

St. Andrews Scots Sr. Sec. School

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Session: 2022-2023

Chapter 8 - Notes

Class: VIII

Subject: Science

Topic: Reproduction in Animals

Reproduction:

Reproduction is the process by which living organisms produce more living organisms of its own kind.

Mode of Reproduction:

There are two main types of reproduction in living organisms.

1. Asexual Reduction: The process of reproduction in which new individuals are produced from a single parent. E.g. microorganisms.

Asexual reproduction is found in the single-celled organism such as the archabacteria, eubacteria etc. Many plants and fungi reproduce asexually as well.

2. Sexual Reproduction: The process of reproduction in which two individuals are involved to produce a new individual. E.g. Human, tiger

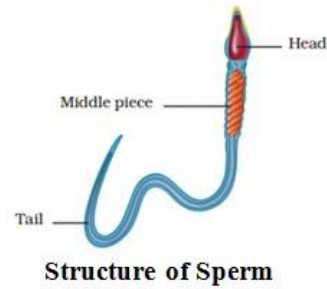
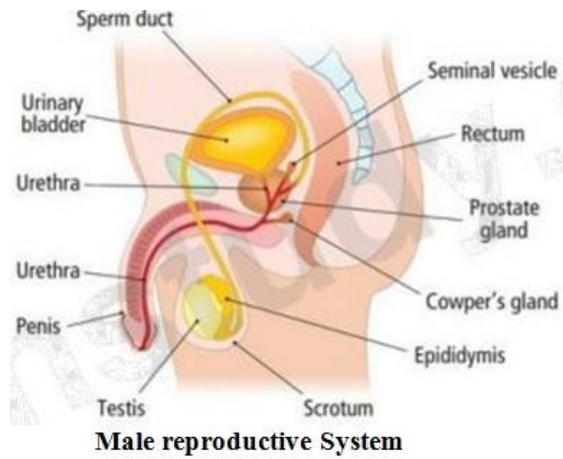
Sexual Reproduction:

In animals, males and females have different reproductive parts or organs. The reproductive parts in animals produce gametes that fuse to form a zygote. It is the zygote which develops into a new individual. This type of reproduction beginning from the fusion of male and female gametes is called sexual reproduction.

Reproductive Organs in Humans:

Male Reproductive System:

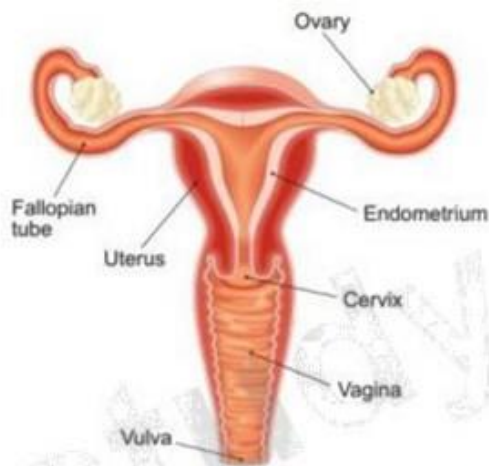
A pair of testes (singular, testis), two sperm ducts and a penis, these are the male reproductive organs. The testes produce the male gametes called sperms. Millions of male gametes (sperms) are produced by the testes. Though sperms are very small in size, each has a head, a middle piece and a tail. Sperm is a single cell with all the usual cell components.



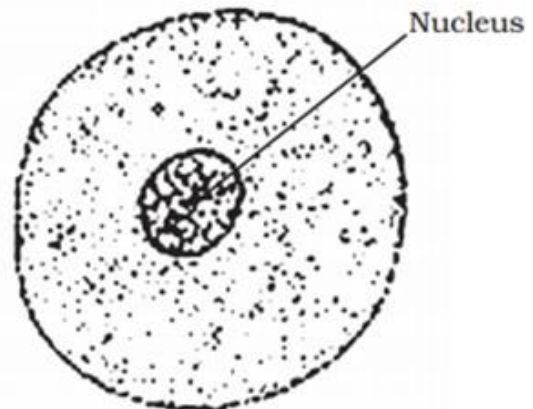
Sperm

Female Reproductive System:

A pair of ovaries, oviducts (Fallopian tubes) and the uterus, these are the female reproductive organs. Ovary produces female gametes called ova (eggs). In human beings, a single matured egg is released by one of the ovaries, into the oviduct every month. Uterus is the part where development of the baby takes place. An egg is also a single cell.



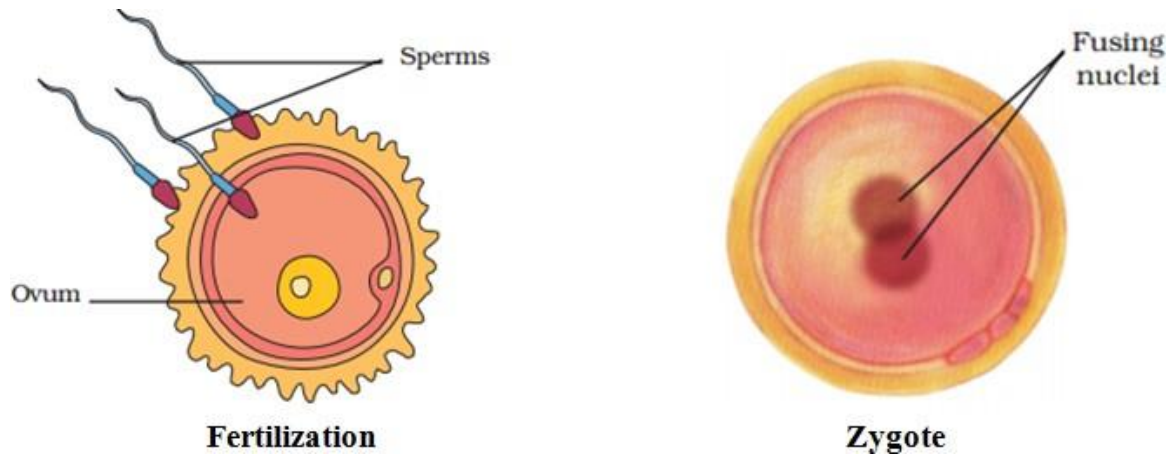
Female reproductive organs in humans



Human Ovum

Fertilization:

The process of fertilization is fusion of a male gamete (Sperm) with a female gamete (Ovum) is called fertilization. Zygote is formed after fertilization.

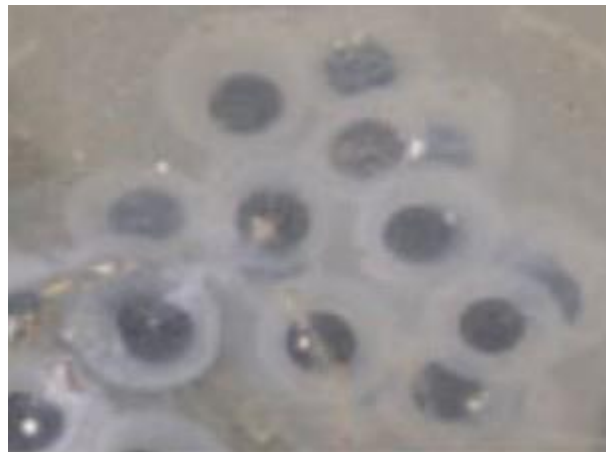


Types of Fertilization: There are two types of fertilization in animals, external fertilization and internal fertilization.

1. **Internal Fertilization:** When fertilization takes place inside the animal's body, it is called internal fertilization. Internal fertilization occurs in many animals including humans, cows, dogs and hens.

2. **External Fertilization:** In this type of fertilization, the fusion of a male and a female gamete takes place outside the body of the animal's body is called external fertilization. It is very common in aquatic animals such as fish, starfish, etc.

Example: During spring or rainy season, frogs and toads move to ponds and river. When the male and female come together in water, the female lays the eggs, the male deposits sperms over them. Each sperm swims randomly in water with the help of its long tail. The sperms then come in contact with the eggs.



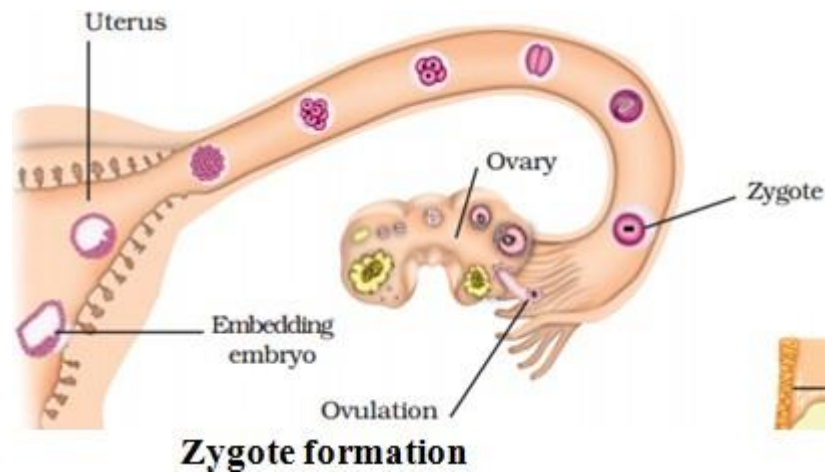
Eggs of frog

Development of Embryo:

Development of embryo takes place in the female reproductive system through following steps:

1. Every month, a single egg comes out of the ovary and reaches the fallopian tube of female reproductive system.

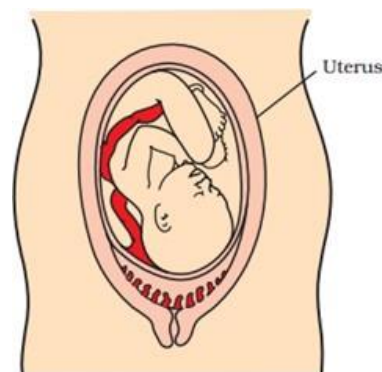
2. During copulation, sperms reach the Fallopian tube where a sperm fertilizes the egg. This results in formation of zygote.



3. The zygote divides repeatedly to give rise to a ball of cells. The cells then begin to form groups that develop into different tissues and organs of the body. This developing structure is termed an embryo.

4. The embryo gets implanted in the wall of the uterus for further gradually developed the body parts such as hands, legs, head, eyes, ears, etc.

5. The stage of the embryo in which all the body parts can be identified is called a foetus. When the development of the foetus is complete, the mother gives birth to the baby.



Foetus in the uterus

Formation of Egg Shell in Hens:

Internal fertilization takes place in hens. After fertilization, the zygote divides continuously and moves to the oviduct. As it travels down, many protective layers are formed around it. The hard shell in a hen's egg is one such protective layer. After the hard shell is formed, the hen finally lays the egg. The embryo takes about 3 weeks to develop into a chick. The hen sits on the eggs to provide sufficient warmth. After the chick is completely developed it bursts open the egg shell.

Viviparous Animals:

The animals which give birth to young ones are called viviparous animals. Examples- Human being, dog, cows.

Oviparous Animals:

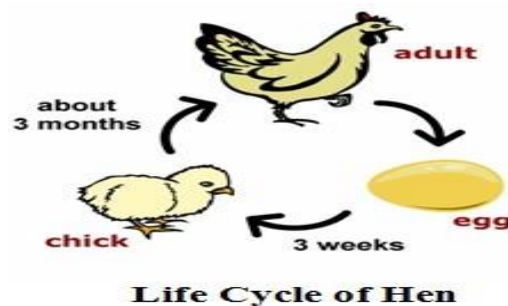
Those animals which lay eggs are called oviparous animals. Examples – hen, frog etc.

IVF (In Vitro Fertilisation):

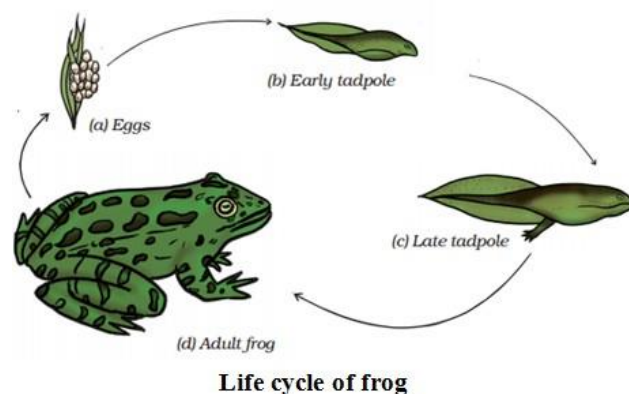
1. A biological process carried out in laboratory is called in-vitro. Thus, fertilization carried out in laboratory is called in-vitro fertilization.
2. Some women are unable to bear babies because of oviducts are blocked in result sperms cannot reach the egg for fertilization. Doctors collect freshly released egg and sperms and keep them together for a few hours for IVF or in vitro fertilization (fertilization outside the body).
3. If fertilization occurs, the zygote is allowed to develop for about a week and then it is transferred in the mother's uterus. Whole development takes place in the uterus and the baby is born like any other baby. Babies born through this technique are called test-tube babies.

Young Ones to Adults:

1. Direct Development: When the young ones of an animal resemble the adult, then direct development takes place, e.g. hen, man, monkey, etc.

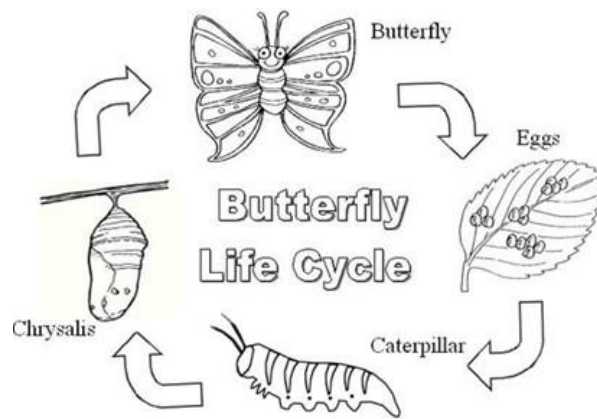


2. Indirect Development: When the young ones of an animal do not resemble the adult, then indirect development takes place, e.g. frog, butterfly, silk moth, etc.



3. Metamorphosis: In case of indirect development, transformation of young ones into adult through drastic changes is called metamorphosis. Larva of butterfly undergoes

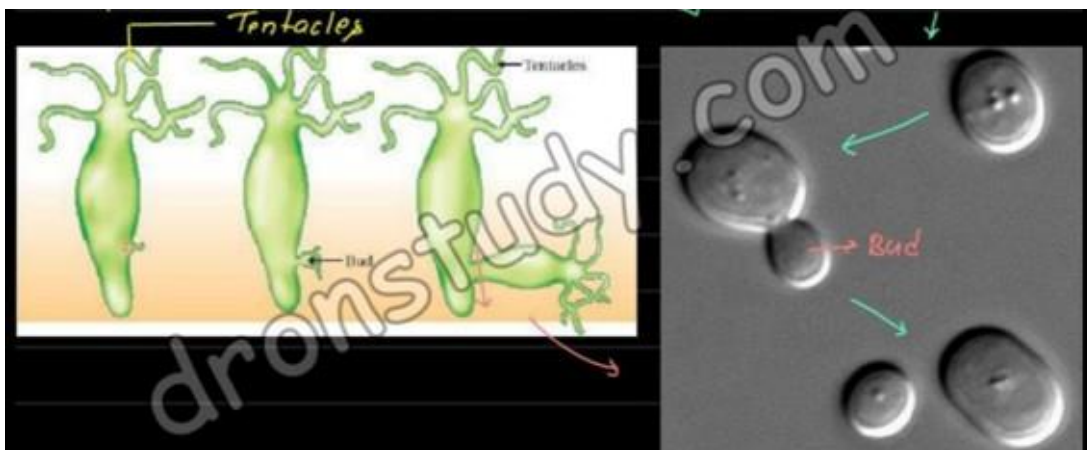
metamorphosis to become a butterfly. A tadpole undergoes metamorphosis to become a frog.



Life cycle of butterfly

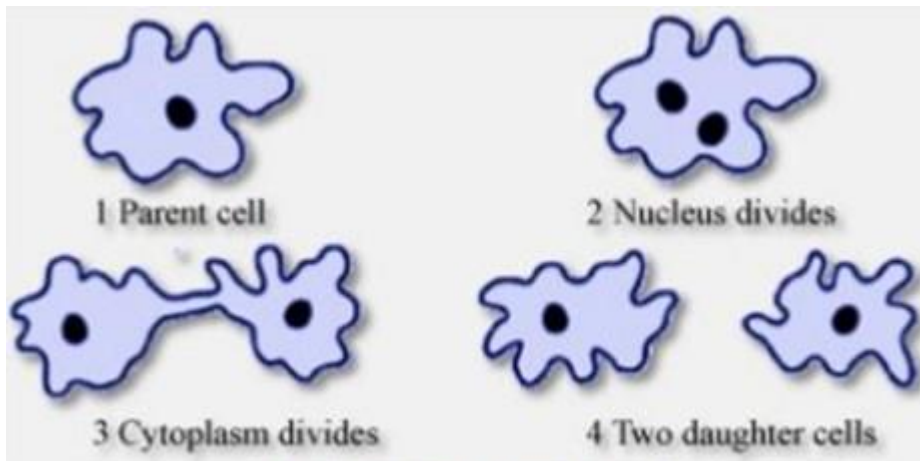
Asexual Reproduction Methods: The process of reproduction in which new individuals are produced from single parent. Example - Microorganisms.

1. **Budding:** This reproduction method is seen in those multi cellular animals which are highly simple in structure. A small bud or bulge develops on the body. After developing the bud, it gets detached from the parent's body to begin life as a new individual. Since new individuals develop from the buds, this type of asexual reproduction is called budding. Examples: Hydra and sponges.



Stages of budding in Hydra

2. **Binary Fission:** This method of reproduction is seen in unicellular animals, example- amoeba. In this method, an organism divides and forms two daughter cells. First the nucleus divides and forms two daughter nuclei. Then the cytoplasm in the mother cell divides into two daughter cells. This leads to the formation of the two daughter cells each having a nucleus and its own cell organelles which then develop into a fully formed adult. Example- paramecium, leishmania etc.



Binary fission in Amoeba

Cloning:

1. Cloning is process of production of an exact copy of a cell, any other living part, or a complete organism. Cloning process of an animal was successfully performed for the first time by Ian Wilmut and his colleagues at the Roslin Institute in Edinburgh, Scotland. They cloned successfully a sheep named Dolly.



(a) Finn Dorsett

(b) Scottish blackface ewe

(c) Dolly

Cloning

2. During the process of cloning sheep named Dolly, a cell was collected from the mammary gland of a female Finn Dorsett sheep. Simultaneously, an egg was collected from a Scottish blackface ewe. The nucleus was removed from the egg. After that, the nucleus of the mammary gland cell from the Finn Dorsett sheep was inserted into the egg of the Scottish blackface ewe whose nucleus had been removed. Then this egg was implanted into the Scottish blackface ewe. Development of this egg followed normally and then finally Dolly was born. It was found to be absolutely identical to the Finn Dorsett sheep from which the nucleus was taken.

Adolescence

The period of life, when the body undergoes changes, leading to reproductive maturity, is called adolescence. This is the time span in which the child develops into an adult.

- Adolescence begins around the age of 11 and goes on until 18 or 19 years of age.
- Adolescents are also called 'teenagers'.
- The body at this stage undergoes important changes and these mark the period of puberty.



Physical Changes in Girls

Puberty

Puberty is the period, during which, the human body undergoes certain changes in their body and reproductive organs which leads to sexual maturity.

- The most important change, which marks puberty is that boys and girls become capable of reproduction.
- In girls, puberty may begin a year or two earlier than in boys.

Changes at Puberty

- An individual goes through different changes during the onset of puberty.
- It differs in males and females, also the extent of these changes is different in each person.
- Each individual goes through changes like increase in height, change in body shape, change in voice, development of sex organs, mental, intellectual and emotional maturity.

Secondary sexual characteristics

These are external, visible characteristics that develop in boys and girls after puberty, help to distinguish the two sexes and are not directly involved in reproduction. A few of them are as follows.

Boys:

1. The growth of facial hair.
2. The growth of body hair including underarm, abdomen, chest hair and pubic hair.
3. Chest and shoulders widen and body becomes muscular.

4. Skin becomes more rough and porous, secretion of sweat glands and sebaceous glands increases.
5. Larynx (Adam's apple)/voice box protrudes out and voice becomes deep and husk.

Girls:

6. Enlargement of breasts
7. The growth of body hair, prominently in the underarm and pubic areas.
8. Widening of hips
9. Changed fat distribution. More fat below the skin, at hips, buttocks and thighs.
10. Development of secondary reproductive organs.

Reproductive health

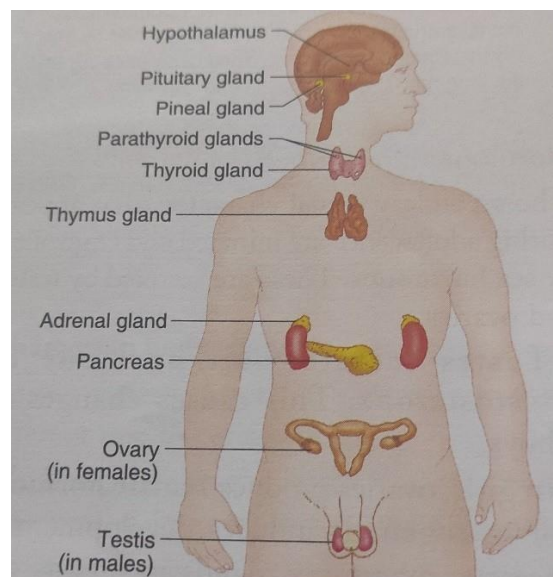
- The physical and mental well being of an individual is regarded as an individual's health.
- During adolescence, the reproductive organs develop and become functional.
- Reproductive health means proper growth and well being of the reproductive organs.

Our Great Glands

Endocrine glands

An endocrine system is a group of **ductless glands** that regulate body processes and functioning of many systems by secreting chemical substances called **hormones**.

- They release their secretions directly into the bloodstream.
- The origin and site of action are usually distant for hormones.



Location of endocrine glands in the human body

Hormones

Hormones are chemical messengers secreted by the endocrine glands.

- They control body functioning, physiology and behaviour.

Pituitary gland

- The pituitary gland is situated in the brain and is called a master endocrine gland.
- It produces hormones that instruct other glands to secrete their hormones.
- The pituitary gland secretes growth hormone which controls the overall growth of a person.
- Secretion of growth hormone is maximum in adolescence period.

Testes

- Testosterone is the primary male sex hormone.
- It is responsible for the development of the male reproductive organs, production of male gamete i.e. sperms and development of secondary sexual characteristics too.
- Testes start secreting testosterone only after puberty.

Ovaries

- Oestrogen is the primary female sex hormone.
- It is responsible for the development of the female reproductive organs, production of female gamete i.e. ova and development of secondary sexual characteristics and menstrual cycle.
- The corpus luteum is a hormone secreting temporary endocrine structure in the female reproductive system. It secretes progesterone that causes changes in the uterus that makes it more suitable for implantation.
- Ovaries secrete this hormone after puberty.

Thyroid gland

- It is a butterfly-shaped gland situated in the throat.
- It secretes a hormone called thyroxin.
- This hormone is important as it maintains the balance of all metabolic activities.
- The deficiency of this hormone can cause swelling of the thyroid gland, leading to goitre.

Pancreas

- The pancreas secretes a hormone called insulin, which regulates the blood sugar level in the body.
- Deficiency of insulin leads to diabetes.

Adrenal glands

- The adrenal glands are situated right above the kidneys.
- They change their shape throughout life and shrink as a person grows older.
- They secrete a hormone adrenaline and also maintain the salt and pH balance.
- Hormone adrenaline is also called 'fight or flight' hormone as it functions in emergency situations.

Menstrual Cycle

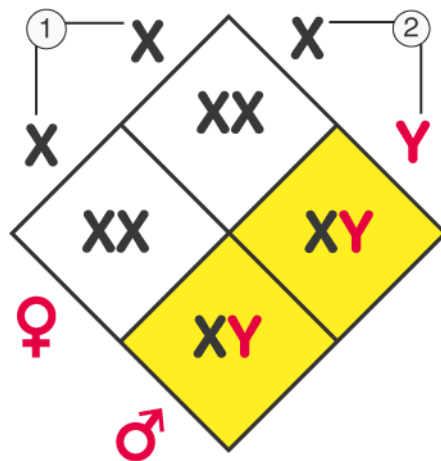
- It is a reproductive cycle of females.
- It begins at puberty and the onset of the menstrual cycle is called '**menarche**'.

- The process includes cyclic changes in the ovaries and in the uterus, both simultaneously.
- In the ovaries, an ovum develops and matures and then released.
- In the uterus, a thick spongy inner lining develops anticipating pregnancy.
- If the egg is fertilized, pregnancy occurs.
- If fertilisation does not occur, the released egg and the thickened lining of the uterus along with its blood vessels are shed off.
- This causes bleeding in women which is called menstruation.
- The menstrual cycle stops in women anywhere between 45 to 52 years.
- Stopping of the menstrual cycle is called ‘**menopause**’.
- The years between menarche and menopause marks the reproductive age of a woman where she is able to bear a child.

Boy or Girl

Sex Determination

- All human beings have 23 pairs of chromosomes in the nuclei of their cells.
- Two chromosomes out of these are of the sex chromosomes, named X and Y.
- A female has two X chromosomes, while a male has one X and one Y chromosome.
- The gametes have only one set of chromosomes.
- The unfertilised ovum always has one X chromosome.
- But in the male gametes or sperms, there exists one kind having an X chromosome and the other kind having a Y chromosome.



① Female gametes | ② Male gametes

Sex determination in Humans

When a sperm containing X chromosome fuses with an egg, it develops into a female child.
When a sperm containing Y chromosome fuses with an egg, it develops into a male child.

Personal hygiene

- Personal hygiene is very important, especially during teenage years.
- Increased activity of sweat glands sometimes makes the body smelly.

- It also leads to acne.
- All parts of the body should be washed and cleaned every day.
- If cleanliness is not maintained there are chances of catching bacterial and fungal infections.

Balanced diet

- Adolescence also equates to a sudden spurt in growth of the body.
- A growing body requires all the nutrients.
- Therefore, all the teenagers should consume a balanced diet and not junk food.
- A balanced diet is a meal that includes proteins, carbohydrates, fats and vitamins in proper proportions.
- Junk food affects the growth of an individual.



Balanced diet, especially needed in Adolescence

Physical exercise

- Exercise ensures a healthy body and mind.
- Walking, playing or practising yoga are some of the many ways we can carry out physical exercise.

Say NO to Drugs

- Drugs are addictive and harm the body in long term.
- Sometimes harm done by drugs becomes irreversible.
- All teenagers should say 'NO' to drugs.
- HIV can pass on to a normal person from an infected person by sharing the syringes used for injecting drugs.
- It can also be transmitted to an infant from the infected mother through her milk.
- The virus can also be transmitted through sexual contact with a person infected with HIV.
- People who are addicted to drugs have more chance of having HIV infection.