HOW DO ORGANISMS REPRODUCE?

Reproduction is a biological process by which an organism reproduces new individual of the same kind.

- advantages of Reproduction:

i] reproduction ensures continuity of a particular species on earth.
ii] It creates genetic variations which leads to stability of species.
iii] It helps in evolution of species

important things to keep in dimag:

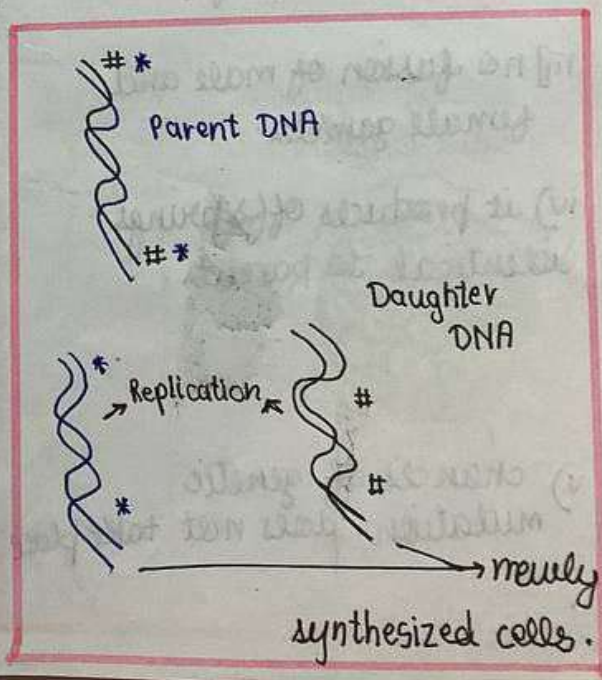
1. DNA: a thread like structure which contains all the info about our character and it is passed on from one generation to next.

2. Chromatin: a genetic material comprising of DNA, RNA and associated proteins, which constitute of chromosomes in the nucleus of a eukaryotic cell.

3. Chromosomes: a DNA molecule that consist of a part or all of the genetic material of organism.

4. Genes: It is a segment of DNA containing information for a particular character.

* A basic event in reproduction is the creation of DNA copy.
* DNA copying is accompanied by the creation of an additional cellular apparatus.
* So effectively, a cell divides to give rise to 2 new cells.



VARIATION:

- The DNA copying process will have some errors (no bio-chemical reaction is absolutely reliable) which will lead to variations. As a result, "the DNA copying generated will be similar, but may not be identical to the original."

- Some variations in DNA may be so extreme that the new cell can't function and dies. However, many other variations might not have such severe consequences.

Importance of Variation:-

- Variations help organisms to adapt in the changing environment.
- Variation provides stability to a species and thereby helps in evolution.
- Variation in DNA results in varities of a species and formation of new species.

ASEXUAL REPRODUCTION	SEXUAL REPRODUCTION.
i] involves single organism.	i] involves 2 or more organisms.
ii] no production of gametes.	ii] male and female gametes are produced.
iii] no fusion of male and female gametes.	iii] involves fusion of male and female gamete.
iv) it produces offsprings identical to parents.	iv) offsprings may have some characters of female and some from male and some may not be from either of parent.
v) chances of genetic mutation does not take place	v] chances of genetic mutation does take place.

Asexual Reproduction

- Fission
  - Binary → Amoeba, Leishmania
  - multiple → Plasmodium
- Fragmentation → spirogyra
- Budding → Hydra, Yeast
- Regeneration → Planeria
- Vegetative Propogation → Bryophyllum
- Spore formation → Rhizopus

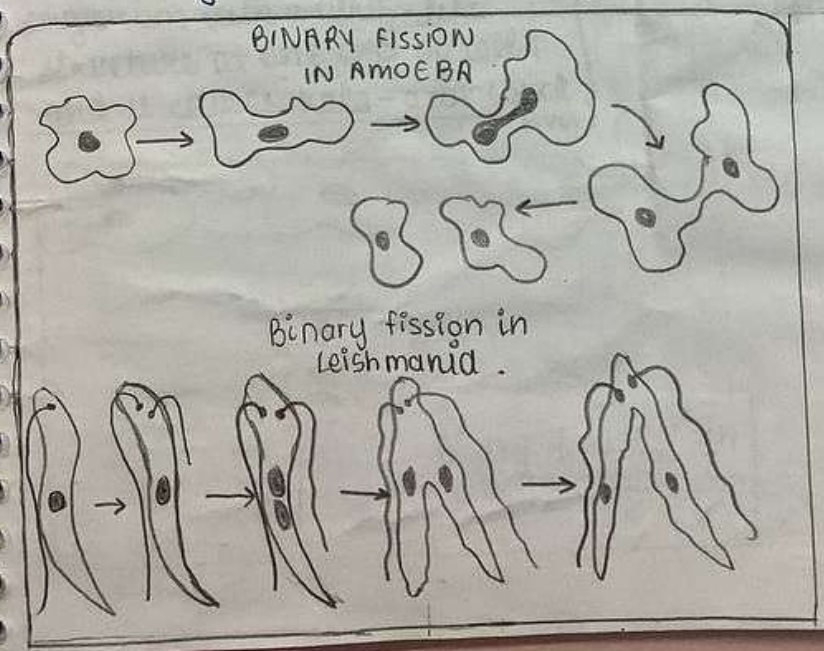
Fission

multiple fission

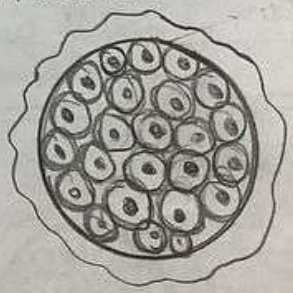
- multiple fission involves the division of parent into many small daughter individuals.
- Nucleus divides several times into many daughter nuclei, without division of cytoplasm.
- when the condition becomes unfavourable a tough coat called cyst forms.
- On returning of favourable conditions the cyst wall breaks and daughter cells are released.

Binary fission.

- division of Parent into 2 small nearly equal to size of daughter individual
- during binary fission nuclear division takes place → division of cytoplasm.
- Binary fission occurs in unicellular organisms
  - Leishmania → unicellular
  - causes Kala-azar (Black fever)



multiple fission in Plasmodium.

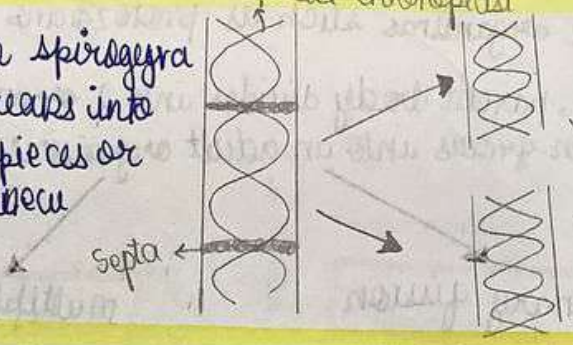


FRAGMENTATION:

Spiral chloroplast

some organisms like spirogyra upon MATURATION breaks into smaller pieces. These pieces or fragments grow in new individuals.

→ Hydra.

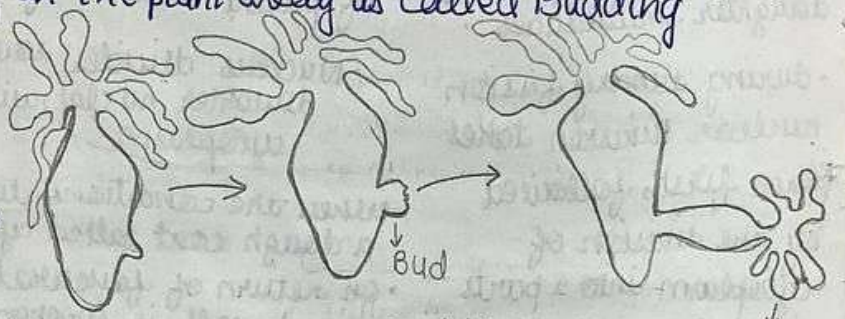


BUDDING:

- formation of a daughter individual from a small projection the bud arising on the plant body is called Budding

→ Yeast; Hydra.

- in Hydra a bud develops as an outgrowth due to repeated cell division at one specific sight.
- when bud is fully developed it detaches.

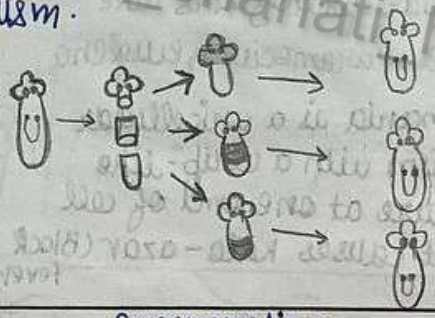


Budding in Hydra.

REGENERATION:

- Planaria is a multicellular organism.
- It is an aquatic animal.
- It can reproduce both sexually and asexually.

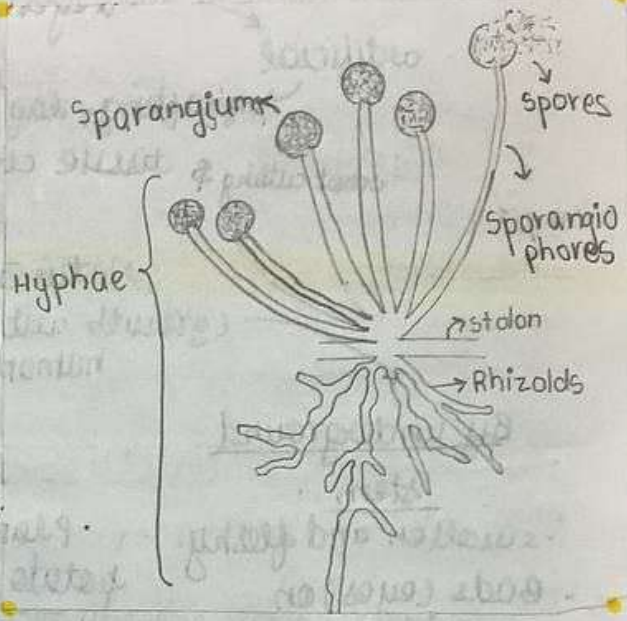
→ Hydra.



Fragmentation	Regeneration
1. occurs in multi-cellular organisms with simple body.	1. occurs in fully differentiated multicellular organisms with complex body.
2. organisms break down into pieces and each piece develops into new individual.	2. organisms if breaks into pieces, each piece may or may not develop into new individuals.
3. No specialized cells are involved.	3. specialized cells are involved.

SPORE FORMATION

- Rhizopus is a multicellular fungi which grows on surface of bread
- The thread like structure that developed on the bread are the HYPHAE of the bread mould.
- The balls are sporangia, which contains spores that eventually develops into new Rhizopus individual.
- when they come in contact with moist surface they grow.



How will organism benefit if it reproduces through spores?

- High offspring production
- easy dispersal
- spores can remain dormant till favourable conditions become available
- organisms do not undergo sexual reproduct^{n} so it is easy fast and wide spread.

VEGETATIVE PROPAGATION :

- Vegetative Propagation is a type of asexual reproduction in which new plants are formed with the help of its vegetative bores.

Vegetative Propagation.

ARTIFICIAL
- grafting — The stem is cut and fitted on another strong plt and covered.
- layering — The stem is bent down until it touches soil. The stem is then cut once it develops and grows individual
- stem cutting — Rose, Banana, sugarcane, Grapes
- root cutting — Raspberry, Black berry, Dahalia.
- tissue culture

NATURAL
- stem : buds of eye on potato
- roots : sweet potato, Tulip, dahalia.
- leaves : Bryophyllum.

Tissue culture : involves growing new plants from small piece of plant.

- cells from the plant's growing tip are placed in artificial medium to form a group of cells (callus).
- the callus is moved to another medium with hormones to help it grow.
- commonly used for ornamental plants.

ADVANTAGES OF vegetative Propogation

- Plants raised by VP bear fruits and flower earlier.
- no seeds.
- all plants are genetically similar.

sexual reproduction

- DNA copying is not perfect leading to various organisms.

* Problem : combination of DNA of 2 individuals would double the DNA amount generation, which would disrupt cellular function.

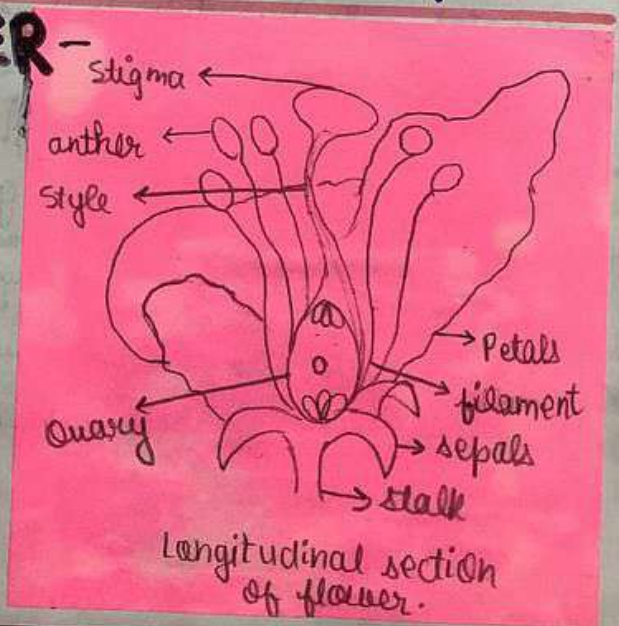
* Solution: complex organisms have germ cell with only half the DNA so when it combines, they generate correct amount of DNA.

Germ cell : male → sperm female → ovum/egg.

FLOWER

- Sepal : usually green, provides protection to plant while in bud stage.
- Petals : attract pollinators.
- Anther : produces pollen grains that contains male gamete.
- Filament : forms stalk that bears anther

ZYGOTE → EMBRYO → FOETUS



Longitudinal section of flower.

SEED GERMINATION:

- seed is the final product of sexual reproduction.
- seed develops into embryo which then develops into seedling.

⇒ Parts of seed:

- seed coat
- embryo
  - plumule
  - Radicle
- cotyledon.
  - ↳ monocotyledon.
  - ↳ Dicotyledon.

HUMAN REPRODUCTION

Puberty: is the time period or stage of human development during which an individual shows growth and becomes sexually mature.

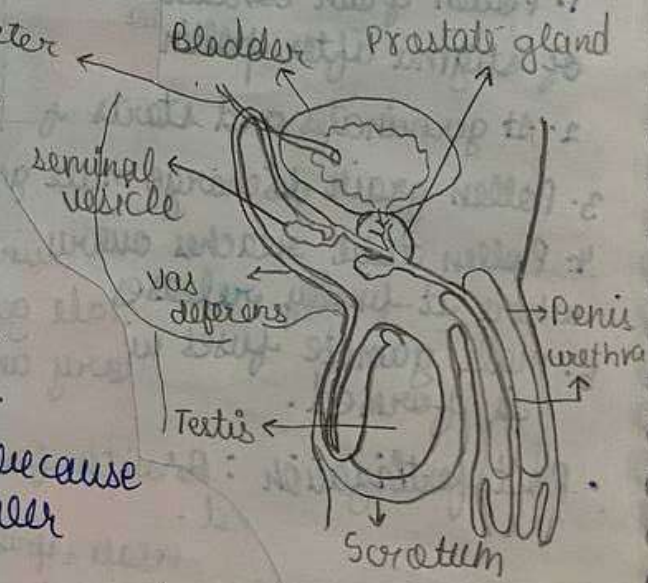
Puberty in Girls:
1. increase in height
2. Breast size begins to increase.
3. Getting pimples
4. Hair growth in armpits, legs and between legs.
5. Beginning of menstruation.

Puberty in BOYS:
1. increase in height
2. Broad shoulders and chest.
3. Thick hair growth on face.
4. Getting pimples.
5. Voice begins to crack and gets deep.
6. Hair growth in armpits, legs, between legs.

MALE:

1] Testes:
- primary male reproductive organ.
- they lie in small sac like muscular structure outside the abdominal cavity called scrotum.
- produces sperm throughout life

2] scrotum: • lower body temp.
- outside the abdominal cavity because sperm formation need lower body temp.



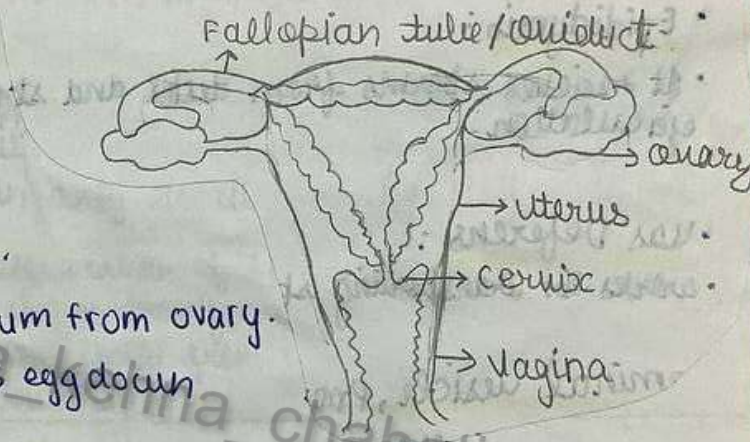
3] epididymis: it recieves sperms from testes and store them temporarily till ejaculation

4] vas deferens: works in transporting sperm to urethra.

5] seminal vesicle and Prostate gland:
- secretion from these gland protect sperm from acidity of male urethra and female vagina.
- increases sperm mobility.
- forms semen. [gland secretion + sperm]

6] Penis: deposits sperm to vagina; dispose urine.

Female:



1] ovary:
- primary sex organ
- production of ovum/egg.
- secretion of sex hormones.

2] ovulation: release of ovum from ovary.

3] Fallopian Tube: - channels egg down the uterus
- Fertilization takes place here.
- provides site for fusion

4] Uterus: - ensures support the growing child.

5] cervix: ~~Egg~~ Ring of muscles that is nearly the lowerr end of uterus.

6] vagina: ~~gathers~~ sperm deposited by penis, acts as a birth channel for birth.

Fertilization

- after copulation millions of sperms are released during ejaculation.
- sperm swim towards female egg by tail.
- only one sperm will fertilize the egg.
- the fertilized egg will move towards uterus.

- ZYGOTE → FOETUS → EMBRYO

- stigma: recieves pollen grain during pollination due to stick nature.
- style: elongated structure that connets the stigma and ovary.
- ~~the~~ ovary: swollen part of pistil. (fruit)
- ovule: inside ovary, female gamete bears.

Types of flower
- Bisexual → both stamen and pistil is present
- Unisexual → either stamen or pistil.

POLLINATION

- Pollination is the transfer of pollen grains from anther to stigma.

Self Pollination	Cross pollination.
i] The pollen grains from a flower are carried to the stigma of the same flower.	i] The pollen grains from one flower are carried to stigma of different flower.
ii] no pollinating agents.	ii] needs pollinating agents.
iii] self pollination is less preferable from the genetic POV since there is no mixing of genes.	iii] cross pollination is more preferable from the genetic POV as new characters are produced.

Fertilization
1. Pollen grain containing male germ cell lands on surface of stigma.
2. It germinates and starts forming pollen tubes towards the ovule.
3. Pollen grain discharge male gamete into pollen tube.
4. Pollen tube reaches ovary and enters the ovule then finally releases male gamete.
5. male gamete fuses with female gamete inside ovule and zygote is formed.

Post fertilization: petals, spals etc fall off.
- development of embryo
- ovule – seeds
- ovary – fruits.

IMPLANTATION: attachment of growing embryo into the soft uterine lining and gets embedded.

Q. How does growing foetus get nutrition?

- The embryo grows inside the mothers womb and get nourishment from mothers blood through the tissue called Placenta.

PLACENTA: a disc like structure that forms inside the uterus.

- villi on Placenta provides it with large surface.

what if fertilization nhi hua?

MENSTRUATION

- The ovary releases one egg every month, promoting the uterus to prepare for potential fertilization by thickening its lining.
- If the egg is not fertilized, it lives for about a day, and the uterine linings is no longer needed.
- The lining then breaks down and is expelled through the vagina as blood and mucous.
- This monthly cycle is known as menstruation and typically lasts for 2-8 days.

Reproductive health:-

- reproductive heath is a condition of overall physical, mental and social prosperity and not just the nonattendance of reproductive disease.

It covers 2 aspects:

- sexually transmitted diseases
- Population explosion and birth control measures.
- fertility control methods

Infection	Example	comments.
Bacterial infection	Gonorrhoea	1) Passed during unprotected sex. 2) Passed from infected mother to foetus. 3) Sharing needles. 4) Can be treated.
	Syphilis	1) Passed by direct contact of syphilis sores. 2) Transmitted during sexual contact. 3) Pregnant mom to foetus. 4) cured by antibiotics.
viral infection	AIDS aquired immuno deficiency syndrome.	1) Causative organism → HIV [Human Immuno deficiency virus] 2) Incurable 3) Suppresses immune system.
	Genital warts	1) Causes warts over external genital area.

methods	Example	Details
1) Barrier	1) condom	1) Rubber sheath worn over penis to stop sperm from entering the vagina. 2) Prevents STD's. 3) no side-effects.
	2) Diaphragm	1) Rubber cup that is placed in vagina over the cervix.
	3) Intra-uterine contraceptive device	1) Cu-T placed in uterus by doctor. 2) ovulation in uterus 3) no STD prevention.
2) Hormonal	1) oral contraceptive pills	1) contains hormones, which prevent release of ovum. 2) disturbs hormonal balance. 3) many side effects.
3) chemical	1) Spermicide	1) applied in vagina 2) kills sperms 3) can only be used with barrier.
4) Surgical	1) vasectomy	1) small portion of sperm duct is cut or tied. 2) ∴ transfer is prevented. 3) Irreversible.
	2) Tubectomy	1) small portion of ovi duct is cut or tied. 2) No STD prevention. 3) Irreversible