

CLASS X/ BIOLOGY
REPRODUCTION /
VEGETATIVE PROPAGATION

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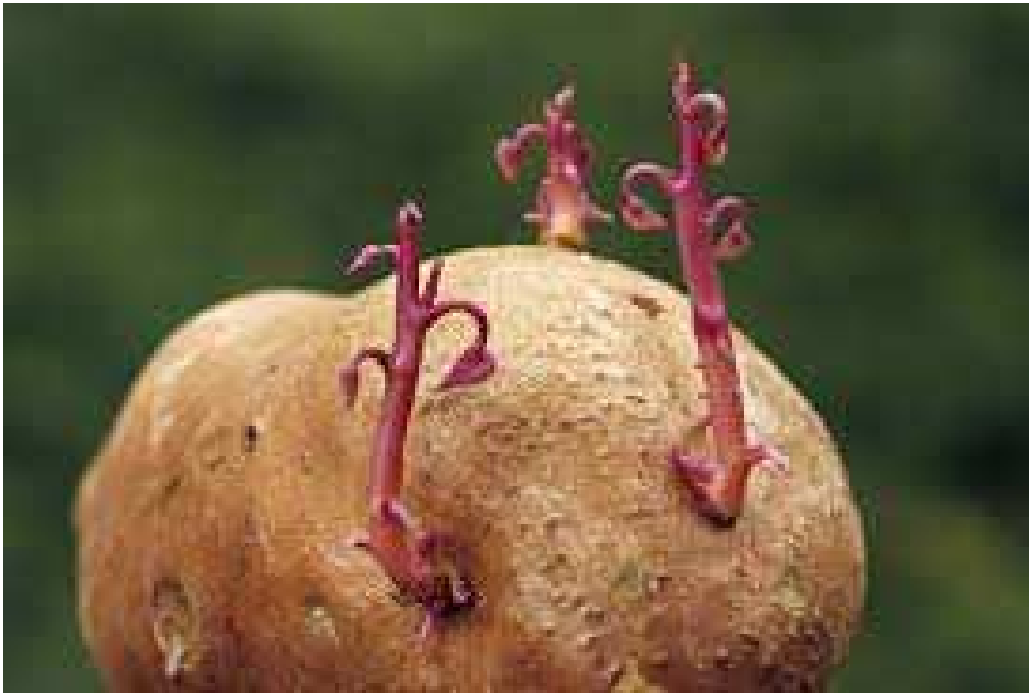
VEGETATIVE PROPAGATION

i) **Natural Vegetative Propagation:** Various plant part such as root , stem, leaf are modified for vegetative propagation.

Vegetative Propagation by Stem: Stem of certain plant are modified into bulbs e.g. onion, garlic, tuber e.g. potato, rhizomes e.g. ginger which have apical and axillary buds. In axillary buds new plant are formed.

Vegetative Propagation by Roots: Sweet potato, carrot, radish when sown in soil develop new plants.

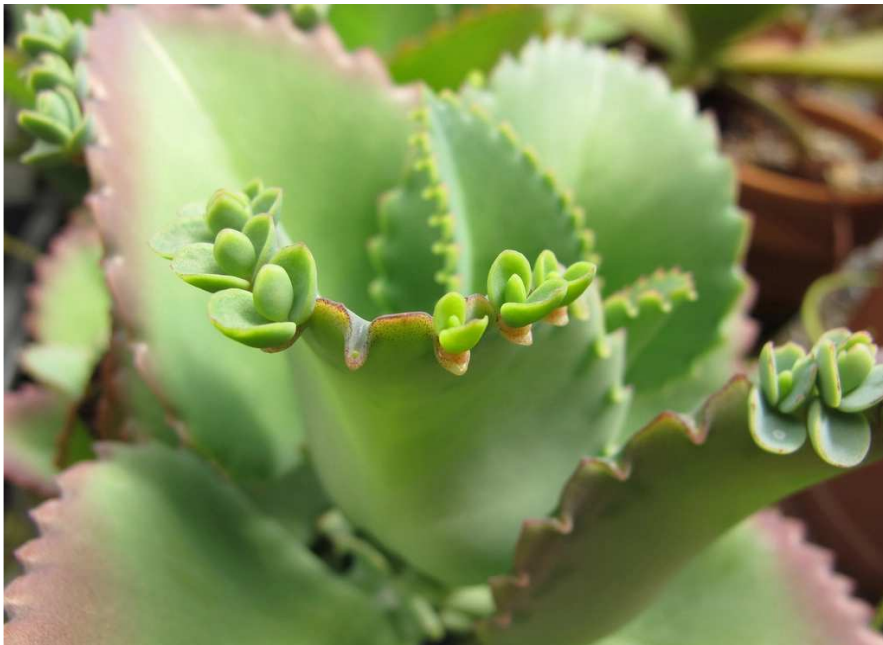
Vegetative Propagation by Leaves: Leaves of Bryophyllum having plantlet along the leaf margin when grown in soil develop into new plants.



Vegetative Propagation by Stem



Vegetative Propagation by Roots



← Vegetative Propagation by Leaves

VEGETATIVE PROPAGATION

ii) **Artificial Vegetative Propagation:** It includes cutting, grafting, layering, tissue culture.

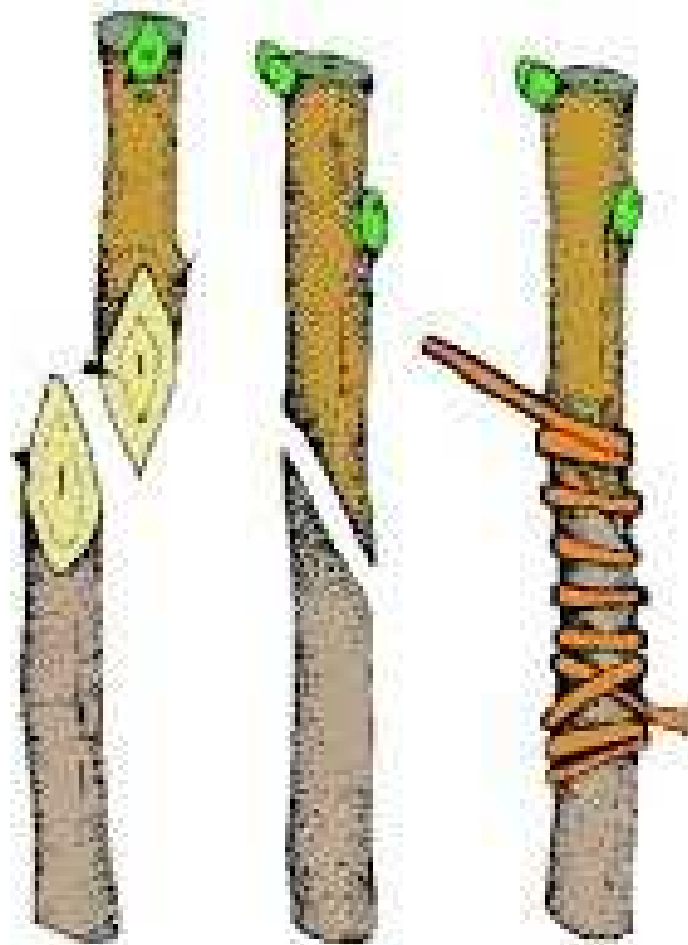
a) **Cutting:** If cutting of stem, root or leaf of certain plant are grown in soil under suitable condition they develop into new plants. E.g. China rose, Rose, Drum stick, sugarcane etc.



VEGETATIVE PROPAGATION

b) Grafting: By joining parts of different plants a new plant variety produced. The stem of the rooted plant is called stock. Stem cutting from a superior quality is called scion. Both stock and scion stems are cut obliquely and then placed over one another so that cambium of both touch each other. The two pieces are then held together by rubber tubing or tape. After a month cambium of the two fuse with each other and new vascular tissue develop. E.g. Apple, Mango, Pear.

Scion



Rootstock



VEGETATIVE PROPAGATION

c) Layering: In layering roots are induced on the stem. When roots develop the part of stem is detached from the parent plant and grown in the soil. Layering is of two types:

➤ **Mound Layering:** A lower branch of the rooted plant is bent and buried into the moist soil. The tip of the branch should remain above the ground. In a few days the portion under the soil develops roots. It is now cut off from the parent plant and grown in the soil as a new plant. E.g. Grapevine, Jasmine.

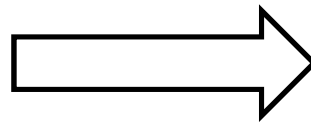
VEGETATIVE PROPAGATION

➤ **Air Layering:** This method is used in plant cannot be bent and buried into the moist soil. The stem is girdled and it is covered with moist cotton and enclosed in a polythene bag. After few days roots emerge from this region and branches cut off from the parent plant. It can now be planted in the soil. E.g. Crotons.



Mound Layering

Air Layering



VEGETATIVE PROPAGATION

d) Tissue Culture: In this method plants cells or tissue are cultured on a sterilized medium containing necessary nutrients and hormones. The culturing of cells or tissues results in the formation an undifferentiated mass of cells called callus which is then transferred to another medium for differentiation of plantlets. The plantlets then transplanted to separate spots or nursery beds and allow to grow for a definite period of time. The matured plant are then transplanted in the fields. E.g. Chrysanthemum, Orchids



Advantages of Artificial Vegetative Propagation

1. The new plants produced by this process are the exact replica of the parent plants.
2. Fruit trees produced from cutting or grafting start growing rapidly and bear fruits earlier than the plant produced from seeds.
3. The plants grown by vegetative propagation usually needs less attention

Sexual Reproduction in Flowering Plants

In flowers Androecium bearing anthers are the male reproductive parts. Pollen grains are the male gametes. Gynoecium bearing ovary are the female reproductive parts. Eggs are the female gametes.

Sexual reproduction in plants takes place in the following steps:

- i) Pollen grains from anther stick to the stigma of carpel.
- ii) Pollen grains form pollen tubes to reach the ovule.
- iii) Pollen grains fertilise the egg in ovules. These fertilised egg cells grow inside the ovules and become seeds.
- iv) The seeds produced new offsprings on germination under suitable conditions of availability of water, temperature, air, light.

POLLINATION

Pollination is of two types:

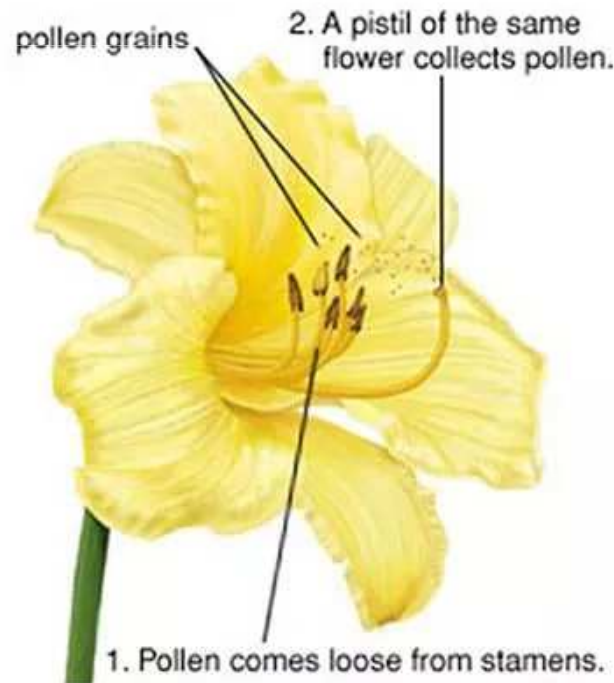
i) Self Pollination

ii) Cross Pollination

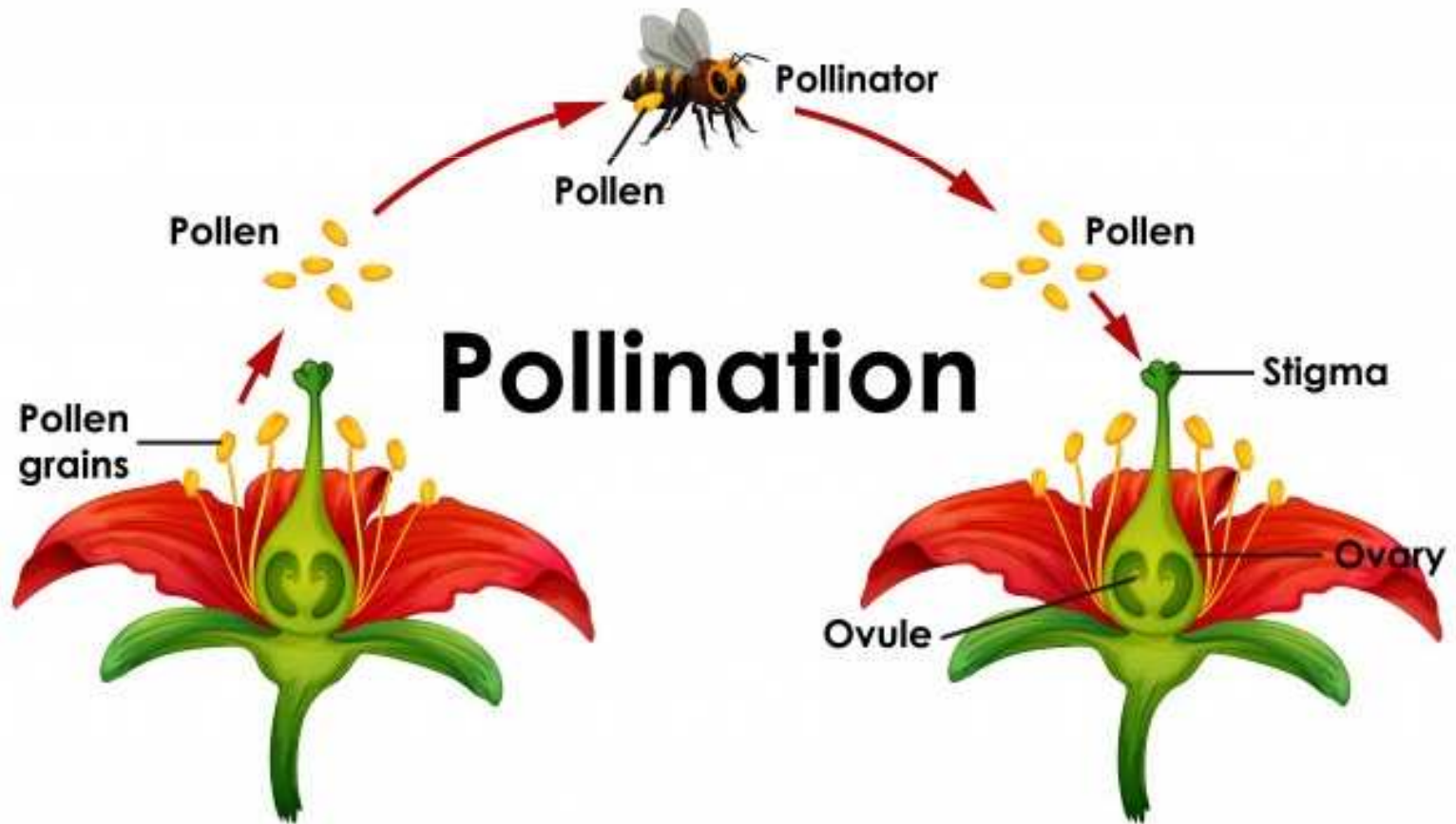
Self Pollination: Self pollination is the transfer of pollen grains from the anther to the stigma of the same flower. E.g. Rice, Wheat, Pea.

Self Pollination

Plant fertilizes its own eggs



Cross Pollination: In this type of pollination the pollen grains from the anther one flower a transfer to the stigma of flower of another plant.



FERTILISATION IN PLANTS

- ❖ Pollination results in the deposition of related pollen grains over the receptive stigma of the carpel.
- ❖ One pollen tube grows from pollen grain into the stigma passes through the style and then moves towards the ovarian cavity.
- ❖ Two non motile male gametes are formed inside the tube during its growth through the style.
- ❖ After reaching the ovary pollen tubes enter the ovule through the micropyle.
- ❖ The tip of the tube finally pierces the egg apparatus end of the embryo sac.

- ❖ After penetration the tip of pollen tube ruptures releasing two male gametes into the embryo sac.
- ❖ During the act of fertilisation one male gamete fuses with the egg to form the diploid zygote. This process is called syngamy.
- ❖ The diploid zygote finally develops into embryo.
- ❖ The other male gamete fuses with the two polar nuclei to form the triploid primary endosperm nucleus. This process is called triple fusion.
- ❖ This mechanism involving two acts of fertilisation in an embryo sac is called double fertilisation.
- ❖ After fertilisation zygote develops into embryo, ovule develops into seed and ovary develops into fruit.

