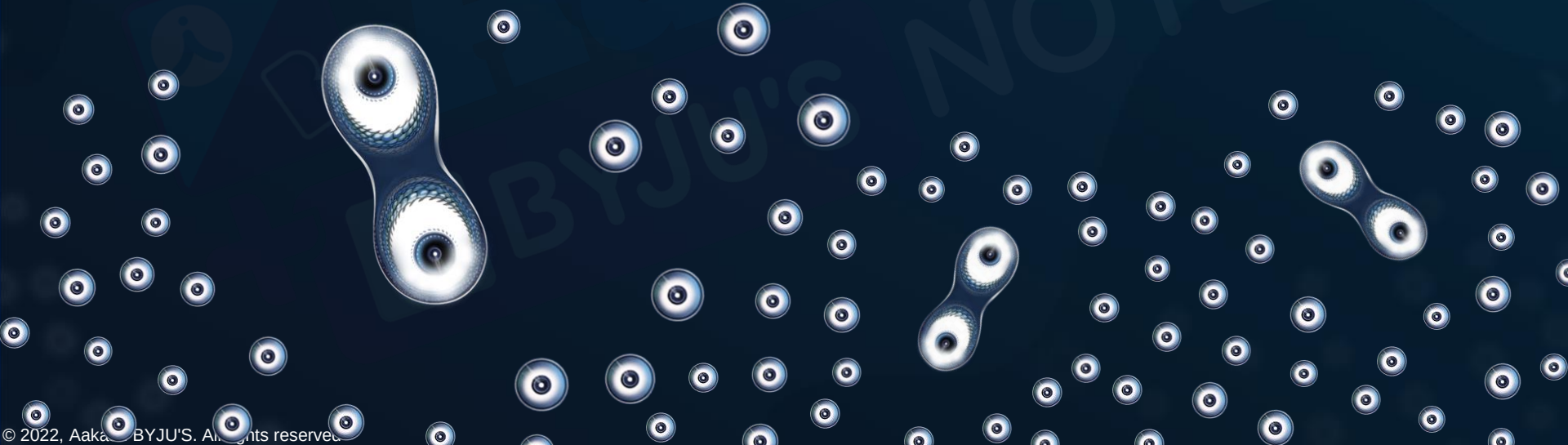
Aakash + BYJU'S NOTES

Reproduction in Organisms

Asexual Reproduction



Key Takeaways

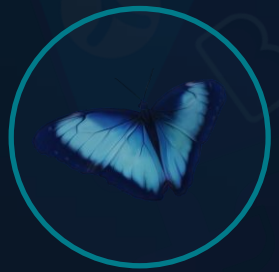
1. Life span
2. Reproduction
   - Features of reproduction
   - Features of asexual reproduction
   - Types of reproduction
3. Asexual reproduction
   - Binary fission
   - Encystation
   - Sporulation
   - Budding
   - Fragmentation
4. Vegetative propagation
   - Roots
   - Underground stem
   - Sub aerial stem

Summary

Life Span

- **Life span:** Each and every organism **can live only for a certain period of time**.
- The period from birth to the natural death of an organism represents its **life span**.

Butterfly
1-2 weeks



Crow
15 years

Crocodile
60 years

Parrot
140 years

Tortoise
100 - 150 years

Reproduction

- **Biological process** in which an organism gives rise **to young ones (offspring)** similar to itself.
- The offspring **grow, mature and in turn produce new offspring**.
- Since, diversity is very high on earth, each living organism reproduces differently to **maintain their generation** for ages.

- Offspring is produced by a single parent
- **Genetically identical** offspring

- Two parents participate in the reproductive process
- **Genetically unique** offspring

Features of Reproduction

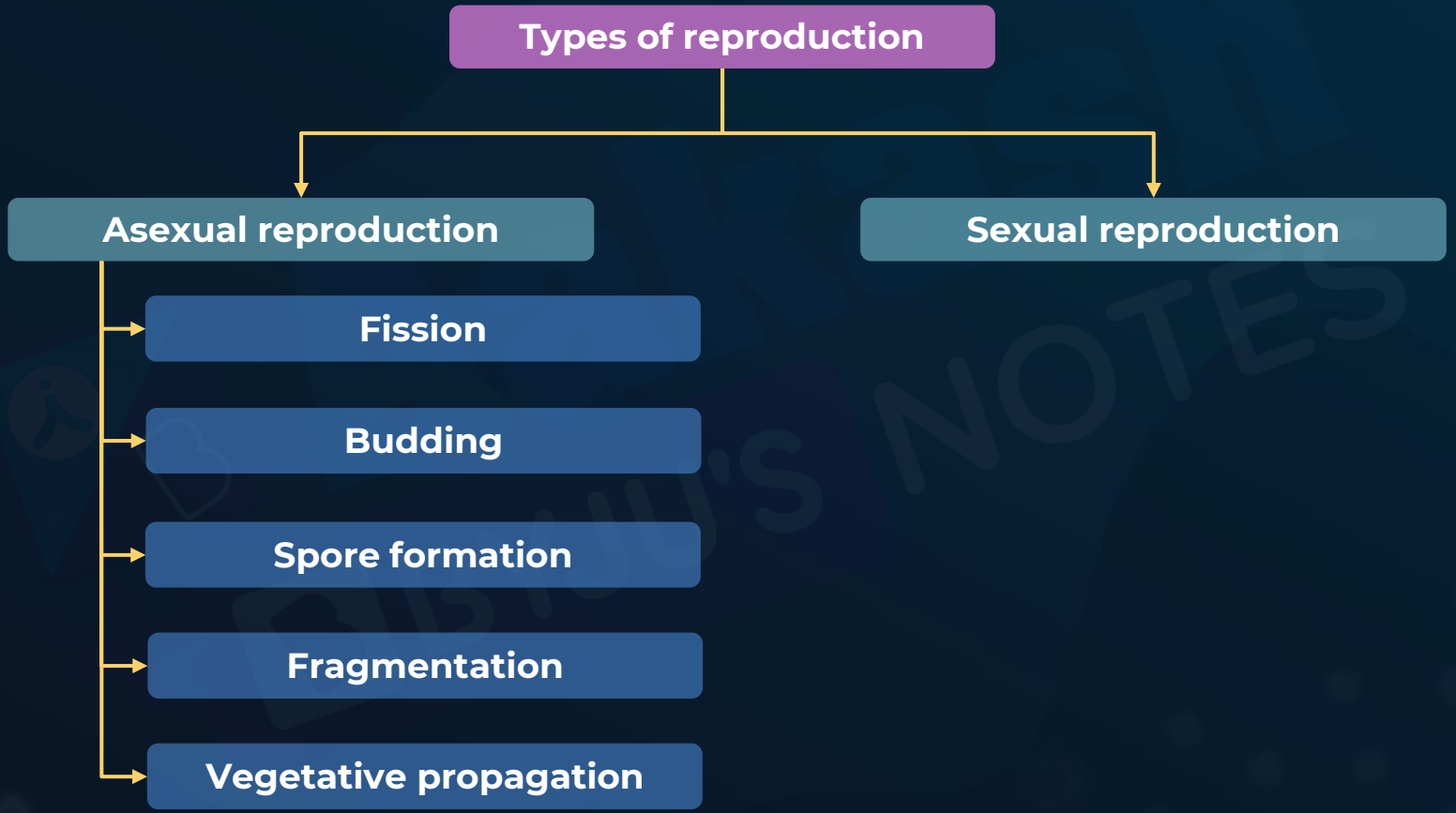
Features

Cell division	Duplication of cellular apparatus	Formation of reproductive units
It is a key event that occurs during reproduction. Majorly, there are two types of cell division i.e. **mitosis** and **meiosis**	Cellular material present in parent cell can be **equally distributed** amongst two daughter cells.	Specialised or non-specialised parts of an organism which after separation or modification result in the formation of **new individual/offspring.**

Features of Asexual Reproduction

- **Uniparental**
- Can occur with or without gametes formation, but **fusion of gametes** is **absent**
- Individual produced in asexual are **exact copies** both morphologically and genetically and are referred to as **clones**
- In case of lower organisms like single celled organisms belonging to **monera, protista** as well as plants with simple organisation it is referred as **asexual reproduction**
- On the other hand, asexual reproduction in higher plants is referred to as **vegetative propagation**

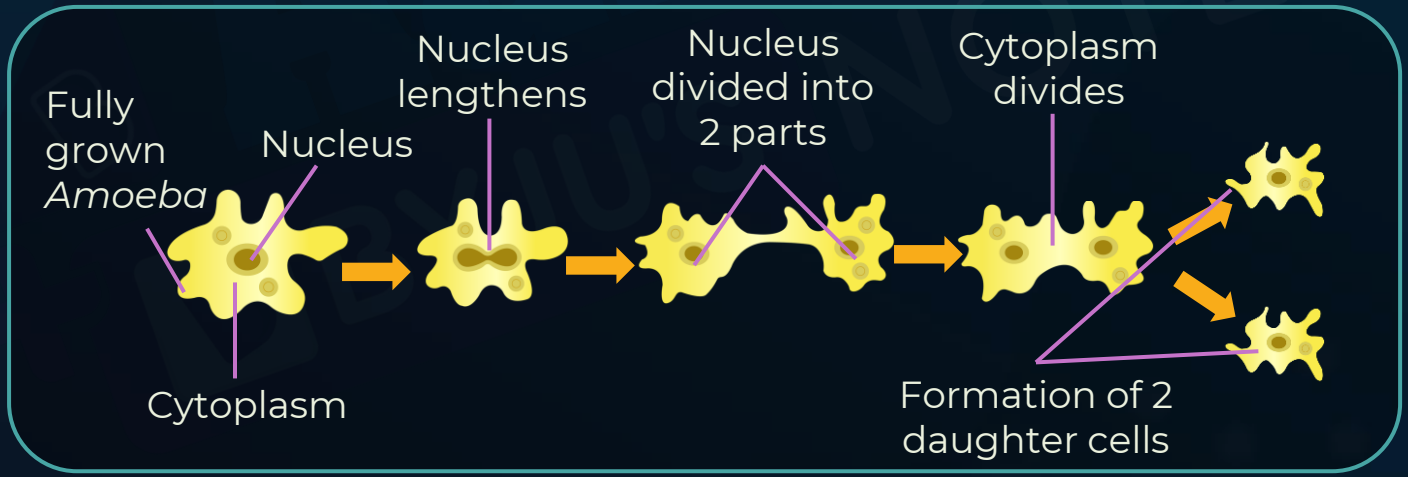
Reproduction



Asexual Reproduction

Binary fission

- Process in which a parent **cell divides into two daughter cells** of approximately equal size
- Daughter cells grow into **adults**
- Example : *Amoeba*, *paramecium*, bacteria

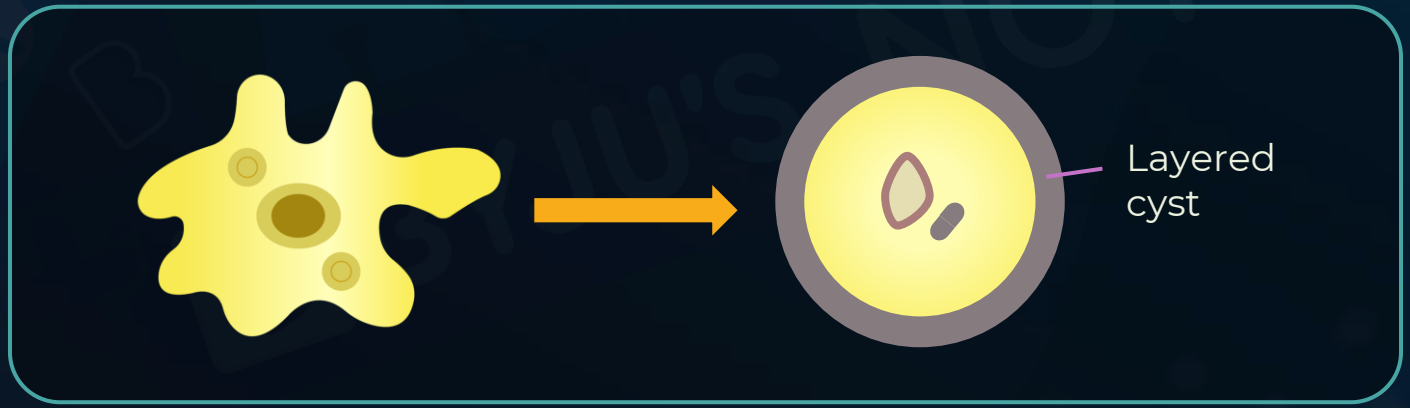


Binary fission in *Amoeba*

Asexual Reproduction

Encystation

- **Under unfavorable conditions,** *Amoeba* **withdraws its pseudopodia** and **secretes a three-layered** hard covering or cyst around itself - **Encystation**
- **Under favourable conditions,** parent ***Amoeba*** divides into many minute ***Amoeba*** (Pseudopodiospores). This process is called **sporulation**.



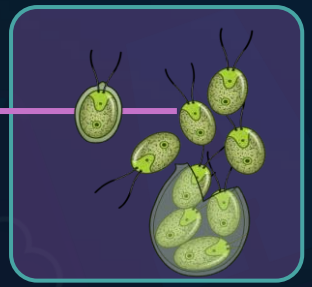
Encystation in *Amoeba*

Asexual Reproduction

Sporulation

- Organism **gives rise to several reproductive structures; spores**.
- They eventually grow into adult form.

Zoospores



Zoospores in algae

Conidia

Sporulation in *Penicillium*

In Plants

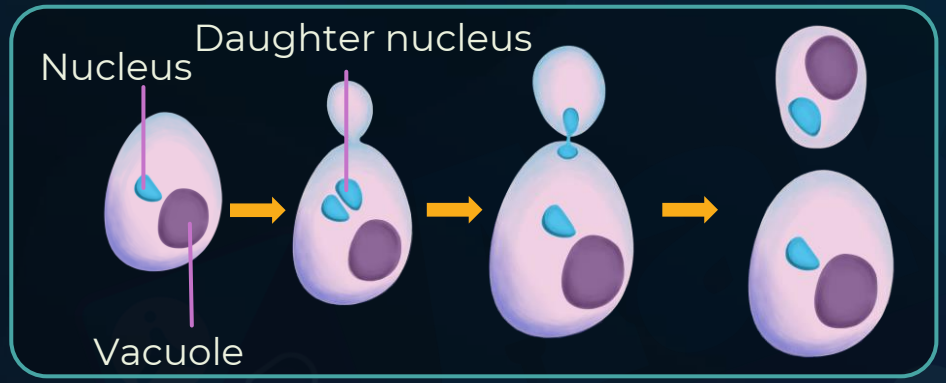
- Produce zoospores
  - **Microscopic**
  - **Motile**
- Common in lower plants such as **algae**

In Fungi

- Produce **conidia**
  - **Outside of the body**
  - **Non-motile**
- Common method in fungi E.g., ***Penicillium***

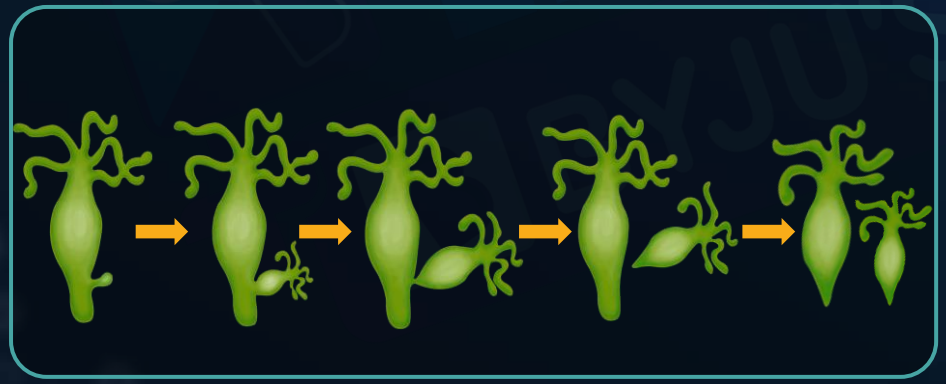
Asexual Reproduction

Budding



Budding in yeast

- Division is **unequal**
- Small bud is **attached** to parent body
- Bud develops into adult

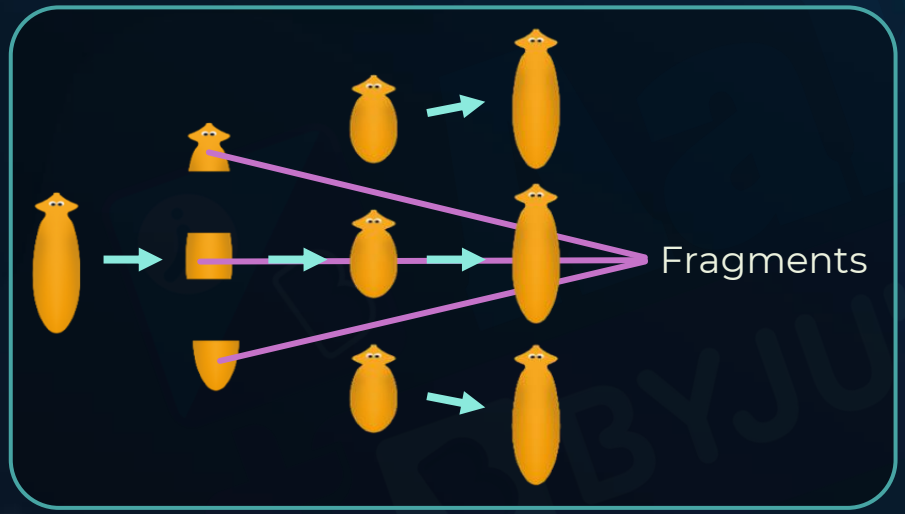


Exogenous budding in *Hydra*

- Bud grows **externally**
- Bud is **attached** to parent body
- Bud develops into adult

Asexual Reproduction

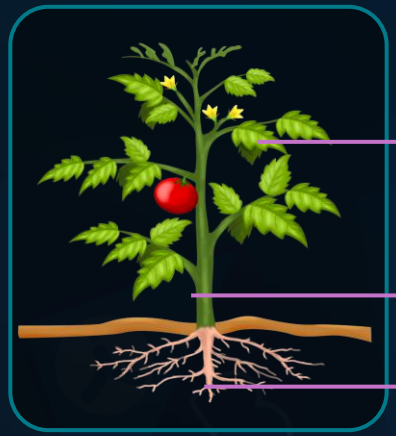
Fragmentation



Fragmentation in flatworms

- Body breaks into distinct pieces **(Fragments)**
- Each fragment grows into an adult
- E.g., **Flatworms, *Hydra***

Vegetative Propagation



Vegetative organs

- Formation of **new plants** from **vegetative parts** of the plant
- These vegetative units are called **vegetative propagules.**
- Form of **asexual reproduction** in plants

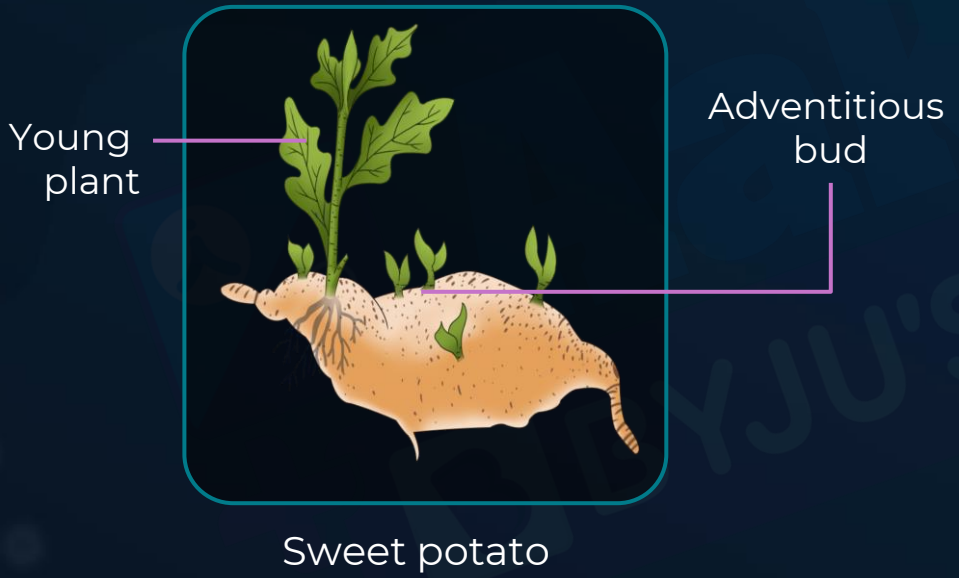
Natural

Vegetative propagules detach from the body of parent plant and **develop into new plants naturally**

Artificial

Development of new plants from the vegetative parts of the plant by **human intervention**

Vegetative Propagation

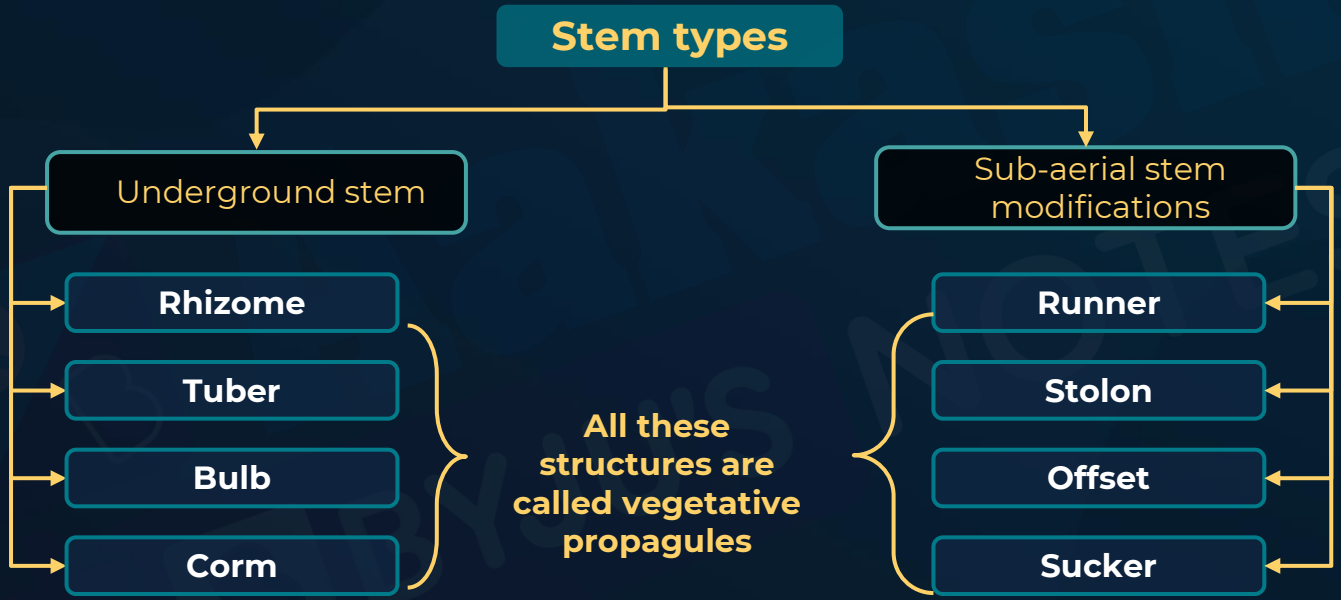


Sweet potato

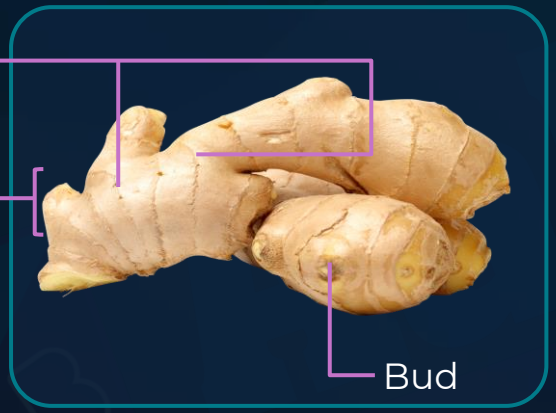
Root

- Both tap and adventitious roots develop **adventitious buds** to form new plants
- Example for taproot : ***Dalbergia***, **poplar**
- Example for adventitious root : Sweet potato, tapioca, dahlia, asparagus

Vegetative Propagation



Vegetative Propagation



Underground stem: Rhizome

- **Store food** for perennation during unfavourable conditions
- Buds arise from the stem and give rise to new plants
- Example : **Ginger**

Underground stem: Tuber

- Usually short and thickened and contains **stored starch**
- They bear **minute scale like leaves** with **buds** capable of developing into new plants
- Example : **Potato**

Vegetative Propagation

Underground stem: Bulb

- Stem is **shortened to disc** from which roots arise and leaf bases are attached to the upper surface of stem
- Axillary buds found at the node where leaves are attached
- Example : **Onion**

Underground stem: Corm

- **Unbranched swollen** underground stem having **circular nodes** that have buds for growth of daughter plants
- Example : ***Colocasia***

Vegetative Propagation

Sub-aerial stem modifications

Runner

- Develop at the base of erect **shoot**
- Narrow creeping horizontal stem
- Has **long internodes** and **nodes**
- Bear **axillary buds**
- Example: **Lawn grass**

Stolon

- Week lateral branch
- Arises from the base of main stem
- After growing aerially for some time, it **bend downwards** to touch the ground, where it's **terminal buds give rise to new shoot**.
- Example: **Strawberry**

Offset

- Originates from **leaf axil** which runs **horizontally** having the rosette of leaves above and adventitious root below
- Example: ***Eichhornia***

Sucker

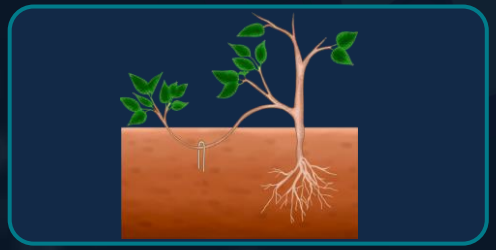
- Develops from the **axil** of the scale leaf in the underground part of the stem
- Grows **horizontally** and comes above the soil and **produces aerial shoot**.
- Example: **Pineapple**

Vegetative Propagation

Leaf

- New plants grow from the buds growing on the **margin of the leaves**
- Example : ***Bryophyllum***

Vegetative Propagation



Cutting

- A part of stem is cut and placed in moist soil.
- E.g. : **Mango, guava, litchi, lemon, rose**

Grafting

- The stem of a plant is cut and then fitted on another plant combining characters of both plants in one.
- E.g. : **Apples, oranges, watermelon, ornamental plants**

Layering

- Burying a **part of the stem** to create a new plant

Phases of Plant Growth

1. **Juvenile phase**
   Pre -reproductive phase or the vegetative phase where the plant grows its vegetative parts and increases in size and mass.

2. **Reproductive phase**
   Reproductive phase: Plants grow their reproductive organs (flowers) and attains sexual maturity.

3. **Senescence phase**
   Post -reproductive phase: Structural and functional deterioration of plant body dues to accumulation of toxic wastes.

Types of Plants

Annual

Entire life cycle occurs in one year.
Grows from seed, flower, produces seeds and dies.

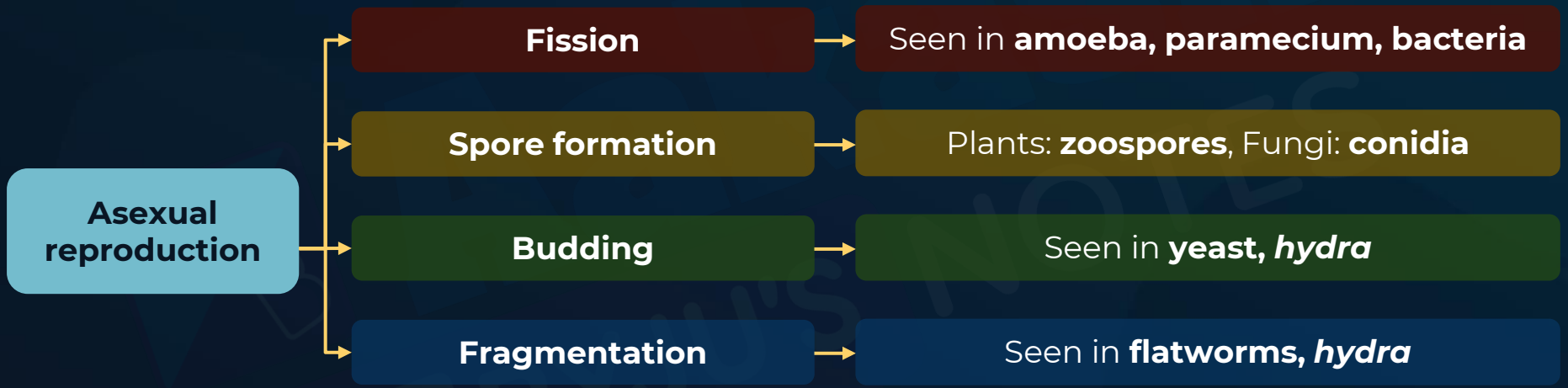
Biennial

Entire life cycle occurs in two years.

Perennial

Entire life cycle continues for more than 2 years. Sets seed multiple times over its life

Summary



Summary