

ST.XAVIER'S SCHOOL

Belguma

Purulia

Subject- Biology

Phase- II

Date-20/05/20

Chapter 2- Reproduction in Plants

Class-VIII

Subject Coordinator- Ms. Benazir Kamal

Instructions to the students

1. You have been provided with the study material relevant to the chapter for your better understanding. Use it as reference along with you textbook.
 2. Solve the exercise multiple choice questions and short answer questions in the textbook and long answer questions in notebook respectively.
 3. The assignment provided at the end of this study material must also be done in the notebook.
 4. The PROJECT WORK will be discussed at the end of this study material.
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Reproduction

The process by which new organism of the same species is formed from an existing organism(s).

Mode of reproduction in Plants:

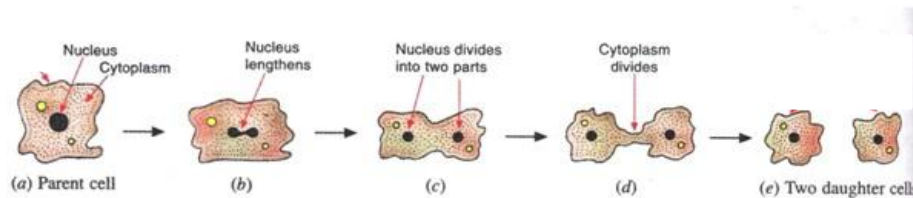
- Asexual
- Sexual

Asexual reproduction in Plants

Asexual reproduction is the mode of reproduction that does not involve the fusion of male and female gametes and produces individuals that are genetically identical to the parent.

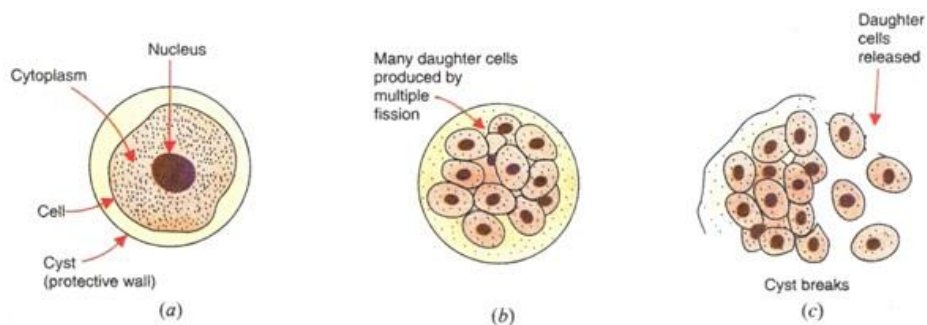
1. Binary fission

In binary fission, the parent cell divides into two after reaching a point where it has fully grown. In this process, the nucleus divides first and then the cytoplasm and cell membrane forming two small identical daughter cells. After splitting the parent cell do not exist and two new organisms are formed. Example- Bacteria.



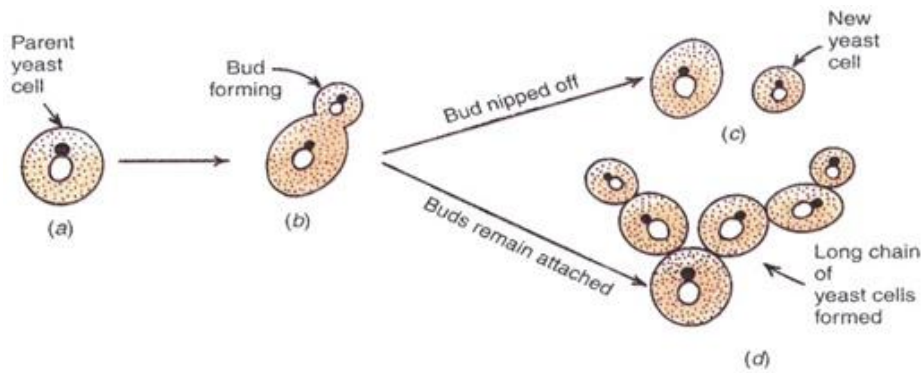
Multiple Fission

Multiple fission is also a process of asexual reproduction in which parent cell splits to form many new organisms. This happens when cyst is formed around a unicellular organism. Inside this cyst the nucleus of an organism breaks in many smaller nuclei. When the favourable conditions come, the cyst breaks and the many daughter cells inside it are released. Example- *Chlamydomonas*, *Chlorella*.



2. Budding

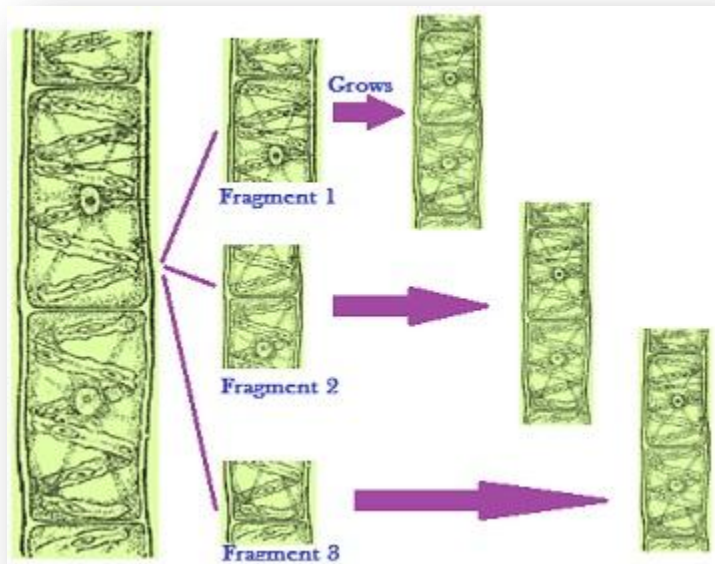
The word **bud** means small outgrowth. In the process of budding, a small bud grows on the body of parent organism and when the time comes it detaches itself to form a new organism. Example-Yeast.



3. Fragmentation

In this process the organism breaks into two or more pieces called **fragments** on maturation. Each piece or fragment then grows into a new organism.

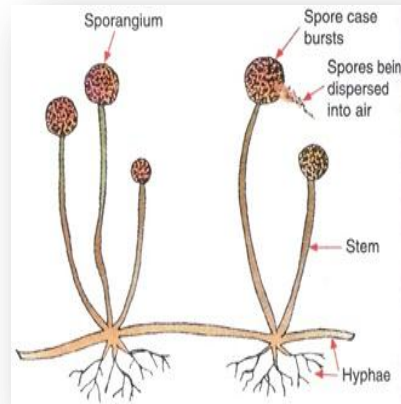
Example-*Spirogyra*



4. Spore Formation

In spore formation, the parent plant produces hundreds of reproductive units called spores in its spore case. When this spore case of the plant bursts, these spores travel in air and land on food or soil. Here they germinate and produce new plants.

Fungi like Rhizopus, Mucor, etc., are examples of spore formation. Ferns and mosses also reproduce by spore formation.



5. Vegetative Propagation

- Process by which plants arise without production of seeds or spores.
- The vegetative parts of a plant like leaf, stem and roots which are capable of giving rise to new plants are called **propagules**.
- The buds which are present in dormant state in old plant when provided with suitable conditions like moisture and warmth grow and develop to form a new plant.
- Vegetative propagation can either be natural or artificial.

i) Natural Vegetative Propagation

a. Reproduction by Stem

Rhizome- Underground stem that grows horizontally, stores food, bears nodes and internodes, nodes possess thin brown scaly leaves, Axillary buds grow from these nodes to produce new plants. Example-Ginger

Stem Tuber-Underground stem, swollen with supply of stored food, bears dormant buds (eyes) which when placed in soil form complete plants. Example-Potato.

Bulb- Short modified stem surrounded by fleshy and modified leaves which contain stored food for the shoot, disc like stem bears terminal and axillary buds which grow into aerial shoots. Example- Onion

Runner- Stems which grow at soil surface or just below ground, forms adventitious roots at the nodes which produce new shoots. Example –Lawn grass

b. Reproduction by Leaf

In leaves of certain plants, tiny plants arise from the notches in their margin in the form of adventitious buds. Each bud on separation gives rise to a new plant.
Example- *Bryophyllum*.

c. Reproduction by Roots

Tuberous roots of certain plants become swollen due to storage of food. These tuberous roots give rise to adventitious buds from which new plants arise.

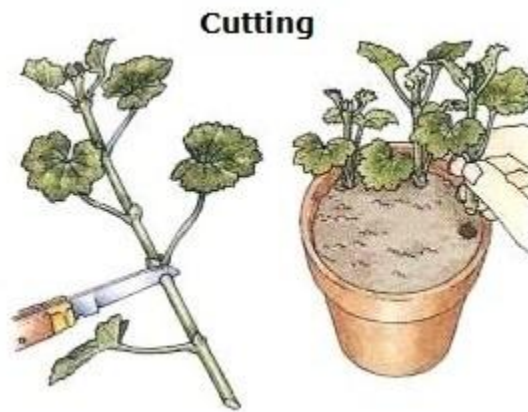
Example - Sweet potato.

[Refer to page no.s 18 and 19 for Advantages and Disadvantages]

ii) Artificial Vegetative Propagation

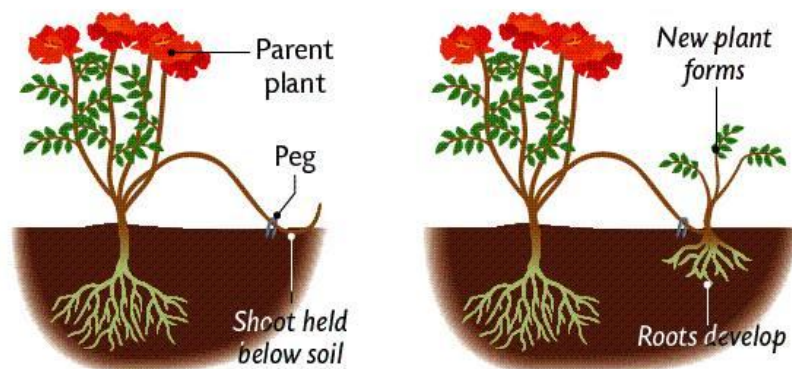
a. Cutting

Certain plants are propagated through stem **cuttings**, where a portion of the stem containing bearing axillary bud is cut and placed in moist soil and allowed to root. Example- Coleus, money plant, Sugarcane, lemon etc.



b. Layering

In layering, a young branch of the plant bearing an axillary bud is bent to touch the ground and covered with moist soil forming a **layer**. This is done in such a way that growing tip remains above the soil. Roots arise where the branch is in contact with the soil, then it is separated from the parent. It then continues to grow into a new plant. Example- Jasmine, Mint, Grapewine etc.



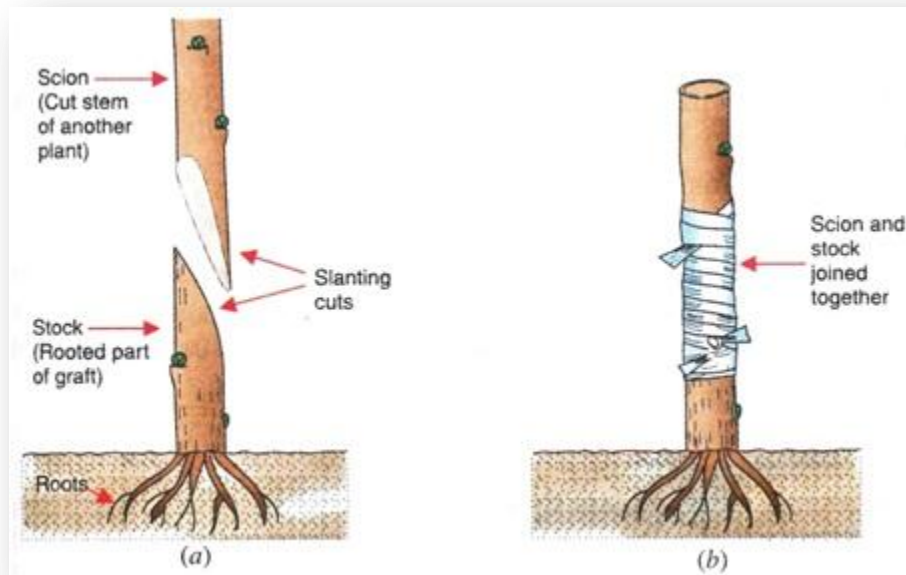
c. Grafting

In **grafting**, two same or related plant species are used.

The part of the stem of the desirable plant is grafted onto a rooted plant called the **stock**. The part that is grafted or attached is called the **scion**. Both are cut at an oblique angle (any angle other than a right angle), placed in close contact with each other.

The vascular tissue must be lined up so that they will grow together. The grafted points must be taped to prevent drying or infection. After a period of time, the scion starts producing shoots, and eventually starts bearing flowers and fruits.

Example- Mango, Apple, Pear, Guava, etc.



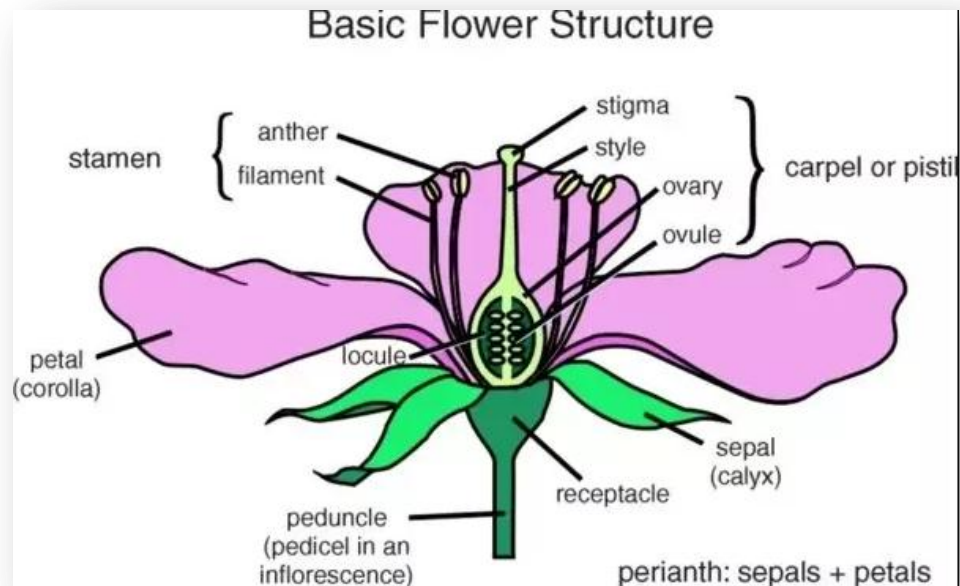
d. Micropropagation

[Discussed in the video]

Sexual reproduction in Plants

Flower

The reproductive structure of the seed-bearing plants.



Floral Parts of Plants

The flower is attached to the shoot by **Pedicel or Stalk**. The tip of the pedicel known as **thalamus or receptacle** is swollen and slightly flattened on which the whorls rests.

1. **Calyx**-Outermost whorl, made up of sepals which are green in colour, protects the flower
2. **Corolla**- Second whorl, made up of petals which are usually bright in colour, attracts pollinators.
3. **Androecium**- Third whorl, male part of the flower, also called Stamens.
Consists of:
 - i) Filament
 - ii) Anther
4. **Gynoecium**-Fourth and inner most whorl, female part, also called carpels or pistil.
Consists of:
 - i) Ovary
 - ii) Style
 - iii) Stigma

Bisexual Flower - Flowers bearing both androecium and gynoecium. Example- China rose, Tulip, Lily.

Unisexual Flowers- Flowers bearing either androecium (Staminate) or gynoecium (Pistillate).Example- Papaya, Cucumber, Maize.

Pollination

The transfer of pollen grains from the anther to the stigma of a flower of the same species.

Pollination is of two types:

a. Self Pollination

It is the transfer of pollen grains from the anther of a flower to the stigma of either the same flower or another flower of the same plant.

b. Cross Pollination

It is the transfer of pollen grains from the anther of one flower to the stigma of another flower on a different plant but of the same species.

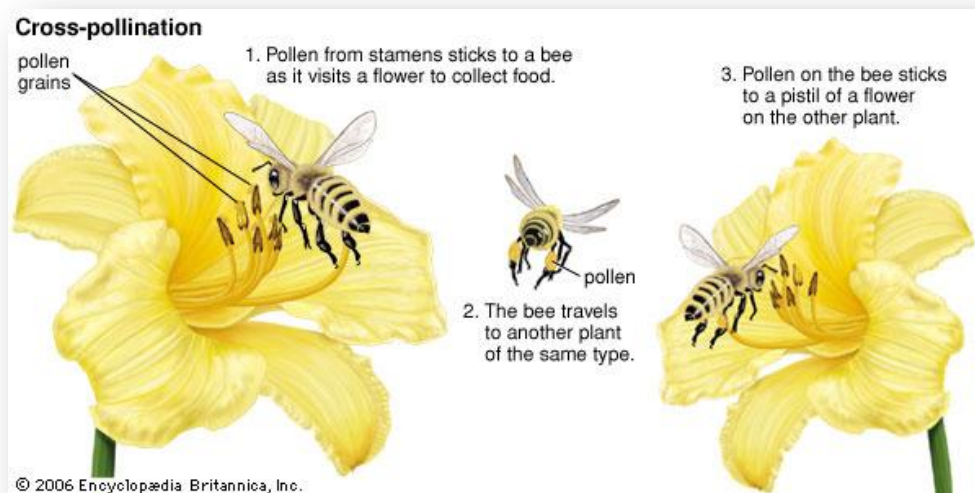
Pollen grains are immobile. They cannot reach the stigma by themselves. An external agent is required which can be animal, wind, water, or gravity.

Agents of Pollination

a. Insects (Entomophily)

It is a mode of cross pollination or transfer of pollen grains through the agency of insects like butterflies, moths, bees etc.

Example- Marigold, Mustard, Rose, Orchids.



b. Wind (Anemophily)

It is a mode of cross pollination or transfer of pollen grains through the agency of wind. Example- Coconut, Palm, Maize, Grasses.

c. Water (Hydrophily)

It is a mode of cross pollination or transfer of pollen grains through the agency of water.
Example- Vallisneria, Hydrilla, Zostera(eel grass).

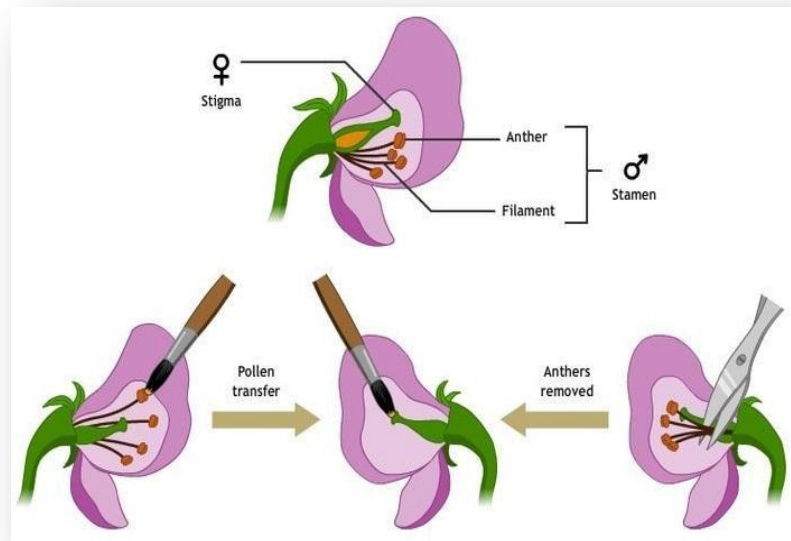
[Refer to Pages 22-24 for the characteristics]

Fertilization

[Refer to the flowchart on Page no. 24 and the video]

Artificial Pollination

The process of transfer of pollen grains to the stigma manually.



Steps:

- I. The male and female plant with desired characteristics is selected.
- II. The anthers are removed from the flowers(emasculatation) of female plant.
- III. Pollen from the male plant is then transferred to the female flower.
- IV. The plants thus produced will have the desired characteristics.

Use:

- I. It helps to produce new and better variety of crops with desired features using crossbreeding techniques.
- II. It helps to overcome the shortage of natural pollinators like bees whose population may be affected by diseases or pesticide treatment.

Exercises -Long answer questions (to be done in notebook)

Find the answers for questions

(Q1) At Page no.15. (Q 2) At Page no. 18-19. (Q3) At page no. 19. (Q4) At page no. 21. (Q5) At page no. 19. (Q6) At page no. 21[Fig.2.8]. (Q7)[a] At page no.20.[b] At page no. 17[c] At page no. 15 [d] At page no. 19. (Q8) At page no. 25. (Q9)[a] At page no.15[Fig.2.1] [b] At page no. 15[Fig.2.2]

Assignments (to be done in the notebook)

1. Define- Reproduction, Fertilization, Artificial Pollination.
2. What is meant by Layering? How it differs from cutting?
3. Differentiate between Unisexual and Bisexual flowers.
4. Compare the characteristics of wind and insect pollinated flowers.
5. What is the difference between Self-pollination and Cross- pollination?
6. Name two aquatic plants where pollination is not carried out by water.

Project Work

On a chart paper or in your exercise notebook, describe the various methods of vegetative propagation.

Instructions:-

- You can either draw or use prints outs for the diagrams.
- Do not use too many colours.
- The propagation methods not included in the book could be added.
- Do not forget to mention the propagation methods used for common types of fruits and vegetables.