Reproduction in Organism

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* Reproduction in organism :-
  - Again
  - Synthesize
    formed
    Replication
    Duplication.

• Life span :- From birth of an organism to till its natural death. (All events) is called life span.

→ Life span varies from organism to organism.

→ Life span may be from 1 day to several years.
eg :- 1 day —— may fly
Several year —— Human (65 to 70) years.
—— Baniyan tree (700-800 year).
—— peepal tree (300-400 year).
organism —— Tortoise (150 year).

→ Same type of physiology does n't Ensure same life span of two different organism.

→ Life span does not depend on size on another complexity of an organism.

→ Usally plants having more life span Compare to animal life span.

- Factors affecting determination of life span :-

1. Gene.
2. Reproduction.
3. Habitat.
4. Accumulation of waste in body.
5. Recovery from injury.

Gene :- It is a unit biological information which transfer from one generation to next generation.

Reproduction :- Reproduction is a biological process in which an organism produce offspring and progeny which due less or more similar to their parents.

Habitat :- Unit atmosphere / environment having different type of biotic and abiotic factors distribute.

Accumulation of wastage in Cell / body :- Through biological system due to their basic functionalities Some product as well as bi-product / wastage form, that's should be remove out from the system our body.

Recovery from injury :- Due to immunity some injuries healed by self i.e. due to your strength of immune system.

- Some of the factors which increase the average life span:-

1. Food
2. Gene - hybridization.
3. Medicine / Immunology / vaccination.
4. Knowledge / Study.

Reproduction :- Reproduction is a biological process through which an organism produces offspring and progeny which are more or less similar to their parents.

→ Due to Reproduction : Continuity of life occur from one generation to next generation.

Reproduction depend on :-

1. Size.
2. Complexity.
3. Physiology.
4. Habitat.

Reproduction is of two type :-

1. Asexual - Reproduction.
2. Sexual Reproduction.

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Asexual Reproduction	Sexual Reproduction
Only one parent involved (uniparental).	Two parent involved (biparental).
Gamete not formed.	Gamete found.
Amphimixis not found.	Amphimixis found.
Variation not ocur.	Variation ocur.
Fast process.	Slow process.

Asexual Reproduction :-

→ It is uniparental condition in which offspring are produced without gamete formation (mostly) where all the offspring parent are similar to each other.

→ In sexual reproduction products are called "clone".

→ unit membrane of clone is called "Ramete".

Type of Asexual Reproduction :-

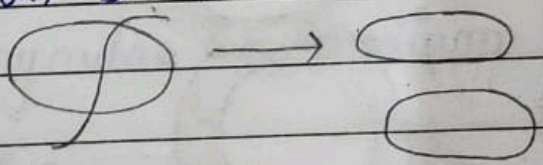
1. Fission
   - Binary fission
   - mutiple Fission.

Binary Fission:

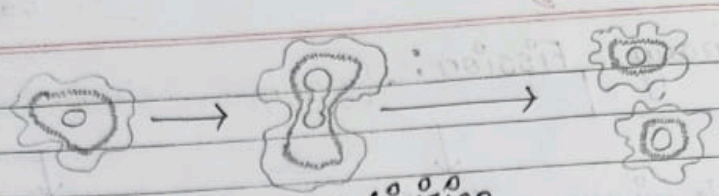
- Simple binary Fission
- Longitudinal binary Fission
- Transverse binary fission
- oblique binary fission

2. plasmotomy.
3. Budding.
4. Spoumlation.
5. Toumlution.
6. Fragmentation.
7. Regenration.
8. Vegetative propagation.

1) Fission : meaning = to break.
An ouganism break into Caued many pieces is Caued fission.



Binary Fission — An ouganism divided into equal Halves. Ex - Amoeba.

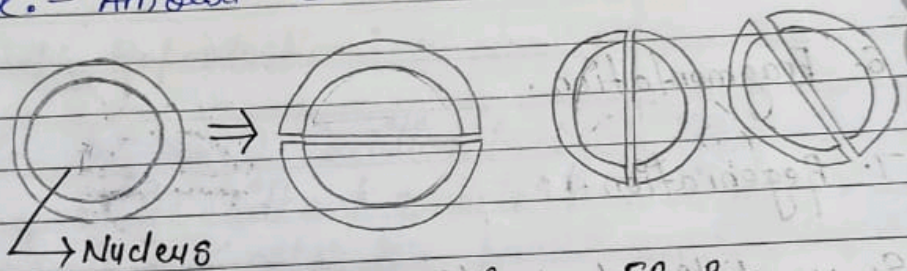


Parent Cell Cell division New daughter Cell.

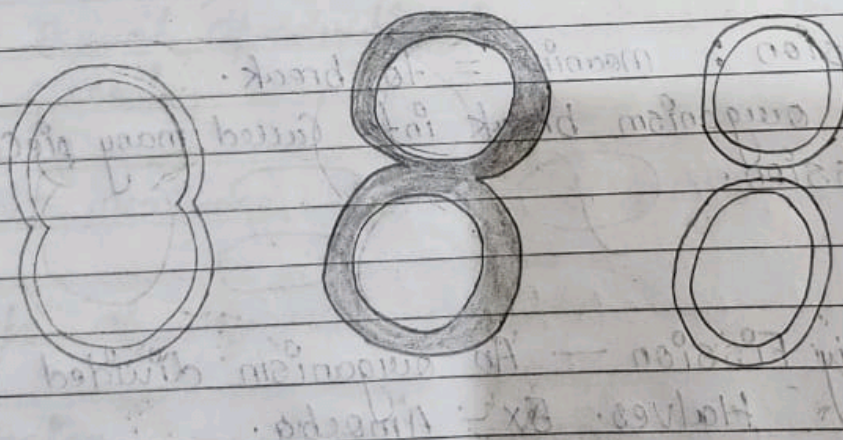
Type of Binary fission :

1. Simple Binary fission : plan of division passes through any axis.

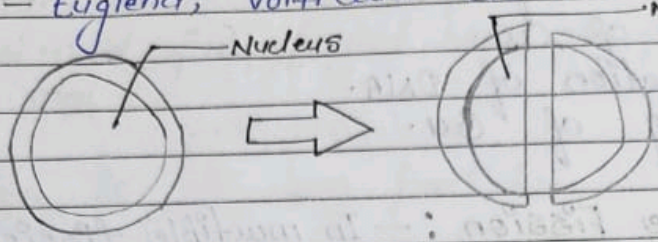
→ It is also called irregular binary fission.
Ex :- Amoeba Etc.



Simple Binary Fission.

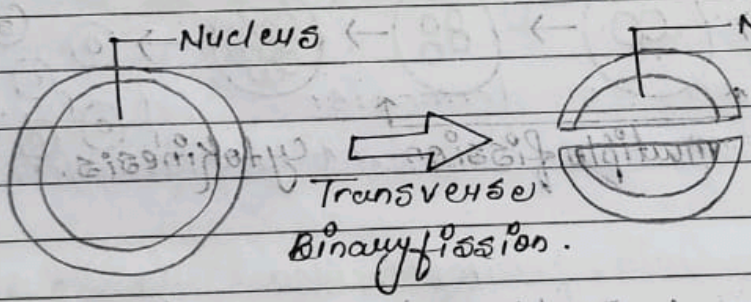


2. Longitudinal Binary fission :- plane of division passes through vertical direction / 90 degree.
Ex :- Euglena, Vorticella etc.



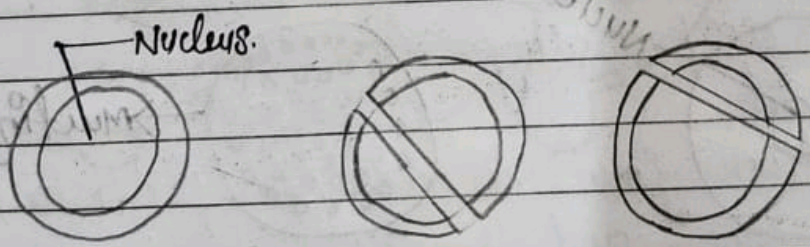
3. Transverse Binary Fission :- plane of division passes through horizontal direction / 180 degree.

Ex :- Bacteria, Diatoms, paramecium.



4. Oblique Binary Fission :- plane of division passes always in oblique direction / without fixed angle.

Ex :- Gonyaulax, Ceratium etc.



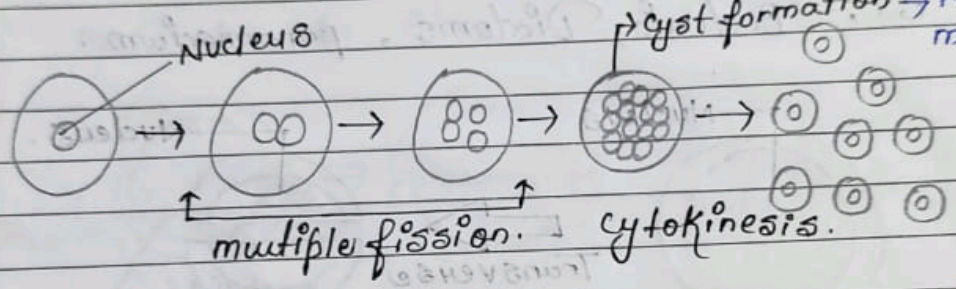
oblique binary fission.

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Steps in Binary fission :-

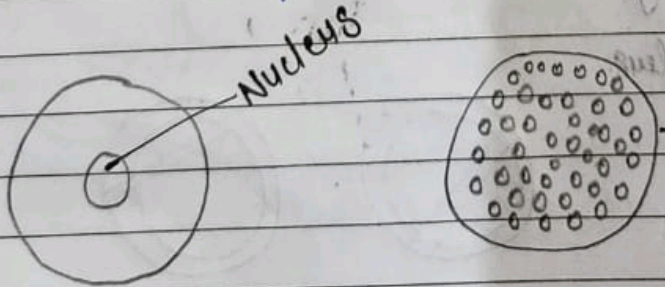
(I). Replication of DNA.
(II). Growth of Cell.
(III). Segregation of DNA.
(IV). Splitting of Cell.

(II). Multiple Fission :- In multiple fission, multi-karyokinesis formed multiple nucleus structure which is followed by cytokinesis and formed multiple cell.



2. plasmotomy :- In plasmotomy, multinucleated structure is not followed by cytokinesis due to this multinucleated cell is formed.

Ex :- Some protozoans.



plasmotomy means uncountable.

budding

3. Budding :- In^ parent body produce an outgrowth is called Bud, bud start producing our the structure similar to its parent and after maturation get detached from parent body and formed as new individual.

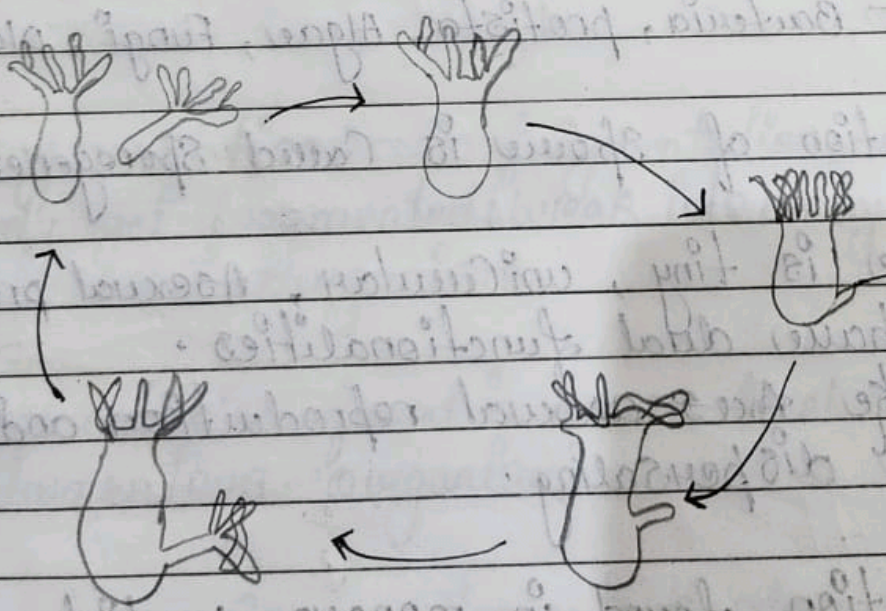
Budding is of two part :

External Budding :- out growth develop on out side of parent body.

Ex :- Hydra Etc.

Internal Budding :- out growth develop on inside of parent body.

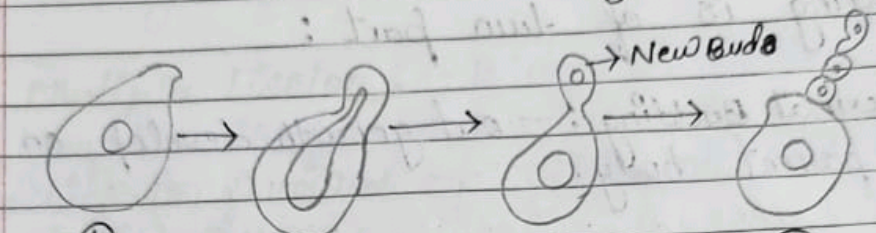
Ex :- Spongila.



4. ~~3~~ Torulation :- Budding in unicellular organism is called torulation.

eg:- Yeast Etc.

Torulation in yeast.



① Yeast cell ② Developing Bud ③ New Bud. ④ chain of buds.

5. Sporulation / spore formation :- Reproduction with the help of spore is called sporulation.

Ex:- Bacteria, protista, Algae, Fungi, plant.

→ Formation of spore is called Sporegenesis.

→ Spore is tiny, unicellular, Asexual propagule that have dual functionalities.
like asexual reproduction and spore dispersaling.

Sporulation found in monera, protista, Algae, fungi and plant.

- Monera — Bacteria.
- protista — slime mould.
- Algae — planospore.
- Fungi — Rhizopus, mucor, Aspergillus.
- plant — mosses, ferns.

*. Sporulation classified into two type :-

on the basis of origin- 2 type.	on the basis of movement- 2 type.
1. Exogenous Sporulation eg :- Conidia.	1. Motile/flagellated Sporulation. Ex :- zoospore/planospore.
2. Endogenous Sporulation ex :- Spongiospore.	2. Immotile/Non-flagellated Sporulation- Ex :- Aplanospore.

6. Fragmentation :- In fragmentation, organism parent body get fragmented/break into many pieces formed into new organism.

→ Fragmentation found in lower level multicellular, filamentous organism.

Ex— : In Some filamentous algae.
Some fungi.
protonema of mosses.
E.t.c.

8. Regenration :- Regaining of parent lost body is called Regenration.
Ex :- Sponge, Hydra, Starfish, flatworm etc.

→ In some lower level ouganism Regenration is mode of asexual Reproduction.

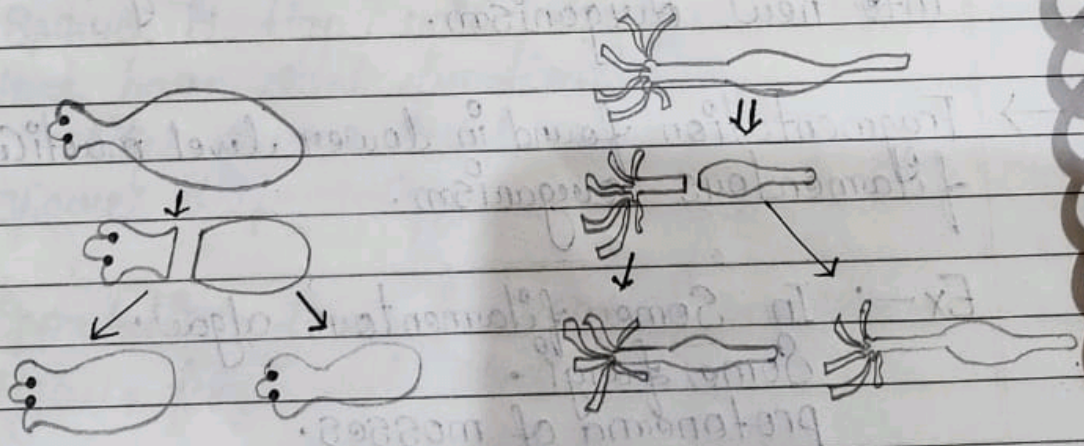
Ex :- planaria (Ctugesia)

→ In some higher level ouganism Regenration is mode of repairing their lost body part.

Ex :- partialy damaged liver in Human.
cut tail of lizard.
cut arm of starfish.

- Regenration is completed into 2 step :

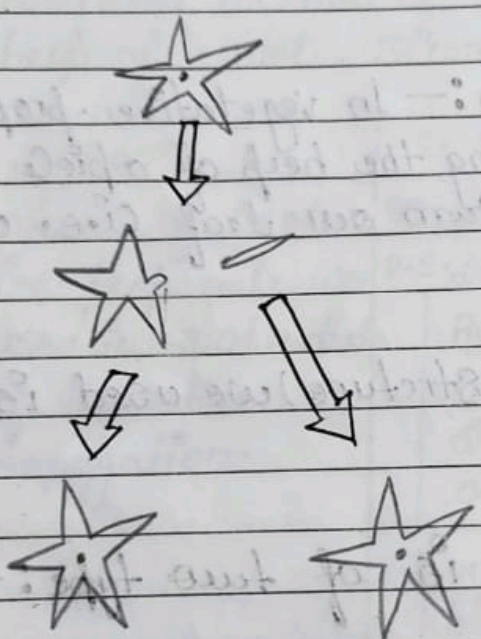
1. Epimorphosis — Lost body part formed.
2. Morphallaxis — Coordination between old tissue and New tissue.



Planaria

Hydra.

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Starfish.

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- Important Toppic.

Vegetative propagation :- In vegetative propagation new plants produced using the heap of a piece of plant from root, stem or leaf (i.e. other than seed).

→ piece of plant (unit structure) we used is called vegetative propagule.

→ Vegetative propagation is of two type :-

(I). Natural vegetative propagation.

(II). Artificial vegetative propagation.

1. Natural vegetative propagation :-

→ propagation happen naturally is called natural method of vegetative propagation.

→ Natural method of vegetative propagation can be possible with the heap of

- Root.
- Stem.
- Leaf.

- Natural method of vegetative propagation with the help of root, stem and leaf further classified.

1. Root	2. Stem	3. Leaf
pieces of Root i.e. propagule we used in Root method of vegetative propagation.	2.1. Aerial stem	bud formed on leaf or pieces of leaf used to grow new plant.
	2.2. Sub-Aerial stem: Runner, Stolen, Sucker, Offset.	Ex:- Bryophyllum. Begonia. Katenchoe.
	2.3. underground stem.	
	Rhizome	
	Corm.	
	Stem Tuber	
	Bulb	
	Bulbil.	

2.1. Aerial Stem :- Whole stem developed above the soil surface i.e stem in air.

2.2. Sub-aerial stem :- Some part of stem above the ground and some part of stem below into the ground (soil surface).

Runner :-

→ These are creeper (lata).

→ Grow on the soil surface in all direction very fast.

→ Scaly leaves.

Ex :- Cynodon (Doob Grass / lawn Grass), Oxalis Etc.

NOTE :- If runner is developed into underground it is called SOBOLE. Ex :- Agropyron.

*. Stolon :-

→ Grow aerially for some time, and then bend downwards to touch the ground and when adventitious root grow form a new plant.

→ originated from Base of main steam.

→ Terminal bud gives rise to a new stem and adventitious roots.

Ex :- Strawberry, Jasmine and mint etc.

*. Sucker :-

→ originated from basal part of main stem.

→ Leafy shoot.

→ Adventitious root.

→ ~~Above~~ move Horizontally undersoil for a distance and grows obliquely upward.

Ex :— Chrysanthemum, pineapple, peppermint etc.

*. Offest :—

→ Shorter and thicker.

→ Aquatic plant.

→ originated from axis of the leaf, Grow horizontally.

→ leaves are produced above and below to the adventitious root.
Ex :— pistia, Eicchornia (water hyacinth / jaukumbhi) etc.

underground stem :— Steams are under the ground (into soil).

Rhizome / Rootstocks

→ It is a type of underground stem.

→ Grows horizontaly inside the soil.

→ Nodes bear adventitious roots.

→ Scaly leaf.

Ex:- Ginger, Turmeric, Banana, Canna etc.

*. Corm :-

→ It is a type of underground stem.

→ Vertical fleshy, underground stem that acts as a food-storage structure.

→ Having node and internode.

→ with every node they have adventitious root developed.

*. Tuber :-

→ It is also a type of underground stem.

→ Has fleshy roots.

→ Tubers are modified stem with starch.

→ Do not definite shape.

→ Instead of node they have bud eye.

→ There are two types of tuber-stem and root stem. Ex:- potato etc.

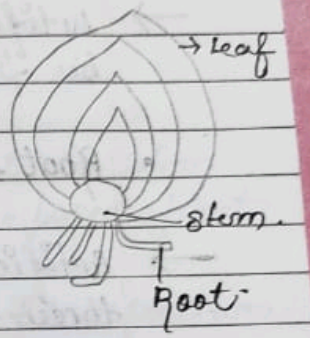
*. Bulb :-

→ It is also a type of underground stem.

→ Bulbs are shortened underground storage structures.

→ They are stem that are enclosed with fleshy, concentric layered leaves.

Ex :- onion, Garlic etc.



*. Bulbil :-

→ It is a type of Aerial tubers.

→ Aerial and fleshy Buds.

→ Fall from plant and grow a new plant.

Ex :- Agave etc.

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*. Artificial vegetative propagation :-

→ propagation happen by human interference is Good artificial method of vegetative propagation.

→ It is used for economic production i.e. Horticulture.

→ Artificial method of vegetative propagation can be possible with the help of :

- Root, Stem, Leaf.

→ Artificial method of vegetative propagation is three type :-

1. Cutting.
2. Layering.
3. Grafting.

1. Cutting :- In cutting type, Small part of plant (i.e, root, stem or leaf) as a propagule placed into soil and in favourable condition it will grow a new plant.

→ Favourable Condition for cutting is Rainy Season.

→ Auxins we can use for Early Rooting.

*. Cutting Can be possible with the help of :

- Root :- Lemon, Tamarind, prime Rose, china Rose. E.t.c.
- Stem :- Rose, Sugarcane, potato Etc.
- Leaf :- Rubber, mahonia, Blackberry Etc.

2. Layering :-

→ Layering is method of developing root in stem while stem is still attached to the parent plant.

→ It is possible in those plant having flexible stem.

→ It is of two type :-

- Ground layering :- Eg. strawberry, jasmine, Raspberry Etc.
- Air Layering :- Guava, china Rose, mango Etc.

3. Grafting :-

→ Grafting is an act of joining two different dicot plant of some species having vascular Cambium.

NoTe :- Grafting is not possible in monocot plant.

→ It is common method of vegetative propagation.

→ During grafting first of all callus is formed.

• In grafting:

1. Rooted part is called stock
1. Grafted part is called scion.

*. Type of grafting :-

→ Slice / Tongue / whip Grafting.

→ Wedge Grafting.

→ Crown Grafting.

→ Side Grafting.

→ Bud Grafting.

→ Approach Grafting.

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Life cycle of an organism is divided into three phase:-

Hormone — Cause transition from one phase to another phase.

puberty — Early reproductive phase in Human.

1. Juvenile phase	2. Reproductive phase	3. Senescence phase.
→ pre-reproductive phase.	organism able to Reproduce	organism grow older.
→ Rapid Growth.	Development of Gonads & Gametogenesis.	Loss the ability of reproduction.
→ Inplant Called Vegetative phase	Male Gonads → Testes	Female — Menopause.
	Female Gonads → ovaries.	Male — Andropause.

Sexual Reproduction :-

→ In sexual Reproduction offspring are produce by two different organism of opposite sex by the involvment of gamete.

→ products of sexual reproduction are not identical as well different from their parents.

→ Sexual reproduction involve Amphimixis which cause the variation.

→ Variation is raw material for Evolution.

Events in sexual Reproduction :-

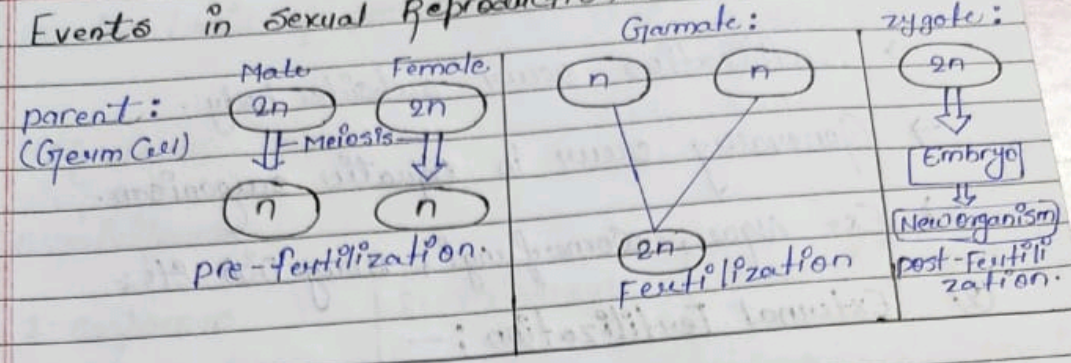
1. pre-Fertilization.
2. Fertilization.
3. post-Fertilization.

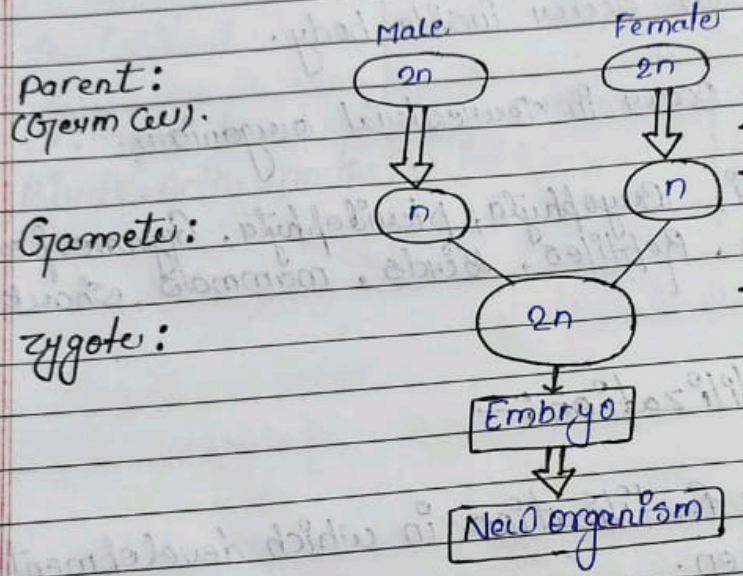
pre-Fertilization :- All the events occur before fertilization.

- It Completed in two steps:
  - Gametogenesis
  - Gamete Transfer.

Gamete :- gamete is haploid structure produce by sexually reproducing organism.

Events in Sexual Reproduction :-





2. Fertilization / Syngamy :-

→ Fusion of male and female gamete is called Fertilization.

- On the basic of Synagamy — Fertilization is of two type.

(1) External Fertilization :-

→ Fertilization occur outside body.

→ Generally occur in Aquatic organism.

→ Ex- Algae, some fungi, Bony Fish etc.

(2) External Fertilization :-

→ Fertilization occur inside body.

→ Generally occur in Terrestrial organism.

→ Some Fungi, Bryophyta, pteridophyta, Gymnosperm, Angiosperm, Reptiles, Birds, mammals, Shark etc.

3. post - Fertilization :-

→ Event after fertilization in which development of zygote happen.

→ It is Completed in two stage.

1. zygote — vital link between two successive Generation.

2. Embrogenesis — Formation of Embryo.

– on the basis of place of Embryogenesis : animal are of three type.

1. Oviparous.
2. Viviparous.
3. Ovoviviparous.

1. Oviparous	2. Viviparous	3. Ovoviviparous.
→ No Embryonic development.	Embryonic development inside mother.	Embryonic development inside, egg remain in mother body until they are ready to hatch.
Ex:– Reptiles, Birds, Arthropods. etc.	Ex:– mammals. &tc.	Ex:– Echidna, platypus, Duck Billed. Etc.

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plant life cycle : completed by three way

1. Annual plant.
2. Biennial plant.
3. perennial plant.

1. Annual plant

→ plant Complete their life cycle in a single year.

→ In the same season it shows vegetative growth, Reproductive growth and then die.

→ Ex : wheat, Rice, Maize etc.

2. Biennial plant

→ plant survive for two season.

→ In First season it shows vegetative growth.

→ In Second season it shows reproductive growth.

→ Ex :- Beet-Root, Carrot, Raddish etc.

3. perennial plant

→ plant survive for many year.

→ Every year shows flowering and fruiting.

• It of two type:

1. polyCarpic perennial plant :- Flowering and fruiting Every season.
   Ex:- Mango, Guava, Blackberry etc.

2. MonoCarpic perennial plant :- Flowering and Fruiting once in their life cycle.
   Ex:- Bamboo, Strobilanthes Kunthiana (Neelakuringi) etc.

Reproductive cycle in mammals :-

→ In placental mammals female shows some cyclic changes due to activity of ovary, accessory duct and hormone, throughout their reproductive phase, Called Reproductive cycle.

• It is of two type :-

1. Menstrual cycle :- In primate mammals cyclic changes occur.
   Ex - Human, Monkey, Ape, Gorilla etc.

2. Oestrous cycle :- In non-primate mammals cyclic changes occur.
   Ex:- cow, dog, ship, Rat, Tiger etc.

Type of Breeder :

1. Continuous Breeder :- Organism Reproduce throughout the year.
   Ex :- Human, poultry, lion, Cow etc.
2. Seasonal Breeder :- Organism Reproduce in particular season.
   Ex :- Frog, lizards, Some birds etc.

#. Micropropagation / Tissue culture :

- In tissue culture, new plant is produced by a pieces of ex-plant (i.e. Root, Stem, leaf) instead of Seed in a test-tube (In vitro).
- Generally we used Shoot-apical meristem as a Ex-plant.
- It is a procedural propagation.

Tissue culture :-

Step 1 : Shoot apical meristem in culture medium.

Step 2 : Culture medium having all the nutrients in optimum Condition.
+
Hormone which promote Cell-division (i.e. cytokinin).

Step 3 :- Callus Formed After Some time Callus (Mass of undifferentiated cell).

Step 4 :- Callus - Transferred into another medium having only nutrients.

Step 5 :- After differentiation Root, Stem, Leaf formed - (i.e. plantlet).

Step 6 :- put the plantlet into soil - New plant grow.

Application of tissue culture :

1. Large Number of plant in very short duration.
2. Virus Free plant from virus infected plant using meristem tissue.

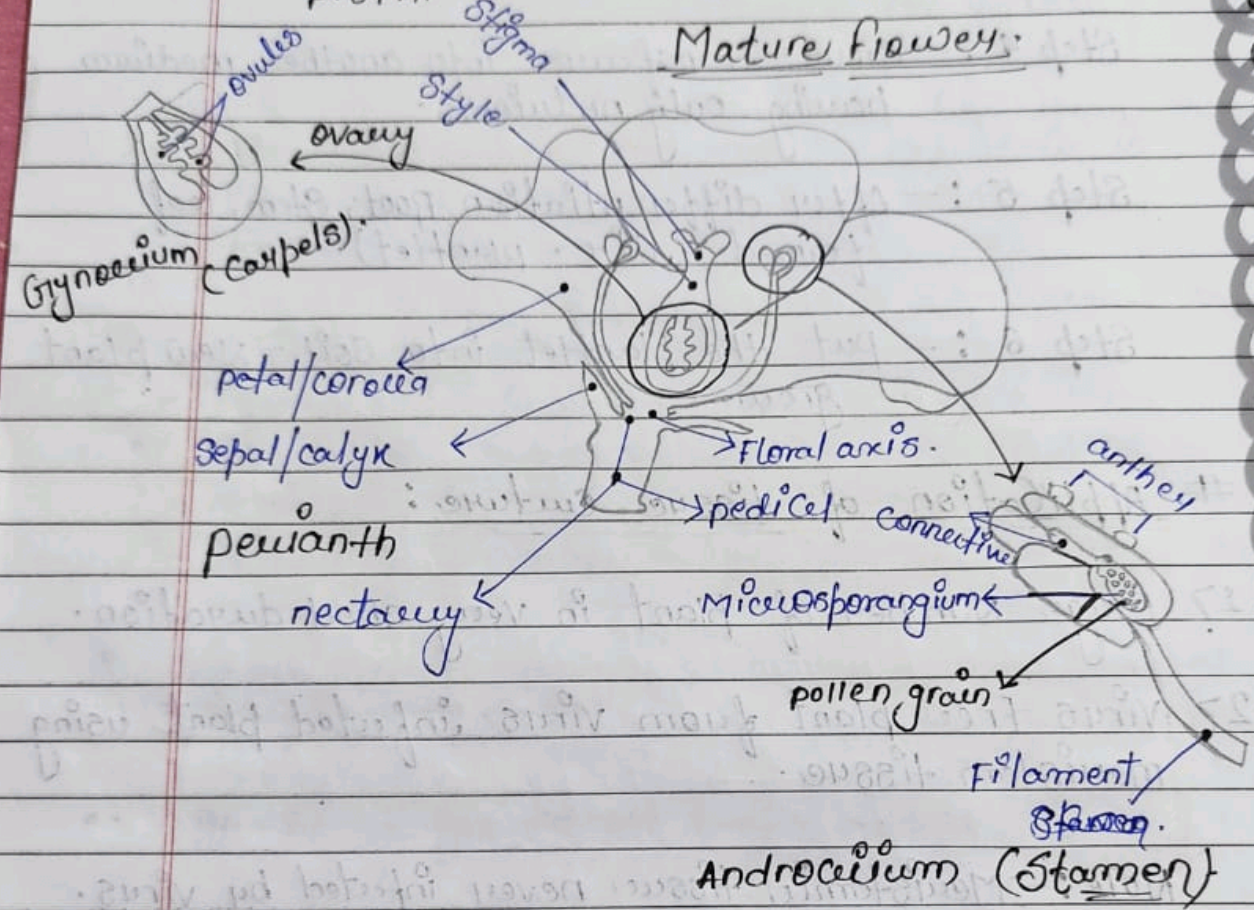
NOTE :- Meristemic tissue never infected by virus.

Type of Flower :- on the basic of Stamen and Carpel.

Stamen - Male Reproductive organ of flowering plant.
Carpel/pistil - Female Reproductive organ of flowering plant.

1. Bisexual Flower :- Both Stamen and Carpel present on Same flower.

2. unisexual flower :- Either Stamen or Carpel present on flower.



On the basic of flower — plant is of two type

1. Monoecious :— Both male and female flower present in same plant.
   Ex :— Maize, Coconut, Cucumber, Castor etc.

2. Dioecious :— Either male or female flower is present in a plant.
   Ex :— papaya, Date palm etc.

Bisexual Animal / Hermaphrodite : Self fertilization.

- If both male and Female reproductive organ present in some individual then it is called Bisexual or Hermaphrodite animal.
- Ex :— Earthworm, Leech, flatworm etc.
- In most of these animals cross-fertilization takes place.
- In flatworm only Self fertilization occur.

parthenogenesis :—

- Formation of Embryo without fertilization.
- parthenogenesis found in both animal and plant.

- Ex :- Grapes, Banana, Tomato, orange etc.
- In animal like :-

Haploid - Male honey bee (Drone), Ant, wasp etc.

Diploid - Aphids

parthenocarpy :-

- Formation of fruit without fertilization.
- Their fruits are called parthenocarpy fruit.
- Ex :- Tomato, Banana, orange, Grapes etc.
- parthenocarpy fruits are seed less fruits.
- parthenocarpy can be induced by hormone → Auxins.