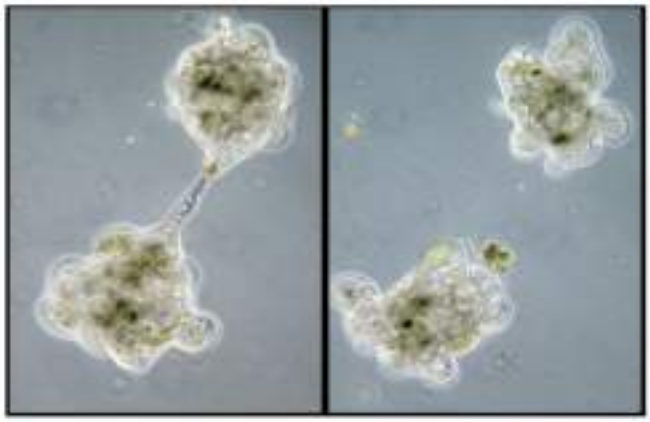
Asexual Reproduction

Fission

- In this process of fission, a unicellular organism splits or divides into two or more new organism.

Binary Fission	Multiple Fission
1) The parent organism splits to form two new organism.	1) The parent organism splits to form many new organism at the same time
Example 1) - Binary fission in Amoeba (fission can take place in any place)	Example - Plasmodium





Real Image of Binary Fission in Amoeba

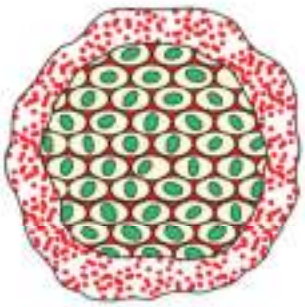


Figure 8.2
Multiple fission in Plasmodium

Example 2) -

Binary fission in Leishmania (fission takes place in a definite orientation)

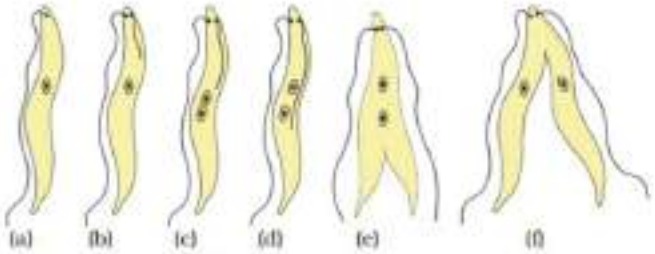
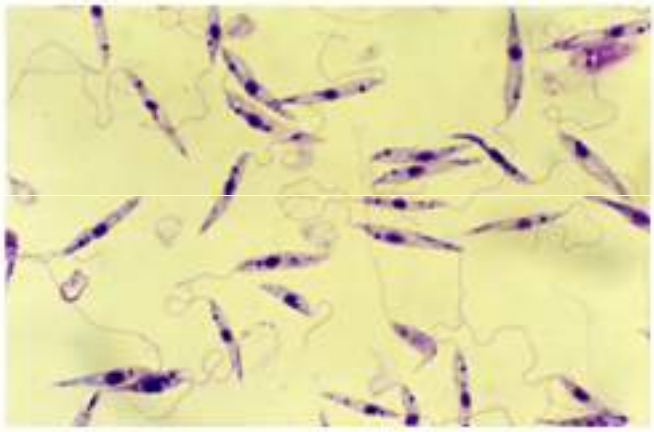


Figure 8.1(b) *Binary fission in Leishmania*



Real Image of Binary Fission in Leishmania

Fragmentation

- The breaking up of the body of a simple organism into two or more pieces on maturing, each of which subsequently grows to form a complete new organism, is called fragmentation.

- Example – Spirogyra

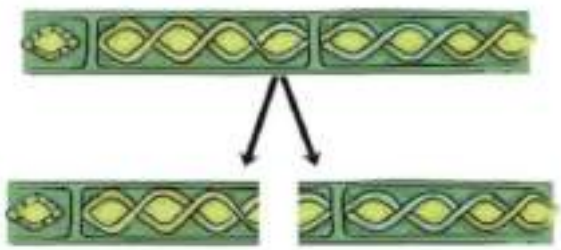
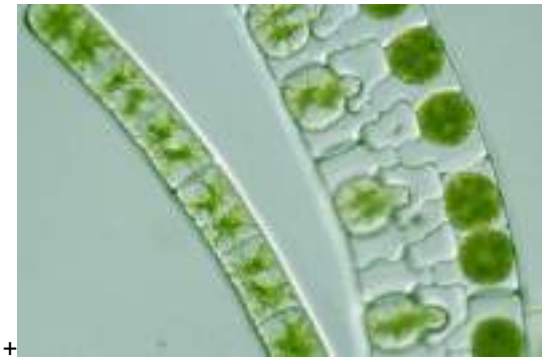


Fig. Fragmentation in Spirogyra



Real photo of Fragmentation in Spirogyra

Ques - What is the difference between Fission and Fragmentation?

Ans -

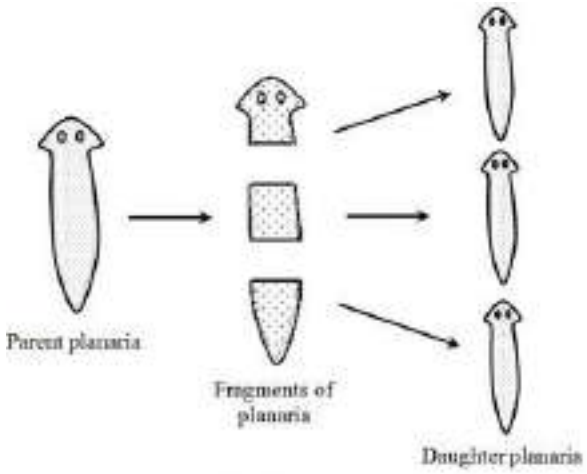
Fission --------> Unicellular

Fragmentation ----------> Multicellular

Regeneration

The process of getting back a full organism from its body parts is called Regeneration.

Example - Hydra and Planaria

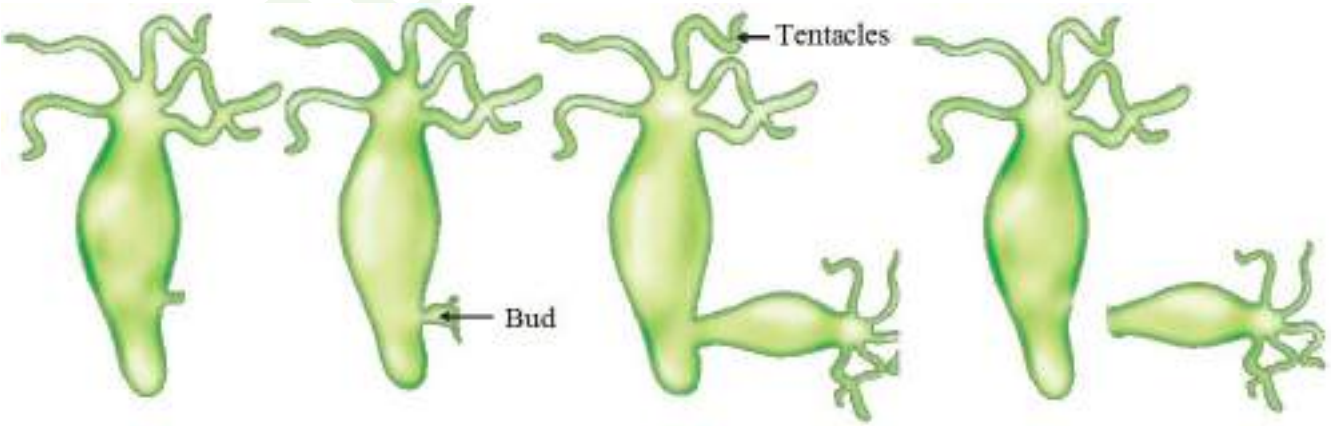


Fragmentation in Planaria

Real photo of Planaria

Budding

- In budding, a small part of the body of the parent organism grows out as a 'bud' which then detaches and becomes a new organism.
- Example - Hydra



Budding in Hydra

Real photo of budding in Hydra

Spore Formation

- The parent plant produces hundred of microscopic reproductive units called 'spores'. When the spore case of the plant bursts, then the spores spread into air. When these air-borne spores land on food (or soil) under favourable conditions (like damp and warm conditions), they germinate and produce new plants.
- Example - Rhizopus

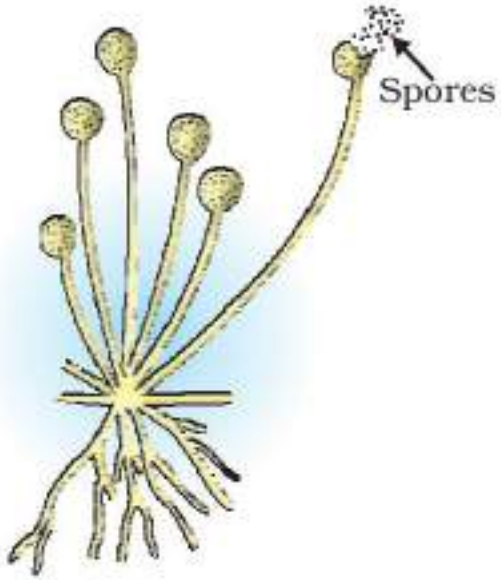
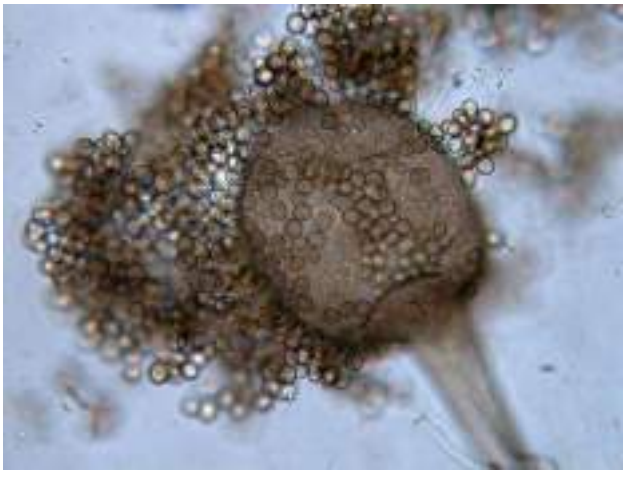


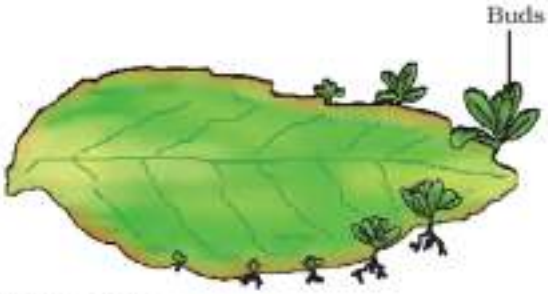
Figure 8.6
Spore formation in Rhizopus



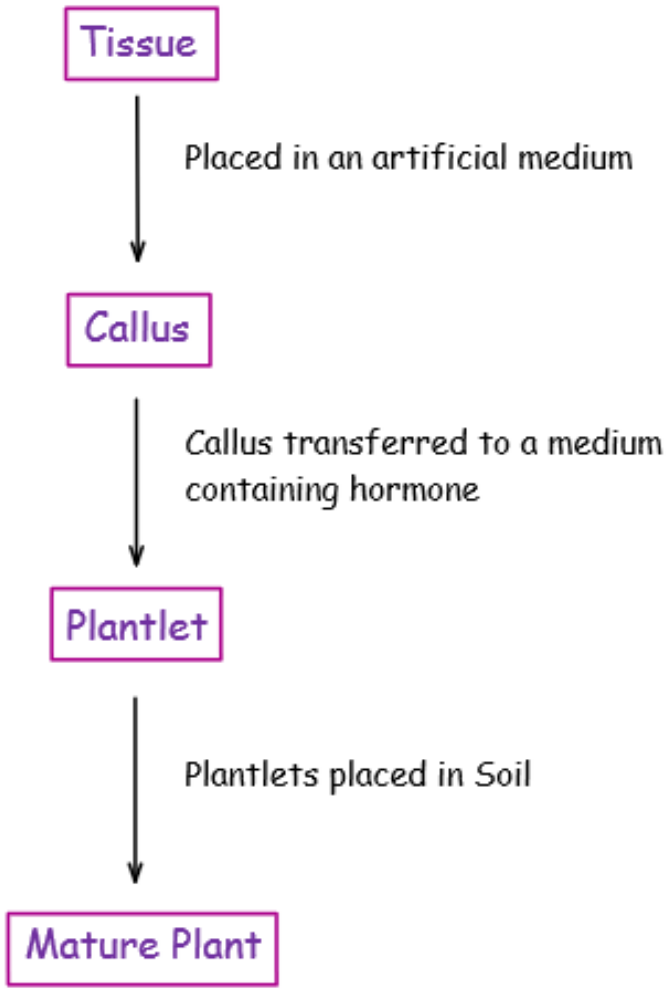
Real photo of Spore Formation in Rhizopus

Vegetative Propagation :

- In Vegetative propagation, new plants are obtained from the parts of old plants (like Stem, roots and leaves) without the help of any Reproductive organs.

Natural Vegetative Propagation	Artificial Vegetative Propagation
1) Buds produced in the notches along the leaf margin of Bryophyllum fall on the soil and develop into new plants.	1) The process of growing many plants from one plant by man-made methods. Example - Sugarcane, Rose, Jasmine
 ***Figure 8.5*** *Leaf of Bryophyllum with buds*	2) Its three common methods are- (i) Cutting : It involves cutting a piece of the plant and rooting it to produce a new plant. (ii) Layering : It involves covering the branch of a plant with soil and then cutting it. (iii) Grafting : It occurs when two different plant stem are joined and they grow as a single plant.
 Real image of Bryophyllum Leaf	

Tissue Culture



DNA [Deoxyribo Nucleic Acid] -

- The individuals produced during reproduction are similar to each other and their parents. This similarity occurs because of DNA.
- During reproduction, DNA copying takes place.
- However, the process of DNA copying is not 100% accurate. These inaccuracies during DNA copying leads to variations. (Even during asexual reproduction)

Importance of Variation

- It helps the species to survive even in adverse environment.

Sexual Reproduction

- Sexual Reproduction involves the fusion of gametes or sex cells resulting in the formation of zygote

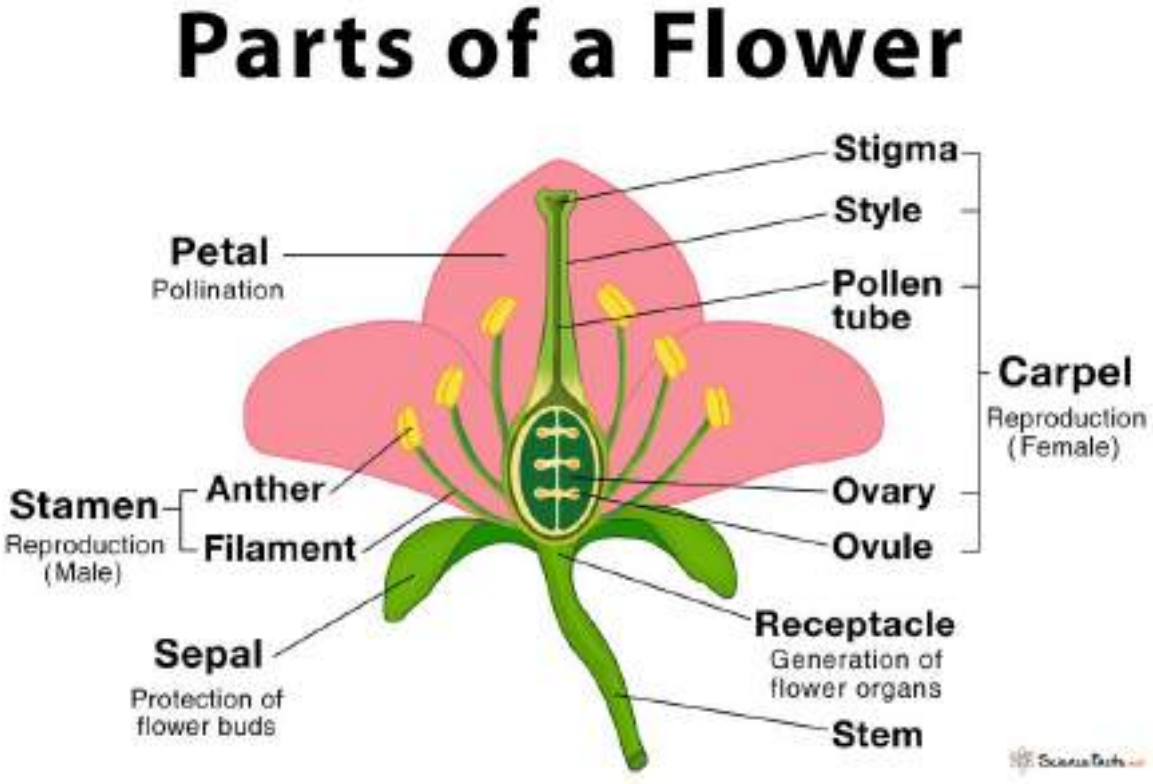
- Due to the fusion of gametes, the chances of variations are very high during sexual reproduction

Ques - What is the advantage of Sexual reproduction?

Ans – Sexual reproduction results in genetic variation which ultimately leads to evolution of new species.

Sexual Reproduction in Flowering Plants

The Sex Organs (or reproductive organs) of a plant are in its flowers.



1) Stamen

- It is the male reproductive part of the flower.
- It is composed of two parts - Anther and Filament.
- Stamen produces pollen grains that are yellow in colour.

2) Pistil

- It is the female reproductive part of the flower.
- It is composed of three parts - Ovary, Style and Stigma.
  - Ovary : The swollen bottom part
  - Style : Middle elongated part
  - Stigma : Terminal sticky part

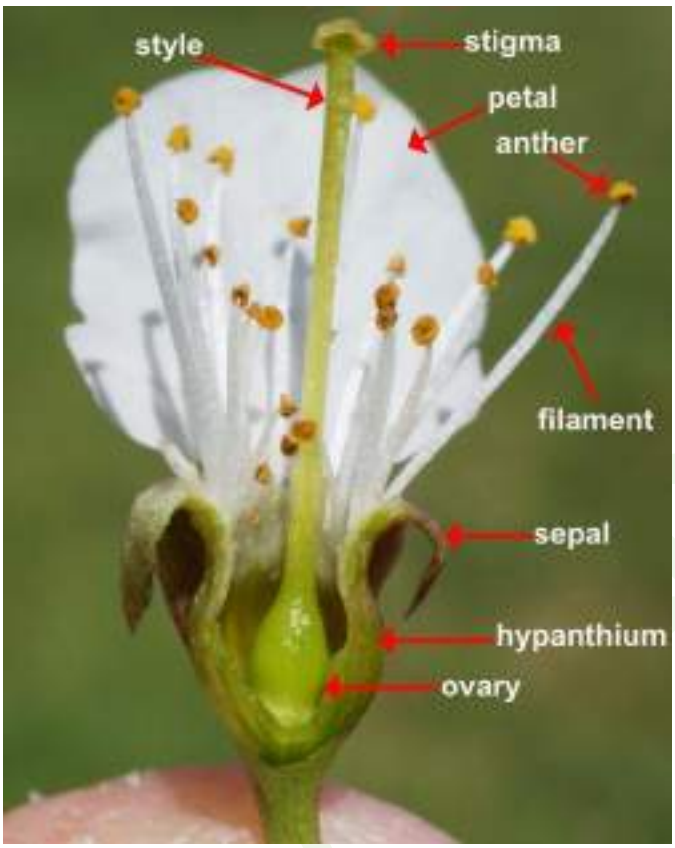
3) Sepals

- The green, leaf-like parts of the flower are called Sepals.
- Its function is to protect the flower in its initial stages.

4) Petals

- The colourful parts of a flower are called Petals.

- Its function of petals is to attract insects for pollination and to protect the reproductive organs.



Real photo of parts of Flower

Types of Flowers

1) Unisexual flowers

- Contains either Stamens or Pistil
- Example - Papaya, Watermelon

2) Bisexual flowers

- Contains both Stamens and Pistil
- Example - Hibiscus, Mustard

Steps of reproduction in Flowering Plants

1. Pollination

The transfer of pollen grains from anther of a stamen to the stigma of a carpel is called pollination.

- Pollination can be of two types:

  - **Self Pollination** - The pollen grains from the anther of a flower are transferred to the Stigma of the same flower (or another flower of the same plant)

  - **Cross Pollination** - The pollen grains from the anther of a flower on one plant are transferred to the Stigma of a flower of another similar plant.

2) Fertilization

Fertilization occurs when the male gamete present in the pollen grain joins with the female gamete (or egg) present in ovule.

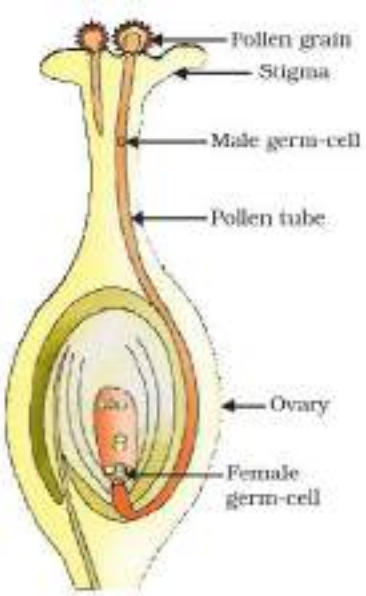
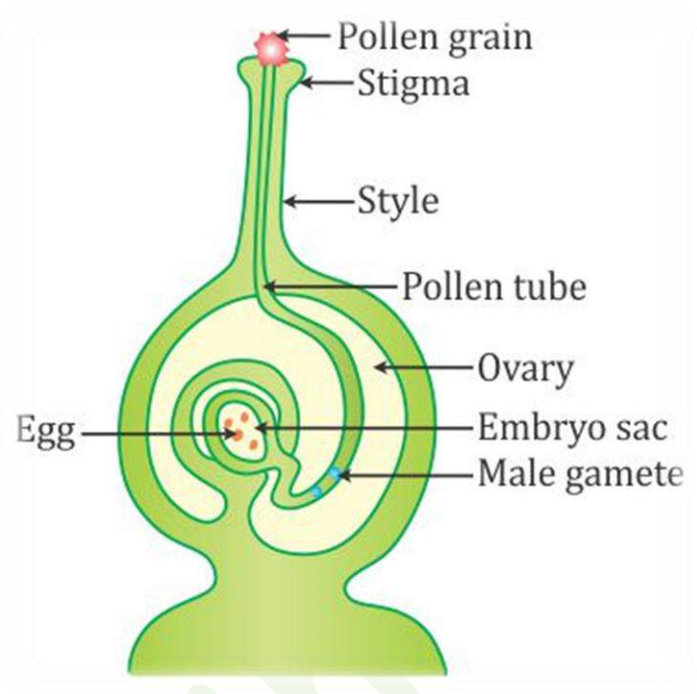


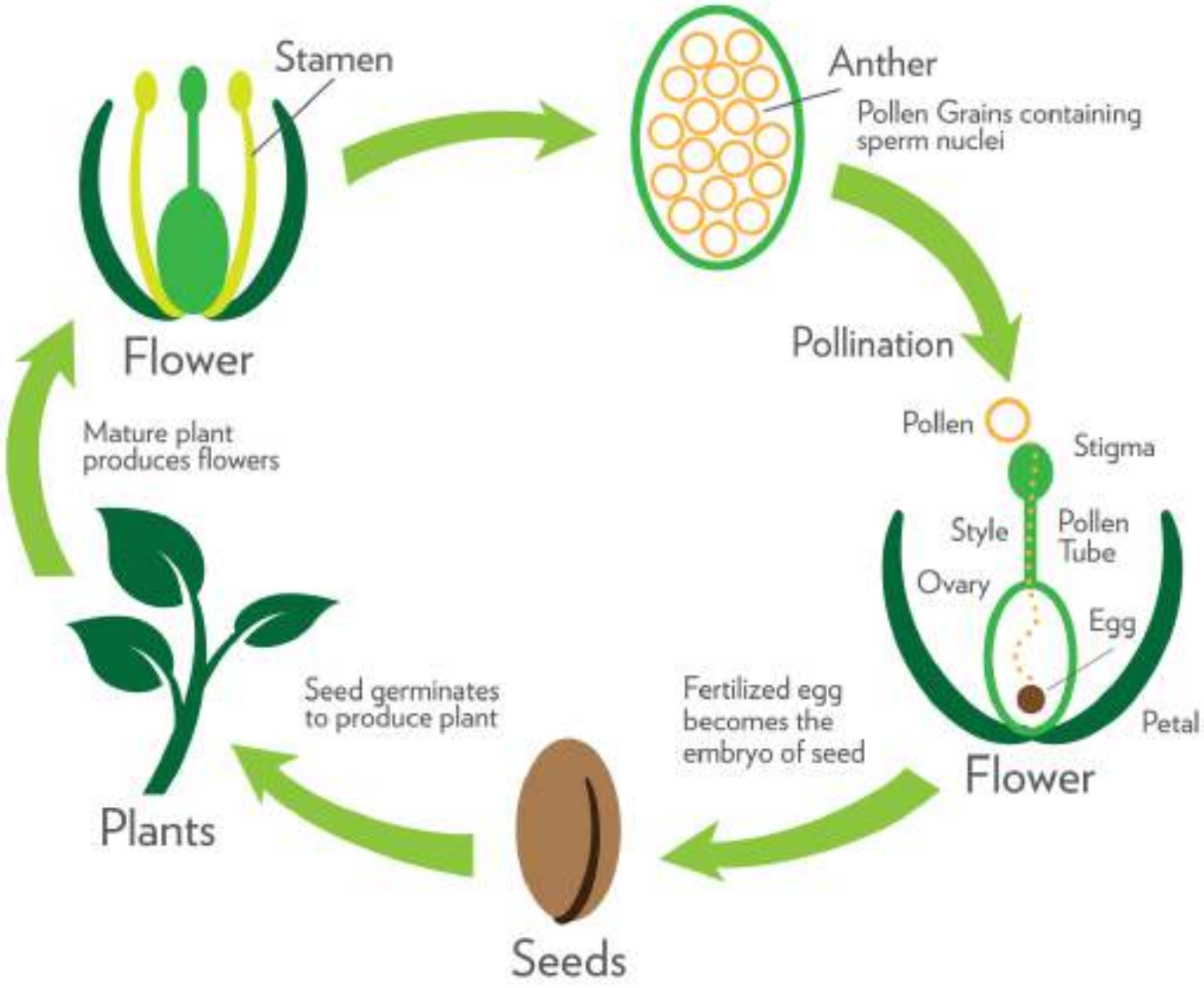
Figure 8.8
Germination of pollen on stigma



Easy Diagram of Ovary

Both Diagrams are of same thing but
Left Diagram is of NCERT book
And the Right Diagram is easy to understand

Complete process of Reproduction in Flower
Just in one Diagram



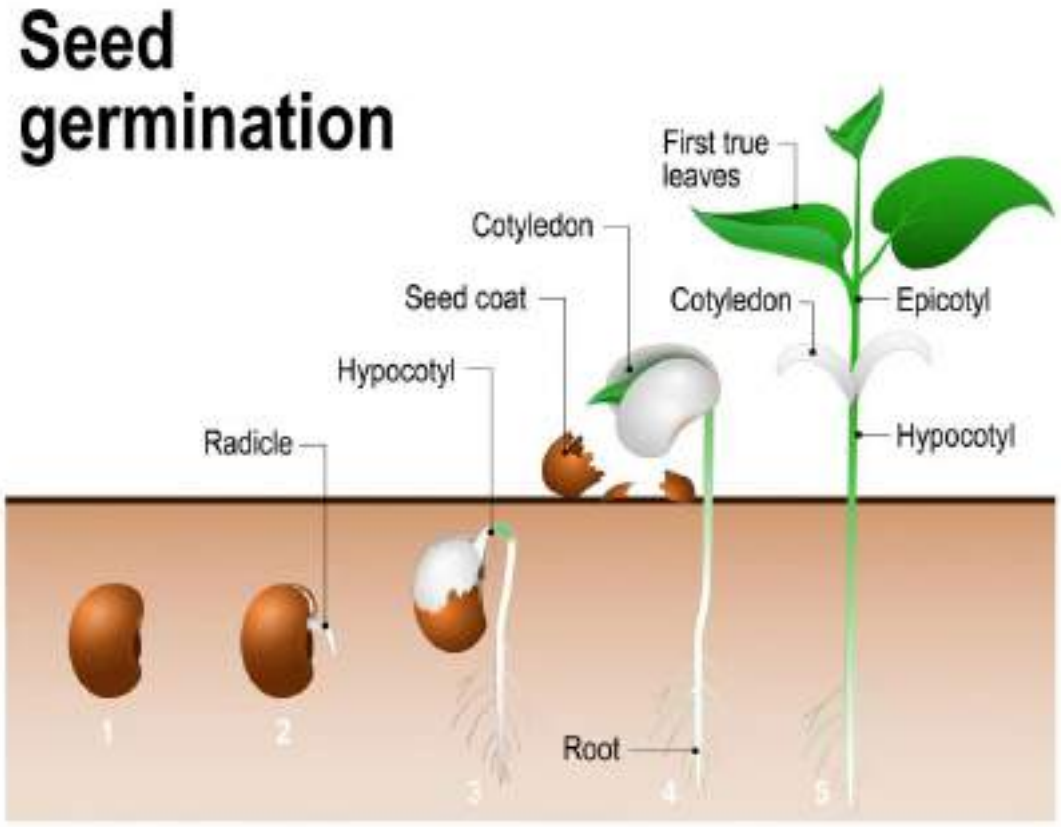
3) Formation of Fruits and Seed

- After fertilization, the zygote divides several times to form an embryo within the ovule.
- The ovule develops a tough coat and is converted into Seed.

- The ovary grows rapidly and ripens to form a form of Fruit.

4) Germination of Seed

- The Seed contains the future plant which develops into a Seedling.
- The radicle grows to form the root.
- Plumule grows upward to form the shoot.
- Cotyledon contains stored food that helps radicle and plumule to grow.



Reproduction in Human Beings

Puberty

- The age at which the Sex hormone and gametes begin to be produces and the Boy and Girl become sexually mature is called Puberty.
- In males, after Puberty, testes starts producing sperms and the Male sex hormone called Testosterone.
- In females, after puberty, ovaries starts producing Ova (or eggs) and Female sex hormone, **Estrogen**.
- Male and female also starts developing secondary sexual characters.

Secondary Sexual characters in **Male** :

a. Hair grow in Armpits, Pubic regions, Chest and Face
b. Body becomes muscular.
c. The voice deepens.
d. Chest and Shoulders broaden.

Secondary Sexual characters in **Female** :

a. Hair grow in Armpits and Pubic regions.
b. Mammary glands develop and enlarge.
c. Hips broaden.
d. Fallopian tube, uterus and Vagina enlarge.

Male Reproductive System :

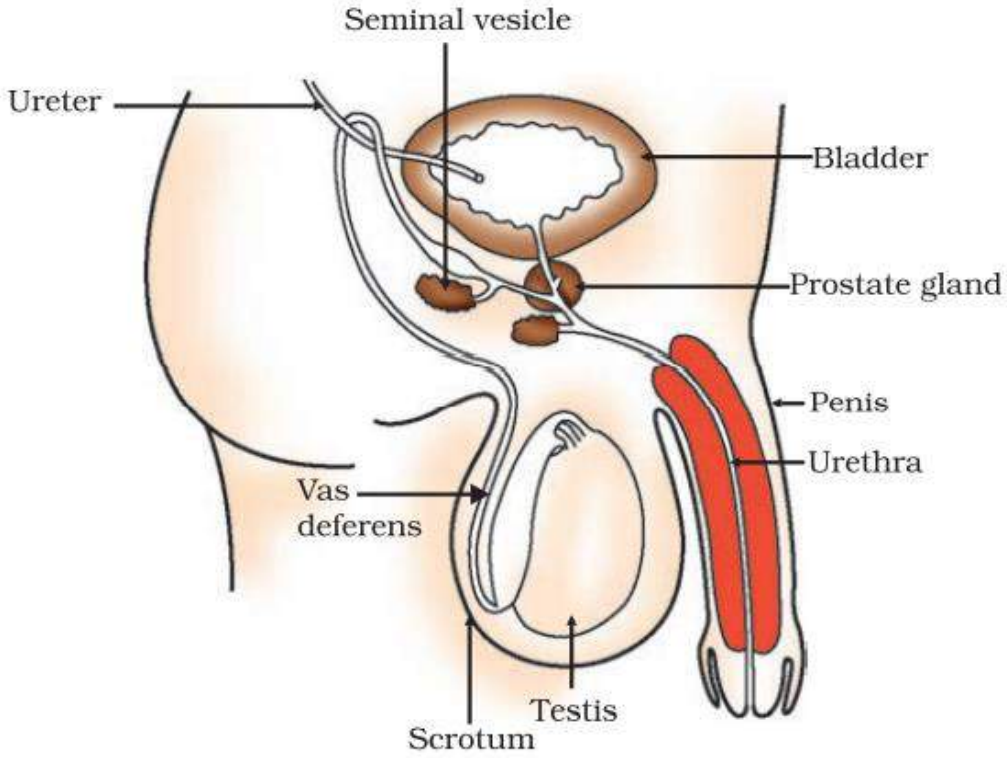


Figure 8.10 *Human–male reproductive system*

- The male reproductive system consists of portions which perform two major functions-

  - Produce sperms – Testes

  - Deliver sperms to the site of fertilization - All the rest (Vas deferens, Seminal Vesicle, Prostrate)

1) Testes

– It is primary reproductive organ in male.

– It is located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature.

Functions of Testes –

- Formation of Sperms.
- Secretion of testosterone.

Testosterone -

- It is the Male sex hormone.
- It helps in the development of secondary Sexual characters.
- It regulates the formation of Sperms.

2) Vas Deferens

– Vas deferens delivers sperms from testes to urethra.

3) Prostate and Seminal Vesicle

– Both of these gland add fluid secretions to the sperms which makes the transport of sperms easier and provides nutrition.

4) Urethra

– Forms a common passage for both Sperms and Urine.

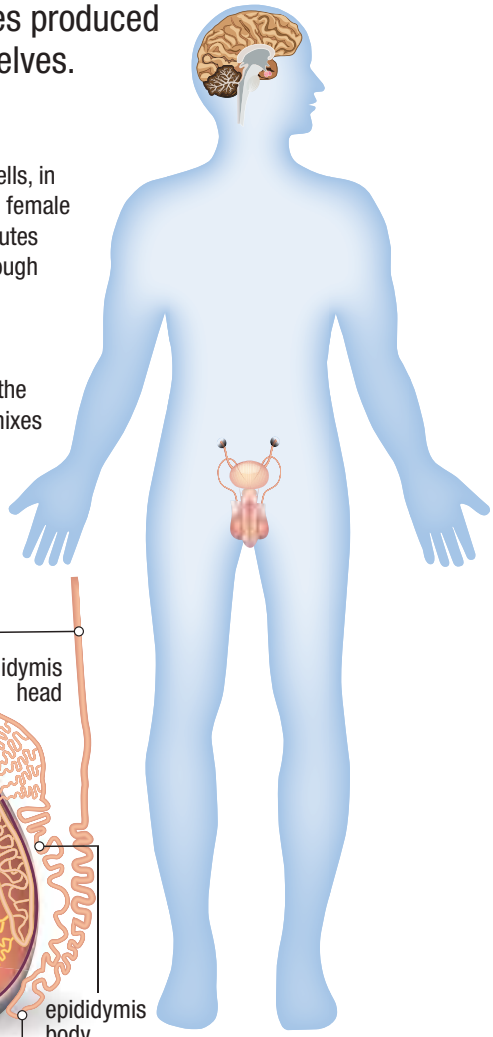
Sperms -

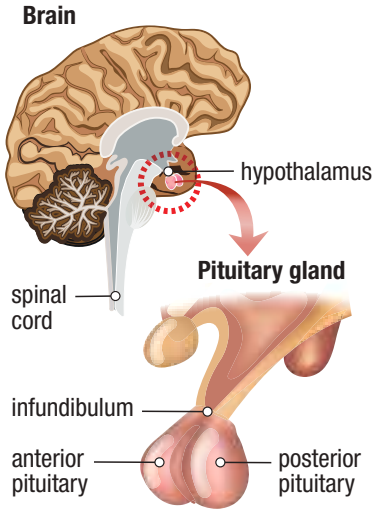
- They are tiny bodies that consists of mainly genetic material and a long tail that helps them to move towards the female germ cell.

Detailed Diagram of
Human Reproductive System
on Next Page

Human Body: Reproductive System

The male and female reproductive systems are controlled by hormones produced by the pituitary gland in the brain, and the reproductive organs themselves.





Pituitary Gland

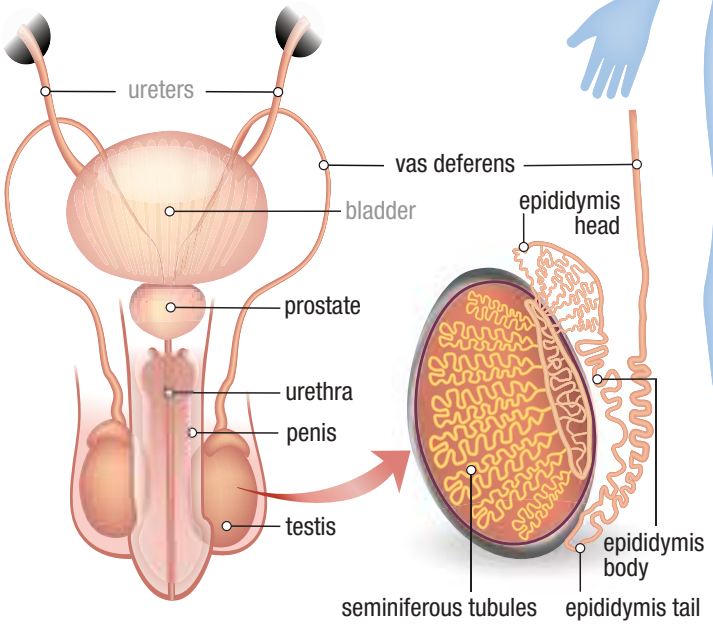
The pituitary gland secretes hormones that control the reproductive organs. It signals the production of sex hormones and controls ovulation and the menstrual cycle in women.

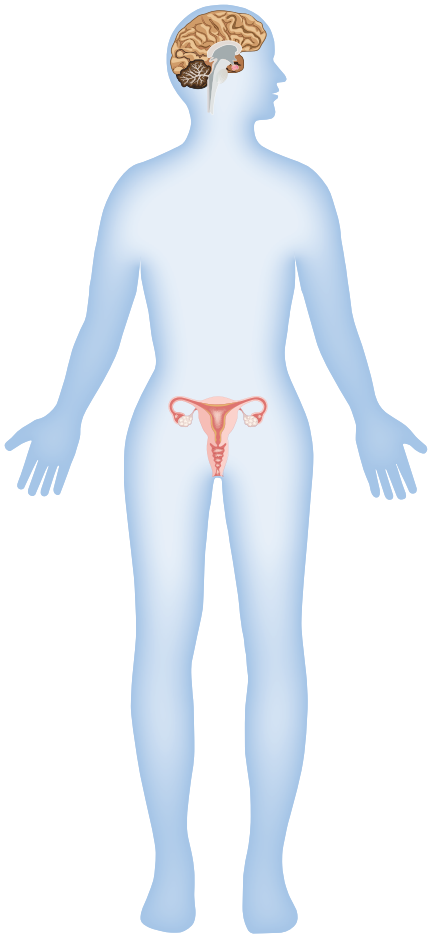
The Reproductive Organs

These organs make, mature, and store gametes, or sex cells, in the human body. The male gametes are called sperm and female gametes are called ova or egg cells. Each gamete contributes half of an offspring's DNA, providing genetic variation through sexual reproduction.

Male reproductive system

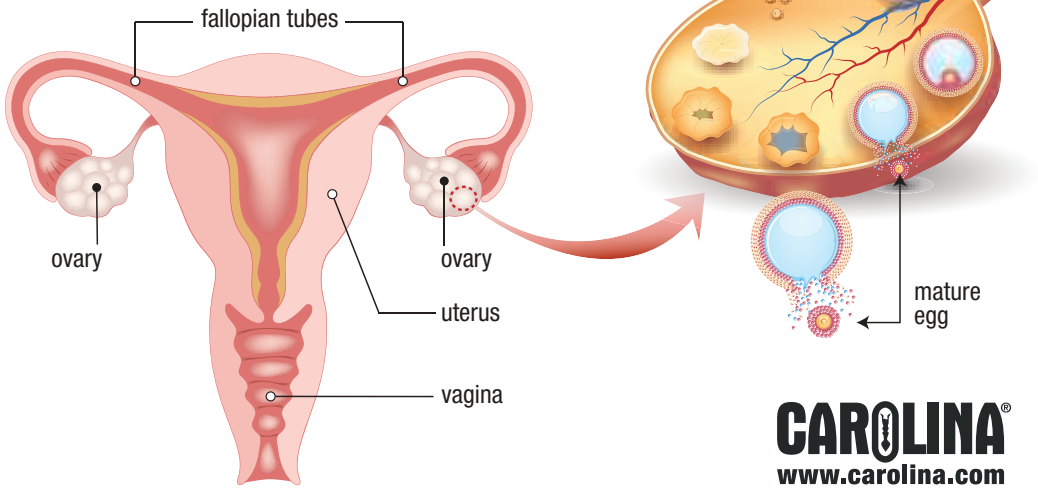
Sperm is made in the seminiferous tubules and stored in the epididymis. It travels through the vas deferens, where it mixes with seminal fluids and passes through the urethra.





Female reproductive system

Immature eggs are found in the ovaries where they mature and are released into the fallopian tubes. An egg travels down the tube to the uterus, where it either implants and develops into an embryo or is shed with the lining of the uterus at the end of a menstrual cycle.



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Female Reproductive System

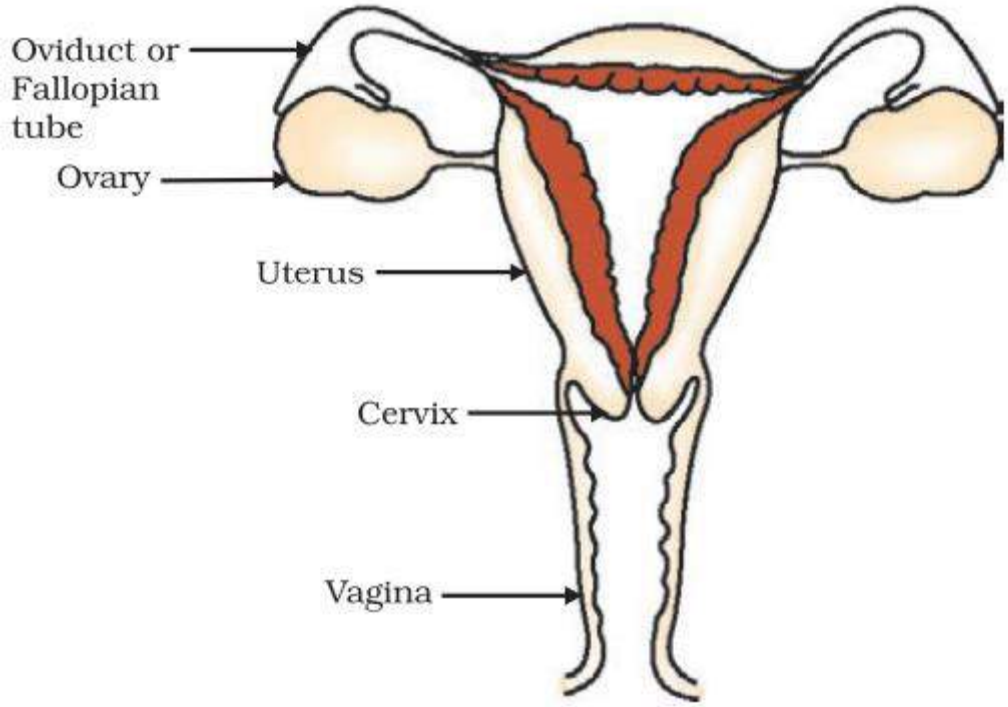

Figure 8.11 *Human–female reproductive system*

1) Ovary

- It is the primary reproductive organ in female. It performs two major functions
    - Production of - Egg/ Ovum.
    - Secretion of Estrogen and Progesterone
- One egg is produced every month by ovaries.

2) Fallopian tube / Oviduct

- It is the primary reproductive organ in female. It performs two major functions
- It acts as a site of fertilization.

3) Uterus

- The Oviducts unite into an elastic - bag like structure known as the uterus.
- Uterus opens into the vagina through cervix.

4) Vagina

- It receives sperms from male partner, serves as a Birth Canal.

5) Cervix

- Uterus is connected to vagina through a narrow opening called Cervix.

Fertilization & Development of Embryo

- The sperms enter through the vaginal passage during sexual intercourse.
- They travel upwards and reach the oviduct where they may encounter egg.
- The fertilized egg (zygote) starts diving to form a ball of cells or embryo.
- The embryo is implanted in the lining of the uterus where they continue to grow and develop organs to become foetus.
- The embryo gets nutrition from the mother's blood with the help of a special tissue called **Placenta**.

Placenta

- It is a disc shaped structure embedded in the uterine wall.
- It helps in exchange of nutrients, oxygen and waste products between the embryo and mother.

- The development of the child inside the mother's body takes approximately nine months (Gestation period). The child is born as a result of rhythmic contractions of the muscle in the uterus.

Mensuration

- Every month, Ovary releases one egg and uterus prepares itself to receive the fertilised egg by developing thick, spongy lining.
- If fertilisation doesn't take place, egg along with the uterus lining breaks down and comes out through vagina as blood and mucus.
- This cycle takes place roughly every month and is known as Mensuration.
- It lasts for about 2-8 days.

Sexually Transmitted Diseases (STD)

- Diseases which are spread by sexual contact with an infected person are called Sexually Transmitted Diseases (STD).
- Common STD are:
  - Gonorrhoea
  - Syphills Caused by Bacteria
  - AIDS (Acquired Immune Deficiency Syndrome) Caused by Virus

Contraceptive/ Birth Control Methods

– The prevention of pregnancy in Women is called Contraception.

1. Barrier Method - Condoms

Advantage : It helps in the prevention of STD

2) Chemical Method - Oral pills

Disadvantage : It changes hormonal balance which can cause side effects.

3) IUCD (Intra Uterine Contraceptive Devices) - Copper -T

Disadvantage : Can cause irritation of uterus.

4) Surgical Methods

Vasectomy	Tubectomy
Blocking of Vas deferens in male	Blocking of fallopian tube in females.

- Surgical methods are safe in the long run but surgery itself can cause infections if not performed properly.

CHEMICAL REACTIONS & EQUATIONS

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Acid, Base & Salt

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Magnetic Effects
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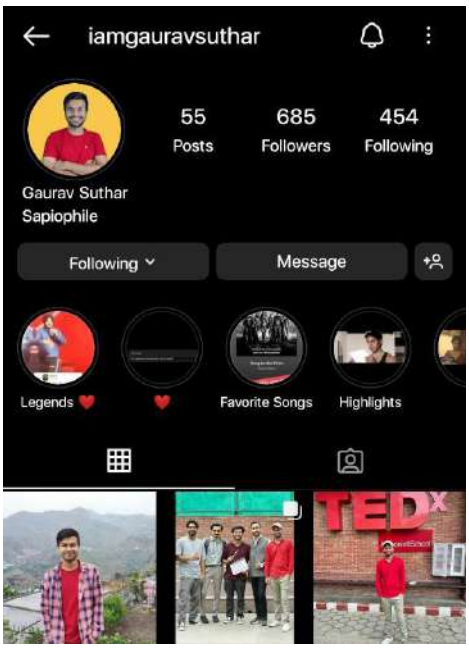
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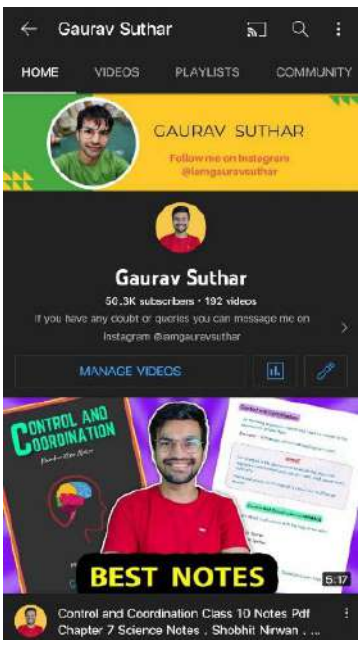
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