Chapter :- How Do Organisms Reproduce ?

Reproduction :-

- Reproduction is the process by which all organisms multiply in number and increase their population.
- Reproduction ensures continuity of life on earth.
- Chromosomes in the cell contain the information for inheritance of features which are passed from generation to generation in the form of DNA molecules.
- So reproduction involves copying of DNA and other cell. The copy will be similar to original and not identical.
- This property is variation which is the basis and necessary for evolution of living beings.
- Reproduction is of two types :- (a) Asexual Reproduction
  (b) Sexual Reproduction.

Asexual Reproduction :-

- It is a process in which a single parent is involved for producing new offsprings.
- Gametes not formed.
- Progeny is identical to their parent.
- Asexual reproduction is extremely useful as a mean of rapid multiplication. It is common in lower plants and animals.

Sexual Reproduction :-

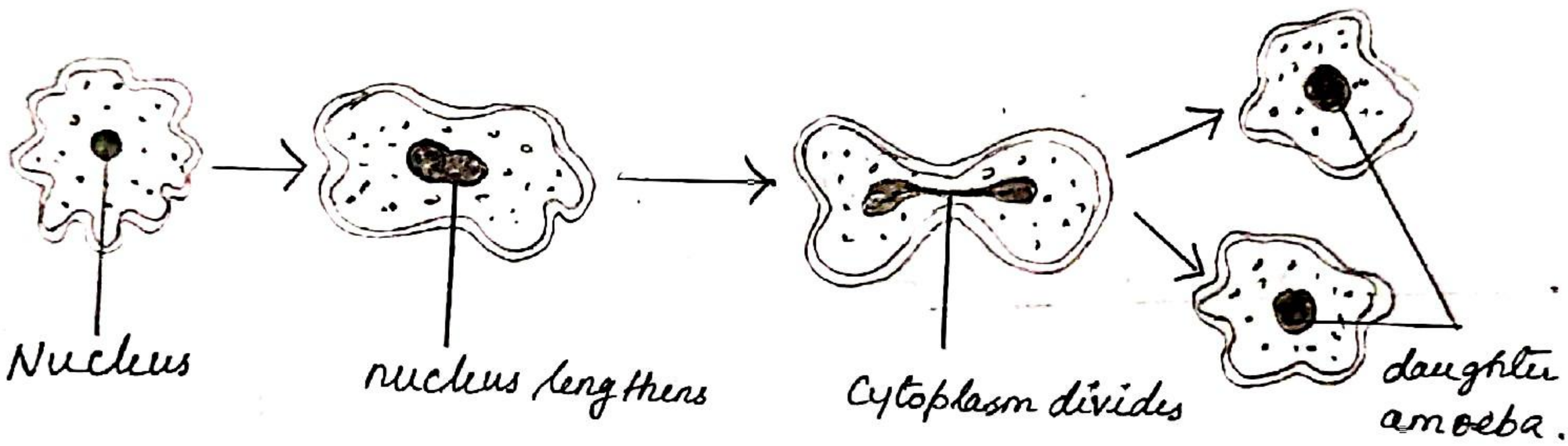
- It is a process in which both the parents are involved in producing new offspring.
- Gametes are formed. Fusion of gametes takes place.
- Progeny is not identical but only genetically similar to their parent.
- It is common mode in animals (mammals) & Humans.

Fission:- The parent cell divides/splits into two daughter cell - Binary fission.

Splits into many daughter cells - Multiple Fission.

Binary fission:-

- The parent cell divides into two equal halves (daughter cells) Eg. Amoeba follows transverse binary fission, ie fission in any plane.
- Leishmania has a whip-like structure at one end and binary fission occurs in a definite orientation.



Beinary fission in Amoeba.

- The process where nucleus lengthens is Nucleokinesis and where the cytoplasm lengthens is Cytokinesis.

Multiple Fission:-

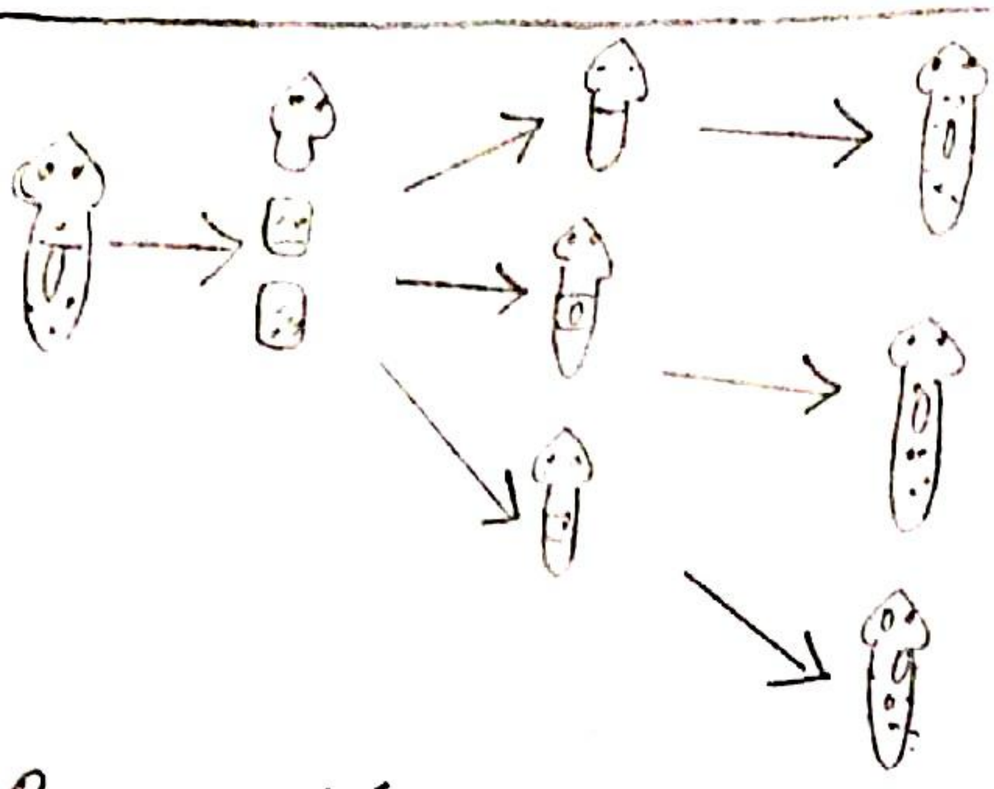
The parent cell divides into many daughter cells simultaneously eg. Plasmodium.

Budding:- A bud develops as an outgrowth on parent body due to repeated cell division at specific sites. These buds detach from the parent body when they mature. Eg. Hydra

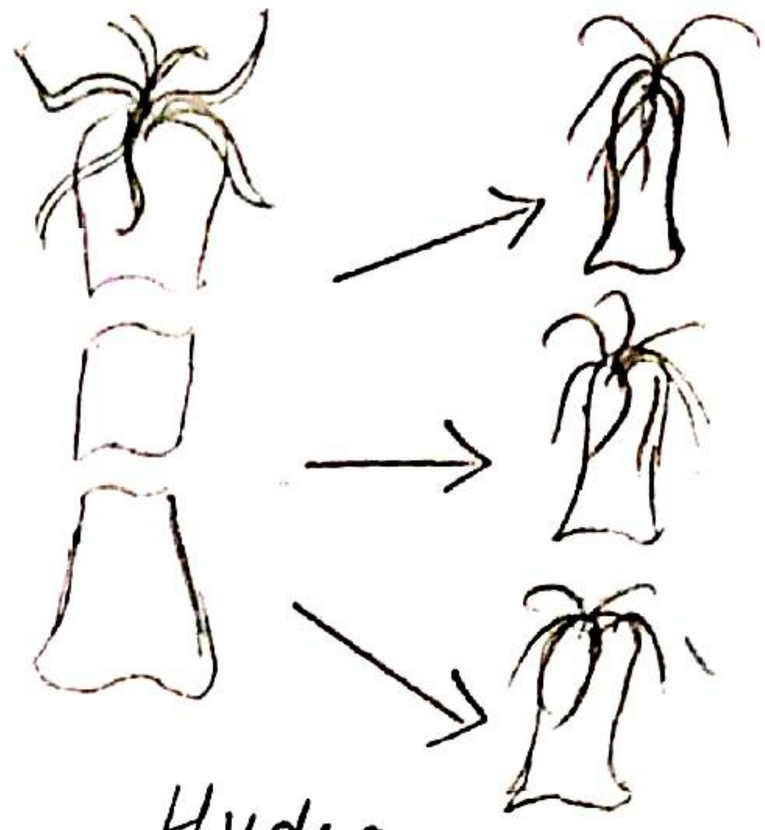
Regeneration:-

- Regeneration is the process of growing back the lost organ or body part by the organism (eg. lizard).

eg. Planaria



Regeneration in Planaria.



Hydra

Fragmentation :- Fragmentation is the process by which an organisms gets fragmented into smaller pieces and each piece grows into a whole new organism. Eg. Planaria, Hydra.
- It takes place in multicellular organism with simple body organisation.

Vegetative Propagation :-
- A mode of reproduction in which reproduction take place from the vegetative parts like the stem, root, leaves.

Methods of Vegetative Propagation :-
1. By Roots :- Eg. adventitious roots of Dahlias.
2. By Stems :- Eg. Potato (tuber), ginger (rhizome)
3. By leaves :- Eg. leaves of bryophyllum bear adventitious buds

Benefits of Vegetative Propagation :-
1. Plants can bear flowers, fruits earlier than these produced.
2. Growing plants like Banana, orange, rose, jasmine that have lost the capacity to produce seeds.
3. Genetically similarity is maintained
4. Help in growing seedless fruits.
5. Cheaper and easier method of growing plants.

Spore Formation :-
Spores which are present in sporangia are small, bulb like structure which are covered by thick walls that protect

them until they come in contact with suitable condition.
- Under favourable conditions, they germinate and produce new Rhizopus individual.

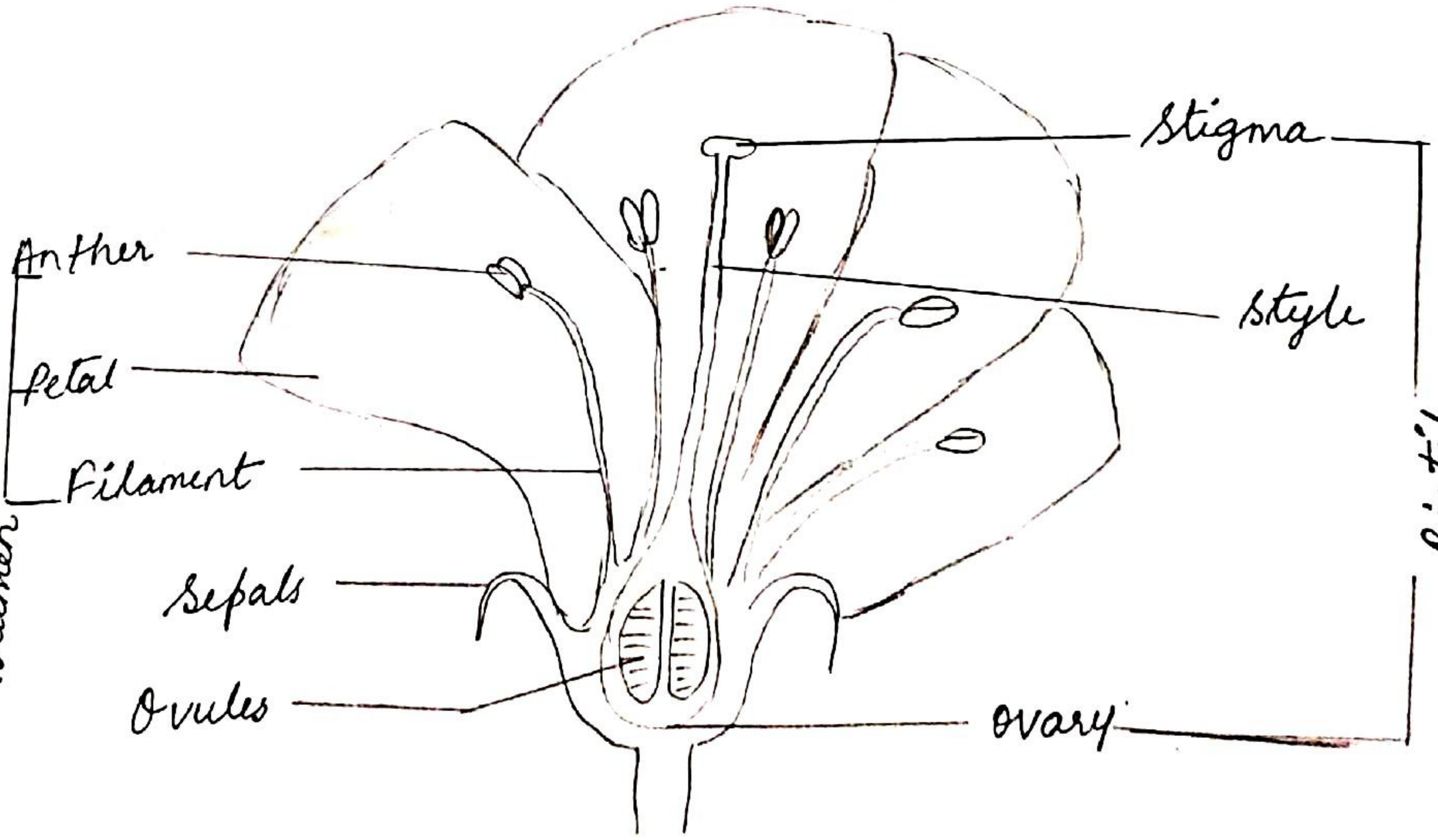
Sexual Reproduction:-

- When reproduction takes place as a result of fusion of two gametes, one from each parent, it is called sexual reproduction.
- The process of fusion of male and female gametes is called fertilisation.
- The formation of gametes involves exchange of chromosomal (genetic) fragments between homologous chromosomes causing genetic recombination which leads to variations.

Sexual Reproduction in Plants:-

It occurs mostly in flowering plants. Flowers are the reproductive organ of plants.

Flowers:- Reproductive organ of plants.



Longitudinal section of flower.

Parts of Flower:- A flower consists of four main whorls namely calyx., Corolla (Petals), Androecium (Stamens) and Gynoecium (Carpels).

Reproductive Part of Flower.

- Stamen (male part)
  - Filament
  - Anther
    - Pollen Grain (male gamete) (n)
- Carpel (female Part)
  - Style
  - Ovary
    - Egg cell (ovule) (n).
  - Stigma.

- Pollen grains of flower, transfer to the stigma of carpel of same flower (Self-Pollination) or to the stigma of carpel of another flower (Cross Pollination)
- Transfer of pollen is achieved by agents like wind, water, or animals.
- After Pollination, a pollen tube grows out of pollen grains, through which male germ cell reaches the ovary and fuses with the female germ cell.

Fertilisation:- The fusion of male and female gamete is called fertilization. It occurs inside the ovary.
- Zygote is produced in this process.

Ovary → Ovule → Egg Cell → Polar Nuclie.

- Zygote divides several times to form an embryo within ovule. The ovule develops into a seed.
- Ovary grows rapidly and ripens to form a fruit.
- Flowers can be unisexual (contain either stamen or carpel) or bisexual (contains both stamen and Carpel).

- Unisexual flowers :- Papaya, Watermelon.
  Bisexual flowers :- Hibiscus, Mustard.

Reproduction in Human Beings :-

- Humans use a Sexual mode of Reproduction.
- It needs sexual maturation which includes creation of germ cells, ie. egg (ova) in female.
  Sperm in male
- This period of sexual maturity is called Puberty.

Male Reproductive System :-

- The formation of male germ cell (sperms) takes place in testes.
- Testes is the main reproductive organ in male.
- They are present in scrotal sacs outside body in the abdominal cavity. Scrotum has relatively low temperature needed for production of sperms in testes.
- Testes release a male sex hormone called testosterone and its function is to :-
  1. Regulate the function and production of sperms.
  2. Brings about changes in appearance seen in body at the time of puberty.
- The sperms along with secretion of prostate gland and seminalvesicle, together constitute semen.
- This is released and made to enter the female genital tract during Copulation.
- Vas deferens and urethra are main ducts.
- Penis, having urethra passing through it, is called copulatory organ.
- Male sex, sperms are produced by seminiferous tubules which secrete hormone testosterone.

Female Reproductive System :-

- 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 organs producing sex hormones called estrogen and progesterone.
- Ovaries are located in both side of abdomen.
- When a girl is born, the ovaries already contain thousands of immature eggs.
- At puberty some of these eggs start maturing. One egg is produced every month by one of ovaries.
- The egg is carried from ovary to the womb through a fallopian tube. These two fallopian tube unite into an elastic bag like structure known as uterus.
- The Uterus opens into vagina through the cervix.
- Fertilisation occurs in the fallopian tube of female genitalia.
- **Menstruation :-**

The fertilized egg also called Zygote (2n) gets implanted in the lining of the uterus, and start dividing. Uterus is richly supplied with blood to nourish the growing embryo. If Zygote is not formed, the inner wall of uterus breaks which causes bleeding through vagina. This process is called Menstruation.

- It occurs at a 28 days cycle.
- The Embryo gets nutrition from the mothers' blood with the help of special tissue called Placenta. It provides a large surface area for glucose and oxygen to pass from the mother to the embryo.
- The time from fertilisation upto the birth of baby is called Gestation period. It is about 9 months.

- The Menstruation Cycle in a woman continues upto the age of 45-50 yrs. This stage is called Menopause, in which ovaries do not release egg.
- Female sex hormone are oestrogen and progesterone which are produced by the ovary.

Reproductive Health :- Reproductive Health means a total well-being in all aspects of reproductive i.e physical, emotional, social and behavioural.
- Reproductive health deals with the prevention of STDs and unwanted pregnancy.
- Contraception :- It is avoidance of pregnancy and help to avoid STDs.
  - Contraceptions can be of various types such as mechanical/ barriers, hormonal/ chemical methods.

- Healthy society needs a balanced sex ratio that can be achieved by educating people to avoide malpractices like female foeticide and prenatal sex determination.