



## **CBSE Class 10 Science Chapter 8 How Do Organisms Reproduce Notes**

### **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. Learn what the different reproductive structures are and about the modes of reproduction, such as cell division, vegetative reproduction, asexual reproduction, and sexual reproduction.

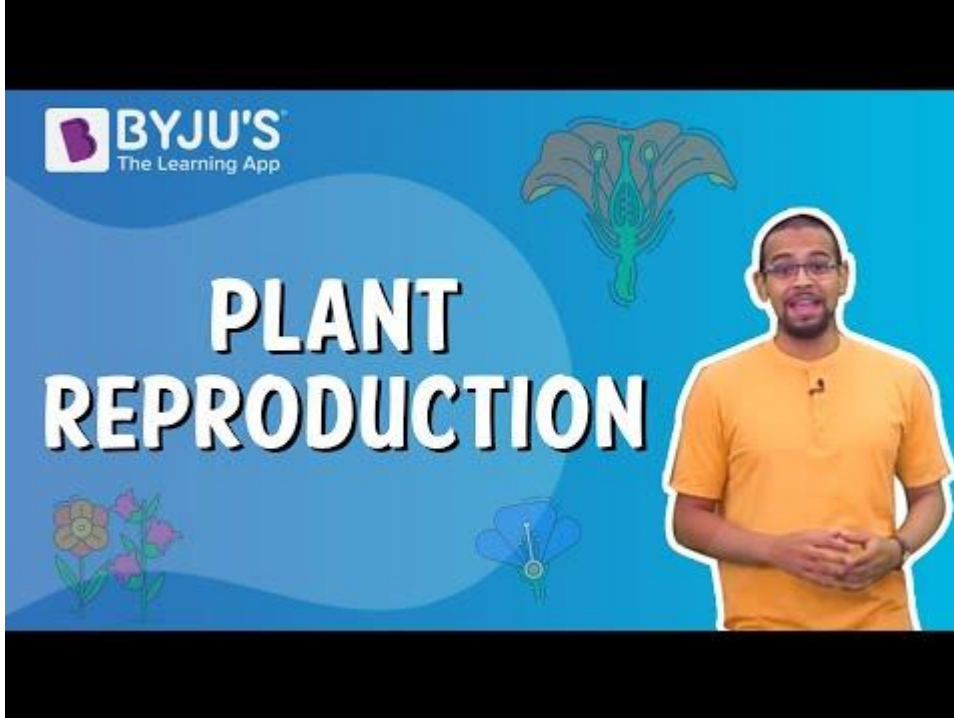
Reproduction is the process by which all organisms multiply in number and increase their population.

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.

**For more information on Plant Reproduction, watch the below video**



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To know more about Asexual reproduction, [visit here](#).

## Sexual Reproduction

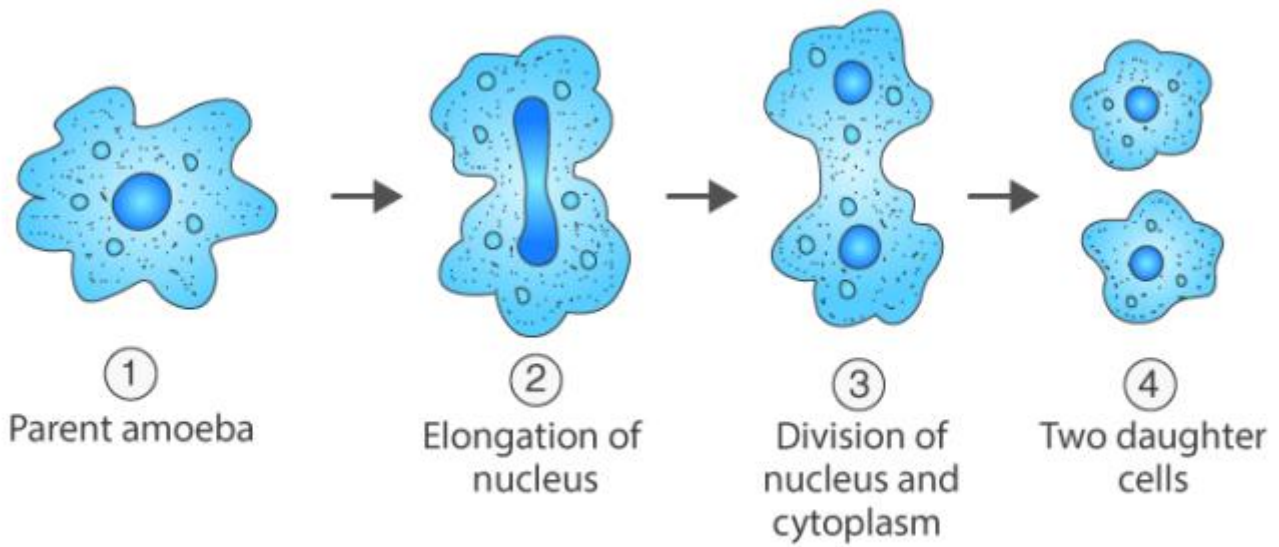
The mode of reproduction involves two individuals; one male and one female. They produce sex cells or gametes, which fuse to form a new organism.

To know more about Sexual reproduction, [visit here](#).

## Asexual Reproduction

### Fission

- Fission is an asexual reproduction that is common in most 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.



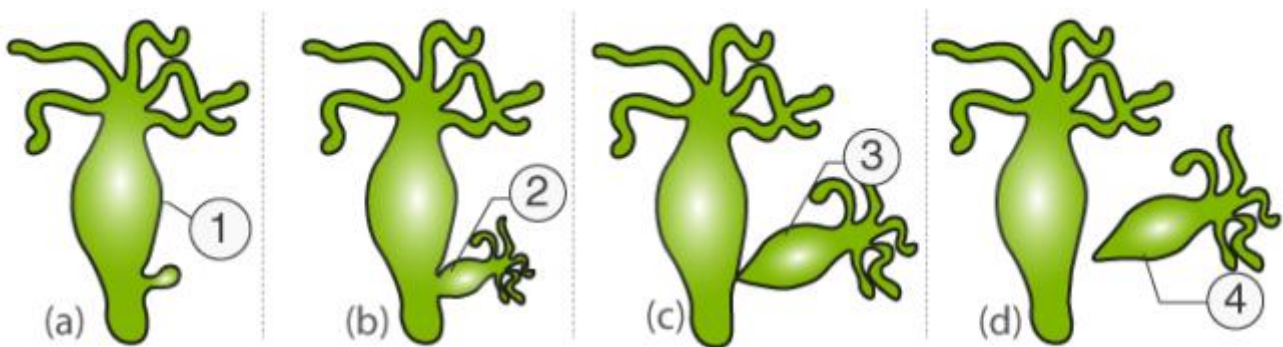
## Binary fission in a amoeba

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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).



**1** Parent Hydra | **2** Developing Bud | **3** New Bud | **4** New Hydra

## Budding in Hydra

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For more information on Budding, watch the below video

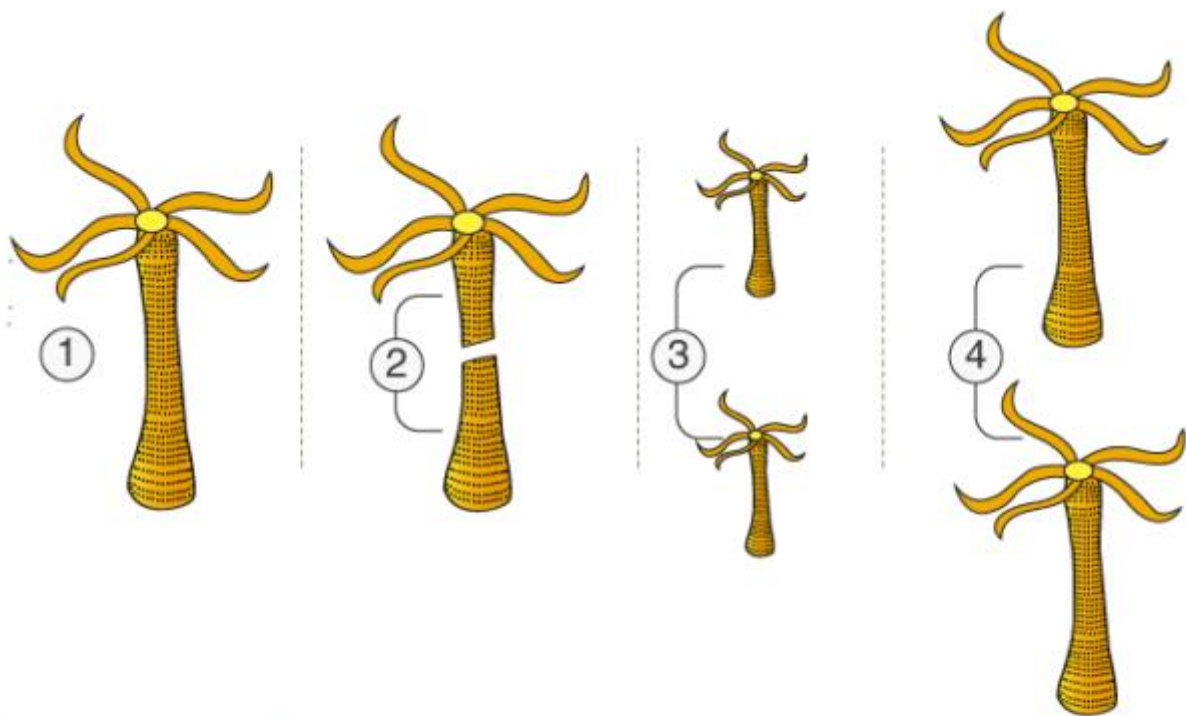


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To know more about Budding, [visit here](#).

## 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



① Adult Hydra | ② Amputation | ③ Regeneration of Tiny Hydra | ④ Growth

## Fragmentation and Regeneration in Hydra

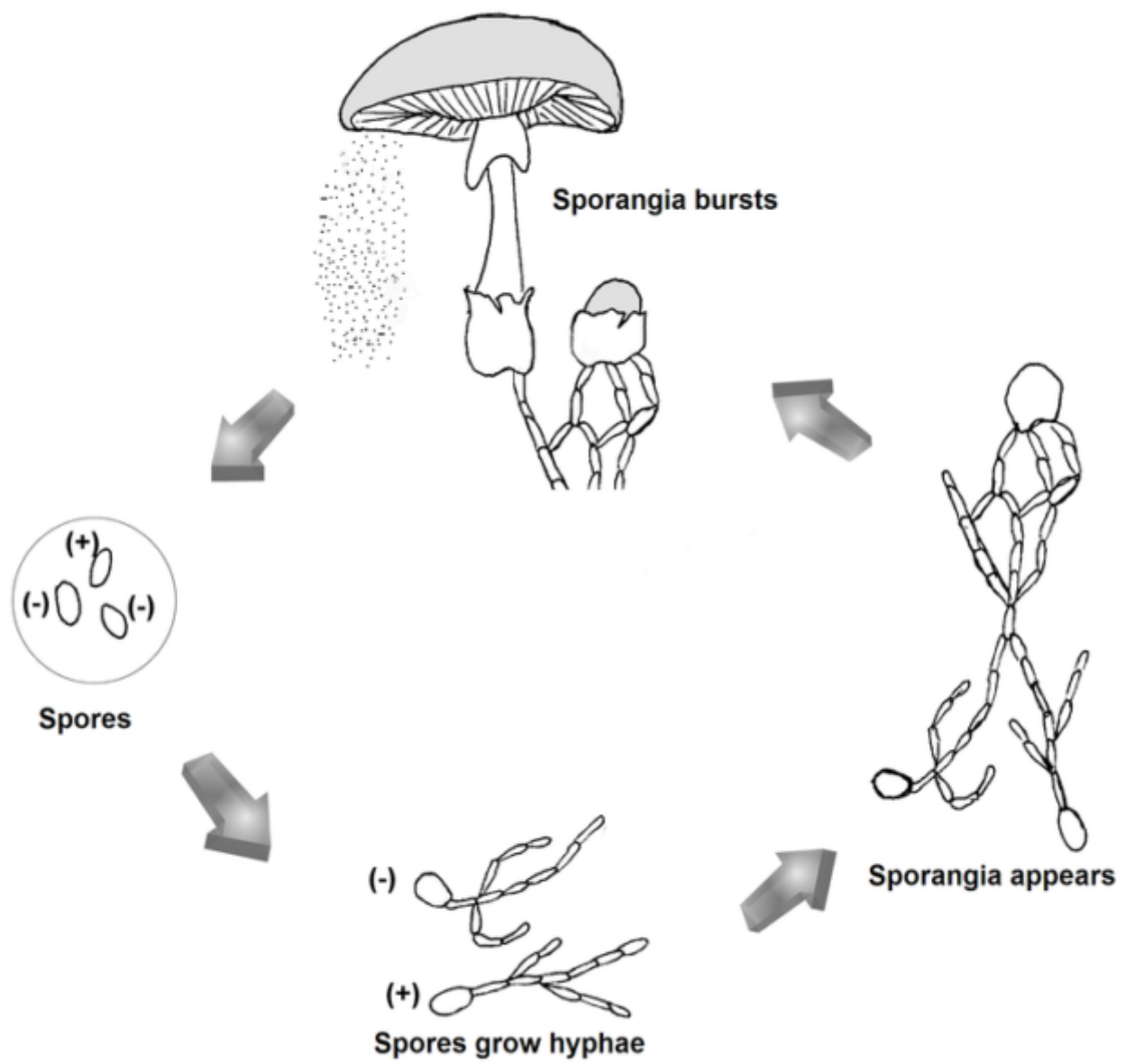
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- Fragmentation and Regeneration in Hydra

To know more about Regeneration and fragmentation, [visit here](#).

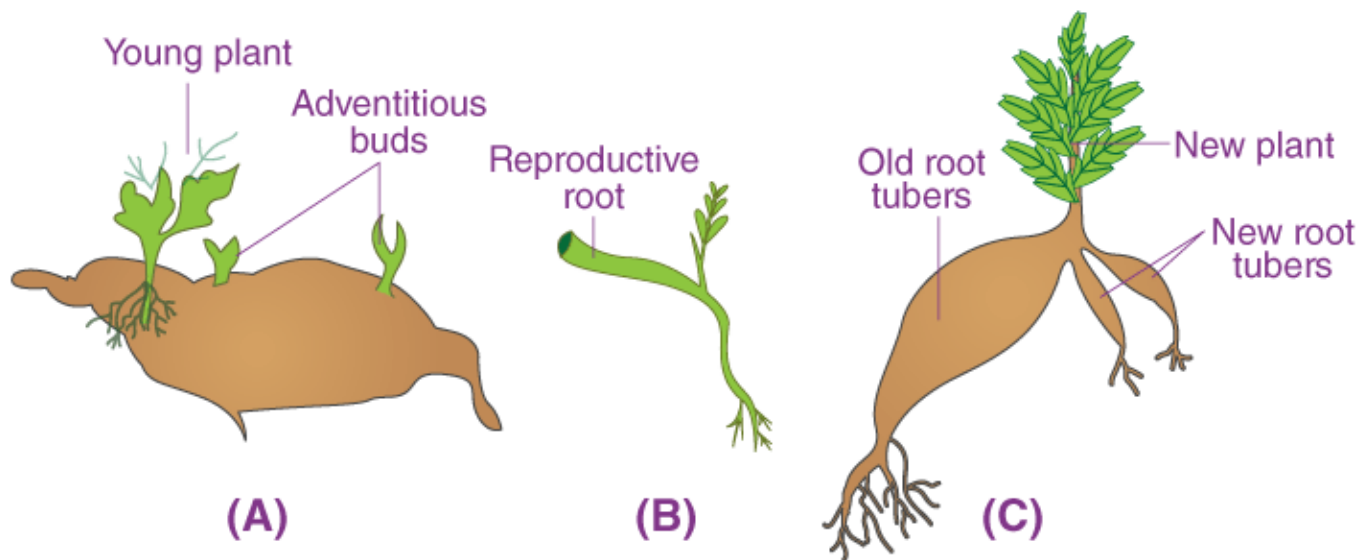
### Spore Formation

Organisms such as fungi make spores that can grow into completely new individuals when dispersed from their fruiting bodies. 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



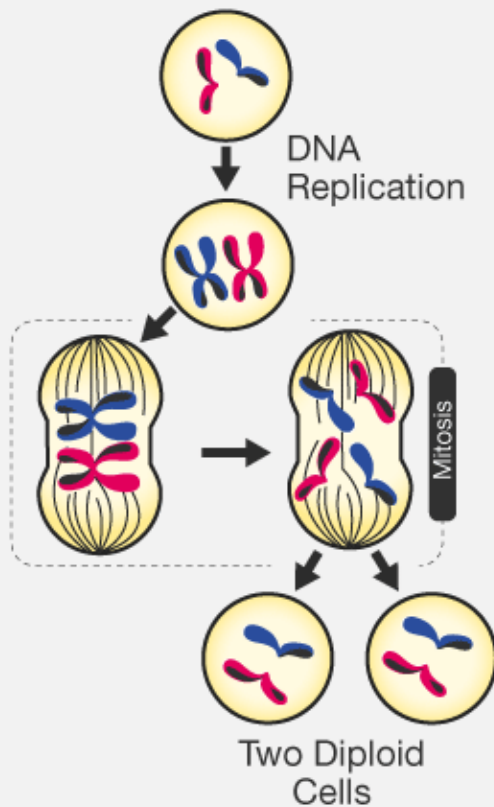
- This is a type of asexual reproduction seen in plants.
- The vegetative parts of the plant, like leaves, stems, and roots, give rise to a new plant.
- Vegetative propagation can be artificial or natural.
- Natural vegetative propagation happens through leaves (e.g. bryophyllum), stem (e.g. turmeric, 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

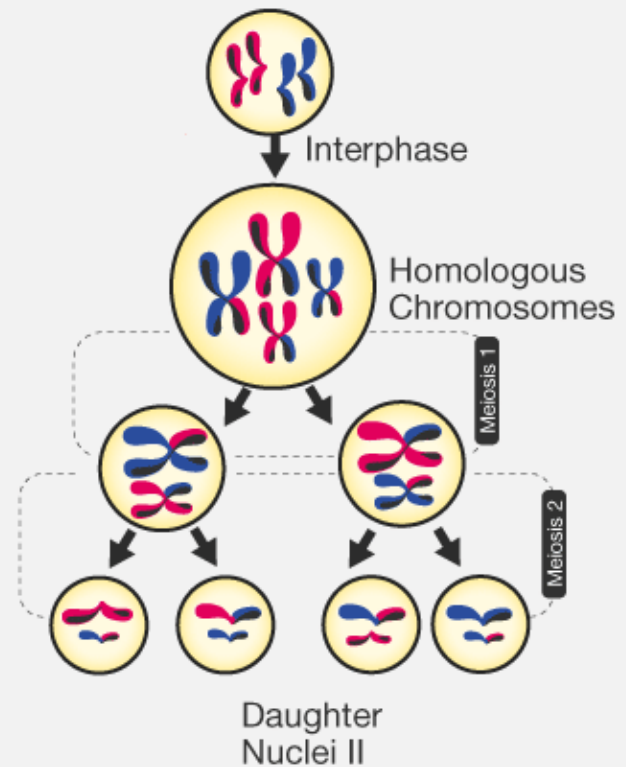
### Types of Cell Division





## Mitosis

Mitosis, a process of cell duplication, or reproduction, during which one cell gives rise to two genetically identical daughter cells. strictly applied, the term mitosis is used to describe the duplication and distribution of chromosomes.



## Meiosis

Meiosis is a specialized type of cell division that reduces the chromosome number by half, creating four haploid cells, each genetically distinct from the parent cell that gave rise to them.

**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](#).

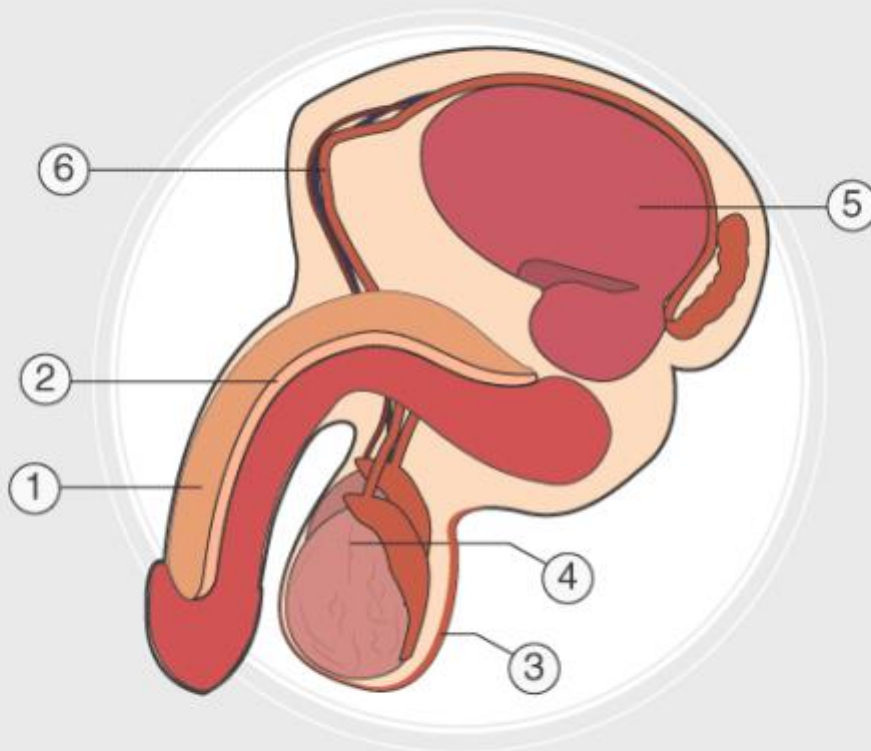
## The Reproductive System

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.



- |                   |                |           |            |
|-------------------|----------------|-----------|------------|
| 1 Penis           | 2 Urethra      | 3 Scrotum | 4 Testicle |
| 5 Seminal vesicle | 6 Vas deferens |           |            |

## Male Primary Reproductive Organ

- 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 the 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 the urethra passing through it, is called a copulatory organ.

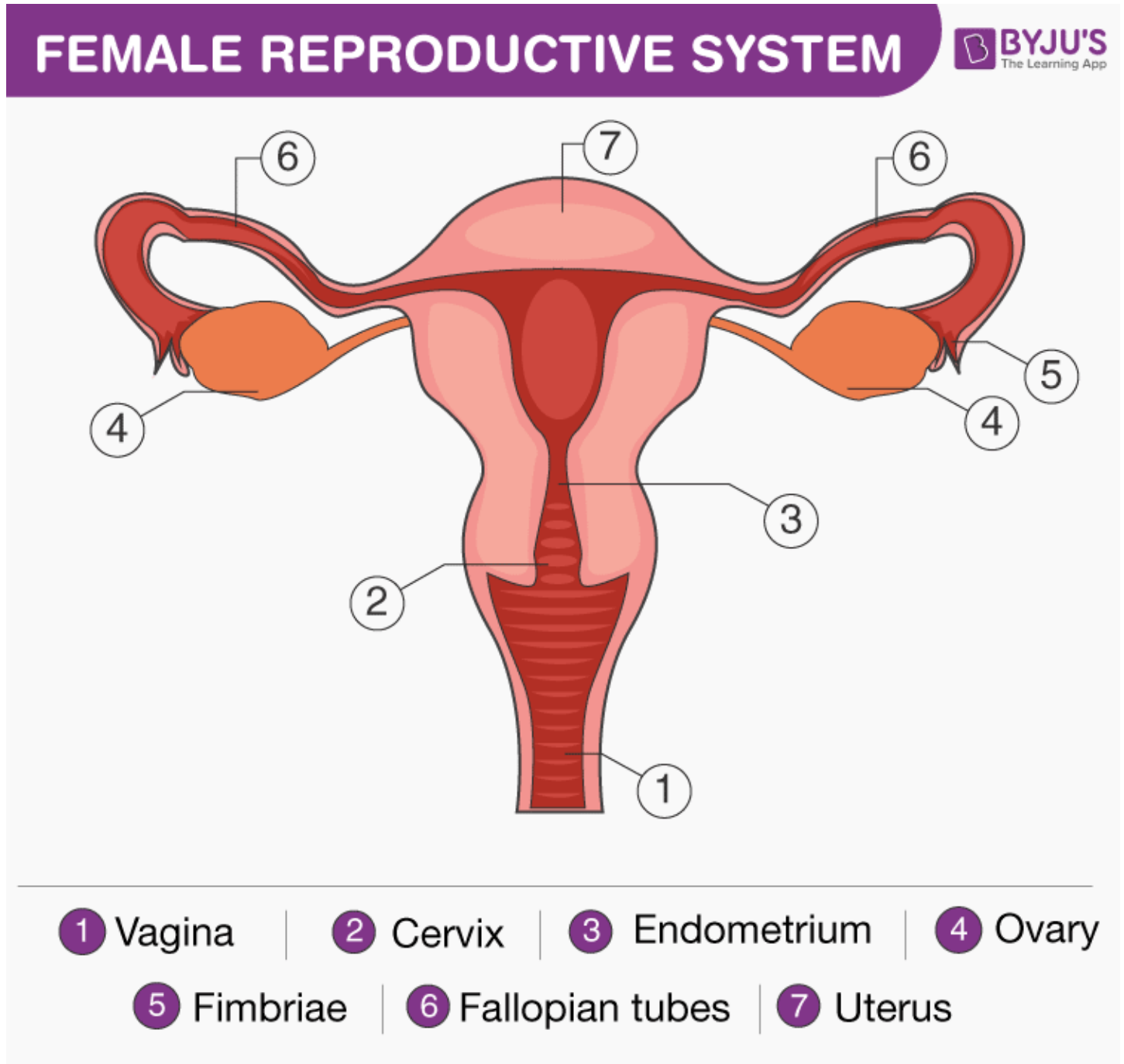
## Male Ducts

- In males, the vas deferens and the urethra are the main ducts.
- A single vas deferens carries sperm from the 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 Primary 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

- The 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 the 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](#).

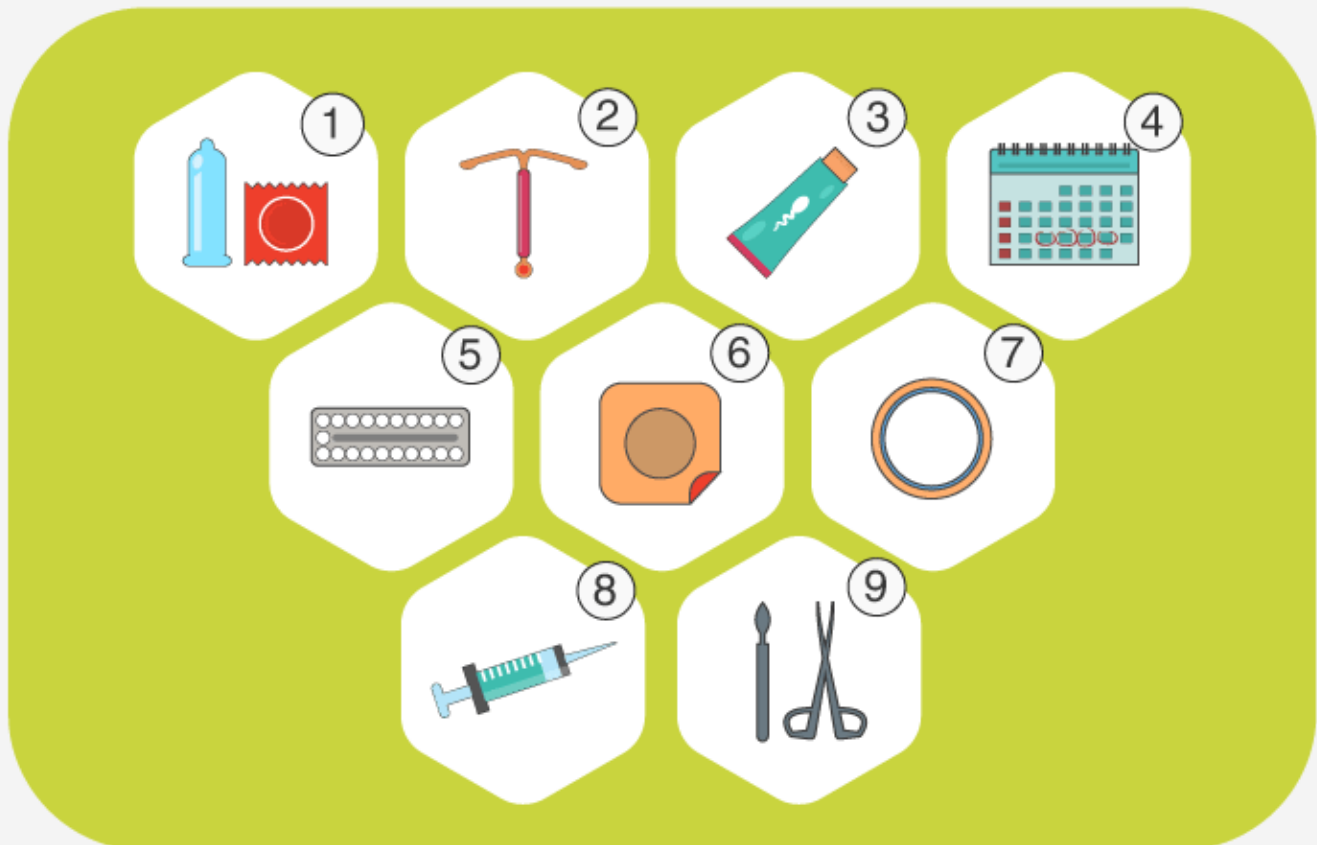
## Fertilization

### 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



1 Condoms

2 Intrauterine devices

3 Spermicides

4 Calendar rhythm method

5 Oral contraception

6 Contraceptive patch

7 Hormonal ring

8 Contraceptive Injection

9 Surgical sterilization

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## 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](#)

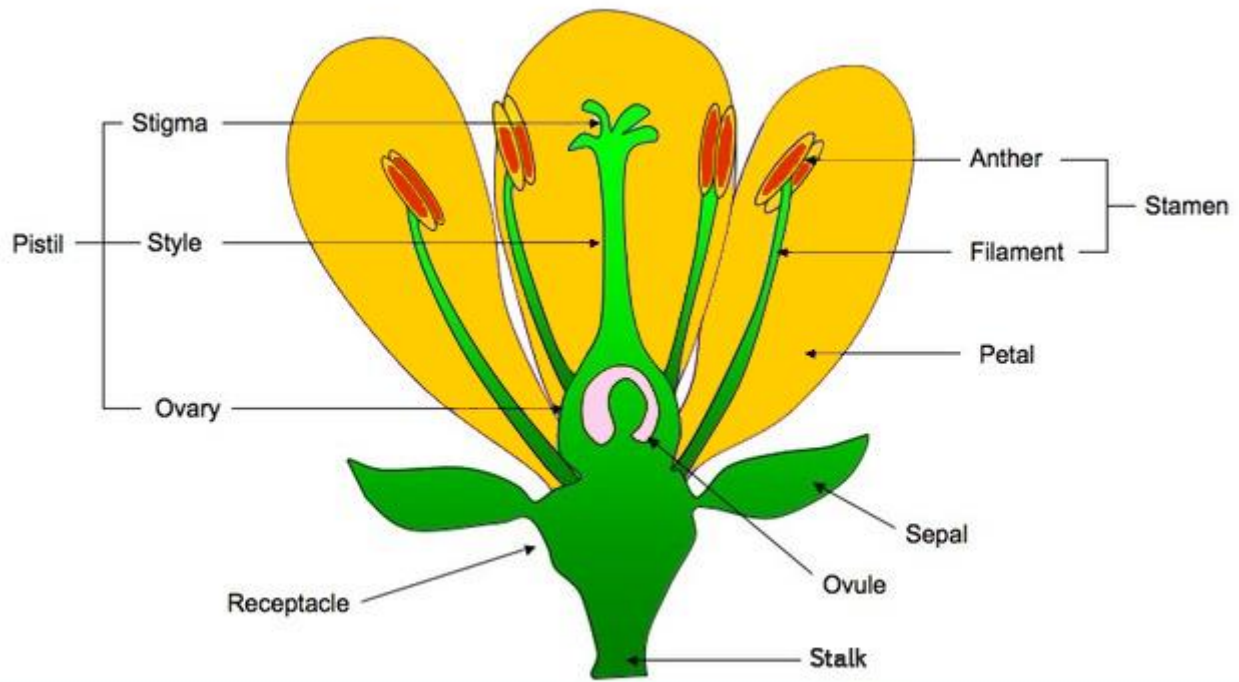
## Non-Essential Parts of Flowers

- 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 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 whorls, while unisexual flowers contain either of them.
- Each individual member of androecium is called a **stamen** and consists of an **anther and filament**.
- Anther produces haploid pollen grains.

- Each individual member of the gynoecium is called a **pistil** and consists of a **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.

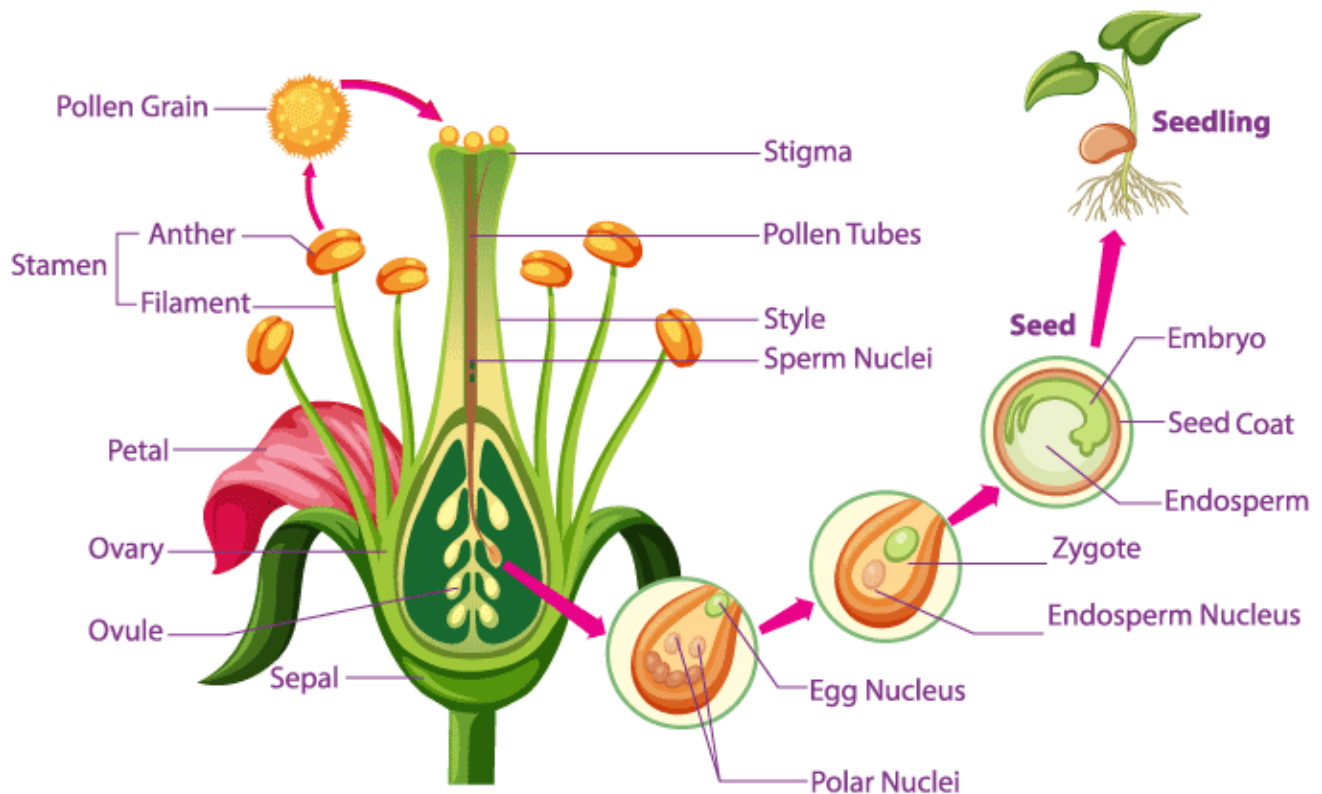
Know more: [Pollination](#)

## Fertilization

Fusion of male and female gametes is known as fertilization.

- In flowering plants, after pollination, the pollens germinate on the stigma surface of the pistil and generate two male nuclei.
- Ovule has an egg cell and two polar nuclei.
- One male nucleus fuses with two polar nuclei and forms a 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, the ovary becomes the fruit, and the ovules turn into seeds. All other parts wither away.



## Access Answers to Science NCERT Class 10 Chapter 8 How do Organisms Reproduce? (All intext and Exercise Questions Solved)

Questions Page no: 128

### 1. What is the importance of DNA copying in reproduction?

#### Solution:

DNA – Deoxyribonucleic acid is the genetic material that is present in the cells of all organisms. DNA carries genetic information from one generation to the other, and this helps in producing organisms of its own types. DNA copying is a must for inheriting the traits from parents. Any variations in DNA copying will give rise to origin of new species.

### 2. Why is the variation beneficial to the species but not necessarily for the individual?

#### Solution:

The reason why the variation is beneficial to the species rather than individuals is because sometimes the climatic changes have a drastic effect on the species, which makes their survival difficult. For examples, if the temperature of the water body increases, there might be certain species of microorganisms which might die. This may

result in disturbance in the environment. So, variation is beneficial to species and not for the individuals.

Questions Page no: 128

### **1. How does binary fission differ from multiple fission?**

#### **Solution:**

When a single cell divides into two equal halves, it is known as binary fission. Bacteria and amoeba are examples of binary fission.

When a single cell divides into multiple daughter cells at the same time, it is known as multiple fission. Algae and sporozoans are examples of multiple fission.

### **2. How will an organism be benefited if it reproduces through spores?**

#### **Solution:**

Following are the ways through which an organism will be benefited if it reproduces through spores:

- Number of spores produced in one sporangium would be large.
- In order to avoid competition at one place, spores can be distributed to faraway places with the help of air.
- In order to prevent dehydration under unfavorable conditions, the spores are covered by thick walls.

### **3. Can you think of reasons why more complex organisms cannot give rise to new individuals through regeneration?**

#### **Solution:**

Organisms at higher complex levels cannot give rise to new individuals through regeneration because they have organization of their organs system at different levels. All these organ systems are interconnected and work in full coordination. They can regenerate a few of their lost body parts like skin, blood, muscles, etc. but can't give rise to new individuals.

### **4. Why is vegetative propagation practised for growing some types of plants?**

#### **Solution:**

Following are the advantages of practising vegetative propagation for growing some types of plants:

- Crops like orange, banana, pineapple do not have viable seeds, so vegetative propagation can be used.

- It is a rapid, cheap and easier method to grow crops.
- It can be used in places where seed germination fails.
- A good quality of variety can be preserved.

## **5. Why is DNA copying an essential part of the process of reproduction?**

### **Solution:**

DNA copying is an essential part of the process of reproduction because it carries the genetic information from the parents to offspring. A copy of DNA is produced through some chemical reactions resulting in two copies of DNA. Along with the additional cellular structure, DNA copying also takes place, which is then followed by cell division into two cells.

## **Questions Page No: 140**

### **1. How is the process of pollination different from fertilization?**

#### **Solution:**

Pollination is defined as the process of transfer of pollens from anther to stigma. The process takes place with the help of pollinators like air, water and some insects.

Fertilization is defined as the fusion of male and female gametes. It takes place in the ovule and leads to the formation of zygote.

### **2. What is the role of the seminal vesicles and the prostate gland?**

#### **Solution:**

Lubrication of sperms and providing of a fluid medium for the easy transportation of sperms takes place with the help of secretions from the seminal vesicles and the prostate gland. These secretions also provide nutrients in the form of fructose, calcium and some enzymes.

### **3. What are the changes seen in girls at the time of puberty?**

#### **Solution:**

Following are the changes seen in girls at the time of puberty:

- Hair growth appears in genital area.
- Hair growth in other areas like underarms, face, hands and legs.
- The size of uterus and ovary increases.
- The size of the breast increases followed by darkening of the nipple skin that is present at the tip of the breast.
- Beginning of menstrual cycle.

- Appearance of pimples, as there is more oil secretion from the skin.

#### **4. How does the embryo get nourishment inside the mother's body?**

##### **Solution:**

The lining of the uterus thickens after fertilization. The blood flow is good so as to nourish the growing embryo. Placenta is a special tissue which is embedded in the uterine wall and helps the embryo get the nourishment from the mother's tissue. Placenta has villi on the embryo side and blood space on the mother's side. This spacing provides a large area between the mother and the embryo and also for waste removal.

#### **5. If a woman is using a Copper-T, will it help in protecting her from sexually transmitted diseases?**

##### **Solution:**

No, the usage of copper-T cannot stop the contact of body fluids. Hence, it cannot protect her from getting sexually transmitted diseases.

## **Exercises Page no: 141**

### **1. Asexual reproduction takes place through budding in**

**(a) Amoeba**

**(b) Yeast**

**(c) Plasmodium**

**(d) Leishmania**

##### **Solution:**

**(b) Yeast**

Yeast is an example for asexual reproduction taking place through budding. A small protuberance is produced on the parent cell that grows in full size forming a bud. In the parent cell, the daughter nucleus splits and migrates to the daughter cell. By forming a constriction, the bud detaches from the mother's body at the base. This process of budding continues to form a chain of bud cells. The mother cell is smaller than the daughter cell.

### **2. Which of the following is not a part of the female reproductive system in human beings?**

**(a) Ovary**



**(b) Uterus**

**(c) Vas deferens**

**(d) Fallopian tube**

**Solution:**

**(c) Vas deferens**

Vas deferens is a part of the male reproductive system. It is a long, muscular tube travelling from the epididymis into the pelvic cavity. It is behind the bladder. Its function is to transport the mature sperm to the urethra. It also carries urine to the outside of the body.

**3. The anther contains**

**(a) Sepals**

**(b) Ovules**

**(c) Pistil**

**(d) Pollen grains**

**Solution:**

**(d) Pollen grains.**

Pollen grains are the microscopic particles that occurs in the pollen giving rise to male gametophyte of a seed plant.

**4. What are the advantages of sexual reproduction over asexual reproduction?**

**Solution:**

Following are the advantages of sexual reproduction:

- The offspring has the characters of both the parents.
- The survival of the species is ensured as there are more variations.
- The offspring can easily adapt to environmental changes.
- It also improves the health of humans.

**5. What are the functions performed by the testis in human beings?**

**Solution:**

Following are the functions performed by the testis in human beings:

- Apart from the production of sperms, it also produces the male hormone known as androgens.

- They also produce hormone called testosterone, which is responsible for secondary sexual characters in boys.

## 6. Why does menstruation occur?

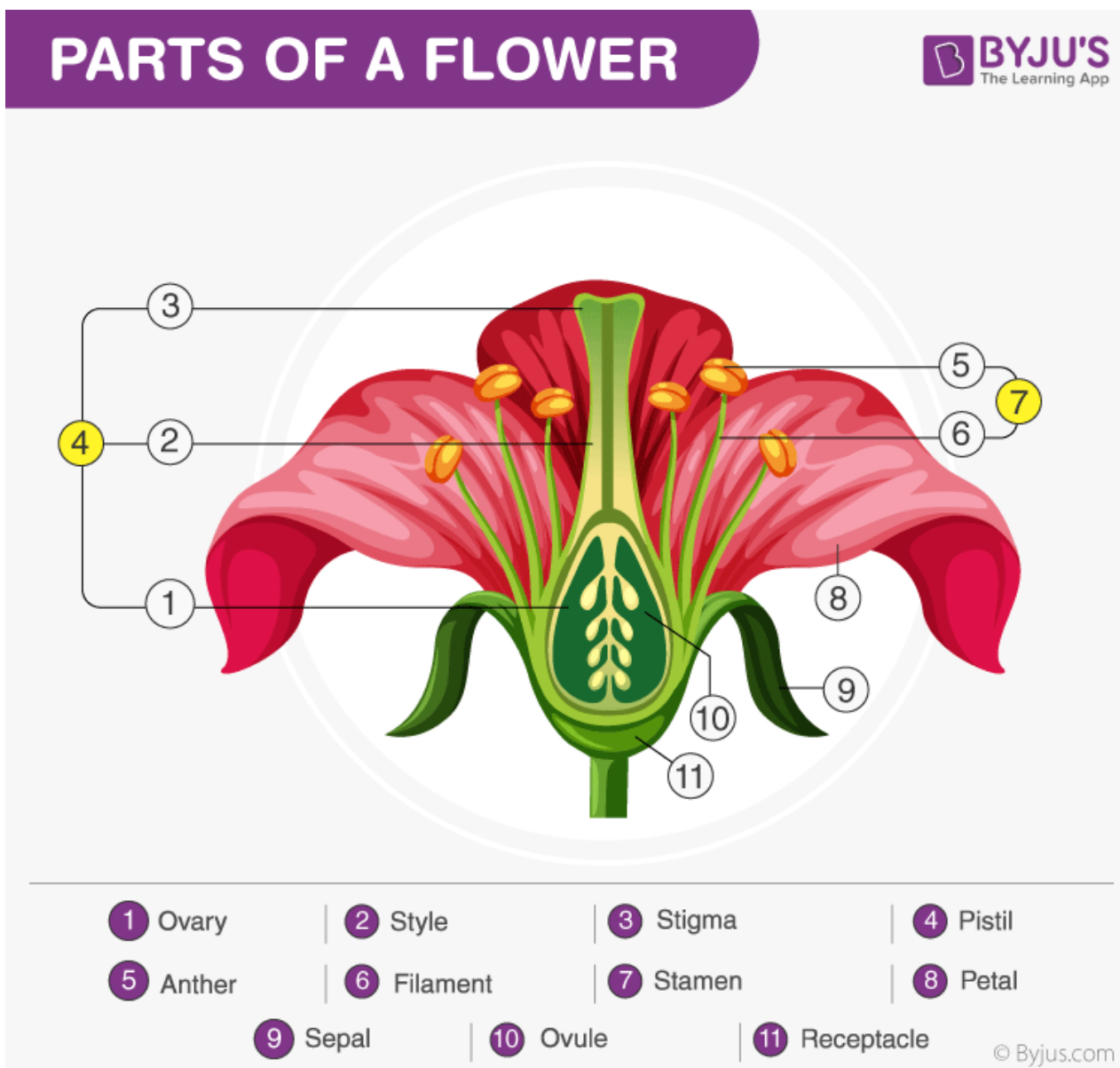
### Solution:

Menstruation is the normal bleeding of the vaginal line, which starts at puberty and lasts till menopause. During this period, the body prepares itself for pregnancy.

Every month an egg is released from one of the ovaries at the same time when the uterus prepares itself for the fertilized egg. The inner lining of the uterus gets thickened and is supplied with a sufficient amount of blood for the embryo. Since there is no interaction between the egg and the sperms, the fertilization of egg doesn't takes place. So when the egg doesn't get fertilized, the uterus lining breaks down slowly resulting in menstruation.

## 7. Draw a labelled diagram of the longitudinal section of a flower.

### Solution:



## 8. What are the different methods of contraception?

### Solution:

Following are the different methods of contraception:

- Natural method: In this method, the main focus is to avoid the meeting of sperms and ovum. This can be achieved by avoiding the mating from 10<sup>th</sup> to 17<sup>th</sup> day of the menstrual cycle. During this period, there are high chances of fertilization as ovulation is expected.
- Barrier method: In this method, the meeting of sperms and ovum is avoided by using a barrier. These barriers are available for males as well as for females. Condoms for both male and female, diaphragms for female, cervical cap and contraceptive sponge for females.
- Oral contraceptives: In this methods, pills are taken orally. These pills contain small portion of hormones that block the eggs so that fertilization doesn't takes place.
- Implants and surgical method: In this method, contraceptive devices like copper-T or a loop can be used to block the meeting of sperms and ovum. In surgical method, the fallopian tubes are blocked in females to stop the flow of eggs and vas deference is blocked in men to stop the flow of sperms.

## 9. How are the modes for reproduction different in unicellular and multicellular organisms?

### Solution:

The different modes of reproduction in unicellular organisms are fission, budding, etc. Here, the cell divides into two daughter cells and this process of cell division continues.

Whereas, in multicellular organisms there is a different organ system for reproduction. The different modes of reproduction in multicellular organisms are vegetative propagation, spore formation, etc.

In more complex organisms like humans and animals, reproduction is through sexual reproduction.

## 10. How does reproduction help in providing stability to populations of species?

### Solution:

Reproduction is the process of producing the same kind of species by the existing species. This is done so as to maintain the population of that species and also to take forward their species to the next generations. Stability is maintained by keeping a check of rate of births and rate of deaths.

## 11. What could be the reason for adopting contraceptive methods?

### Solution:

Following are the reasons for adopting contraceptive methods:

- To control population
- To avoid unplanned pregnancy
- To avoid transfer of sexually transmitted disease

## Multiple Choice Questions

**1. In the list of organisms given below, those that reproduce by the asexual method are**

**(i) banana**

**(ii) dog**

**(iii) yeast**

**(iv) Amoeba**

**(a) (ii) and (iv)**

**(b) (i), (iii) and (iv)**

**(c) (i) and (iv)**

**(d) (ii), (iii) and (iv)**

**Soln:**

Answer is (b) (i), (iii) and (iv)

**Explanation:**

Dog reproduce sexually, yeast reproduce by budding, Amoeba reproduce sexually and cultivated banana also reproduce asexually.

**2. In a flower, the parts that produce male and female gametes (germ cells) are**

**(a) stamen and anther**

**(b) filament and stigma**

**(c) anther and ovary**

**(d) stamen and style**

**Soln:**

Answer is (c) anther and ovary

**3. Which of the following is the correct sequence of events of sexual reproduction in a flower?**

- (a) pollination, fertilisation, seedling, embryo**
- (b) seedling, embryo, fertilisation, pollination**
- (c) pollination, fertilisation, embryo, seedling**
- (d) embryo, seedling, pollination, fertilization**

**Soln:**

Answer is (c) pollination, fertilisation, embryo, seedling

**Explanation:**

Pollination leads to fertilization after which embryo is formed. Seedling comes out from embryo.

**4. Offspring formed by asexual method of reproduction have greater similarity among themselves because**

- (i) asexual reproduction involves only one parent**
  - (ii) asexual reproduction does not involve gametes**
  - (iii) asexual reproduction occurs before sexual reproduction**
  - (iv) asexual reproduction occurs after sexual reproduction**
- (a) (i) and (ii)**
  - (b) (i) and (iii)**
  - (c) (ii) and (iv)**
  - (d) (iii) and (iv)**

**Soln:**

Answer is (a) (i) and (ii)

**Explanation:**

Asexual reproduction involve single parent and there will be no exchange of gametes hence offspring looks similar to their parent.

**5. Characters transmitted from parents to offspring are present in**

- (a) cytoplasm**
- (b) ribosome**

**(c) Golgi bodies**

**(d) genes**

**Soln:**

The answer is (d) genes

**6. Characters that are transmitted from parents to offspring during reproduction show**

**(a) only similarities with parents**

**(b) only variations with parents**

**(c) both similarities and variations with parents**

**(d) neither similarities nor variations**

**Soln:**

Answer is (c) both similarities and variations with parents

**7. A feature of reproduction that is common to Amoeba, Spirogyra and Yeast is that**

**(a) they reproduce asexually**

**(b) they are all unicellular**

**(c) they reproduce only sexually**

**(d) they are all multicellular**

**Soln:**

Answer is (a) they reproduce asexually

**Explanation:**

Amoeba reproduce by binary fission, Spirogyra reproduce by fragmentation, yeast reproduce by budding.

**8. In Spirogyra, asexual reproduction takes place by**

**(a) breaking up of filaments into smaller bits**

**(b) division of a cell into two cells**

**(c) division of a cell into many cells**

**(d) formation of young cells from older cells.**



**Soln:**

Answer is (a) breaking up of filaments into smaller bits

**Explanation:**

Spirogyra reproduce by fragmentation. Spirogyra simply breaks up into smaller pieces upon maturation. These pieces or fragments grow into new individuals

**9. The ability of a cell to divide into several cells during reproduction in Plasmodium is called**

**(a) budding**

**(b) reduction division**

**(c) binary fission**

**(d) multiple fission**

**Soln:**

The answer is (d) multiple fission

**Explanation:**

Plasmodium divide into many daughter cells by binary multiple fission. In Multiple fission nucleus of the cell divides multiple times by mitosis then separates to create multiple daughter cells.

**10. The correct sequence of reproductive stages seen in flowering plants is**

**(a) gametes, zygote, embryo, seedling**

**(b) zygote, gametes, embryo, seedling**

**(c) seedling, embryo, zygote, gametes**

**(d) gametes, embryo, zygote, seedling**

**Soln:**

Answer is (a) gametes, zygote, embryo, seedling

**Explanation:**

Gametes fuse to form a zygote during fertilization. After fertilization-embryo will be formed which will lead to seedling in plants.

**11. The number of chromosomes in parents and offsprings of a particular species remains constant due to**

- (a) doubling of chromosomes after zygote formation**
- (b) halving of chromosomes during gamete formation**
- (c) doubling of chromosomes after gamete formation**
- (d) halving of chromosomes after gamete formation**

**Soln:**

The answer is (b) halving of chromosomes during gamete formation

**Explanation:**

The halving of chromosome during gamete formation number of chromosome remain same as the somatic cell of an organism. Halving of gametes in a chromosomes is called the diploid number of chromosomes.

**12. In Rhizopus, tubular thread-like structures bearing sporangia at their tips are called**

- (a) filaments**
- (b) hyphae**
- (c) rhizoids**
- (d) roots**

**Soln:**

The answer is (b) hyphae

**Explanation:**

Tiny blob-on-a-stick like structures involved in reproduction are called hyphae. The blobs are called sporangia, which contain cells, or spores, that can eventually develop into new Rhizopus individuals.

**13. Vegetative propagation refers to the formation of new plants from**

- (a) stem, roots and flowers**
- (b) stem, roots and leaves**
- (c) stem, flowers and fruits**
- (d) stem, leaves and flowers**

**Soln:**

The answer is (b) stem, roots and leaves

**Explanation:**

Vegetative propagation is a type of asexual reproduction occurs in plants. In vegetative reproduction new plant is produced from vegetative parts of the plants such as roots, stem, leaf and buds. In vegetative reproduction plants produced are genetically similar enough to the parent plant to have all its characteristics.

**14. Factors responsible for the rapid spread of bread mould on slices of bread are**

**(i) large number of spores**

**(ii) availability of moisture and nutrients in bread**

**(iii) presence of tubular branched hyphae**

**(iv) formation of round shaped sporangia**

**(a) (i) and (iii)**

**(b) (ii) and iv)**

**(c) (i) and (ii)**

**(d) (iii) and (iv)**

**Soln:**

Answer is (c) (i) and (ii)

**Explanation:**

A large number of spores ensure a few spores survive even in adverse conditions. Availability of moisture and nutrients in the bread provides the necessary environment for the spore to grow into mould.

**15. Length of pollen tube depends on the distance between**

**(a) pollen grain and the upper surface of the stigma**

**(b) pollen grain on the upper surface of stigma and ovule**

**(c) pollen grain in anther and upper surface of stigma**

**(d) upper surface of stigma and lower part of style**

**Soln:**

The answer is (d) upper surface of stigma and lower part of style

**Explanation:**

Length of pollen tube ensures pollens reach the stigma to conduct pollination.

**16. Which of the following statements are true for flowers?**

- (i) Flowers are always bisexual**
- (ii) They are the sexual reproductive organs**
- (iii) They are produced in all groups of plants**
- (iv) After fertilisation, they give rise to fruits**
- (a) (i) and (iv)**
- (b) (ii) and (iii)**
- (c) (i) and (iii)**
- (d) (ii) and (iv)**

**Soln:**

Answer is (d) (ii) and (iv)

**Explanation:**

Flowers are not always bisexual hence statement i) is wrong. Only angiosperms produce flowers hence statement iii) is wrong.

**17. Which among the following statements are true for unisexual flowers?**

- (i) They possess both stamen and pistil**
- (ii) They possess either stamen or pistil**
- (iii) They exhibit cross-pollination**
- (iv) Unisexual flowers possessing only stamens cannot produce fruits**
- (a) (i) and (iv)**
- (b) (ii), (iii) and (iv)**
- (c) (iii) and (iv)**
- (d) (i), (iii) and (iv)**

**Soln:**

Answer is (b) (ii), (iii) and (iv)

**Explanation:**

Cross-pollination is necessary in unisexual flowers as they possess either stamen or pistil. Flowers possessing only stamens cannot produce fruits because fruit is a mature ovary.

**18. Which among the following statements are true for sexual reproduction in flowering plants?**

- (i) It requires two types of gametes**
- (ii) Fertilisation is a compulsory event**
- (iii) It always results in the formation of zygote**
- (iv) Offspring formed are clones**
- (a) (i) and (iv)**
- (b) (i), (ii) and (iv)**
- (c) (i), (ii) and (iii)**
- (d) (i), (ii) and (iv)**

**Soln:**

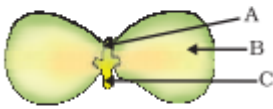
Answer is (c) (i), (ii) and (iii)

**Explanation:**

Off-springs produced from sexual reproduction cannot be clones hence statement iv) is wrong.

**19. In Figure 8.1, the parts A, B and C are sequentially**

- (a) cotyledon, plumule and radicle**
- (b) plumule, radicle and cotyledon**
- (c) plumule, cotyledon and radicle**
- (d) radicle, cotyledon and plumule**



**Fig. 8.1**

**Soln:**

Answer is (c) plumule, cotyledon and radicle

**20. Offspring formed as a result of sexual reproduction exhibit more variations because**

- (a) sexual reproduction is a lengthy process**
- (b) genetic material comes from two parents of the same species**
- (c) genetic material comes from two parents of different species**
- (d) genetic material comes from many parents**

**Soln:**

The answer is (b) genetic material comes from two parents of the same species

**Explanation:**

In sexual reproduction zygote is formed by gametes produced by a male and a female. A male and a female gamete fuse to form a zygote which fertilizes to produce new offspring. Because of the contribution of two parents, off-springs incur more variations.

**21. Reproduction is essential for living organisms in order to**

- (a) keep the individual organism alive**
- (b) fulfil their energy requirement**
- (c) maintain growth**
- (d) continue the species generation after generation**

**Soln:**

The answer is (d) continue the species generation after generation

**Explanation:**

Reproduction is essential to the lineage of the species whereas other life processes are essential to keep the organism alive.



**22. During adolescence, several changes occur in the human body. Mark one change associated with sexual maturation in boys**

**(a) loss of milk teeth**

**(b) increase in height**

**(c) cracking of voice**

**(d) weight gain**

**Soln:**

Answer is (c) cracking of voice

**Explanation:**

During adolescence Following changes occur in boys

- Growth of hairs in new parts of the body such as armpits, on the chest and between thighs near genital organ face, legs and on arms.
- Creaking of voice
- Skin becomes oily and pimples will start appearing
- Occasionally penis will erect especially while dreaming.

**23. In human females, an event that reflects the onset of the reproductive phase is**

**(a) growth of body**

**(b) changes in hair pattern**

**(c) change in voice**

**(d) menstruation**

**Soln:**

The answer is (d) menstruation

**Explanation:**

During adolescence Following changes occur in boys

- Growth of hairs in new parts of the body such as armpits, between thighs near genital organ thin hairs on face, legs and on arms.
- Start menstruation
- Skin becomes oily and pimples will start appearing
- Breast size will increase

**24. In human males, the testes lie in the scrotum, because it helps in the**

- (a) process of mating**
- (b) formation of sperm**
- (c) easy transfer of gametes**
- (d) all the above**

**Soln:**

The answer is (b) formation of sperm

**Explanation:**

Testes lying in the scrotum ensures the temperature of the testes remain lower than the body temperature. This helps in sperm production.

**25. Which among the following is not the function of testes at puberty?**

- (i) formation of germ cells**
- (ii) secretion of testosterone**
- (iii) development of placenta**
- (iv) secretion of estrogen**

- (a) (i) and (ii)**
- (b) (ii) and (iii)**
- (c) (iii) and (iv)**
- (d) (i) and (iv)**

**Soln:**

**Answer is (c) (iii) and (iv)**

**Explanation:**

Testis is a male reproductive organ but estrogen is produced in females. Placenta is formed in females during pregnancy.

**26. The correct sequence of organs in the male reproductive system for transport of sperms is**

- (a) testis → vasdeferens → urethra**
- (b) testis → ureter → urethra**

**(c) testis → urethra → ureter**

**(d) testis → vasdeferens → ureter**

**Soln:**

Answer is (a) testis → vasdeferens → urethra

**Explanation:**

Testis produces sperm which is transferred into epididymis through vasdeferens. From vasdeferens sperm is taken to urethra.

**27. Which among the following diseases is not sexually transmitted?**

**(a) Syphilis**

**(b) Hepatitis**

**(c) HIV – AIDS**

**(d) Gonorrhoea**

**Soln:**

The answer is (b) Hepatitis

**Explanation:**

Hepatitis spread through contaminated water and food.

## **Short Answer Questions**

**28. In a bisexual flower in spite of the young stamens being removed artificially, the flower produces fruit. Provide a suitable explanation for the above situation.**

**Soln:**

When stamens of a bisexual flower are removed. Cross-pollination can take place which results in fertilization and production of fruit.

**29. Can you consider cell division as a type of reproduction in unicellular organism? Give one reason.**

**Soln:**

Reproduction is the creation of a new individual. In unicellular organism cell division leads to the formation of new individuals. Hence cell division is a type of reproduction in unicellular organisms.

**30. What is a clone? Why do offsprings formed by asexual reproduction exhibit remarkable similarity?**

**Soln:**

Clones are the aggregate of cells or organisms which are produced asexually. Asexual reproduction involves a single parent and there will be no exchange of gametes; hence the offspring looks similar to their parent.

**31. Explain how, offspring and parents of organisms reproducing sexually have the same number of chromosomes?**

**Soln:**

Because of the halving of the chromosome during gamete formation, the number of chromosomes remains the same as in the somatic cell of an organism. Halving of chromosomes in gametes is called a haploid number of chromosomes.

**32. Colonies of yeast fail to multiply in water, but multiply in sugar solution. Give one reason for this.**

**Soln:**

Yeast requires energy for its growth and cell division. Water does not provide the required energy, whereas sugar provides energy; hence yeast multiplies in sugar solution.

**33. Why does bread mould grow profusely on a moist slice of bread rather than on a dry slice of bread?**

**Soln:**

Spores of bread mould need moisture to germinate and grow. Hence mould grows profusely on a moist slice of bread.

**34. Give two reasons for the appearance of variations among the progeny formed by sexual reproduction.**

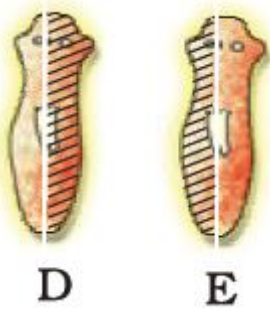
**Soln:**

- Gametes are contributed by two individuals of the same species.
- Crossing over occurs during meiosis.

**35. Would a Planaria cut vertically into two halves regenerate into two individuals? Complete Figure 8.2 D and E by indicating the regenerated regions.**

**Soln:**

Yes, Planaria cut vertically into two halves can regenerate into two individuals.



**36. From the internet, gather information about the chromosome numbers of five animals and five plants. Correlate the number with the size of the organism and answer the following questions.**

**(a) Do larger organisms have more number of chromosomes/cells?**

**(b) Can organism with fewer chromosomes reproduce more easily than organisms with more number of chromosomes?**

**(c) More the number of chromosomes/cells greater is the DNA content. Justify.**

**Soln:**

<b>Animals</b>	<b>Chromosome numbers</b>	<b>Plants</b>	<b>Chromosome numbers</b>
Man	46	Corn	20
Cat	38	Cotton	52
Horse	64	Garden pea	14
Rabbit	44	Mango	40
Elephant	56	Onion	16

1. Size of the organism has nothing to do with chromosomes numbers
2. Organism with fewer chromosomes need not reproduce easily compared to organisms with more number of chromosomes.
3. Chromosomes are made of DNA. Hence more number of chromosomes means more number of DNA.

**37. In the tobacco plant, the male gametes have twenty-four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?**

**Soln:**

Number of chromosomes in both the gametes are equal hence a number of chromosomes in a female gamete of tobacco plant is 24. Combining both number of chromosomes in a zygote is 48.

**38. Why cannot fertilisation take place in flowers if pollination does not occur?**

**Soln:**

Pollination is a process in which transfer of pollen grains from anthers to stigma takes place. If there is no pollination then there will be no fusion of gametes and fertilization do not take place.

**39. Is the chromosome number of the zygote, embryonal cells and adult of a particular organism always constant? How is the constancy maintained in these three stages?**

**Soln:**

Meiosis is a way of cell division in which a number of chromosomes get halved. After fertilization chromosomes become equal to that of somatic cells. After fertilization Mitosis takes place for the rest of the stages of life. Hence chromosomes remain constant.

**40. Where is the zygote located in the flower after fertilization?**

**Soln:**

After fertilization zygote will be located in the **ovary**.

**41. Reproduction is linked to stability of population of a species. Justify the statement.**

Competition for food, predation is common in nature. If there is no reproduction species would have become extinct. Hence reproduction linked to population of the species.

**42. How are general growth and sexual maturation different from each other?**

**Soln:**

General growth is all about growth of size. Sexual maturation is about achieving the ability to reproduce. General growth begins with the growth of an organism whereas sexual maturity is attained at a certain stage of life called adolescence.

**43. Trace the path of sperm during ejaculation and mention the gland and their functions associated with the male reproductive system.**

**Soln:**

Sequence of organs in the male reproductive system for transport of sperms is testis → epididymis → vasdeferens → prostate → urethra.

Glands associated with male reproductive system	Function
Testes	Secretion of testosterone
Prostate gland	Makes the medium of semen alkaline
Seminal vesicle	Addition of fluid content to semen
Cowper's gland	Urethra lubrication and neutralizes acidic traces of urine.

**44. What changes are observed in the uterus if fertilisation does not occur?**

**Soln:**

Following changes occur in the uterus if fertilization does not occur

- Extra lining of Uterus degenerates
- Uterus lining fragments gets discharged through vagina
- Unfertilized egg gets discharged
- Menstruation takes place

**45. What changes are observed in the uterus subsequent to implantation of the young embryo?**

**Soln:**

Following changes are observed in the uterus subsequent to implantation of the young embryo.

- Uterine lining thickens to support to developing embryo. (PLACENTA)
- Uterine lining is richly supplied with blood vessels so that nutrition and oxygen could be supplied to the developing foetus.

**46. What are the benefits of using mechanical barriers during sexual act?**

**Soln:**

- Mechanical barriers prevents unwanted pregnancy

- Mechanical barriers prevent sexually transmitted diseases.

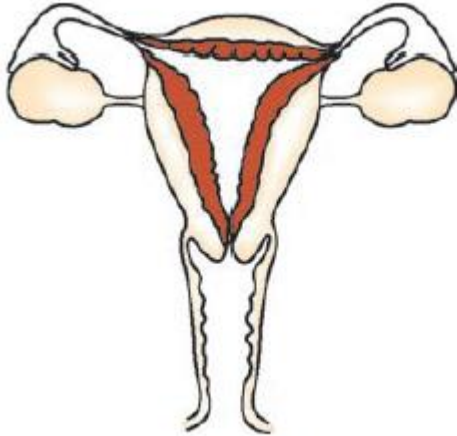
**47. In the given Figure 8.3 label the parts and mention their functions**

**(a) Production of egg**

**(b) Site of fertilisation**

**(c) Site of implantation**

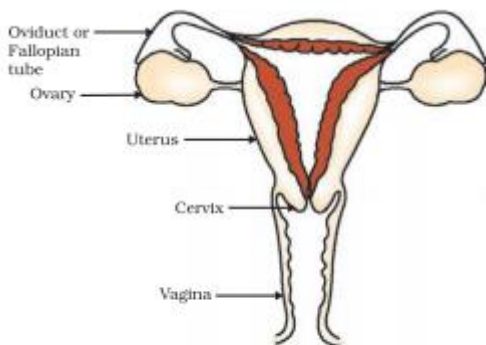
**(d) Entry of the sperms**



**Fig. 8.3**

**Soln:**

1. Ovary
2. Oviduct
3. Uterus
4. Vaginal passage



**Figure 8.11** Human -female reproductive system

**48. What would be the ratio of chromosome number between an egg and its zygote? How is the sperm genetically different from the egg?**

**Soln:**

The ratio of chromosome number between an egg and its zygote is 1:2.



Sperm contains the genetic material from the father while the egg contains the genetic material from the mother. Sperm can either have X chromosome or Y chromosome but egg always have an X chromosome.

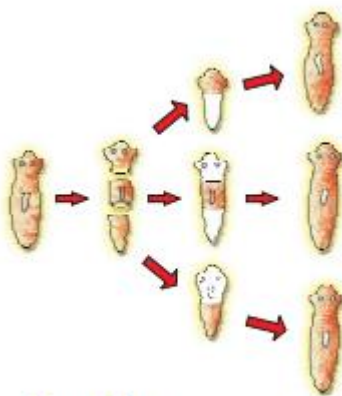
## Long Answer Questions

**49. Why are budding, fragmentation and regeneration all considered as asexual types of reproduction? With neat diagrams explain the process of regeneration in Planaria.**

**Soln:**

In Budding, fragmentation and regeneration only a single parent is involved and there is no formation of gametes hence they are considered as asexual types of reproduction.

### Regeneration of Planaria



**Figure 8.3** Regeneration in Planaria

Here the body of planaria cut into pieces and each piece has the ability to grow into a new organism. In the figure above the planaria body is cut into 3 pieces which regenerates into 3 individual cells.

**50. Write two points of difference between asexual and sexual types of reproduction. Describe why variations are observed in the offspring formed by sexual reproduction.**

**Soln:**

Sexual reproduction	Asexual reproduction
Two parents are involved	Single parent is involved
Gametes are formed	Gametes are not formed

In sexual reproduction, we can find more variations when compared to asexual mode of reproduction. Following are the reasons for that.

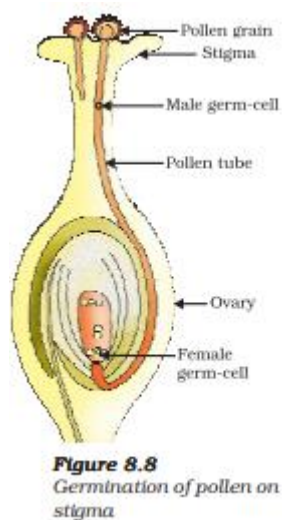
- Gene pool are contributed by two parents
- Crossing over that occur during meiosis results in more variation
- DNA replication also contributes to the variation

**51. Distinguish between pollination and fertilisation. Mention the site and product of fertilisation in a flower. Draw a neat, labelled diagram of a pistil showing pollen tube growth and its entry into the ovule.**

**Soln:**

Pollination	Fertilization
It is the transfer of pollen grains from the anther to the stigma of a flower.	It is the fusion of male gamete with female gamete.
Achieved by agents like wind, water or animals.	Achieved by the growth of the pollen tube so that the male gamete reaches the female germ cells.
Leads to fertilization	Lead to the formation of seeds
Pollination is an external process	Occurs in the ovary of the female.

Ovary is the site of fertilization and pollination occurs externally



**52. Distinguish between a gamete and zygote. Explain their roles in sexual reproduction.**

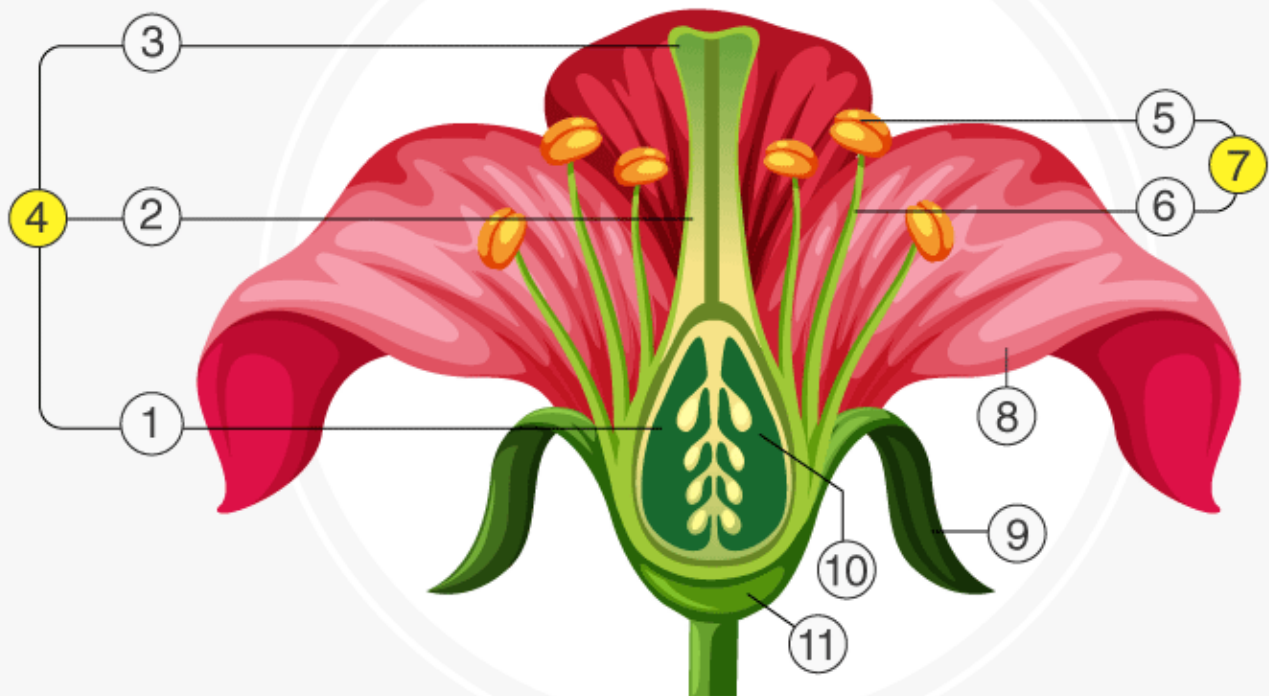
**Soln:**

Gamete	Zygote
Formed after Meiosis	Formed by the fusion of two gametes.
Gametes produces haploid number of chromosomes	produces diploid number of chromosomes
Male and female parts produces gametes	Zygote formation takes place in female
Gametes are required for sexual reproduction	Zygote is the precursor for embryo formation

**53. Draw the diagram of a flower and label the four whorls. Write the names of gamete producing organs in the flower.**

**Soln:**

Ovary produces female gametes. Anthers produces male gametes.



- |         |         |          |               |          |            |          |
|---------|---------|----------|---------------|----------|------------|----------|
| 1 Ovary | 2 Style | 3 Stigma | 4 Pistil      | 5 Anther | 6 Filament | 7 Stamen |
| 8 Petal | 9 Sepal | 10 Ovule | 11 Receptacle |          |            |          |

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## 54. What is placenta? Mention its role during pregnancy?

**Soln:**

Placenta is a disc which is embedded in the uterine wall. It contains villi on the embryo's side of the tissue. On the mother's side are blood spaces, which surround the villi. This provides a large surface area for glucose and

oxygen to pass from the mother to the embryo. The embryo gets nutrition from the mother's blood with the help of placenta. The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta.

## 55. What are various ways to avoid pregnancy? Elaborate any one method.

**Various ways to avoid pregnancy are given below**

1. **Physical barrier**
2. **Copper-T**
3. **Hormone Pills**
4. **Surgical procedure**

Barrier method: In the barrier methods of preventing pregnancy, the physical devices such as diaphragm (or cap) and condoms are used. Diaphragm (or Cap) is used by human females which is put over the cervix. Condoms are used by males.

**56. How does fertilisation take place? Fertilisation occurs once in a month. Comment.**

**Soln:**

Once in a month, one egg is released from either of the ovaries. The egg gets transferred to the fallopian tube from the ovaries. Sperm swims towards the fallopian tube and only one sperm can penetrate the egg at a time. This process is called fertilization.

A menstrual cycle is composed of about 28 days. This means only one egg is available for fertilization in one menstrual cycle. Hence, it can be said that fertilization can occur only once in a month.

**57. Reproduction is essentially a phenomenon that is not for the survival of an individual but for the stability of a species. Justify.**

**Soln:**

Competition for food, predation is common in nature. If there is no reproduction species would have become extinct. Hence reproduction linked to population of a species. New individuals carry the lineage of their parents. More number of organisms produces counterbalances the mortality that arises due to various factors. Like this reproduction helps in maintain stability of a species.

**58. Describe sexually transmitted diseases and mention the ways to prevent them.**

**Soln:**

Disease that gets spread from person to person through sexual means are called sexually transmitted diseases. These include bacterial infections such as gonorrhoea and syphilis, and viral infections such as warts and HIV-AIDS.

Below are the ways to prevent sexually transmitted diseases

- Use of condoms or other physical barriers.
- Avoiding sexual contact with unknown partners.
- Avoid sharing towels or underclothing.
- Get a vaccination for hepatitis B.

