

How do organisms reproduce

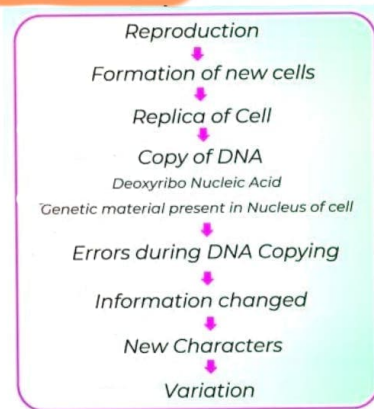
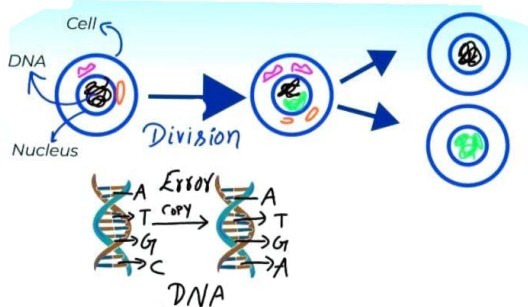
Reproduction:-

- Reproduction is the process by which living organism produce new individuals of the same species.
- it is not essential life process

Why is it important?

- (1) it ensures the continuity of a particular species on earth—population stability.
- (2) it creates variation in DNA that provides stability to a species.

Do Organisms create exact copies of themselves?

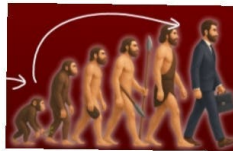


Variation:-

Variation are the differences present between the individuals of the same species.

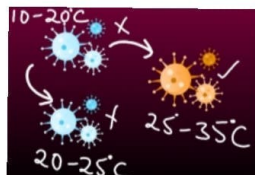
Importance of Variation:-

1. Survival during Environmental changes.
2. Prevents extinction of species → provides stability.
3. Helps in Evolution of species.
4. Variation in DNA results in the varieties of a species and Formation of new species.



Population of bacteria in water - Global warming increases water temperature → most bacteria die → only few.

Variants which can live in high temperature survive → They reproduce and species grow further



Asexual Reproduction

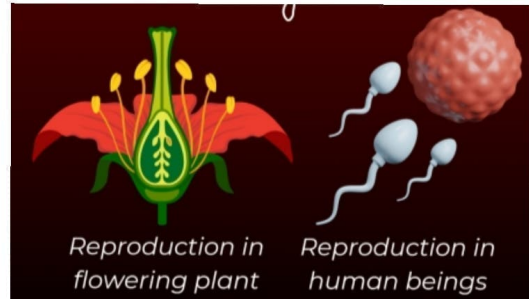
1. Single parent is involved
2. No Gamete formation.
3. No fertilisation.
4. offsprings formed are usually genetically similar.

1. Fission
2. Fragmentation
3. Regeneration
4. Budding
5. Spore formation
6. Vegetative propagation



Sexual Reproduction

1. Two parents are involved
2. Gamete formation occurs.
3. Fertilisation occurs.
4. Offsprings formed are genetically dissimilar.

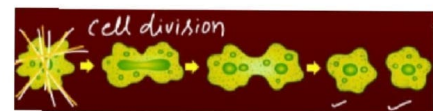


1. Fission

- In Unicellular organisms, cell division or fission is the way of reproduction occurs in many bacteria and protozoa.

Ameoba :- Unicellular organism.

1. Binary fission in ameoba.
2. Splitting of cells can take place in any plane.
3. parent cell divides into two daughter cells.



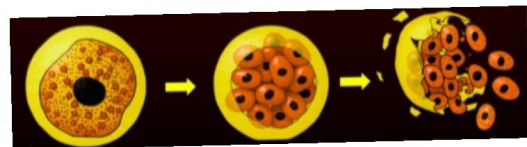
Leishmania :- unicellular organism.

1. Has a whip-like structure at one end of cell.
2. Binary fission occurs in fixed plane (in relation to whiplike structure) — longitudinal fission.
3. Causes kala-azar → Black fever.



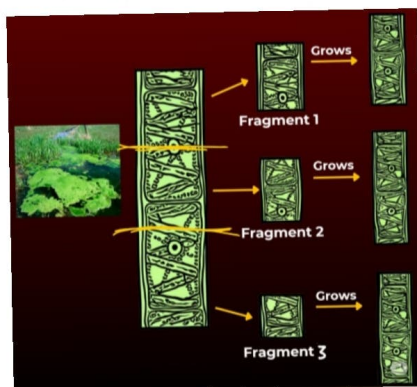
Plasmodium - unicellular organism

1. Divides by multiple fission
2. Malarial parasite



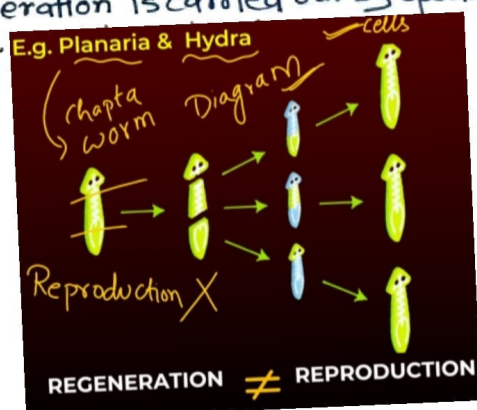
2. Fragmentation in Spirogyra

Breaks into smaller pieces upon maturation



3. Regeneration in planaria

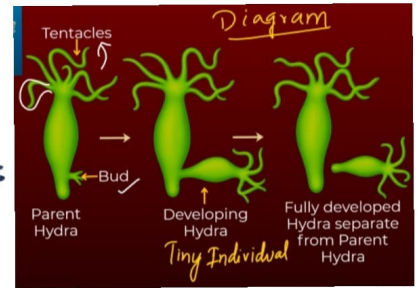
if the individual is cut into many pieces, these pieces grow into separate individuals. Regeneration is carried out by specialised cells.



4. Budding in Hydra

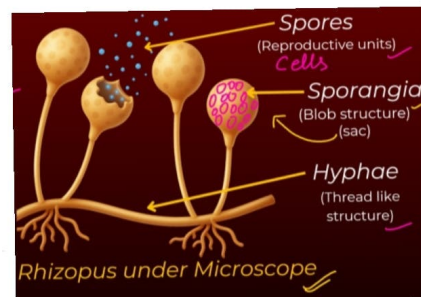
Hydra - Aquatic animal

Use Regenerative cells for reproduction
 ↓
 Repeated cell division at one specific site → forms an outgrowth → bud develops
 ↓
 Buds develop into tiny individuals
 ↓
 on maturity, it detach from the parent body to become new independent individuals



5. Spore formation in Rhizopus (Breadmould)

1. Rhizopus (breadmould) → fungus.
2. spores are covered by thick walls that protect them in unfavorable conditions.
3. Favourable conditions (moisture and warm temperature and nutrition) → spores germinate and develop into new individuals or Rhizopus



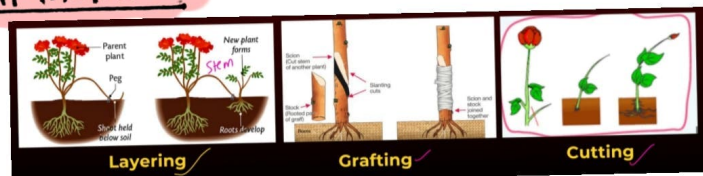
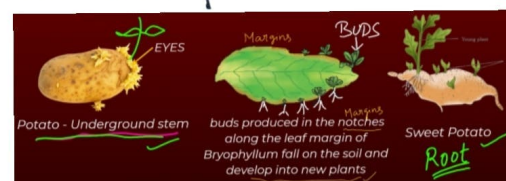
Advantages of spore formation ① spores are very light weight and easily transport from one place to another and large no. of spore are produced in a single time.

6. Vegetative propagation: Asexual Reproduction in plants

Parts like roots, stem and leaves develop into new plants

1. Stem (potato, Ginger, Onion)
2. Root (Sweet potato)
3. leaves (Bryophyllum)

Artificial methods



Advantages of Vegetative propagation:-

1. Bear fruits and flowers earlier than those produced from seeds.
2. Vegetative propagation is a more rapid, easier and cheaper method of multiplication of plants.
3. Used in layering / grafting to grow plant like sugarcane, roses, grapes.
4. Makes possible the propagation of plants that have lost the capacity to produce seeds (banana, fruits, orange, rose, jasmine).
5. Plants produced are genetically similar to the parent plant and its characteristics.
6. Desirable character of fruit can be maintained.

Examples - Sugarcane, potato, Ginger, onion, jasmine, Rose, grapes, Banana, sweet potato, Bryophyllum.

Organism	Cellularity	Mode of Reproduction	Disease
Amoeba	Unicellular	Binary fission (any plane)	
Leishmania	Unicellular	Binary fission (fixed plane)	Kala azar
Plasmodium	Unicellular	Multiple fission	Malaria
Spirogyra	Multicellular	Fragmentation	
Planaria	Multicellular	Regeneration	
Hydra	Multicellular	Budding, Regeneration	
Yeast		Budding	
Rhizopus	Multicellular	Spore formation	

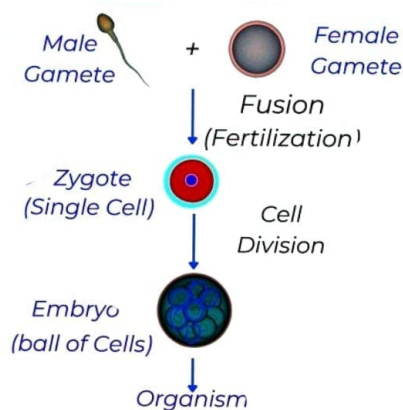
Sexual Reproduction:-

Why the sexual Mode of Reproduction?

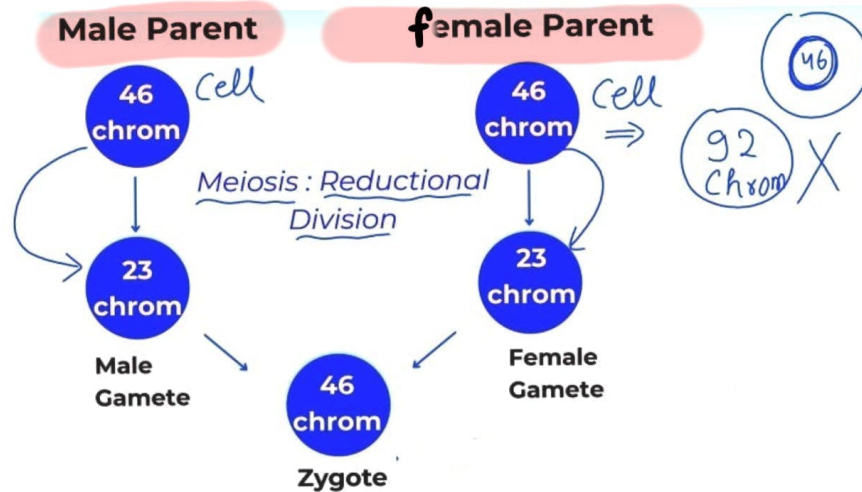
1. combine variations from two parent of same species.
2. Increase chances of survival by creating more variety in a population.

Gamete is a reproductive cell or sex cell.

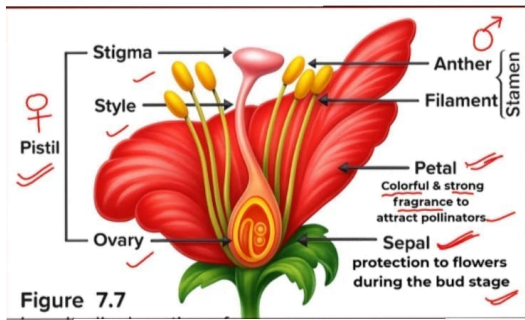
Also called germ cell.



Human cells have 23 pairs of chromosome = 46 chromosome



PARTS OF FLOWER :



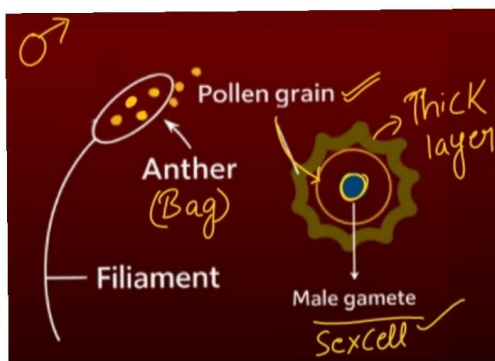
Reproductive organ of plant = flower



Male Reproductive part - stamen
female Reproductive part - pistil/carpel

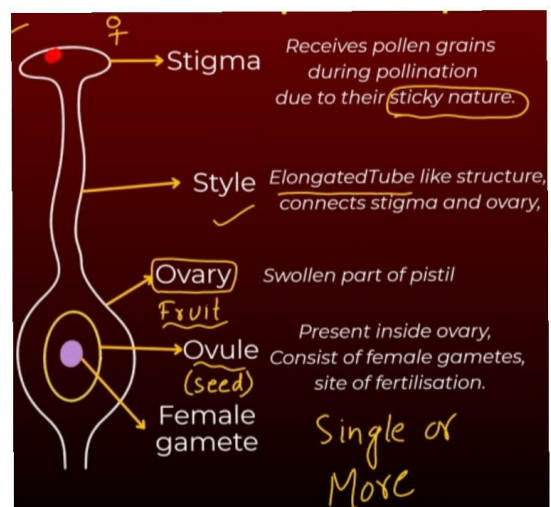
Bisexual flowers → contains both stamens and pistil → hibiscus (china rose), mustard
Unisexual flowers → contains either stamen or pistil → papaya, watermelon.

STAMEN - Male Reproductive part

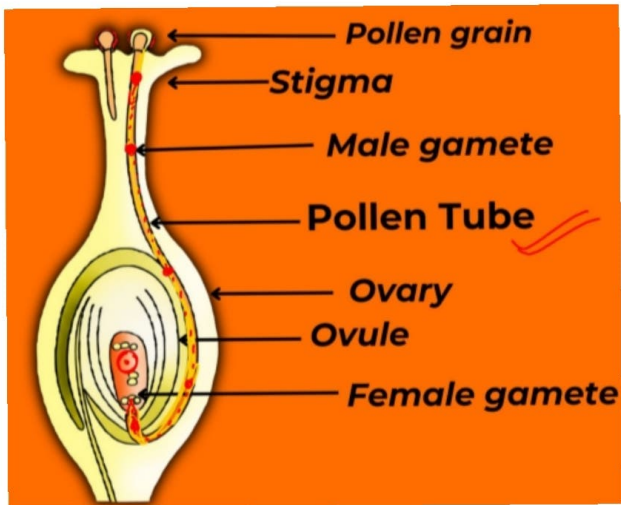


Anther - produces pollen grains which consists of male gamete.
Filament - it forms the stalk that bears anther.

PISTIL - Female Reproductive part



Sexual Reproduction in Flowering plants (Angiosperms)



Anther contains pollengrain

↓
Pollen lands on stigma

↓
A tube grows out of the pollengrain

↓
male gamete travels to ovule.

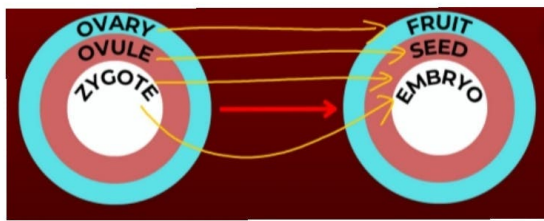
↓
male gamete + female gamete

↓ fertilisation

↓
Zygote (single cell)

↓ Multiple division
in zygote.

↓
Embryo (within ovule)



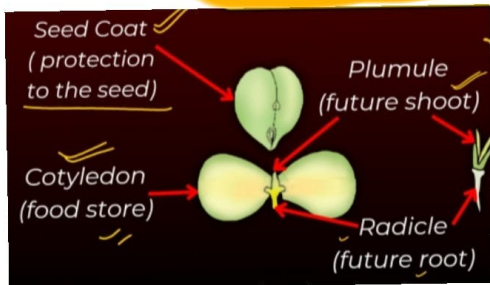
Zygote → divides several times → Embryo

Ovule → develops a tough coat → seed

Ovary → grows rapidly and ripens → fruit

petals, sepals, stamen, style → fall off

Parts of a Seed



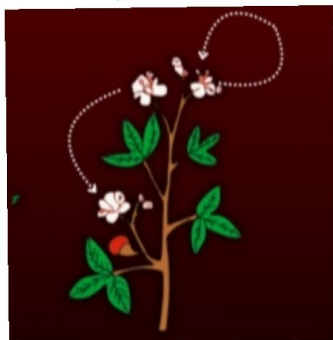
Germination

process by which a seed starts to grow into a new plant.

Pollination :- Transfer of pollen from anther to stigma of a flower.

Agent of pollination: wind, water, animals

Self pollination : Transfer of pollen grains from anther to stigma of either in the same flower or another flower in the same plant.



Cross pollination :-

- Transfer of the pollen grains from the anther of one flower to the stigma of another flower on a different plant of the same species.



- Cross pollination is better for the survival of species. It mixes genes from two different plants, creating more variations, which help plants adapt and survive better in changing environments.

Sexual Maturation of the body: Puberty

Puberty :- The time in life, when a boy or girl becomes sexually mature. It is a process that usually happens between ages 10 and 14 for girls and ages 12 and 16 for boys. It causes physical changes, and affects boys and girls differently.

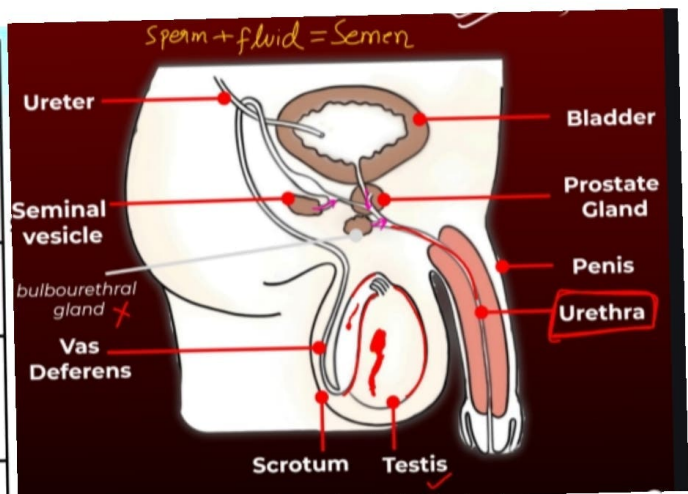
Changes during Puberty	
MALES	FEMALES
1. Facial hair growth ✓	1. Breast development ✓
2. Underarm and pubic hair growth ✓	2. Underarm and pubic hair growth ✓
3. Deepening of voice ✓	3. Increase in fat mass of hips and thighs ✓
4. Enlargement of genitals (Penis size) ✓	4. Menstruation cycles start ✓
5. Sperm production ✓	
6. Oily skin & Pimple form ✓	

1. All of these changes take place slowly over a period of months and years.
2. They do not happen all at the same in one person, nor do they happen at an exact age.
3. In some people, they happen early and quickly, while in others, they can happen slowly.

Male Reproductive System:

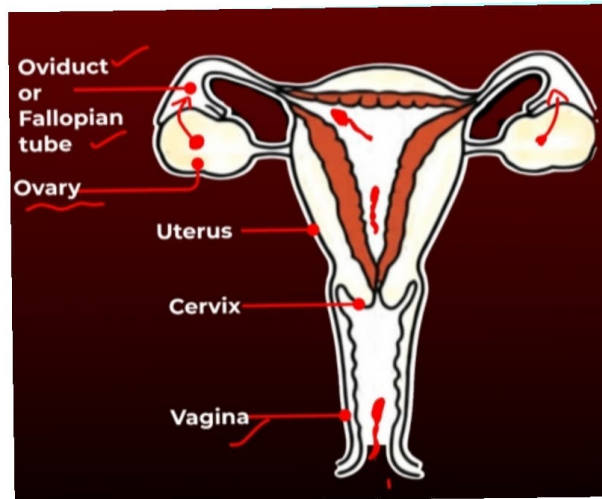
Male gamete → sperm

Scrotum (Skin Pouch)	Maintain the low temperature of the testes (2-2.5°C) lower than the normal internal body temperature
Testis	Produce sperm cells Produce the hormone testosterone • regulates formation of sperms • changes at the time of puberty
Vas deferens	Carries sperm towards urethra (SPERM DUCT)
Seminal vesicle and Prostate gland	• Add their secretions ✓ • Put sperms in a fluid which makes their transport easier ✓ • Provides nutrition ✓
Urethra	Common passage for both semen (sperm) and urine
Penis	Deposits sperm into the vagina during insemination



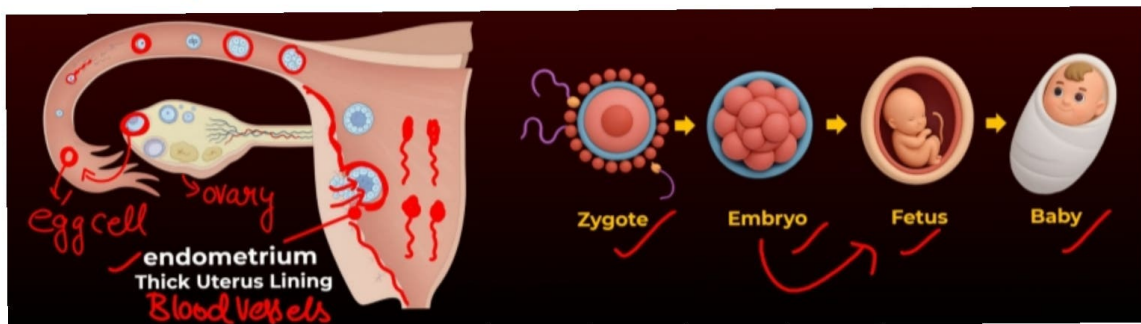
Semen is the whitish fluid that contains sperm cells and a nourishing, protective fluid produced by glands like the seminal vesicles and prostate gland

Female Reproductive System : female gamete - Egg cell / ovum



Ovary	- Site of ovum (egg cell) development - Contain thousands of immature eggs, some of these start maturing on reaching puberty - One egg is released every month by one of the ovaries
Fallopian Tubes (Oviducts)	- Carry the ovum from the ovary to the uterus - Site of fertilization
Uterus (womb)	- Elastic bag-like structure in which the embryo and foetus develop - Involved in menstruation
Cervix	- Separates the vagina from the uterus - Dilates during birth to allow the fetus to leave the uterus
Vagina	- Provides a passageway for sperm and menstrual flow - Functions as the birth canal

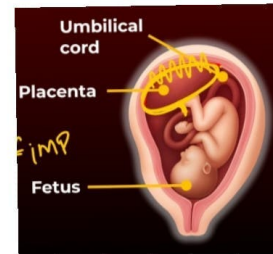
- 1. Fertilization :-** When a sperm reaches the oviduct (fallopian tube), it fuses with ovum (egg cell) to form a zygote.
- 2. Zygote formation and divisions :-** The zygote divides repeatedly to form a ball of cells
- 3. Embryo formation :-** This ball of cells travels down to the uterus and gets implanted in the lining of the uterus (endometrium), forming an embryo.



Male Gamete (Sperm) 	Female Gamete (Egg or Ovum) 
Smallest cell	Largest cell
Motile (swim using tails)	Non-motile
Do not store food	Store food
Produced in Testis	Produced in Ovaries
Produced in large numbers	Only One is released per month

Placenta:-

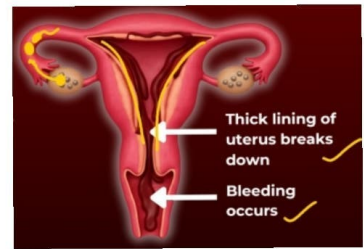
1. Disc shaped tissue develops inside uterus during pregnancy.
2. Placenta is attached to uterus lining and Umbilical cord.
3. Placenta has villi which provide large surface area for the exchange of substances between mother and developing foetus.
4. Placenta help in
 - Exchange of glucose and oxygen to pass from the mother to the developing embryo
 - Wastes to pass from the embryo to the mother through the umbilical cord.



Menstruation :-

Menstruation is the monthly process in which the uterus sheds its lining along with blood through the vagina. It occurs in females. usually once every 28 to 30 days.

- 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 for nourishing the embryo if fertilisation had taken place.



if fertilisation of egg does not occur, this thick lining of uter breaks and bleeding occurs.



Reproductive Health - contraceptive Methods

Physical/Mechanical Barrier

1. To prevent union of sperm & egg.
2. Protection from sexually transmitted diseases (STD) such as (bacterial infections - Gonorrhoea, Syphilis, Viral infections - HIV - AIDS, Warts)
- E.g; Condoms
3. Side effects - Latex Allergy, Vaginal or Penile irritation



Hormonal Barrier

- Pills*
1. Oral contraceptive (OCPs) - changes the hormonal balance to prevent the egg release in females.
 2. Taken orally.
 3. Side Effects - Headache, Irregular Periods, Dizziness



IUCD

- Females*
1. Intrauterine contraceptive device (Copper-T or loop) is placed in uterus to prevent pregnancy 3-4 years.
 2. Can cause irritation of uterus.
 3. Side Effects - Irregular Periods, Backache, Vaginal discharge



Surgical Barrier

1. In Vasectomy, the vas deferens of male is blocked to prevent sperm transfer.
2. In Tubectomy, the fallopian tube of female is blocked to prevent egg from reaching uterus.
3. Side Effects - Dizziness, Weakness, Nausea

