

Ch → 1

Reproduction in Organisms

Lifespan → Period between Birth and Natural Death.

Organisms	Lifespan
1. Elephant	60-90 years
2. Rose	5-7 years
3. Dog	20-25 years
4. Butterfly	1-2 weeks
5. Crow	15 years
6. Banana Tree	25 years
7. Cow	20-25 years
8. Parrot	140 years
9. Crocodile	60 years
10. Tortoise	100-150 years
11. Horse	60 years

• Lifespan not depend on SIZE

Older time
(unfavorable
condition)

Later time
(Long Life
Span)

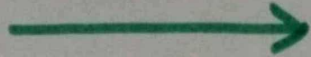
↓
organism Evolve
Short life span.

- Life span is Variable
- Death is certain.

Unicellular organisms are immortal



Amoeba



] If favorable condition → they keep on dividing.

Reproduction → Biological process by which an organism reproduce an offspring who is biologically similar to the organism. Reproduction enables and ensures the continuity of species, generation after generation.

- All living organism show a cycle of → Birth, Reproduction, Death.

Reproduction solve following purpose.

1. Continuity of Life
2. Variation.

Mode of Reproduction depend on -

- Habitat
- Internal physiology
- Other Factor.

Type of Reproduction

① Asexual Reproduction → In this type of Reproduction, Single Parent involve.

Feature -

- Simple

- Take Less time / Less complex
- Gamete formation may or may not occur.
- Single Parent involve.

Parthenogenesis - Asexual Reproduction

Queen ($2n$)

↓ Meiosis

⊙ Egg cell → drone
Mitosis

Mode of Asexual Reproduction

Unicellular

Multicellular

Monera
(Bacteria)

Protista
(Unicellular
Eukaryotes)

Less
Differentiated
(Lower
organism)

Higher
Organisms

- Fission
(Favorable
Condition)
- Spore
(Unfavorable
Condition)

- Amoeba
- Paramecium
- Euglena

Unicellular Eukaryotes (Protista)

1. Binary Fission -

Amoeba → Any Plane

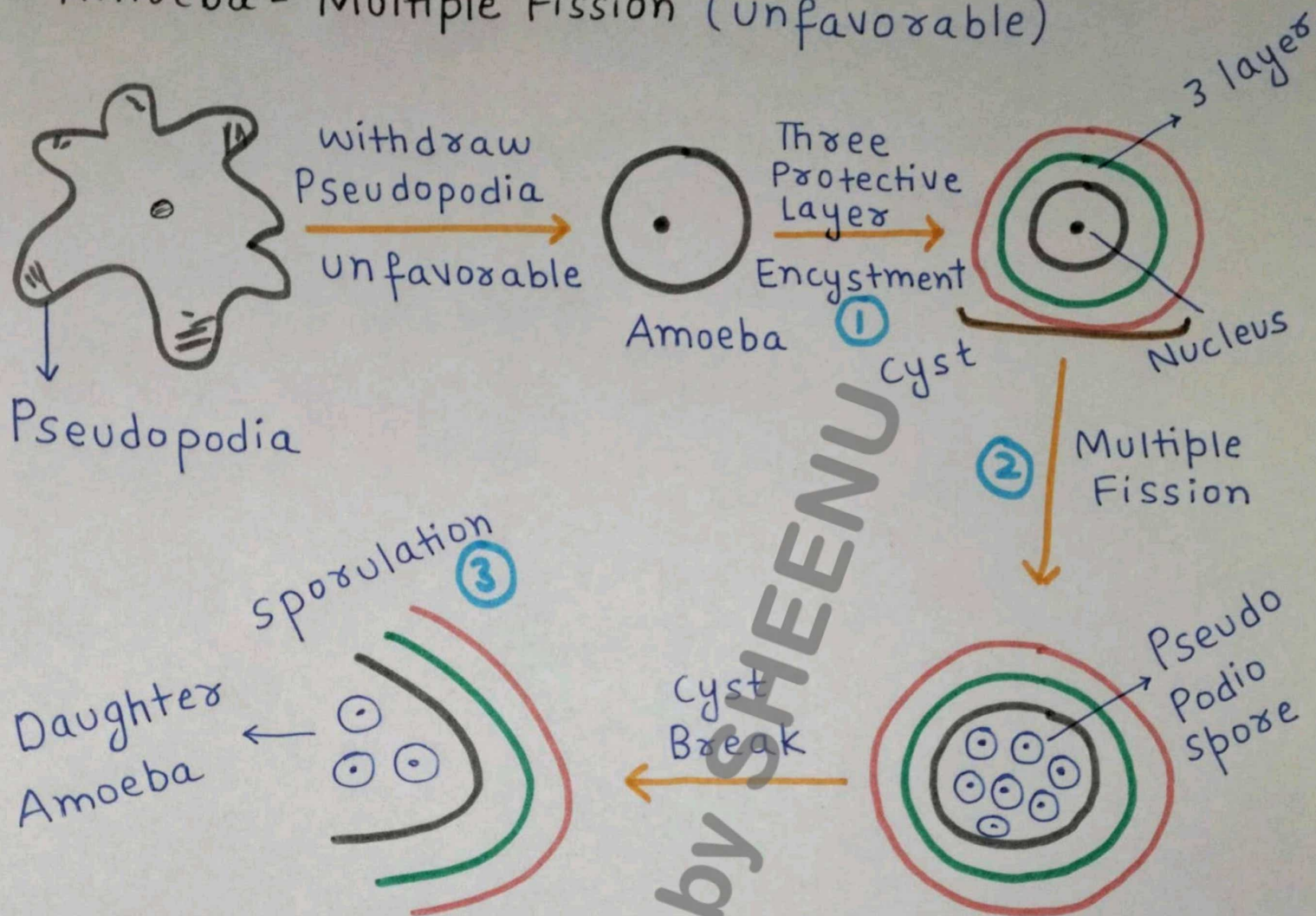
Euglena → Longitudinal

Paramecium → Transverse

2. Multiple Fission

- Plasmodium (Genus)
- Amoeba (unfavourable condition)

Amoeba - Multiple Fission (unfavourable)



Zoospore in Chlamydomonas

Zoospore (Microscopic) — in Algae

- Haploid
- Motile
- Asexual spore
- Flagella
- Green Algae + Brown Algae

Budding in Yeast

Budding

- ① Daughter cell attach
- ② Unequal
- ③ Parent cell can be identified after division

Fission

- ① Daughter cell Free.
- ② Equal size daughter cell.
- ③ Not Possible.

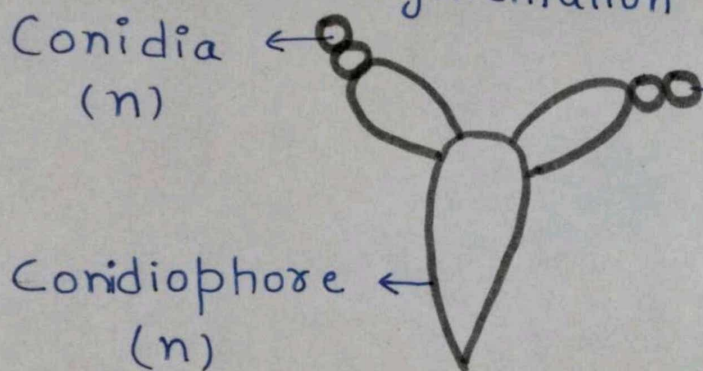
Multicellular lower organisms → Algae, Fungi, Bryophyte, Sponge, Hydra

(a) Algae → Multicellular

— Fragmentation, Zoospore

(b) Fungi → Fragmentation (Except Red Algae)

Conidia (n)



Conidiophore (n)

conidia - Asexual spore

- Non-Motile

(Aplanospore)

- Haploid

- Product of Mitosis

→ This structure is for fungi Penicillium.

Conidia

Conidia

- Non-Motile
- Main spore of Fungi
- Flagella not Present
- Air → Move

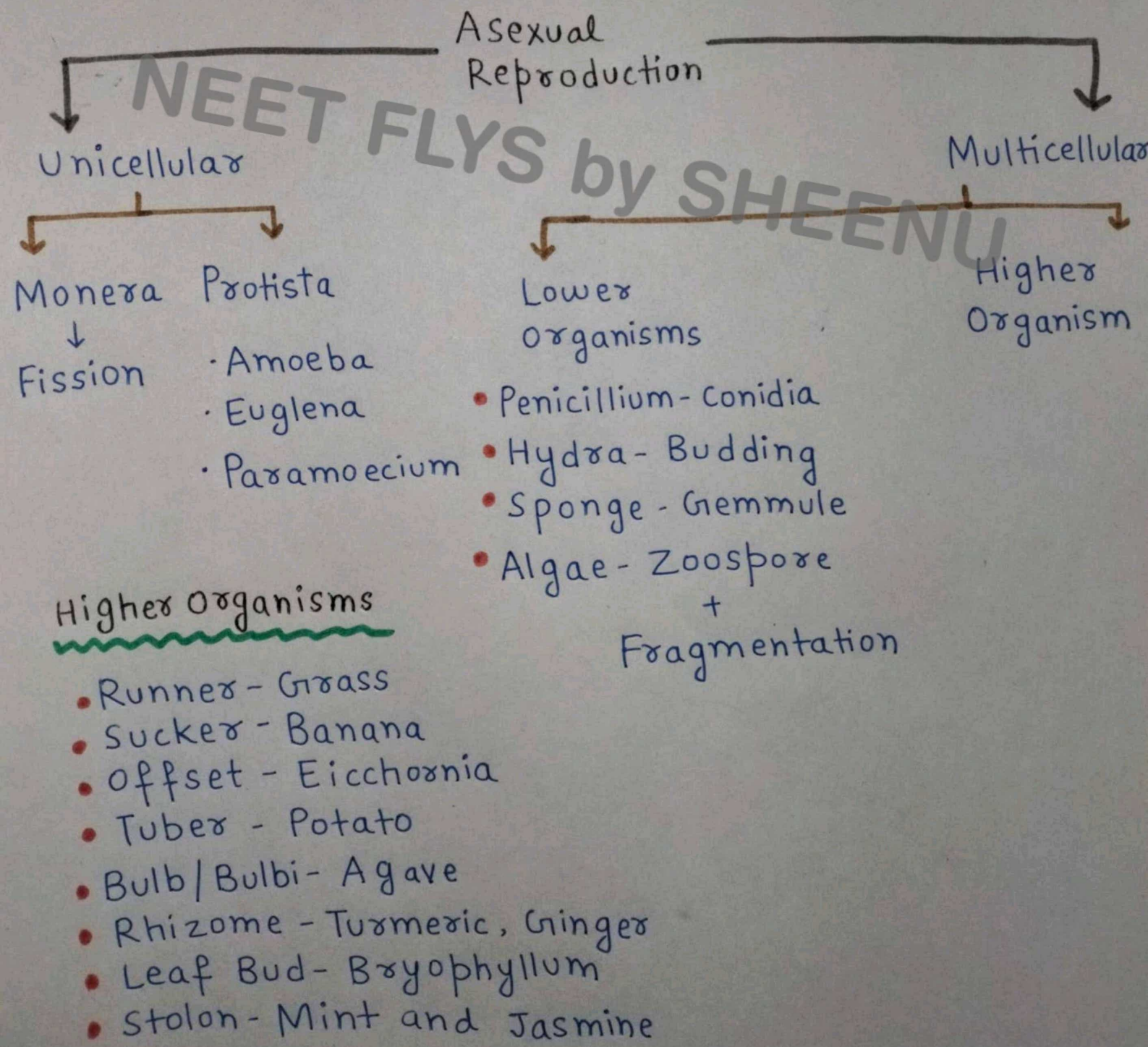
Zoospore

- Motile
- Main spore of Algae
- Flagella Present
- Water → Move

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- Hydra (Bud) → outgrowth (Exogenous Bud)
- Sponges - Gemmule (Endogenous Bud)

→ while in Animals and other simple organisms the term Asexual is used, unambiguously, in plants, the term vegetative propagation such as runner, rhizome, sucker, tuber, offset, bulb are all capable of giving rise to new offspring. These structures are called Vegetative Propagules.



Sexual Reproduction → In Sexual Reproduction, Fusion of male and Female gametes results in offspring that are not identical to parents.

→ Different phases in Sexual Reproduction.

(a). Juvenile Phase → The period between birth and Sexual Maturity is called Juvenile phase. In plants, it is known as Vegetative phase.

(b). Reproductive Phase → Some plants show flowering in particular season and some other flowers in all seasons.

Bamboo species flower only once in their lifetime (generally after 50-100 years)

Strobilanthes kunthiana (neelakuranji) flower once in 12 years.

- The females of placental mammals exhibit cyclic changes in the activities of ovaries and accessory ducts as well as hormones during the reproductive phase. In non-primate mammals like cows, sheep, rats, deer, dogs, tiger etc such cyclical changes during reproduction are called **Oestrous Cycle**. where as in primates (monkeys, apes and humans) it is called **menstrual cycle**. Many mammals, especially those living in natural, wild conditions exhibit such cycles only favourable seasons in their reproductive phase and are therefore called

Seasonal Breeders. Many other mammals are reproductively active throughout their reproductive phase and hence are called continuous breeders.

On the basis of length of vegetative and Reproductive phase

① Annual → Complete Vegetative and Reproductive phase in single season or year → death occurs. They are Monocarpic. They produce fruit once in a life.
Ex - wheat, Tomato.

② Biennial → 1st year - Growth - Vegetative Phase
2nd Year Reproduction and death occurs.
They are also Monocarpic.
Ex - Cabbage, Raddish.

③ Perennial → Vegetative phase is more than one year.

(c) - Senescent Phase → The period after reproductive phase, when a cell loses its ability to reproduce.

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Events in Sexual Reproduction-

(i). Pre fertilisation Events → These include all the events of sexual reproduction prior to the fusion of gametes. The two main pre fertilisation events are-

(a). Gametogenesis

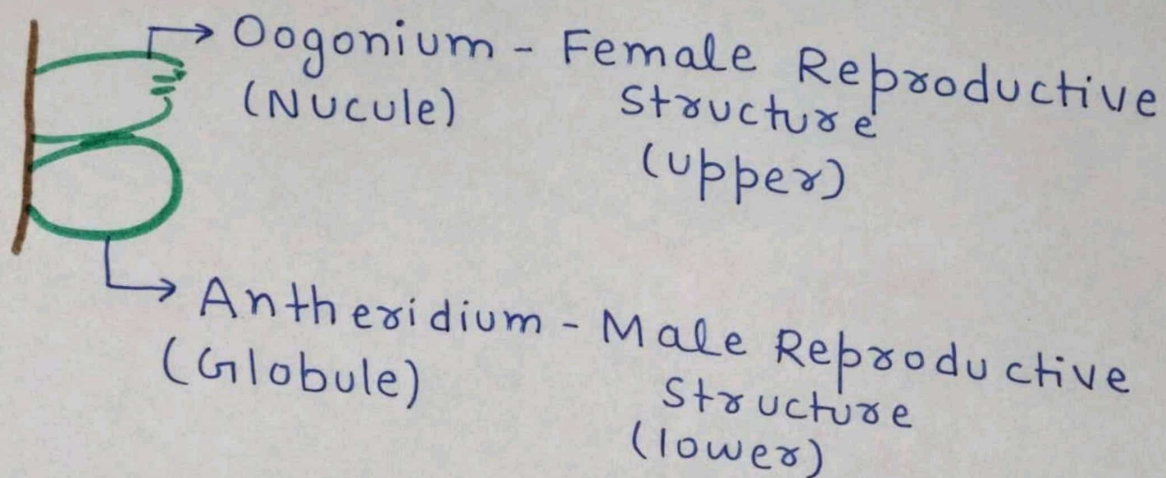
(b). Gamete transfer

Gametogenesis → The process of formation of the two type of gametes - Male and Female gametes are haploid cells.

Sexuality in organisms.

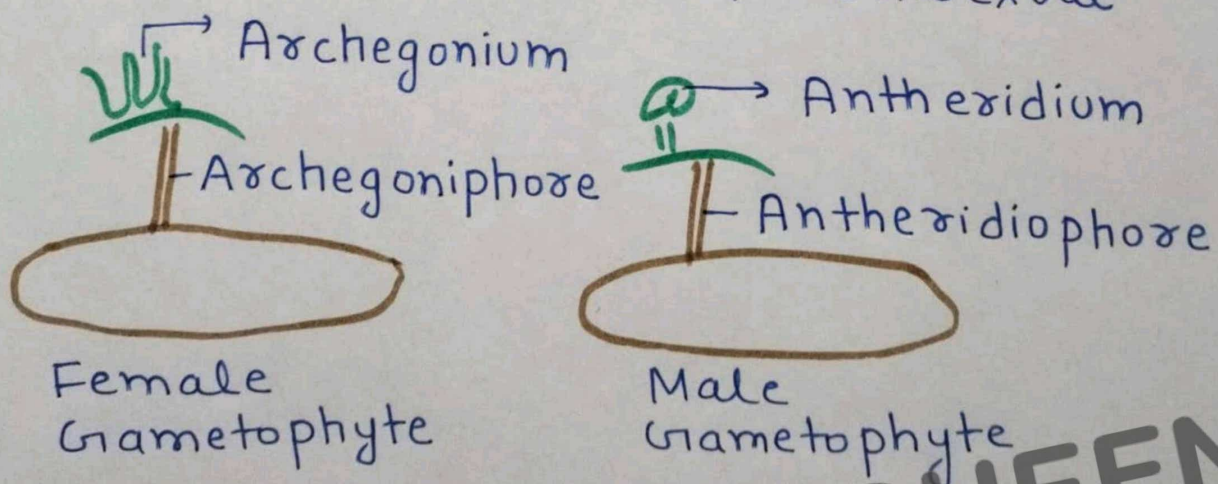
Lower organisms [Unisexual → Dioecious
Bisexual → Monoecious]

(a). Algae - Bisexual Green Algae.
e.g., Chara.



(b). Fungi - Homothallic - Bisexual

(c). Bryophyte - Marchantia (n) - Unisexual



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Plants

→ Gymnosperm → Pinus (Bisexual)
Cycas (unisexual)

↓
Angiosperm
(Flowering Plant)

→ Bisexual Flower / Plant is also Bisexual] Ex → Sweet Potato

Plant Bisexual

Flower unisexual

→ Male Flower - Staminate
Female Flower - Pistillate

e.g.. Coconut, Cucurbits,
Maize, Castor

SAME
PLANT

Unisexual Plant (Male and Female flower on
Different Plant)

e.g.. Papaya, Date palm, Mulberry, Vallisneria.

Animals

→ Bisexual → e.g.. Earthworm
(Monoecious)
Sponge
Flatworm

↓
Unisexual - Cockroach.
(Dioecious)

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Type of gametes -

① Homogamete / Isogamete

- Male and Female - Morphologically Similar.

- e.g.. Cladophora (Motile), Spirogyra (Non Motile)

② Heterogamete

- Anisogamous
 - Eudozina
- Oogamous
 - Male gamete Normally Motile.
 - Female gamete - Non Motile.
 - e.g.. Fucus, Human.

Division to form gametes

- Mitosis - In some organisms which is haploid (Algae, Fungi)
Mitosis occur to form Gamete.
- Meiosis - In diploid organism, Meiosis occur to form gamete.

Gamete Transfer

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Mostly Oogamous → Female gamete non-motile

Male gamete need to move toward Female gamete

→ wastage of Male gamete.

No. of male gamete is more in Number



Higher Plant → Pollination



Than Pollen tube carry Male gamete

Male gamete move with the help of flagella. (Algae, Bryophyte, Pteridophyte)

Syngamy / Fertilization = Fusion of Male and Female Gamete



Result is diploid Zygote.

Parthenogenesis → A form of reproduction in which an egg can develop into an embryo without being fertilized by a sperm.

External Fertilization

1. Outside Female Body
2. Possible only when male and Female-gamete release & Maturity Synchronise.
3. Ex- Bony Fish, Amphibians, Algae.

Internal Fertilization

1. Inside Female Body.
2. More Protection - chance of Parental care
3. Ex- Cartilaginous Fish, Reptiles, Birds, Mammals, Fungi, Bryophytes, Angiosperm, Pteridophyte, Gymnosperm

Post Fertilization changes

Division in Zygote

1. Haplontic Life cycle - Algae, Fungi undergo Meiosis.

2. Diplontic (Angiosperms, Gymnosperms)
Haplodiplontic (Bryophyte, Pteridophytes)



↓
Form Embryo.

Embryogenesis



Zygote

Mitosis → cell division

↓
cell Growth
and Differentiation

Multicellular
Embryo

Oviparous → Egg Laying

External
Fertilization

- Amphibian
- Bony Fish
- Egg → No Calcareous shell

Internal
Fertilization

- Reptile
- Birds
- Calcareous shell

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Viviparous - Lay young one after Maturity

Post Fertilization change in Plants

The zygote develops into the Embryo and the ovules develop into the seed.

The ovary develops into the fruit which develop a thick wall called pericarp that is protective in function.

After dispersal, seeds germinate under favourable conditions to produce new plants.

Ques → Which of the following flowers only once in its lifetime?

- ☒ (a) Bamboo species
- (b) Jack fruit
- (c) Mango
- (d) Papaya

→ Bamboo species

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All the Best Future Doctors ❤️

- Your Senior Di..