Introduction

All living organisms multiply or reproduce and produce offspring of a similar kind. Reproduction is an essential process for the existence of a species and the continuation of life.

Here, in this chapter, we will learn about how different unicellular and multicellular organisms such as bacteria, algae, plants, animals and human beings reproduce. What are the different reproductive structures and modes of reproduction such as cell division, vegetative reproduction, asexual reproduction, and sexual reproduction.

Reproduction

Reproduction is the process by which all organisms multiply in number and increase their population.

To know more about Reproduction, visit here.

Asexual reproduction

Asexual reproduction is a method of reproduction that involves only one organism. A single organism reproduces two or multiple organisms on its own. This is seen in all unicellular organisms, some multicellular organisms and a few plants.

To know more about Asexual reproduction, visit here.

Sexual reproduction

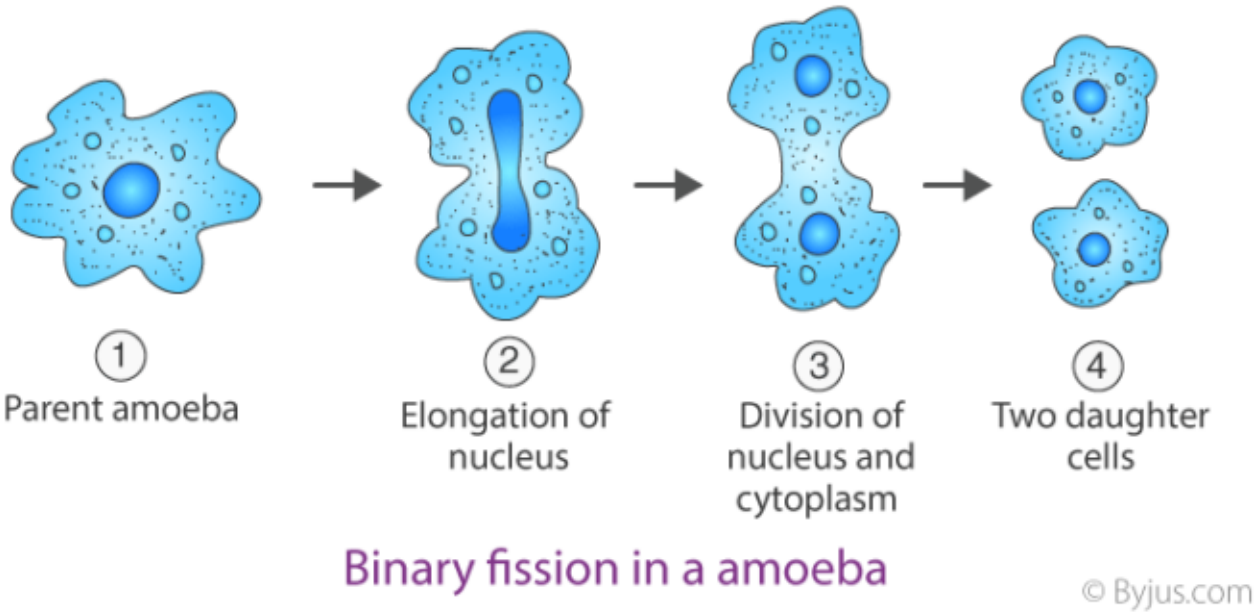
The mode of reproduction that involves two individuals; one male and one female. They produce sex cells or gametes which fuse to form a new organism.

To know more about Sexual reproduction, visit here.

Asexual Reproduction

Fission

- Fission is an asexual reproduction that is common in most of the unicellular organisms.
- When the fission results in two daughter cells, it is binary fission (e.g. paramecium).
- When fission results in many daughter cells, it is called multiple fission (e.g. Plasmodium).
- Planes of fission may be different for different organisms.

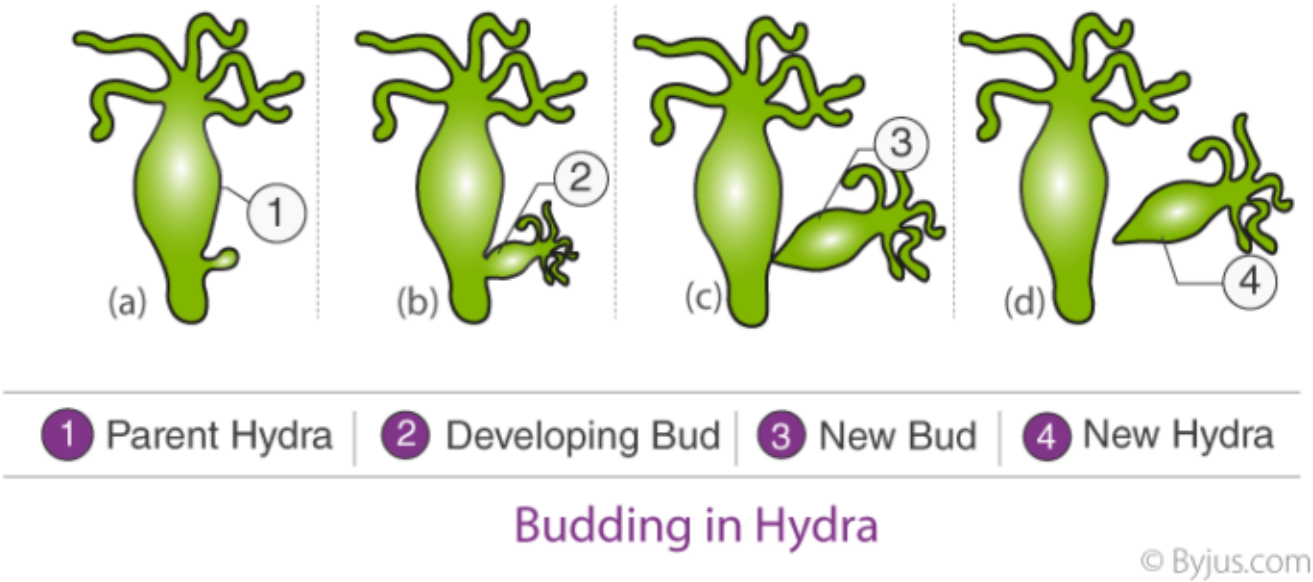


Binary fission in a amoeba

To know more about Binary Fission, visit here.

Budding

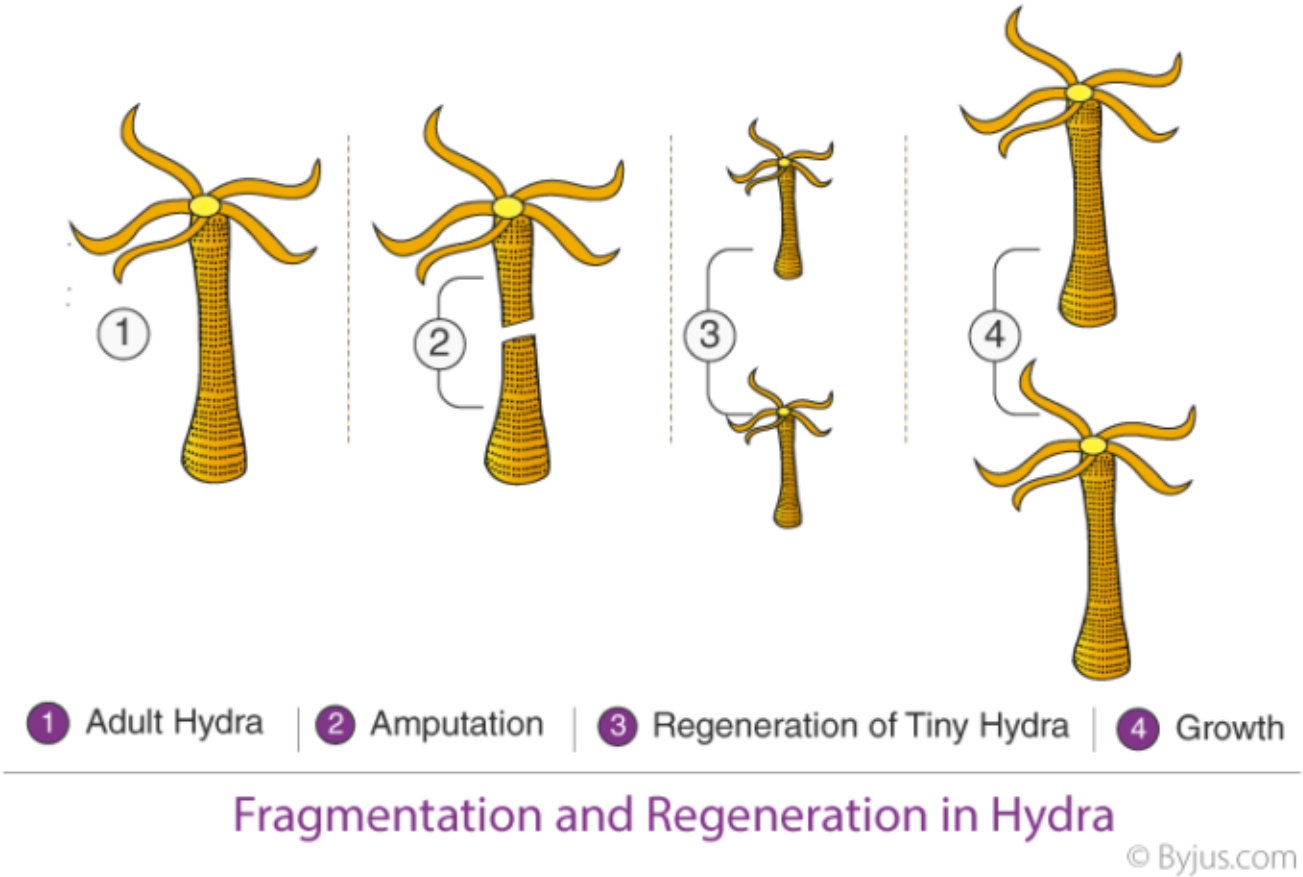
- Budding is a type of asexual reproduction in which a small cyst-like structure is formed on the parent's body, which gives rise to a new individual.
- Bud may remain attached to the parent (yeast) or may separate and become a new individual (hydra).



To know more about Budding, visit here.

Regeneration and fragmentation

- Regeneration is the process of growing back the lost organ or body part by the organism (e.g. lizard).
- Fragmentation is the process by which an organism gets fragmented into smaller pieces and each piece grows into a whole new organism.
- E.g. Planaria, Hydra

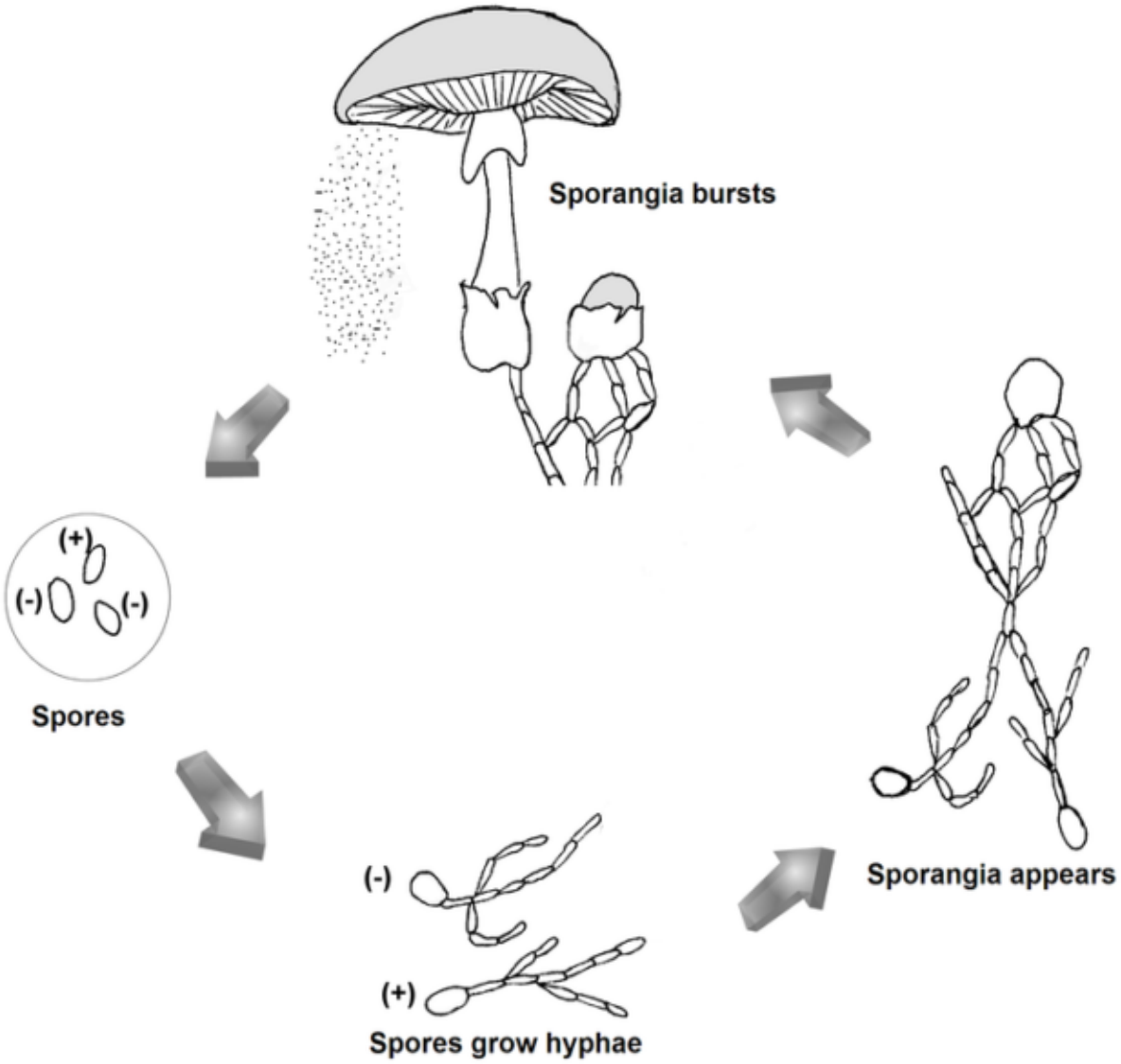


- Fragmentation and Regeneration in Hydra

To know more about Regeneration and fragmentation, visit here.

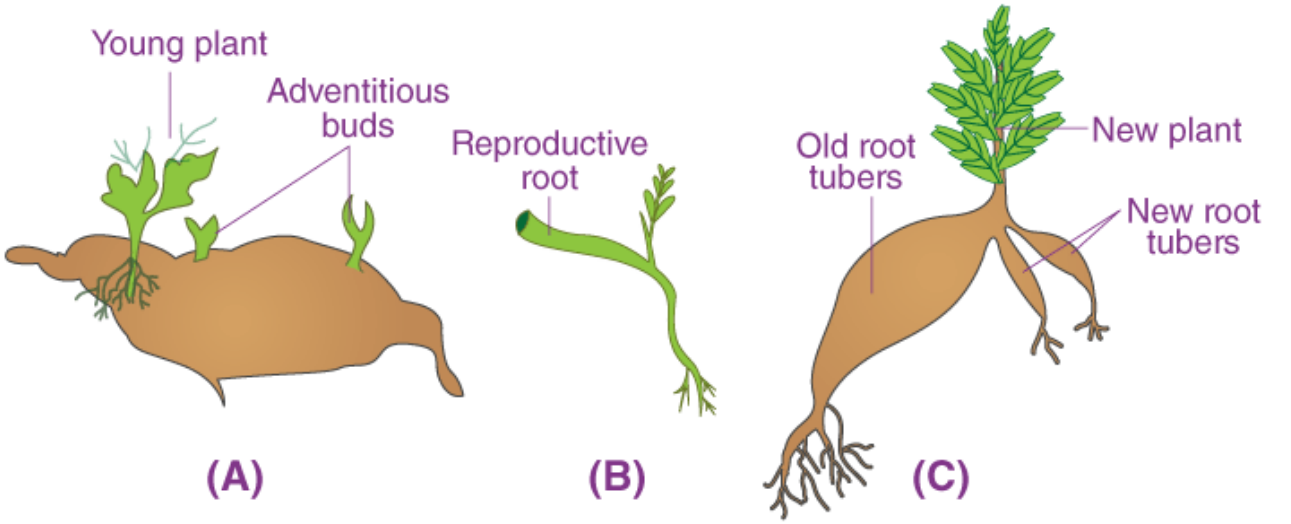
Spore formation

Organisms such as fungi make spores that can grow into complete new individuals when dispersed from their fruiting body. Spores are produced inside sporangia. They are covered by a thick outer layer that protects them in adverse conditions. When spores get suitable environmental conditions they germinate and begin to grow.



Read more: Spore Formation

Vegetative propagation

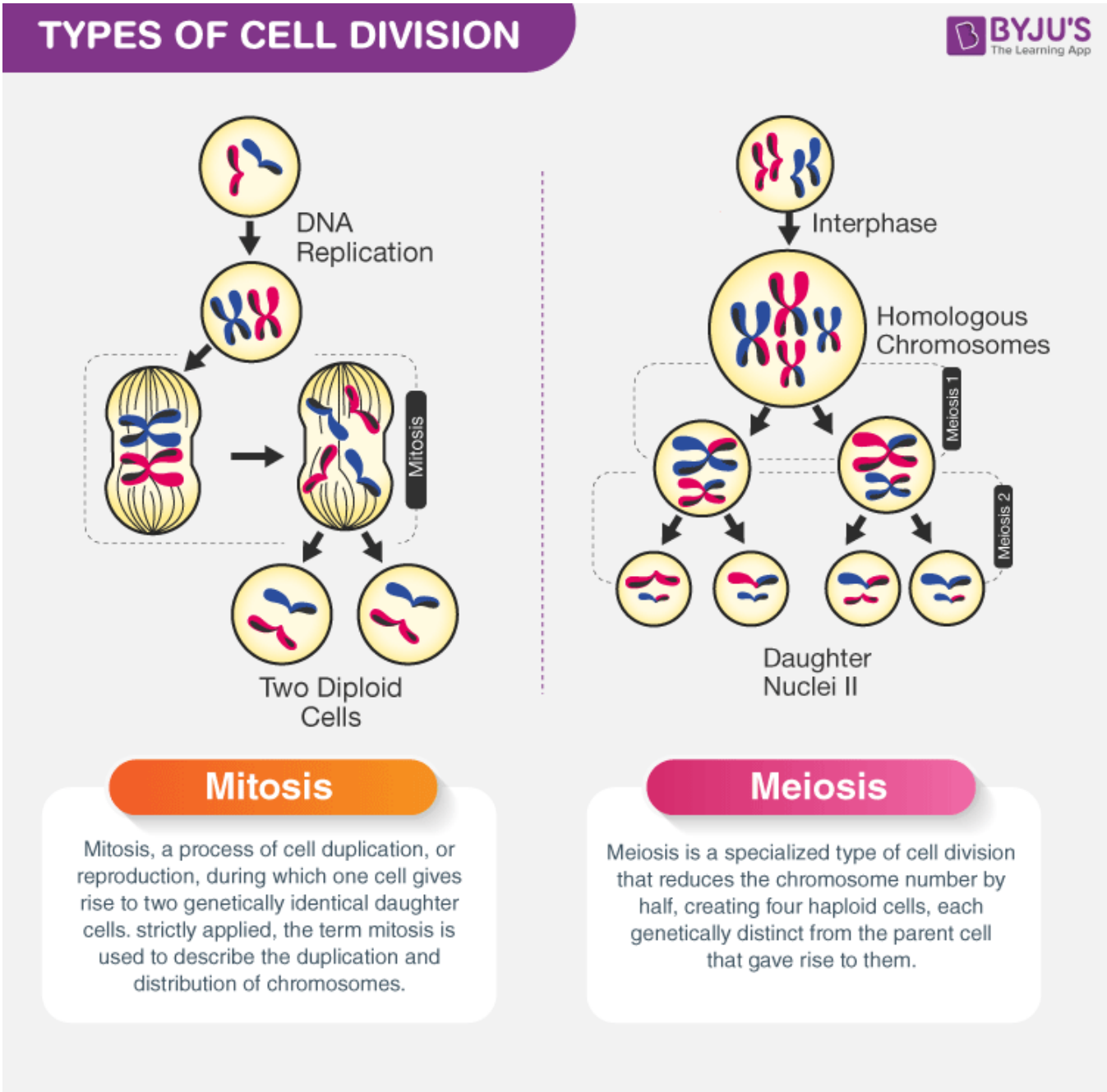


- This is a type of asexual reproduction seen in plants.
- The vegetative part of the plant, like leaves, stem, roots, gives rise to a new plant.
- Vegetative propagation can be artificial or natural.
- Natural vegetative propagation happens through leaves (e.g. bryophyllum), stem (e.g. turmeric, ginger), runners/stolon (e.g.grass runners, strawberry), bulbs (e.g. onion, lily), etc.
- Artificial methods include cutting, grafting, layering and plant tissue culture.

To know more about Vegetative propagation, visit here.

Sexual Reproduction

Types of Cell division



Two types of cell division are seen in eukaryotic organisms:

Mitosis

- Takes place in somatic cells
- Maintains the chromosome number
- Produces two, diploid daughter cells
- Required for asexual reproduction, development and growth, cell replacement and regeneration

Meiosis

- Takes place in sex cells
- Reduces the number of chromosomes by half
- Produces four haploid daughter cells
- Required for sexual reproduction, i.e gamete formation

To know more about Cell division, visit here.

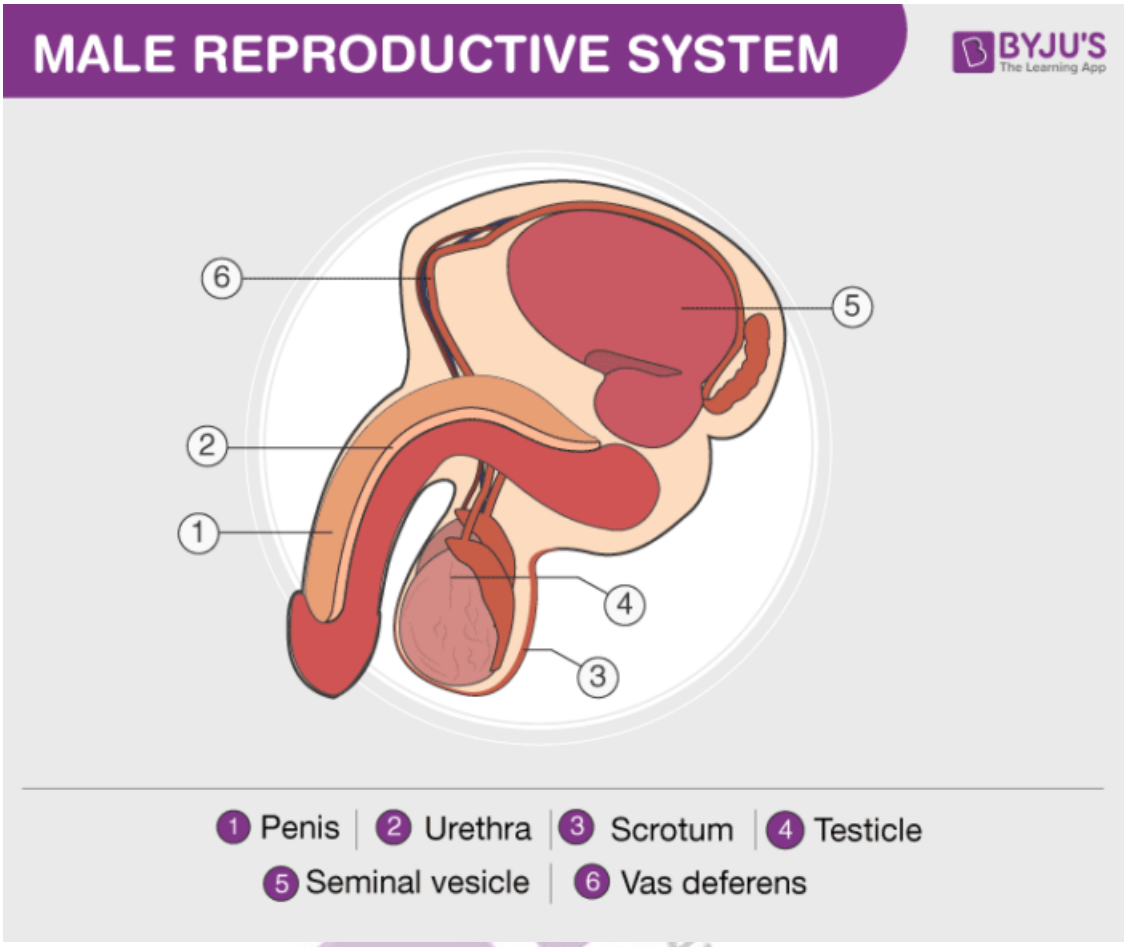
The Reproductive System

In humans, there is a remarkable difference in the male and female reproductive systems. Testes are the main reproductive structure in males where sperms (male gametes) are produced and ovum (female gamete) is produced inside the ovary. Let us now learn in detail about male and female reproductive systems in humans.

To know more about Human Reproductive System, visit here.

Male reproductive system

- The main reproductive organ in males is a pair of testes.
- They produce the male sex cells called sperms and also produce the male sex hormone testosterone.



Male main reproductive organs

- The main reproductive organ in males is a pair of testes.
- They are present in scrotal sacs outside the body and contain seminiferous tubules as the structural and functional unit.
- Male sex cells, sperms, are produced by seminiferous tubules and mature in the epididymis.
- Leydig cells or interstitial cells present in between the seminiferous tubules secrete hormone testosterone.

Male accessory reproductive organs

- Several accessory reproductive organs aid in the reproductive process.
- The prostate gland and the seminal vesicles are glands of the reproductive system which make semen and nourish the sperm.
- Penis, having urethra passing through it, is called copulatory organ.

Male Ducts

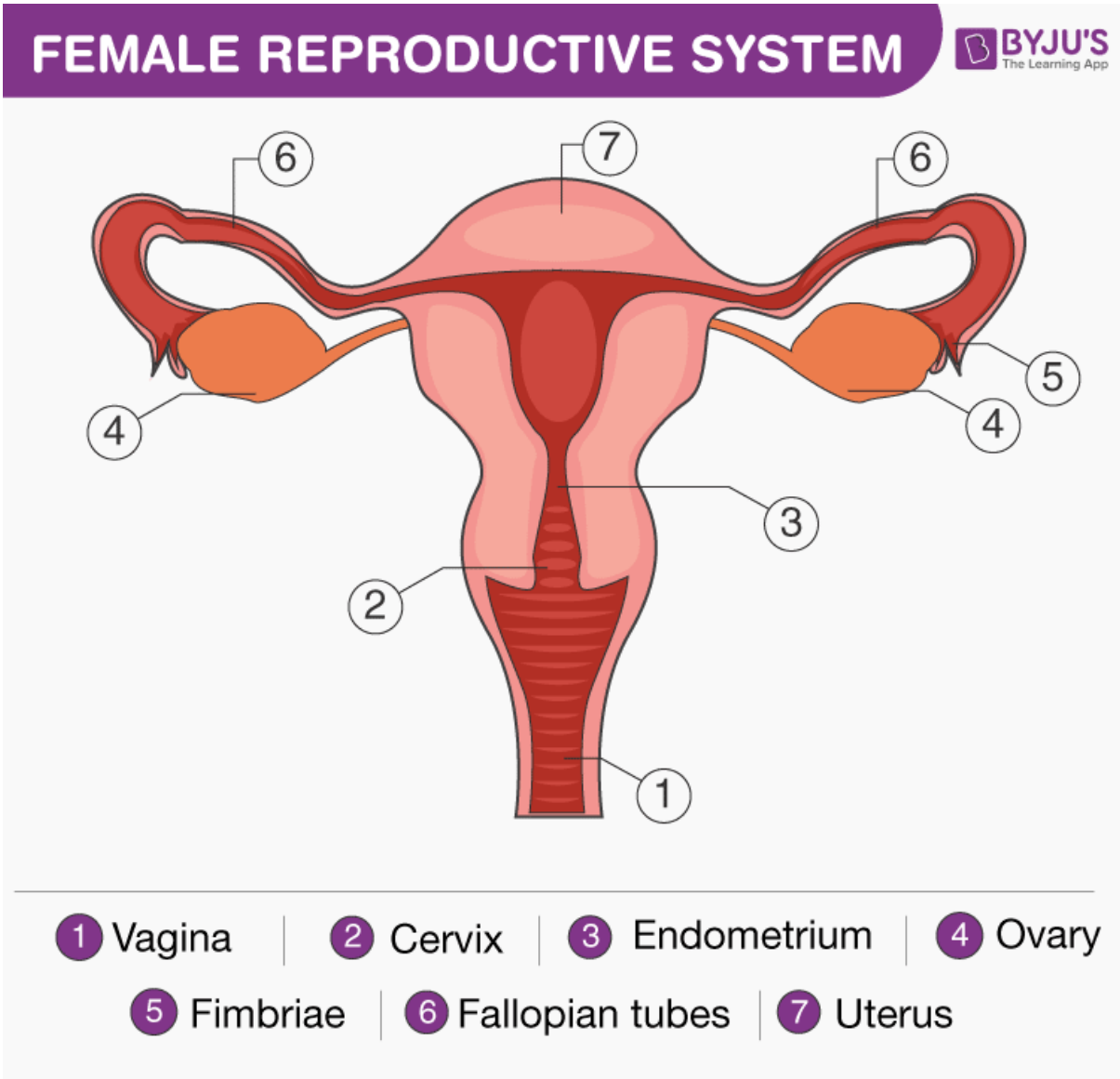
- In males, the vas deferens and the urethra are the main ducts.
- A single vas deferens carries sperms from respective testis up to the urethra.

- The urethra acts as a common passage for semen and urine.

To know more about Male Reproductive System, visit here.

Female reproductive system

The human female reproductive system consists of a pair of ovaries, a pair of fallopian tubes/oviducts and the accessory organs such as the uterus and the vagina.



Female main reproductive organ

- The main reproductive organ in a female is a pair of ovaries.
- They produce the female sex cells called eggs or ova and also produce female sex hormones called estrogen and progesterone.

Female accessory reproductive organ

- Uterus, oviducts, and vagina are the accessory reproductive organs in human females.
- The uterus is the site of fetal development and the vagina receives sperm from the male. Ovum is carried from ovaries to the uterus through a pair of oviducts.

To know more about the Female reproductive system, visit here.

Menstrual Cycle

Menstruation

- **Menstruation is the cyclic event of the release of the ovum from the ovary and its removal from the body when fertilization does not happen.**
- During menstruation, the blood-rich endometrium of the uterus also breaks down while the ovum is removed from the body.
- Two pituitary hormones, LH and FSH, and two ovarian hormones, estrogen and progesterone, all have their roles in menstruation.
- In humans, the cycle repeats every 28 days.

To know more about Menstrual Cycle, visit here.

Fertilization

Human reproduction

Humans reproduce sexually. The male produces sperms and the female produces eggs. When the sperm fuses with the egg, it forms a zygote that gives rise to a new progeny.

To know more about Fertilization, visit here.

Contraceptive Methods

Reproductive health

Reproductive health deals with the prevention of STDs and unwanted pregnancy. Understanding the reproductive system is also a part of reproductive health awareness.

Contraceptives

- Contraceptives are devices that prevent unwanted pregnancy and help avoid STDs.

- Contraceptives can be of various types such as mechanical barriers, hormonal/chemical methods, surgical methods, etc.

Coitus Interruptus

- It is a very unreliable contraceptive method where the coitus is stopped before the male ejaculates inside the female reproductive tracts.

Rhythm Method

- Another unreliable method of contraception is where coitus is avoided when the female is fertile and the chances of fertilization are very high.

Condoms

- One of the most effective methods of contraception.
- A mechanical barrier that stops the semen from entering the female tract preventing pregnancy.
- It also avoids the possibility of contracting STDs.

Diaphragms

- Diaphragms are barriers that can be added inside the female reproductive tracts.
- They stop the entry of semen inside the female tract and thus prevent pregnancy.

Contraceptive Pills

- Contraceptive pills are chemical methods of contraception.
- They change the level of hormones in the body that prevents the release of the ovum from the ovaries.

Emergency Pill

- Emergency pills are those pills which can be taken after coitus to avoid pregnancy.
- They quickly change the level of hormones in the body and prevent a successful implantation even if the egg gets fertilized.

IUD

- IUD stands for Intrauterine Device.
- They can be used for a couple of years.
- It is a device that is inserted into the uterus, changing its shape and preventing successful implantation of the zygote.

Sterilization

- Sterilization is a surgical method of going permanently sterile.
- This can be done in both males and females.
- In males, it is called vasectomy and in females, it is called tubal ligation.

To know more about Contraceptive Methods, visit here.

Reproduction in Plants

Plants reproduce by both, asexual and sexual methods. Vegetative propagation is a type of asexual reproduction in plants. Let's learn now about sexual reproduction in plants.

To know more about Reproduction in Plants, visit here.

Sexual reproduction in flowering plants

- Sexual reproduction in plants happens through flowers.
- Essential whorls of the flowers such as androecium and gynoecium help in the sexual reproduction of plants.

Read more: Sexual Reproduction in Plants

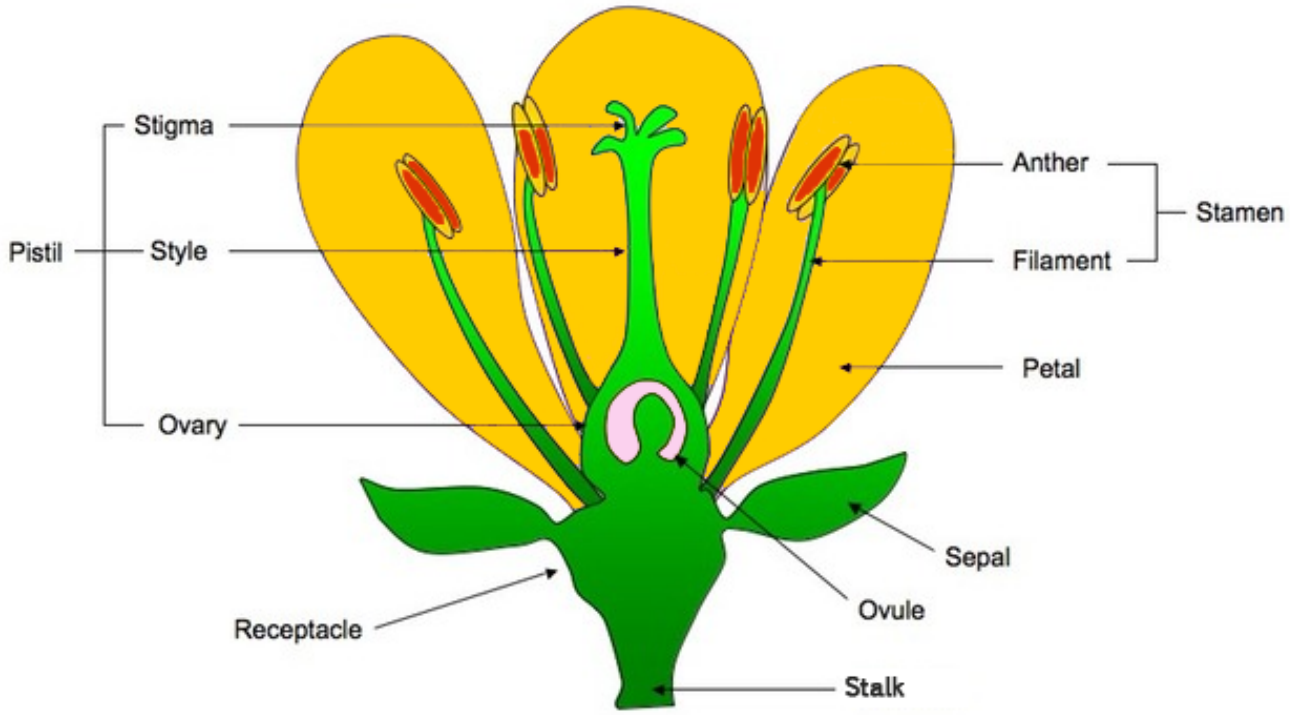
Non-essential parts of flowers

- The typical structure of flowers contains essential whorls and non-essential whorls.
- Sepals and Petals are called non-essential whorls as they do not directly take part in reproduction.
- Sepals protect the inner delicate whorl during bud condition and also perform photosynthesis if they are green in colour.
- Petals, when they are coloured, attract insects for pollination.

Essential whorls of flowers

- Androecium and gynoecium are called as essential/reproductive whorls of a flower.
- Androecium produces pollen grains containing male gametes and gynoecium produces ovules which are female gametes.
- Bisexual flowers contain both the whorls while unisexual flowers contain either of them.
- Each individual member of androecium is called a **stamen** and consists of **anther and filament**.
- Anther produces haploid pollen grains.

- Each individual member of gynoecium is called **pistil** and consists of **stigma, style and ovary.**



Parts of a flower

Pollination

The process of transfer of pollen grains from anthers to the stigma of a flower is known as pollination.

- It is required for fertilization.
- Pollination has two types, self-pollination (autogamy) and cross-pollination (allogamy).
- In self-pollination, the transfer of pollen grains takes place from anthers to the stigma of the same flower or another flower of the same plant.
- In cross-pollination, pollens are transferred from anthers to the stigma of another flower.
- Many pollinating agents play their roles in cross-pollination. Examples: water, wind, insects, birds, bats, etc.

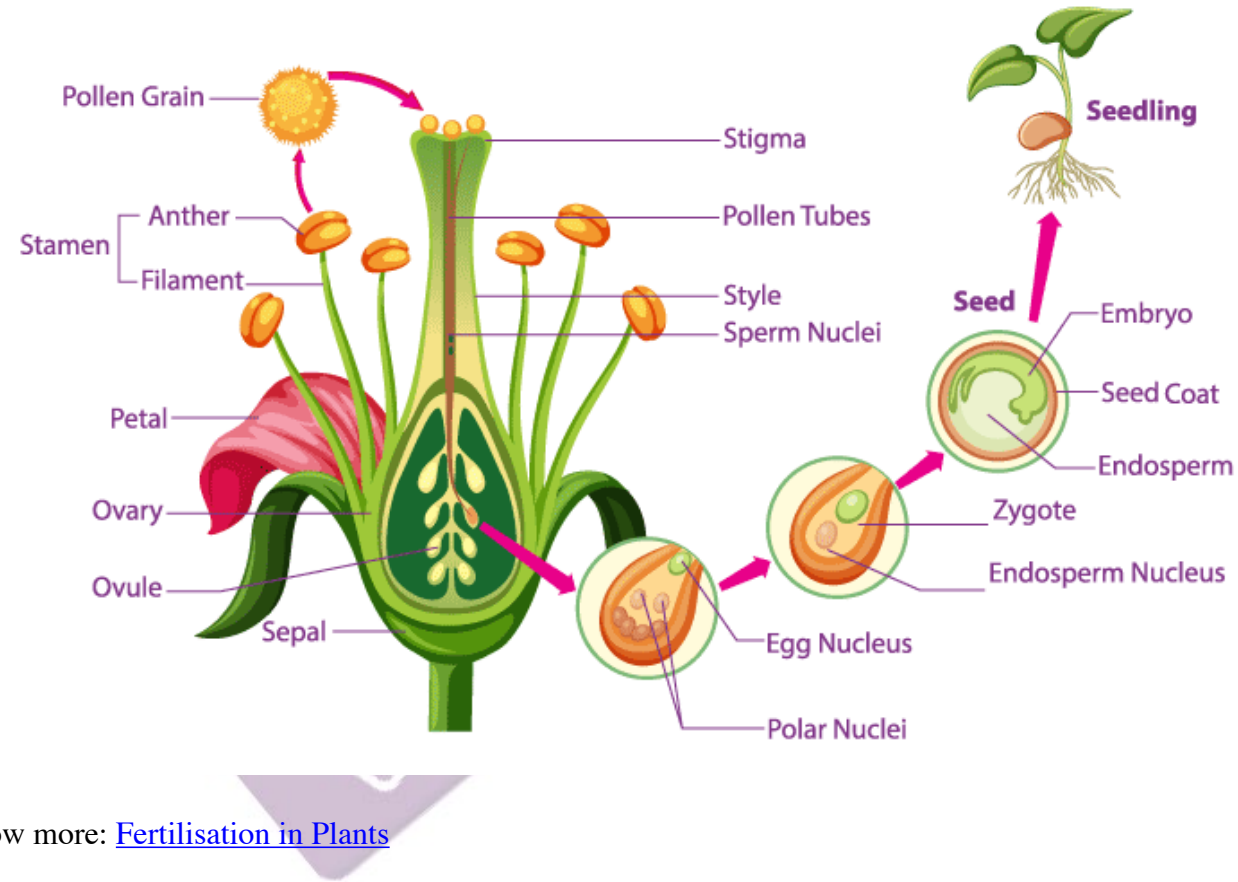
Know more: Pollination

Fertilization

Fusion of male and female gametes is known as fertilization.

- In flowering plants after pollination, the pollens germinate on the stigma surface of pistil and generate two male nuclei.

- Ovule has egg cell and two polar nuclei.
- One male nucleus fuses with two polar nuclei and forms triploid endosperm.
- Another male nucleus fuses with the egg cell and forms the zygote that gives rise to the embryo and future plant.
- After fertilization, ovary becomes fruit and ovules turn into seeds. All other parts wither away.



Know more: Fertilisation in Plants

Also Check:

- CBSE Class 10 Science Chapter 7 Control and Coordination Notes
- CBSE Class 10 Science Chapter 9 Heredity And Evolution Notes
- NCERT Solutions for Class 10 Science Chapter 8: How do Organisms Reproduce?
- NCERT Exemplar Class 10 Science Solutions for Chapter 8 - How Do Organisms Reproduce
- Real Numbers Class 10 Notes: Chapter 1

Frequently Asked Questions on CBSE Class 10 Science Notes Chapter 8: How do Organisms Reproduce

What is difference between fission and fusion?

Fission is the process where an atom splits into two or more smaller parts. Whereas fusion involves the fusing of two or smaller atoms into a larger particular.

What is fragmentation?
Fragmentation is a form of asexual reproduction where the parent organism breaks into fragments. Each of these fragments are capable of growing independently into a new organism.

What is a gamete cell?
Gamete cell are the reproductive cells of an organism. Female gametes are referred to a ova or egg cells and male gametes are known as sperms.