

**CLASS 12
BIOLOGY
SYLLABUS**

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graph TD; A[CLASS 12 BIOLOGY SYLLABUS] --> B[Unit 1 Reproduction in organisms (14mks)]; A --> C[Unit 2 Genetics and evolution (18mks)]; A --> D[Unit3 Biology and human welfare (14mks)]; A --> E[Unit 4 Biotechnology (10mks)]; A --> F[Unit 5 Ecology (14mks)];
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**Unit 1
Reproduction in
organisms
(14mks)**

**Unit 2
Genetics and
evolution
(18mks)**

**Unit3
Biology and human
welfare
(14mks)**

**Unit 4
Biotechnology
(10mks)**

**Unit 5
Ecology
(14mks)**

REPRODUCTION IN ORGANISMS

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Chapter-1

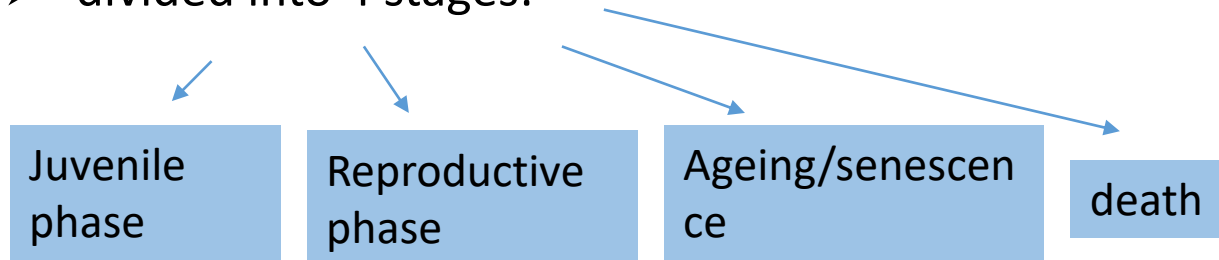
Reproduction In Organisms

REPRODUCTION

- Biological process in which organisms give birth to young ones similar to itself.
- Necessary for continuity of species on planet.

LIFE SPAN

- Period from birth to natural death.
- divided into 4 stages:



PURPOSES OF REPRODUCTION:

- ☐ Reproduction maintains the continuity of species.
- ☐ It introduces variation in the organism which is a source of evolution.
- ☐ Life exists on earth due to evolution.

LIFE SPAN

Life spans of organisms are not necessarily correlated with their sizes.

eg: crow and parrot, mango tree and banayan tree

ORGANISMS	LIFE SPAN
May fly	1 day
Butter fly	1-2 weeks
crow	15 years
crocodile	60 years
man	80 years
parrot	140 years
tortoise	100-150 years
Wheat plant	6 months
Banyan tree	200 years

TYPES OF REPRODUCTION

- 1. Asexual Reproduction**
- 2. Sexual Reproduction**

Asexual Reproduction

- **Production of offsprings from a single parent without involving fusion of gametes**
- **Involves only mitotic division,hence no variation**
- **Offsprings are genetically and phenotypically identical to one another-clones.**

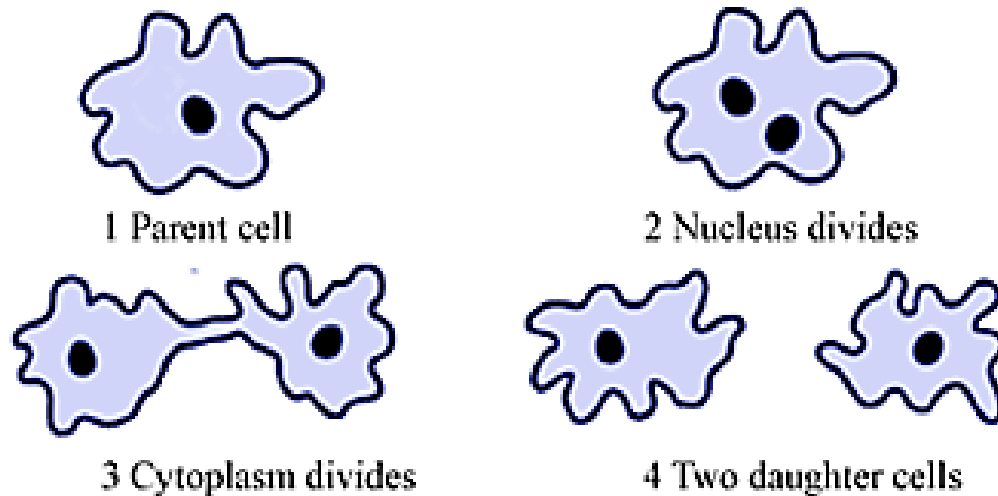
Methods Of Asexual Reproduction

1. **Fission:** parent body divided into two or more daughter individuals

Types

- a) **Binary fission:** parent cell divides into two halves forming two daughter cells.

Eg: Amoeba, Euglena, etc



b) Multiple Fission

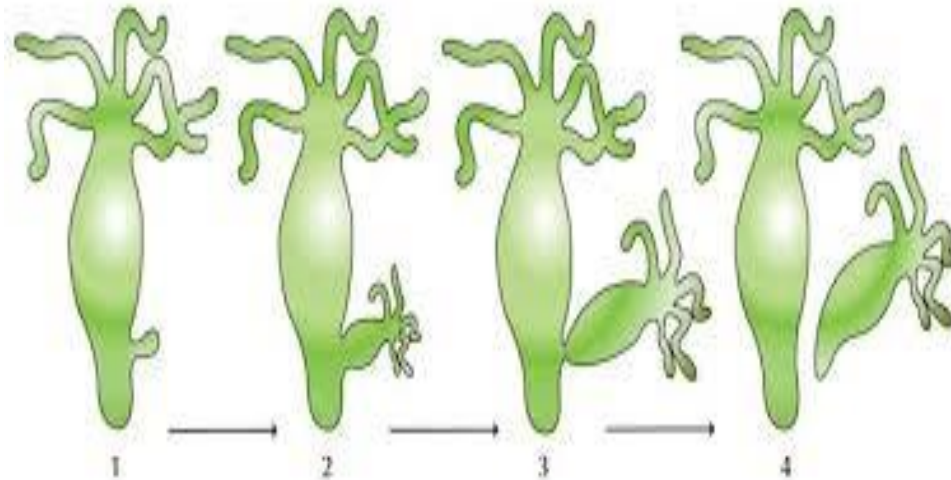
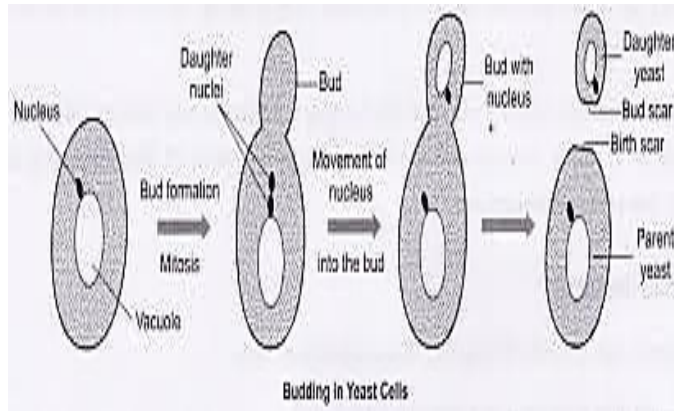
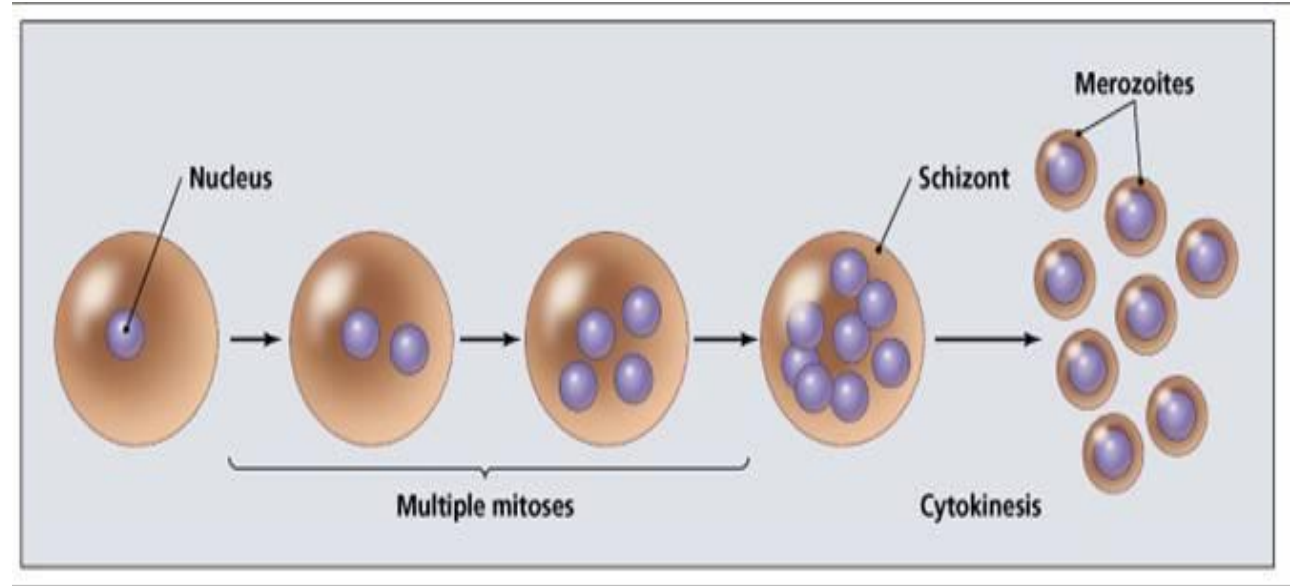
- Uninucleated parent cell undergoes repeated nuclear division followed by cytokinesis to form many small daughter cells.

2. Budding

- Formation of a daughter organism through small outgrowths or projection called buds.

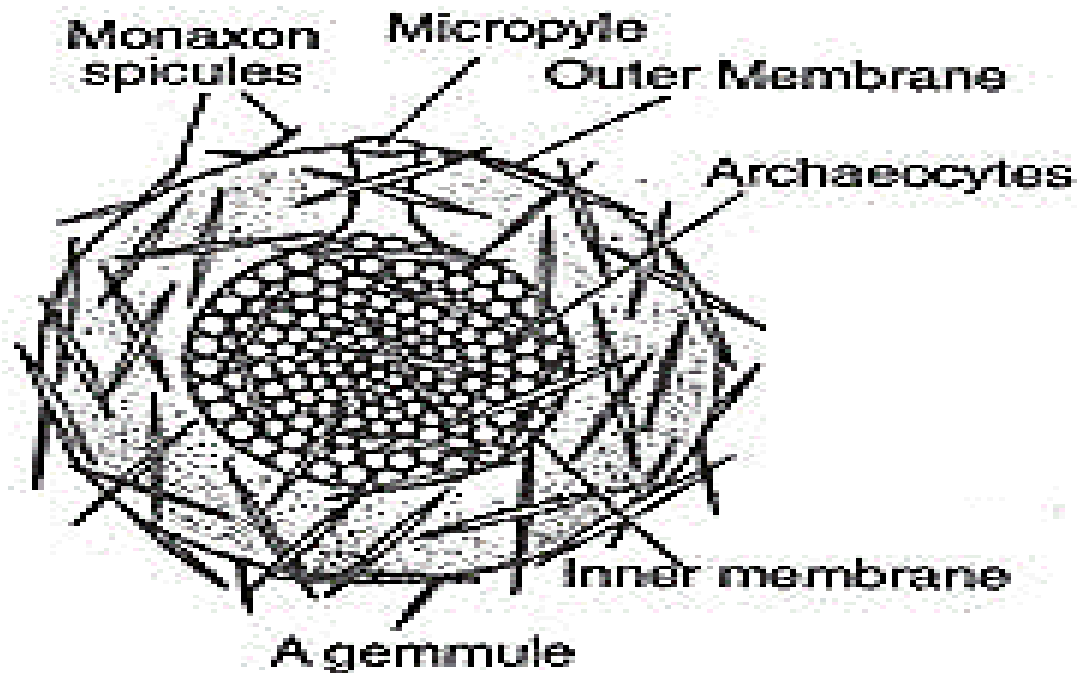
Exogenous buds: outgrowth towards outer surface.

Eg: yeast, Hydra

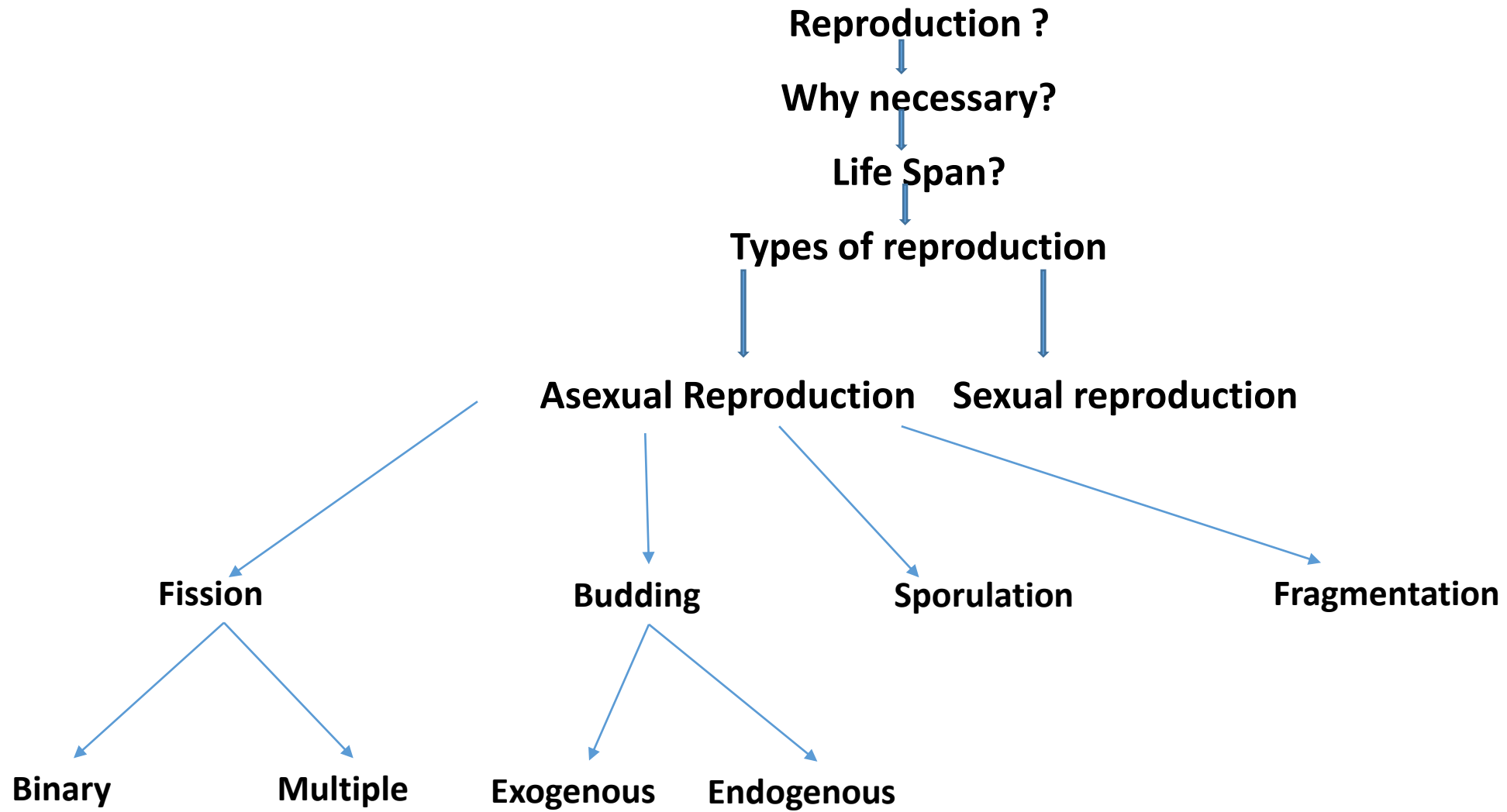


Endogenous budding

- Buds inside body
- Internal buds are called gemmules
- Formed during unfavourable condition in sponges



Recall:



Understanding Type Questions:

Q1. Why is offsprings formed by asexual reproduction reffered to as clone?

(NCERT)

Q2. How do spores help in survival under unfavourable conditions? (CBSE 2013)

Q3. Why is reproduction essential for the organisms? (NCERT)

Q4. Is there a relationship between the size of an organism and its life span? Give two examples in support of your answer. (NCERT)

3. SPORULATION/ SPORE FORMATION:

- Unicellular microscopic asexual reproductive structures surrounded by resistant coat
- Release from the parent which on germination produce new individuals
- Also acts as structure to tide over unfavourable condition.

Note : Under unfavourable condition, Amoeba secretes a three layered hard covering or cyst around itself- called encystation

Zoospore – motile spores with one or two flagella.

- Eg: aquatic algae and fungi- chlamydomonas , ulothrix

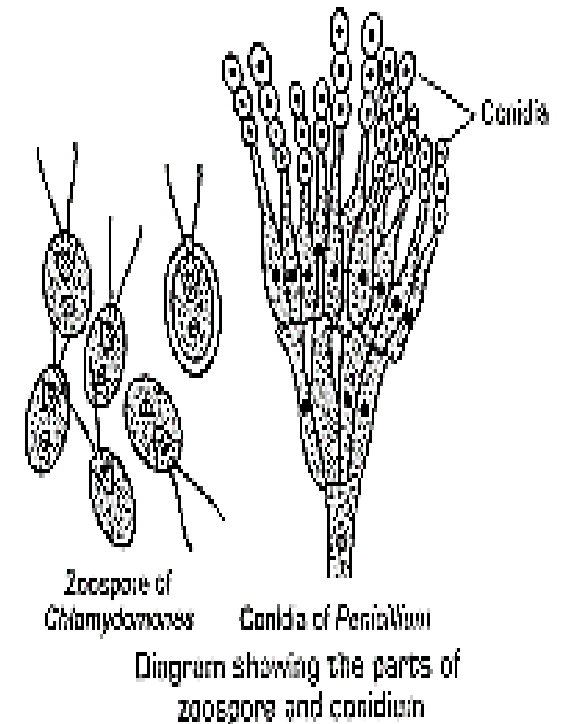
Aplanospores- non-motile spores

- Eg: conidia Penicillium and Aspergillus

4. Fragmentation

- Body breaks into distinct pieces/fragments-each fragment grows into an adult.

Eg: hydra



Features of asexual reproduction

- ☐ Single parent is involved
- ☐ No fusion of gametes i.e. no fertilization
- ☐ Offsprings are genetically identical to parents.
- ☐ It is a rapid process

Vegetative propagation

- In plants , asexual reproduction is commonly called vegetative propagation.
- It is the process of formation of a new plant from detached vegetative parts(root, stem and leaves).
- Vegetative structures are called vegetative propagules

VEGETATIVE PROPAGULES

Runner- oxalis

Tuber- potato

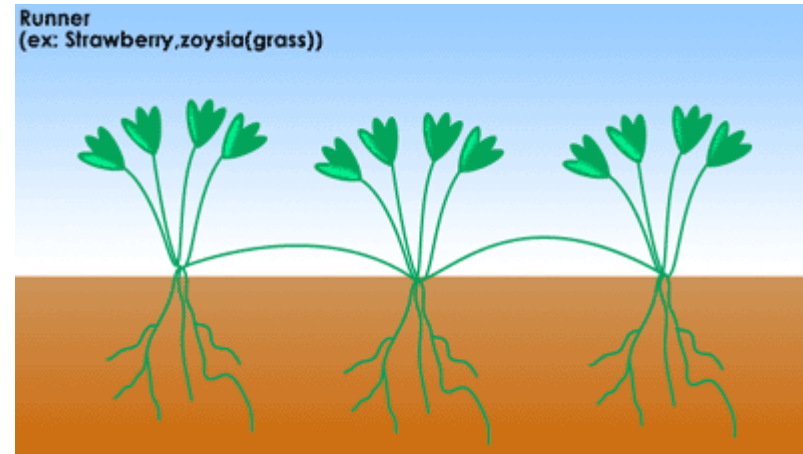
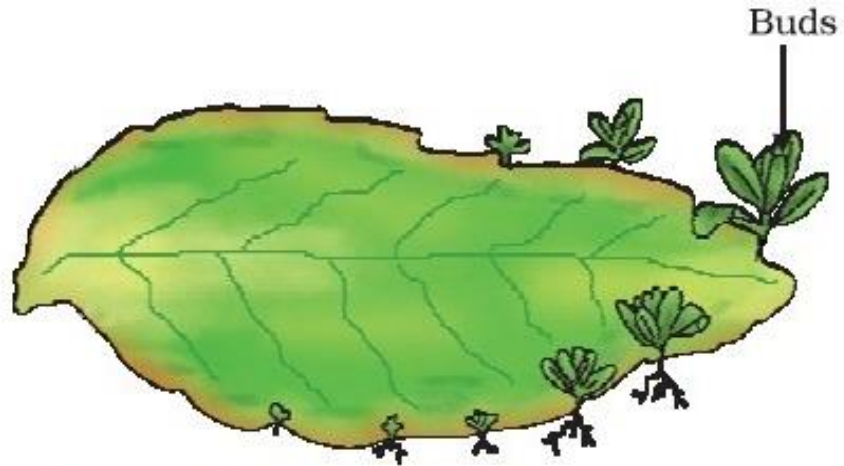
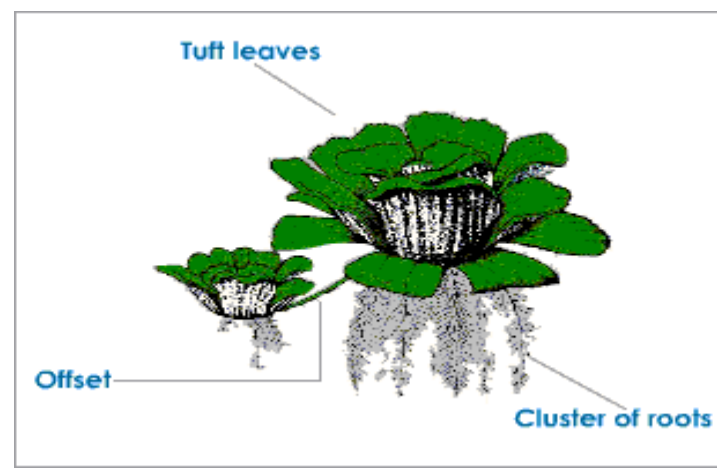
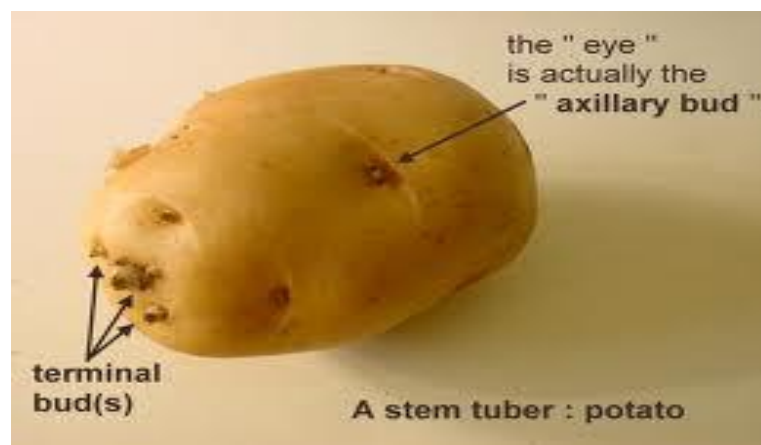
Offset- water hyacinth, pistia

Bulb- onion, garlic

Rhizome- ginger

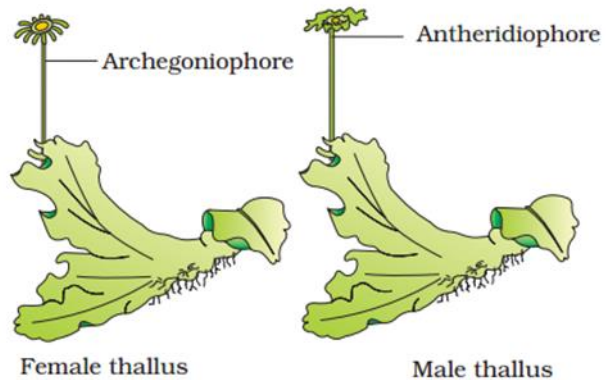
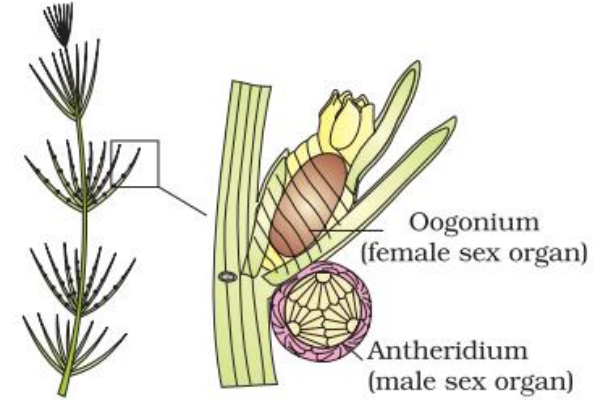
Bulbil- agave

Leaf buds- Bryophyllum



Sexual reproduction

- **Monocarpic –flower** once in lifetime (50-100 yrs) – Bamboo
 - *Strobilanthus kunthiana* – Flower every after 12 yrs
- **Polycarpic** – *flower* every year
- **Homothallic**- plants having both male and female sex organs.
Eg: Chara
- **Heterothallic**- plants having only one sex organ.
Eg: Marchantia



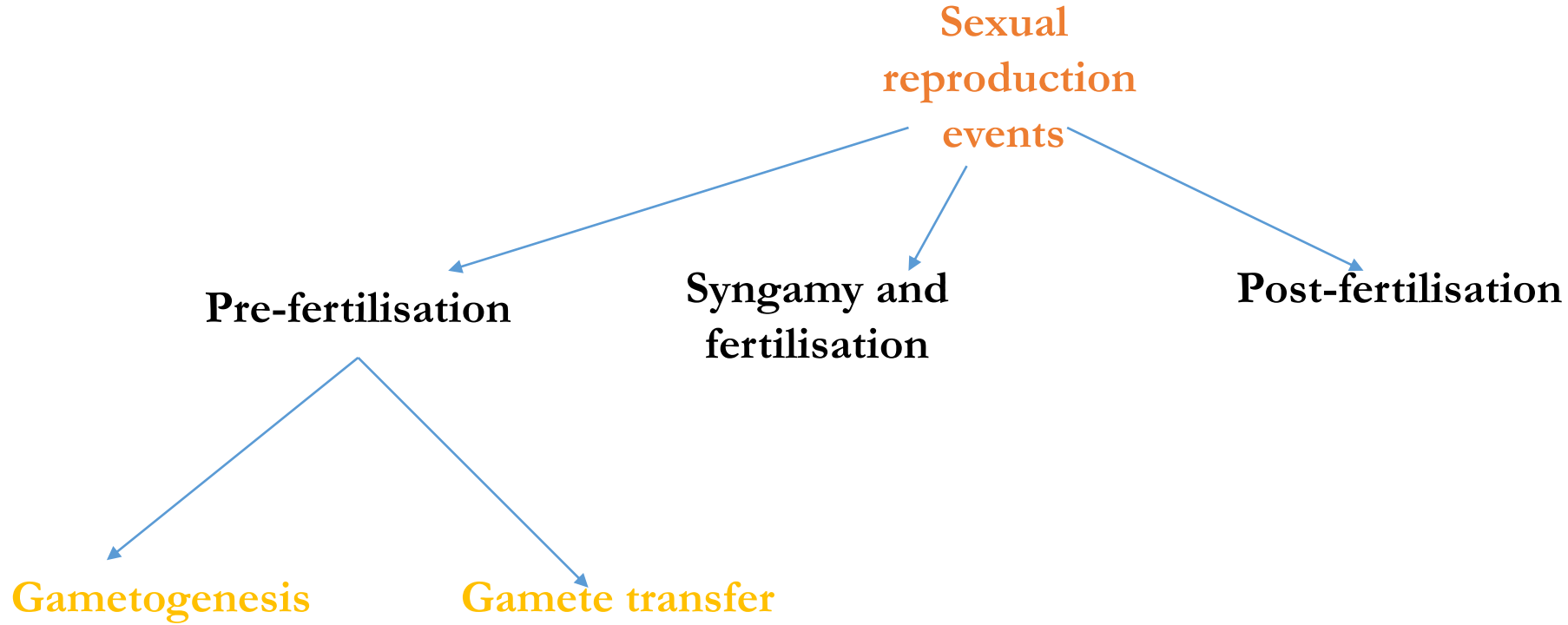
Monoecious- both Staminate and pistillate flower on the same plant.

Eg- Maize, Coconut, Ricinus

Dioecious- Staminate flowers on one plant and pistillate flower on the same plant.

Eg- papaya, hemp

SEXUAL REPRODUCTION



Understanding Type Questions:

Q1. Is it possible to consider vegetative propagation observed in certain plants like Bryophyllum, ginger, etc. as type of asexual reproduction? Give two reasons. (NCERT).

Q2 Coconut palm is Monoecious while date palm is dioecious. Why are they called so? (COHSEM 2009)

Q3. Differentiate between asexual and sexual reproduction. 5marks (COHSEM 2018)

Application type questions:

Q1. Although potato tuber is an underground part, it is considered as stem. Why ? (NCERT)

Q2. Why do intermodal segment of sugarcane fail to propagate vegetatively? (COHSEM 2018)

Q. Which one of the following statements is not correct? [2016 PII]

1. Offspring produced by the asexual reproduction are called clone.
2. Microscopic, motile, asexual reproductive structures are called zoospores
3. In potato, banana and ginger, the plantlets arise from the internodes present in the modified stem
4. Water hyacinth growing in the standing water drains oxygen from water that leads the death of the fishes.

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PRE-FERTILISATION CHANGES

(A) GAMETOGENESIS

- It is the process of formation of haploid male and female gametes.
- Gametes may be **homogametes (isogametes)** or **heterogametes**.
- In heterogametes the male gamete is called **antherozoid or sperm** and the female gamete is called the **ovum**.

- If the parent body is haploid gametes are formed by mitosis, if diploid gametes are formed by meiosis.
- An organism may be homothallic/monoecious or heterothallic/dioecious.

PRE –FERTILIZATION CHANGES

(B) GAMETE TRANSFER

- Fusion of male and female gamete is called fertilisation.
- So male and female gamete must be brought together.
- In some organisms both gametes are motile (algae) but in most cases male gamete is motile where as female is not.
- Algae, bryophytes and pteredophytes, water is the medium for gamete transfer

PRE –FERTILIZATION CHANGES

(B) GAMETE TRANSFER

- Pollination is the method of gamete transfer in higher plants as pollen grains contain male gametes.
- The number of male gametes are thousand times the number of female gametes as there is loss of male gametes during transfer.
- In dioecious animals there is special mechanism for gamete transfer.

SYNGAMY AND FERTILISATION

- It results in the formation of diploid zygote.
- In some animals like rotifers, honey bees, some lizards and birds (turkey) female gametes develop in to organism without fertilisation, such a phenomenon is called parthenogenesis.

POST-FERTILISATION EVENTS

- The events after zygote formation is called post-fertilisation events.

POST-FERTILISATION EVENTS

- Organisms showing haplontic life cycle, zygote undergoes meiosis. While organisms showing diplontic life-cycle undergoes mitosis.
- The zygote develops into an embryo.
- Embryogenesis involves (i) cell division (ii) cell enlargement or growth (iii) cell differentiation.
- In oviparous animals zygote development occurs outside of female's body, they are egg laying e.g. reptiles, birds.

POST-FERTILISATION EVENTS

- In viviparous animals zygote development occurs inside of female's body. They give birth to young individuals. E.g. mammals
- In plants zygote is formed inside ovule, where it develops into embryo, then ovule becomes seed and ovary into fruit.

TYPES OF FERTILISATION

EXTERNAL FERTILISATION	INTERNAL FERTILISATION
Syngamy occurs outside of the body of organisms.	Syngamy occurs inside of the body of organisms.
Large number of gametes (male & female) are released into surrounding medium. E.g. bony fish, amphibians	Number of ova are less, but large number of male gametes are formed. E.g. birds, mammals, earthworm.

TYPES OF ANIMALS

OVIPAROUS	VIVIPAROUS
Animals lay fertilise or unfertilised eggs.	Give birth to young individuals.
Eggs have calcareous shell to protect from the harsh environment.	No shell, they are protected inside the mother's body.

Understanding Type Questions:

Q1. State the difference between meiocyte and gamete with respect to chromosome number. (CBSE 2012)

Q2. Why is a whiptail lizard referred to as parthenogenetic? (Delhi 2012)

. Q3. Mention the unique flowering phenomenon exhibited by *Strobilanthus*. (Delhi 2012)

APPLICATION TYPE QUESTIONS:

Q1. Fertilization is not an obligatory event for fruit formation. Explain . (NCERT)

Q2. New honey bees could be produced without fertilization . Justify the statement. (CBSE 2011)

Q. Which one of the following is correctly matched?

1. Onion – Bulb [2012]
2. Ginger – Sucker
3. Chlamydomonas – Conidia
4. Yeast – Zoospores

Q. The 'Eyes' of potato tuber are [2011]

1. Flower buds
2. Shoot buds
3. Axillary buds
4. Root buds

Q. Vegetative propagation in *Pistia* occurs by [2010]

1. Stolon
2. Offset
3. Sucker
4. Runner

