

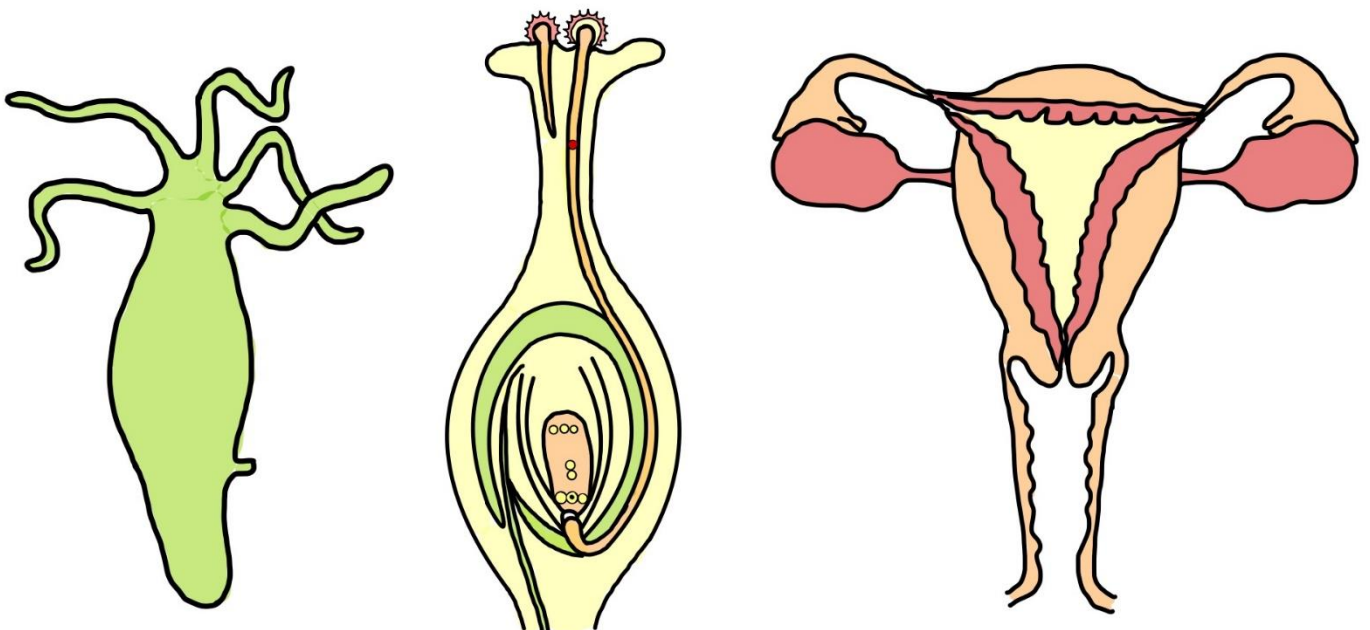


BIOLOGY

AID

How Do Organisms Reproduce

Handwritten Notes



Reproduction

The production of new organism from the already existing 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.

Q. Differentiate between Asexual Reproduction and Sexual Reproduction.

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

Asexual Reproduction

Fission

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

Binary Fission

- The parent organism splits to form two new organism.
- E.g. 1 - Binary fission in Amoeba (fission can take place in any plane)

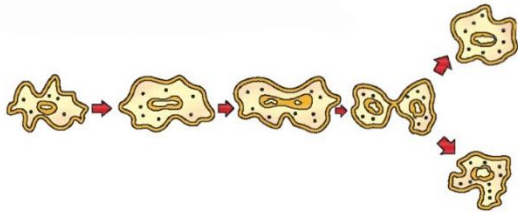


Figure 8.1(a) Binary fission in Amoeba

- E.g. 2 - Binary fission in Leishmania (fission takes place in a definite orientation)

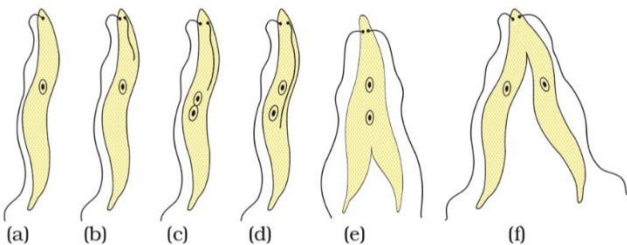


Figure 8.1(b) Binary fission in Leishmania

Multiple Fission

- The parent organism splits to form many new organism at the same time.
- E.g. - Plasmodium

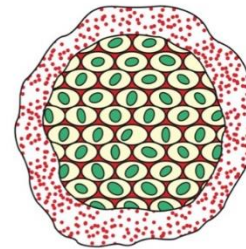


Figure 8.2
Multiple fission in Plasmodium

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.

- E.g. - Spirogyra

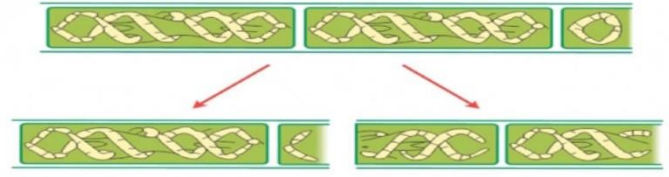


Fig. Fragmentation In Spirogyra

Q. 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.
- E.g. Hydra and Planaria

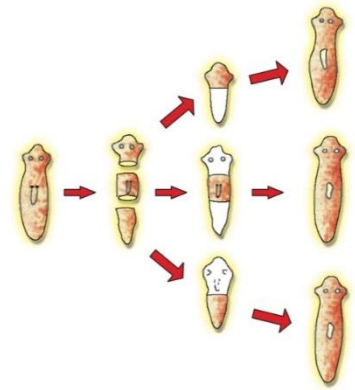


Figure 8.3 Regeneration in Planaria

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.
- E.g. - Hydra

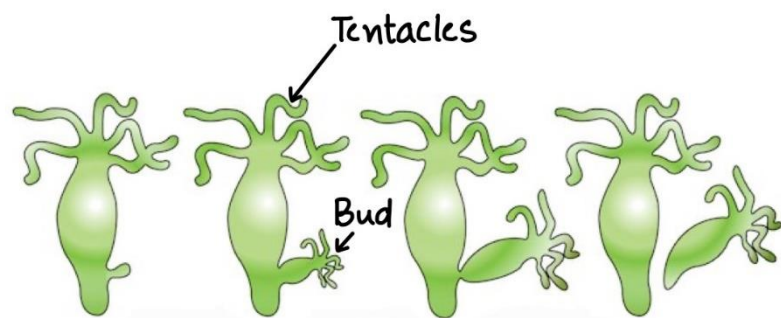


Fig. Budding in Hydra

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.

- E.g. - Rhizopus

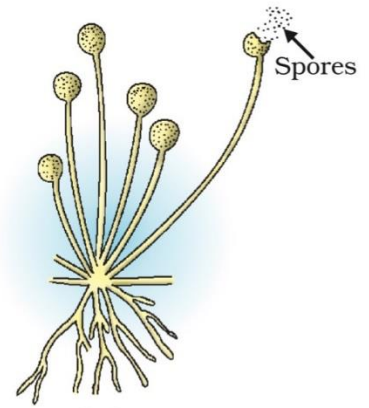


Figure 8.6

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

- Buds produced in the notches along the leaf margin of Bryophyllum fall on the soil and develop into new plants.

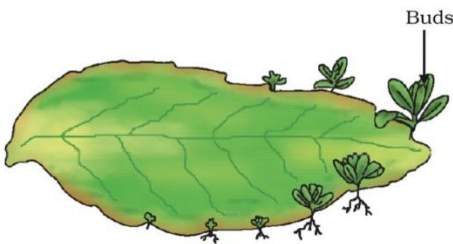
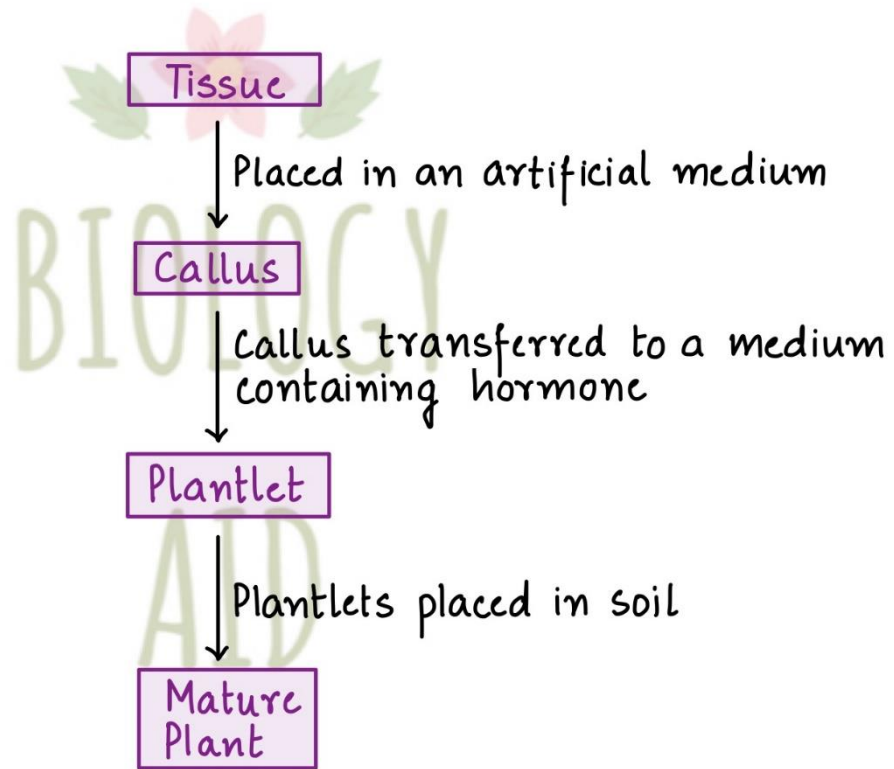


Figure 8.5
Leaf of Bryophyllum
with buds

Artificial Vegetative Propagation

- The process of growing many plants from one plant by man-made methods. E.g. - Sugarcane, Rose, Jasmine
- Its three common methods are -
 1. Cutting: It involves cutting a piece of the plant and rooting it to produce a new plant.
 2. Layering: It involves covering the branch of a plant with soil and then cutting it.
 3. Grafting: It occurs when two different plant stem are joined and they grow as a single plant.

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.

Q. 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.

Parts Of A Flower

- 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.
- Pistil**: It is the female reproductive part. It is made of three parts -
 - Ovary**: The swollen bottom part
 - Style**: Middle elongated part
 - Stigma**: Terminal sticky part
- Sepals**: The green, leaf-like parts of the flower are called sepals.
 - Its function is to protect the flower in its initial stages.
- Petals**: The colourful parts of a flower are called petals.
 - The function of petals is to attract insects for pollination and to protect the reproductive organs.

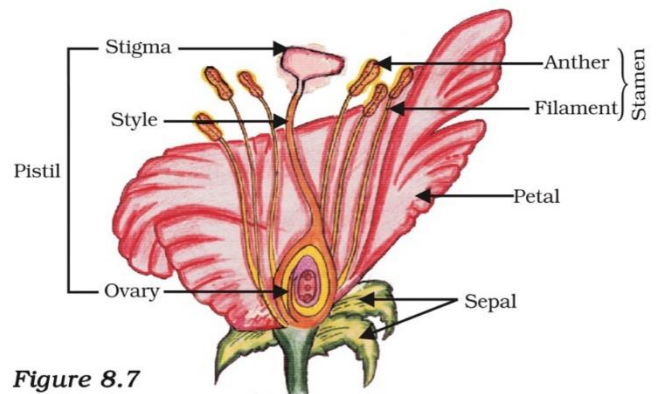


Figure 8.7
Longitudinal section of flower

Types Of Flowers

- **Unisexual flowers** - Contains either stamens or pistil
- E.g. Papaya, watermelon
- **Bisexual flowers** - Contains both stamens and pistil
- E.g. 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.

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 **fruit**.

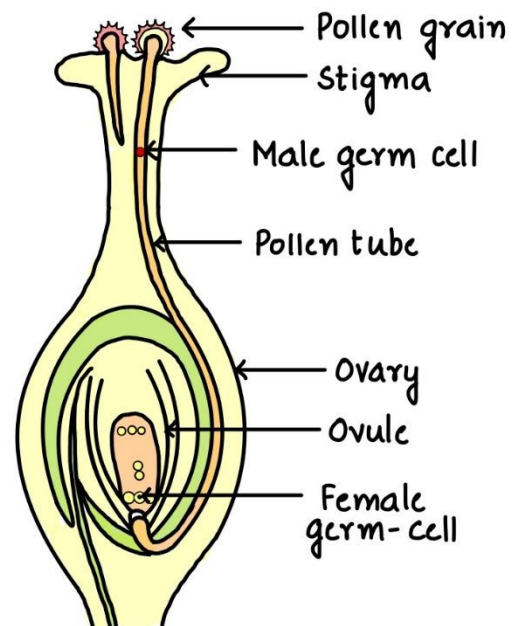


Fig. Germination of pollen on stigma

4. Germination Of Seeds

- 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.

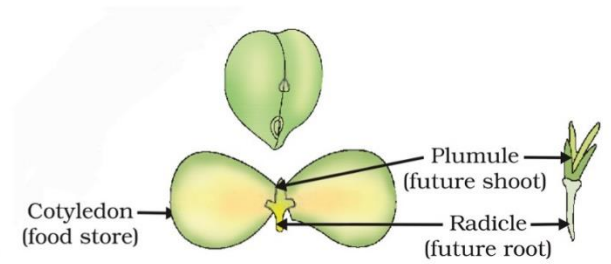


Figure 8.9
Germination

Reproduction in Human Beings

Puberty

- The age at which the sex hormone and gametes begin to be produced 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 hormones, **oestrogen** and **progesterone**.
- Male and female also start developing secondary sexual characters.
- Secondary sexual characters in male:
 - o Hair grow in armpits, pubic regions, chest and face.
 - o Body becomes muscular.
 - o The voice deepens.
 - o Chest and shoulders broaden.
- Secondary sexual characters in female:
 - o Hair grow under armpits and pubic region.
 - o Mammary glands develop and enlarge.
 - o Hips broaden.
 - o Fallopian tube, uterus and vagina enlarge.

Male Reproductive System

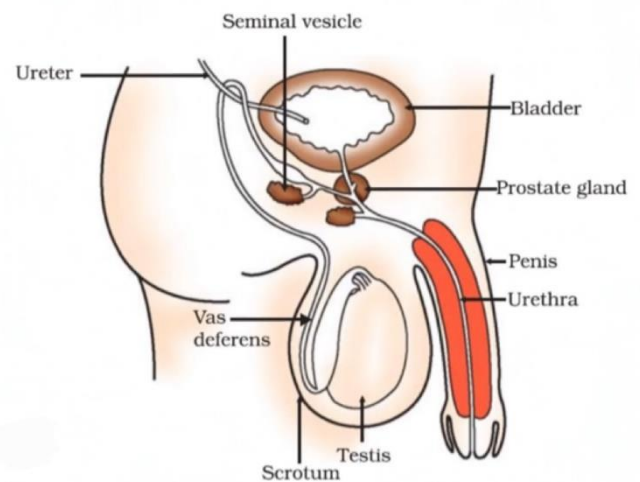
- The male reproductive system consists of portions which perform two major functions -
 - Produce sperms - Testes
 - Deliver sperms to the site of fertilization - All the rest (Vas deferens, Seminal vesicle, Prostate)

1. Testes

- It is the 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.



Human-male reproductive system

2. Vas deferens

- Vas deferens delivers sperms from testes to urethra.

3. Prostate & Seminal Vesicle

- Both of these glands 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 consist of mainly genetic material and a long tail that helps them to move towards the female germ cell.

Female Reproductive System

1. Ovary

- It is the primary reproductive organ in female. It performs two major functions
 - Production of **egg / ovum**.
 - Secretion of **oestrogen** and **progesterone**
- One egg is produced every month by ovaries

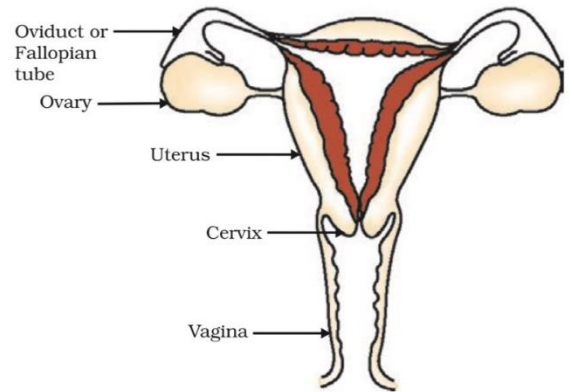


Figure 8.11 Human-female reproductive system

2. Fallopian tube / Oviduct

- Egg is transferred from ovary to uterus through fallopian tube.
- 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 dividing 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 **fetus**.
- 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.

Menstruation

- 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 menstruation.
- 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**
 - **Syphilis**
 - **AIDS (Acquired Immune Deficiency Syndrome)**

} caused by Bacteria

→ 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 - Blocking of vas deferens in male

→ Tubectomy - Blocking of fallopian tube in females.

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