

Topic 23: Asexual reproduction in plants (vegetative reproduction/ propagation)

Competency: The learner appreciates that some parts of a plant can develop into new independent plants.

ASEXUAL REPRODUCTION IN PLANTS (VEGETATIVE REPRODUCTION)

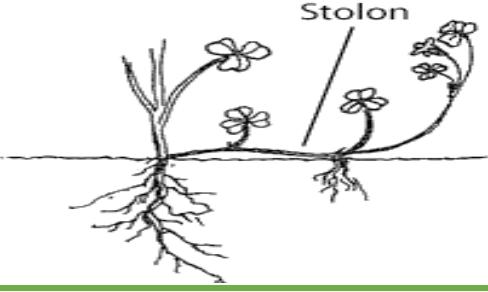
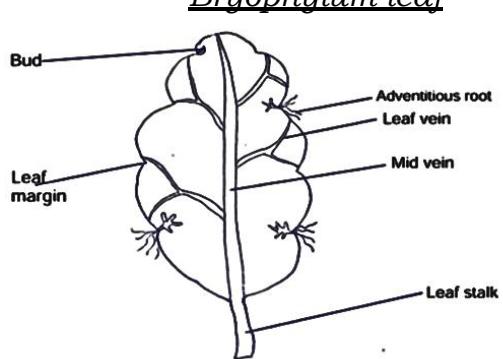
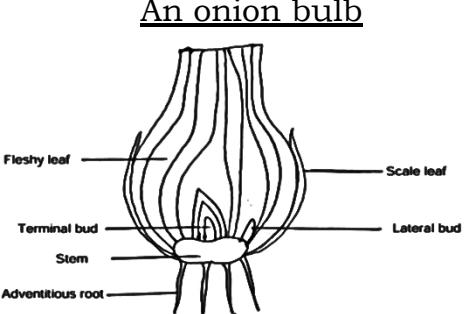
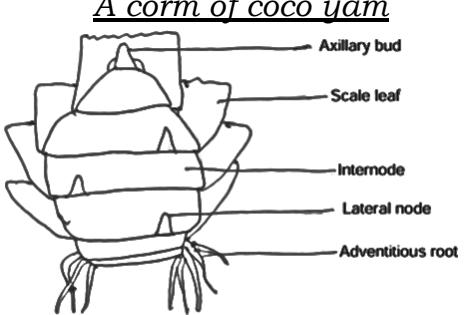
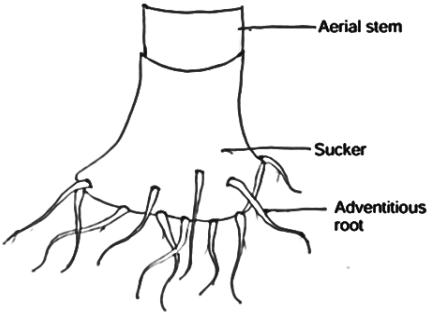
Asexual reproduction in plants specifically vegetative reproduction is a natural process where new plants grow from vegetative parts of the parent plant, such as stems, roots, or leaves, without the need for seeds or fertilization. The new plants are *genetically identical* to the parent, making them *clones*.

This process is common in many plant species and can happen naturally or be encouraged by humans through techniques like cutting, layering, grafting, and tissue culture. For example, stem tubers like potatoes contain buds that sprout into new plants. Rhizomes like those in ginger and banana spread underground and give rise to new shoots.

Plants like Bryophyllum reproduce from leaf margins, while onions use bulbs, and sweet potatoes grow from storage roots.

Table: Vegetative plant parts and examples

Plant structure	Examples and role in asexual reproduction	Diagrams
Stem tuber	In Irish potato or sugarcane, buds ("eyes") on the tuber sprout into new shoots, forming whole plants.	<p><i>Irish potato stem tuber</i></p> <p>Diagram illustrating an Irish potato stem tuber. It shows a central oval tuber with a shoot at the top. Labels indicate the "shoot", "remains of attachment to stem", "lateral bud", "eye" (a small depression), "scale leaf", and "adventitious roots" growing from the side.</p>
Rhizome (Underground stem)	In ginger, passpalam, and turmeric, underground stems grow horizontally and produce shoots and roots at nodes.	<p><i>Diagram of rhizome of ginger</i></p> <p>Diagram illustrating a rhizome of ginger. It shows a horizontal underground stem with several nodes. Labels include "shoot (upper part cut off)", "remains of old shoot", "scale leaf scar", "rhizome", "buds", "contractile root", and "adventitious root".</p>

Runner / Stolon	<p>In strawberry and spider plant, creeping stems grow along the ground, and nodes develop into plantlets.</p>	
Leaf margins / buds	<p>In Bryophyllum, buds on the leaf edges grow into small plantlets that detach and grow independently.</p>	
Bulb	<p>In onion, garlic, and tulip, fleshy leaves store food and contain buds that sprout into new bulbs/plants.</p>	
Corm	<p>In coco yam, swollen underground stems have buds that develop into shoots and grow into new plants.</p>	
Suckers	<p>In Banana and pineapple, shoots grow from the base of the parent plant and develop into independent plant</p>	

Advantages of vegetative reproduction

- ❖ Rapid and efficient method of propagation.
- ❖ Offspring retain the exact genetic traits of the parent.
- ❖ Useful in agriculture to multiply plants with desirable traits (e.g., high yield or disease resistance).

Disadvantages

- ❖ Lack of genetic diversity increases vulnerability to diseases and changing environments.
- ❖ Overcrowding and competition for resources may occur when many new plants grow near the parent.

Real-life relevance of asexual reproduction

This method is widely used in farming, horticulture, and conservation. For example, sugarcane is planted using cut stems, while many fruit trees are propagated through grafting to preserve output quality and yield.

Understanding vegetative reproduction equips learners with knowledge about how life continues and multiplies even without seeds. It also reveals the intersection between nature and human innovation in plant propagation.

Activity 1

At Pallisa public school, the Agriculture Club is leading a project to grow food crops during the dry season. However, their storage shed was infested with weevils, and all their maize, bean, and pumpkin seeds were destroyed. The club advisor suggests using cassava cuttings and sweet potato vines instead.

Tasks and responses

- a) Using the club's situation, explain why cassava cuttings and sweet potato vines are suitable for planting even without seeds, and how this relates to asexual reproduction.

Explanation using the club's situation

Cassava cuttings and sweet potato vines are suitable for planting without seeds because they can grow into new, complete plants through asexual reproduction. In asexual reproduction, a part of the parent plant (such as a stem cutting or vine) grows into a genetically identical offspring without the need for fertilization

- Cassava cuttings are pieces of the cassava stem that contain nodes. When planted in moist soil, these nodes develop roots and shoots, forming new cassava plants
- Sweet potato vines (stem tips or runners) also grow roots and shoots when planted, producing new sweet potato plants

This method works well in emergencies like the Agriculture Club's situation because it bypasses the need for seeds, which were destroyed by weevils

- b)** Evaluate the club advisor's suggestion by giving one advantage of using asexual reproduction in this emergency and one reason why the students might still be right to worry about relying on it in future seasons.

Responses

Evaluation of the club advisor's suggestion:

Advantage of using asexual reproduction in this emergency

It is faster and more reliable than seed germination, especially in a crisis. Since the new plants grow from mature parts of the parent, they establish quickly and are more likely to survive the harsh dry season ensuring continued food production.

Reason students might still be worried about relying on it in future seasons

Asexual reproduction produces genetically identical (clonal) plants, meaning there is no genetic variation. This can make the crops more vulnerable to pests, diseases, or changing climate conditions in future seasons since all the plants would respond the same way to threats. Without diversity, one disease could wipe out the entire crop.

Activity 2 (Trial Activity)

A youth cooperative in Kangulimira Sub-County wants to expand their pineapple farm. They lack money to buy new planting materials, but one member proposes using suckers from mature pineapple plants. Some members doubt this method, arguing that planting the same material again and again might weaken future crops or reduce yields. They turn to a local biology student for advice on what to do.

Tasks

- Based on the cooperative's challenge, explain how suckers from mature plants enable asexual reproduction in pineapples and why this method is practical for the group.
- Advise the cooperative by explaining one reason their concern about repeated use of suckers is valid, and one way they can manage that risk while still benefiting from asexual reproduction.

Did you know

Many plants, particularly trees, can continue to grow and increase in size

throughout their entire lives, a phenomenon called **indeterminate growth**.

Unlike most animals, which stop growing when they reach maturity, plants possess special tissues called **meristems** that contain undifferentiated cells. These cells can continuously divide and differentiate, allowing the plant to lengthen its roots and shoots and widen its trunk for as long as it lives.