



CLASS: X	DEPARTMENT: SCIENCE 2023 - 2024	DATE: 12.10.23
HANDOUT	TOPIC: HOW DO ORGANISMS REPRODUCE? (SEXUAL REPRODUCTION)	NOTE: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

Sexual Reproduction

It is a mode of reproduction that depends on the involvement of two individuals before a new generation can be created.

Four steps in sexual reproduction:

Formation of gametes in the sex organs.

Transfer of male gamete to female gamete.

Fusion of gametes, either inside or outside the female parent's body.

Development of the zygote to embryo and then complete individual.

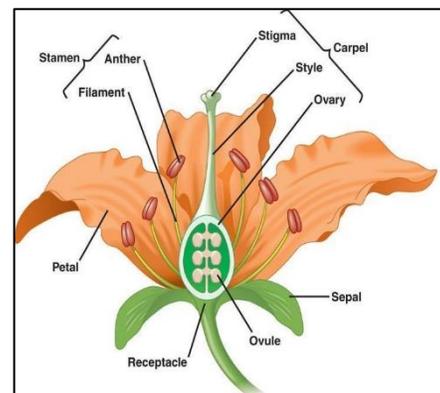
Advantages of sexual reproduction:

- Variations are produced among the progeny.
- Such populations are able to adapt well to changing environment and thus evolves faster.

Sexual Reproduction in Flowering Plants

The reproductive parts of angiosperms are located in the flower. The different parts of a flower – sepals, petals, stamens and carpels. Stamens and carpels are the reproductive parts of a flower which contain the germ-cells.

The flower may be unisexual (papaya, watermelon) when it contains either stamens or carpels or bisexual (Hibiscus, mustard) when it contains both stamens and carpels.



Parts of a Flower

The Four Key Components of a Flower are Sepals, Petals, Stamens and carpels

Sepal: Sepals are the exterior parts of a flower. **Sepals** are small, green coloured, leaf shaped **structures** found on the outermost part of the flower. They are considered to be modified leaves.

Function of Sepal

The initial **function** of **sepals** is to provide support and protection for a flower bud as they close up around it until it's ready to bloom. The **sepals** surround the petals and the reproductive organs inside the flower and protect them from harsh environmental conditions and drying out.

Petals: Usually, **petals** are the most prominent part of a flower **structure**, owing to their vivid colour and sometimes scent.

Function of Petal

Their main **function** is to attract pollinators and also protect the inner reproductive **structures** of a flower.

Stamens (Male reproductive organs)

They consist of an anther, the site of pollen development, and in most species a stalk-like filament, which transmits water and nutrients to the anther and positions it to aid pollen dispersal.

Carpel/Pistil (Female reproductive organ)

A **carpel** is the innermost part of a flower. It is usually surrounded by male reproductive **structures** called stamens, both of which are surrounded by petals.

The three main parts of a **carpel** are the ovary, style, and Stigma.

The ovary is at the base of the flower, from which extends a tubular structure called the style and on the top of the style is a surface receptive to pollen called the stigma where pollination occurs

The **carpels** are female reproductive **structures** that produce egg cells in the ovule within the ovary and protect a developing baby plant, or embryo.

Pollination in Plants

Pollination is the act of transferring pollen grains from the male anther of a flower to the female stigma.

Pollination is of two types: -

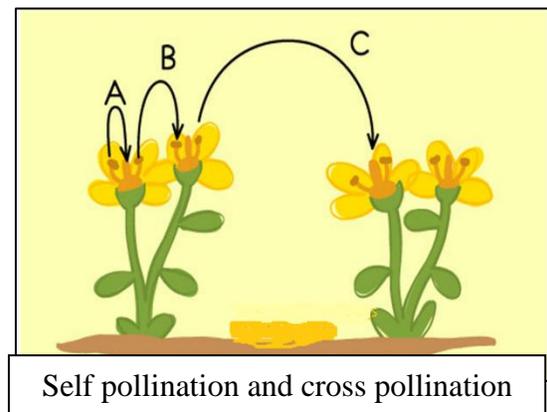
- (i) Self Pollination
- (ii) Cross Pollination

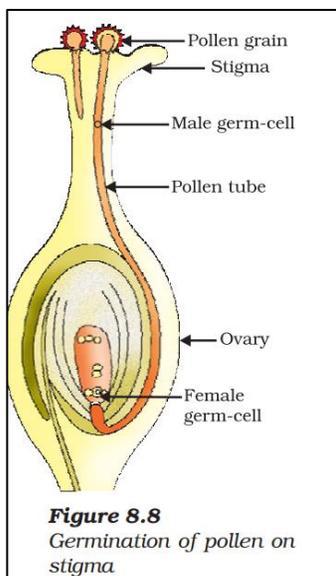
Self-pollination occurs when the pollen from the anther is deposited on the stigma of the same flower, or another flower on the same plant.

Cross-pollination is the transfer of pollen from the anther of one flower to the stigma of another flower on a different individual of the same species.

Fertilisation in plants:

- ❖ In plants, pollination is followed by fertilisation. Once the pollen grains are deposited on the stigma, it forms the pollen tube.





- ❖ The pollen tube grows through the ovary and reach the ovule where the egg cell is located.
- ❖ The pollen tube normally enters the ovule through a small opening called micropyle.
- ❖ Inside the ovule, the pollen tube releases two male gametes into the embryo sac.
- ❖ One male gamete fuse with the egg, this fusion is called syngamy and its product is called zygote.
- ❖ The other male gamete fuse with two polar bodies and this process is called triple fusion, where three nuclei are involved in the fusion process, one male gamete and two polar nuclei.

Thus, inside each embryo sac, two fusions, syngamy and triple fusion, takes place. This mechanism of two fusions occurring in an embryo sac is called **double-fertilisation**.

Post Fertilisation Changes

After fertilisation:

- ❖ Zygote divides several times to form an embryo within the ovule.
- ❖ Ovule develops a tough coat and is gradually converted into a seed.
- ❖ Ovary grows rapidly and ripens to form a fruit.
- ❖ Meanwhile, the petals, sepals, stamens, style and stigma may shrivel and fall off.

Germination of seed

The seed contains the future plant or embryo which develops into a seedling under appropriate conditions. This process is known as germination. The process in which the embryo emerges out of the **seed** by rupturing the **seed** coat, leading to the formation of a seedling is called **germination**. The radicle forms the root system of the plant, and the plumule forms the shoot system of the plant.

Reproduction in Human Beings

Humans use a Sexual Mode of reproduction

Puberty

The time between childhood and adulthood is called **adolescence**. It needs sexual maturation which includes secretion of sex hormones and creation of the germ cells i.e., egg (ova) in the female and sperm in the male partner & this period of sexual maturation is called Puberty.

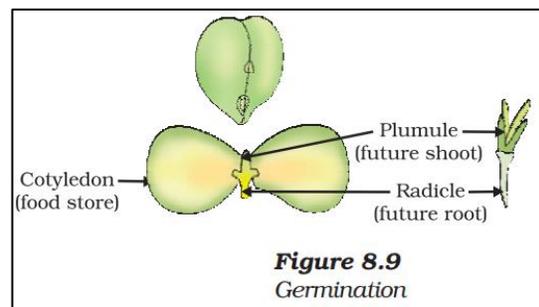
The age of puberty ranges from

- i. Boys: 13 – 14 years
- ii. Girls: 10 – 12 years

The male gonads (Testes) – produce sex hormone testosterone and male gametes sperms

The female gonads (Ovaries) - produce sex hormones Oestrogen and progesterone and female gametes eggs.

Common changes in boys and girls at Puberty



Common Changes in boys and girls

- ❖ Hair grow under armpits, in genital area.
- ❖ Thinner hairs appear in the arm and legs.
- ❖ Oily skin with the development of pimples.

Girls

- ❖ Hips broaden
- ❖ Breasts develop and enlarge.
- ❖ Fallopian tubes, vagina, uterus enlarges.
- ❖ Ovaries produce Ovum (egg)

Boys

- ❖ Growth of hair on chest and face (beard and moustache)
- ❖ Body becomes muscular, chest and shoulders broaden, Voice deepens.
- ❖ Penis and testis enlarge
- ❖ Testes produce sperms

The Male Reproductive System -Male Reproductive System consists of:

1. Testes (Testicles):

- Pair of testes is located below the abdomen in scrotal sac or scrotum.
- Testes produce male gametes sperms (germ cells).
- Sperms can withstand with the lower temperature.
- To maintain the temperature 2 – 3 0C lower than the body and for the development of sperm scrotum is located outside the body cavity.
- Testes also secretes a hormone (testosterone). It regulates the formation of sperms and changes in boys during puberty.

2. Epididymis:

- Tubes present in testes join to form epididymis.
- Epididymis stores sperms temporarily.

3. Vas deferens (sperm duct):

- Each epididymis continues further as sperm duct or vas deferens.
- Each vas deferens unites with ureter coming from the urinary bladder on either side.
- Thus, urethra is the common passage for sperms and urine.
- The vas deferens **transports mature sperm to the urethra in preparation for ejaculation.**

4. Seminal Vesicles:

- A pair of glands. Each gland opens into the corresponding sperm duct.
- Seminal vesicle produces secretion (semen) which is responsible for nutrition and transportation of sperms. (high in fructose, a sugar that provides nutrients for sperm cells, as well as other proteins, enzymes, and mucus).

5. Prostate gland:

- It is bilobed structure which surrounds the urethra.
- To **produce the fluid that nourishes and transports sperm**

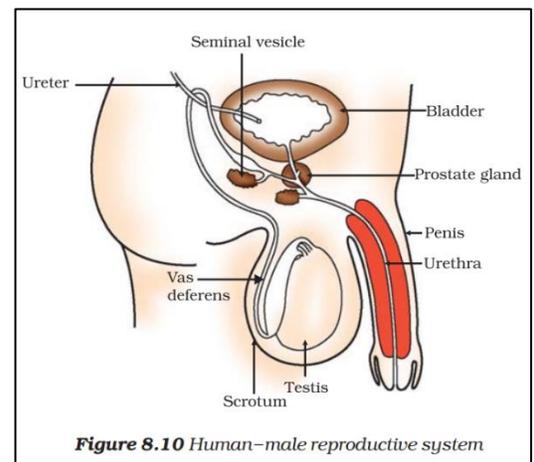


Figure 8.10 Human–male reproductive system

- It pours an alkaline secretion into the semen.

6. Cowper's gland:

- These are two small ovoid glands which open into urethra.
- Its secretion serves as a lubricant.

7. Penis:

- The urethra passes through the penis.
- It carries either urine or semen at a time.
- It deposits sperm into vagina.

Female Reproductive System:

1. Ovaries:

- Two ovaries present in the pelvic cavity, one each side of the uterus.
- Ovaries produce ova which are female gametes.
- One ovum is released by one ovary every month.
- When a girl is born, the ovaries already contain thousands of immature eggs. On reaching puberty, **some** of these starts maturing. One egg is produced every month by one of the ovaries.
- Ovaries also secrete female hormones oestrogen and progesterone.
- Both the hormones are responsible for the changes in female body at the time of puberty and pregnancy.

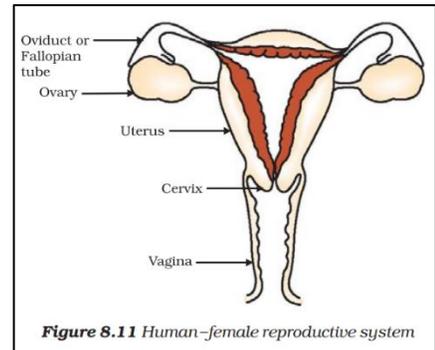


Figure 8.11 Human-female reproductive system

2. Fallopian tube/ oviduct

- The released egg is carried to the uterus through thin oviduct.
- Oviduct is also the site of fertilisation.

3. Uterus

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

4. Vagina

- The sperms enter through the vaginal passage during sexual intercourse. They travel upwards and reach the oviduct where they may encounter the egg.

Fertilisation: The fusion of male gamete with female gamete to form a zygote during sexual reproduction is called **fertilisation**.

Implantation: After the **egg is fertilised**, the zygote is formed. The zygote travels down the uterus in the female body and gets attached to its wall.

Placenta:

This is a disc of special tissue embedded in the uterine wall. It connects the foetus and **uterus** of the mother. 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.

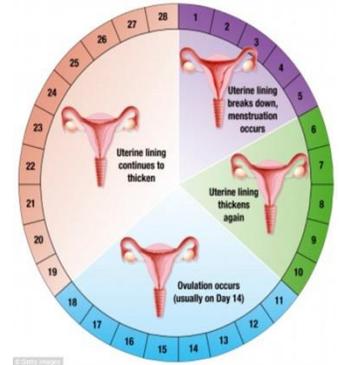
Functions of placenta: It aids in the exchange of nutrients, gases, hormones and waste products between the mother and foetus. In other words, the **placenta** provides nutrition and a means of excretion for the foetus.

Gestation Period: The normal duration it takes for the development of the foetus from the time of fertilisation in the womb of its mother is called the **gestation period**. In **humans**, the **gestation period** is for about 9 months or approximately 280 days.

Parturition: Childbirth, the process of delivering the baby and placenta from the uterus to the vagina to the outside world. Also called labour and delivery.

What happens when the Egg is not Fertilised? (Female Sexual Cycle)

- Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilised egg.
- Thus its lining becomes thick and spongy. This would be required for nourishing the embryo if fertilisation had taken place.
- If fertilisation has not taken place then, this lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucus.
- This cycle takes place roughly every month and is known as menstruation. It usually lasts for about two to eight days. This is called female sexual cycle.



REPRODUCTIVE HEALTH: is all those aspects of general health which help a person to lead a normal, safe and satisfying life.

STDs (Sexually Transmitted Disease): - are the disease which are spread by sexual contact from an infected person to a healthy person. They are caused by various microorganisms that live in warm and moist environments of the vagina, urethra, anus and mouth. Some of the common STDs are: Gonorrhoea and Syphilis (bacterial infections) and warts and HIV-AIDS (viral infections)

Contraceptive methods to avoid pregnancy:

- **Mechanical Barrier method:** In this method physical devices such as Condoms, diaphragm & cervical caps are used. These devices prevent the entry of sperm in the female genital tract during copulation, thus acting as barrier between them.
- **Chemical methods:** In these methods, specific drugs are used by females which are of two types- oral pills and Vaginal pills. Oral pills(oral contraceptive-Ocs)- contains Progesterone hormone mainly which stops the ovary from releasing ovum into the fallopian tube by changing the hormonal balance of the body.
- **IUCD (Intrauterine Contraceptive Devices):-** e.g- Copper-T (Placed safely inside the uterus by a doctor) It prevents implantation in the uterus.
- **Surgical method:** In this method a small portion of vas deferens in male and the fallopian tube in female is surgically removed or tied. It is called VASECTOMY in males and TUBECTOMY in females.

Surgery can also be used for removal of unwanted pregnancies. But it is misused for illegal sex selective abortion (female foeticide). Due to this female- male sex ratio is declined, so prenatal sex determination is prohibited.

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