REPRODUCTION IN PLANTS

INTRODUCTION

- Plants have two kinds of parts:
- Vegetative Parts - These are the parts of the plant that plays a major role in the life cycle of a plant such as preparation of food, transportation of food, water and nutrients etc. For Example, roots, stems and leaves.
- Reproductive Parts - These are the parts of a plant that play a major role in the reproduction process in plants, For Example, flowers, fruit
- The production of new individuals from their parents is known as reproduction.
- There are several ways by which plants produce their offspring. These are categorized into two types:

Asexual Reproduction

- In asexual reproduction new plants are obtained without production of seeds.
- In simple words we can say in asexual reproduction, organisms can give rise to new organisms without fusion of gametes.
- Only one parent is involved.
- There are various types of asexual reproduction in plants and are summarized below: -

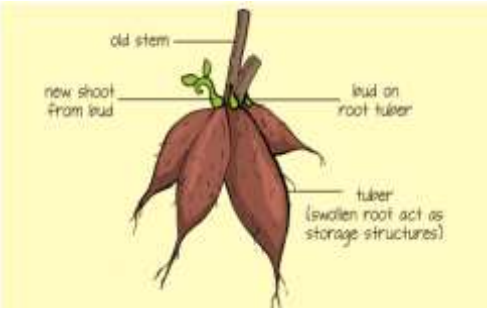
VEGETATIVE PROPAGATION

- It is a type of asexual reproduction in which new plants are produced from roots, stems, leaves and buds. Since reproduction is through the vegetative parts of the plant, it is known as vegetative propagation.

NATURAL MEANS OF VEGETATIVE PROPAGATION

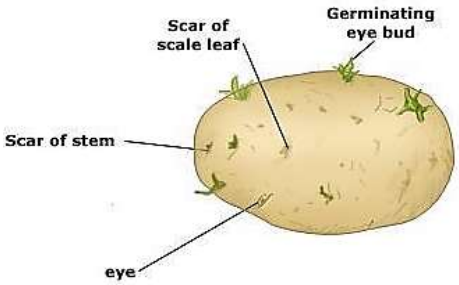
VEGETATIVE PROPAGATION BY ROOTS

- Plants that have tuberous roots, that is, roots which are used as a storage organ in plants participate in vegetative propagation.
- In order to grow new plants, these tuberous roots are sown in the soil.
- There are buds present on the fruits that grow above the ground and a new plant is formed.
- Example: Sweet potato and dahlia

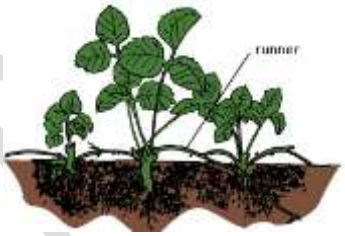


VEGETATIVE PROPAGATION BY STEM

- Stem Tubers: Just like tuberous roots, some plants have tuberous stems. These stem tubers store the nutrients and bear nodes. These notes bear buds that form the new plants. Example: Potato



- Runners: Some plants grow along the ground and contain modified stems called Runners. These runners contain buds that can produce roots and stems. Example: Strawberries



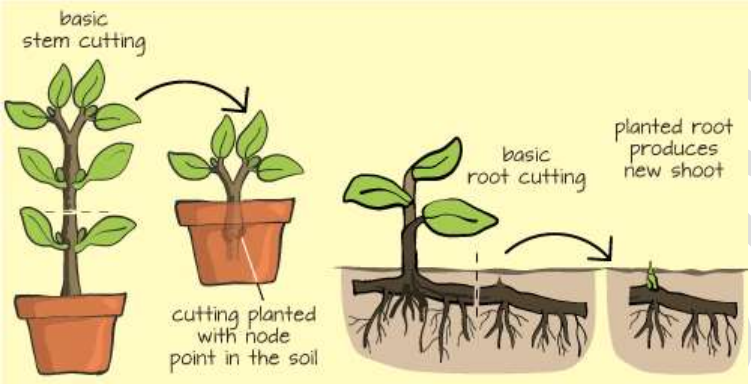
- Vegetative Propagation by Leaves
- Some plants have leaves that contain buds that can develop into a new plant. Example: Bryophyllum

Leaf of Bryophyllum with buds in the margin

ARTIFICIAL MEANS OF VEGETATIVE PROPAGATION

Cutting

- It is a method in which a cutting from a plant is taken and planted. This cutting is a part of the stem or the branch of the plant. Example: Roses



Grafting

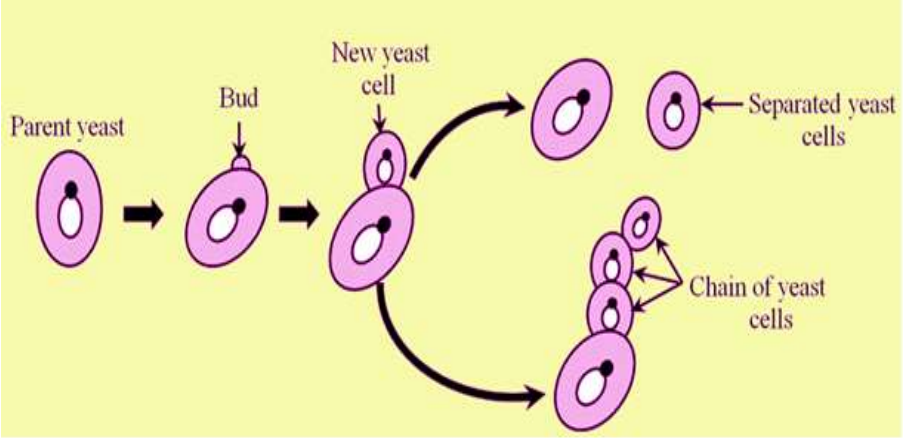
- Sometimes two plants are joined together so that both of them can provide the desired characteristics to the new plant. One plant remains rooted in the ground, which is called the Stock, and provides the essential nutrients and water while the other plants' stem is attached to it. In this way, a new plant develops. Example: Apples

Fragmentation

- Fragmentation is a form of asexual reproduction or cloning, in which an organism is split into fragments.
- Each of these fragments develop into a mature fully grown individual that are clones of the original organism.E.g. An alga breaks up into two or more fragments. These fragments or pieces grow into new individuals.

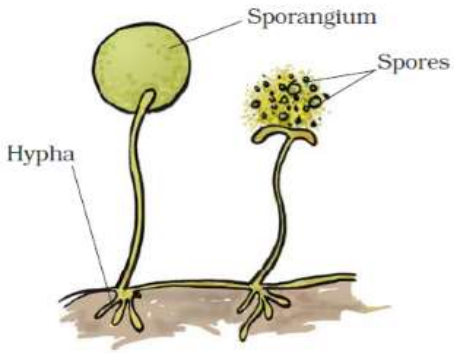
Budding

- Yeast is an organism that contains a single cell. It is a fungi not a plant.
- It can propagate every few hours if the proper amount of nutrients are available to it.
- As the yeast finds favorable conditions, a small bulb-like projection produces from the yeast called Bud.
- The bud grows gradually and then gets detached from the parent yeast.
- This new cell then grows measures and produces more cells.
- Sometimes a chain of buds is formed which leads to the production of a large number of yeasts altogether.



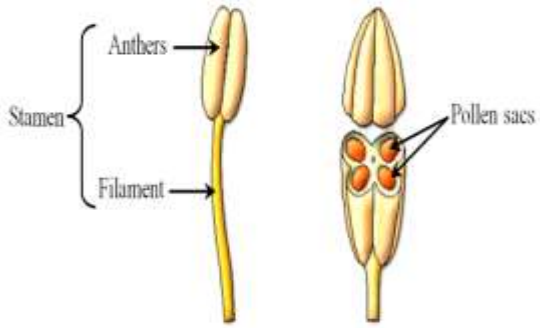
Spore Formation

- The term is also used to refer to the process of reproduction via spores.
- Spores are the reproductive bodies and are microscopic.
- When these spores are released into the surrounding area, they develop into new plants under favorable conditions.
- E.g. Fungi, Ferns

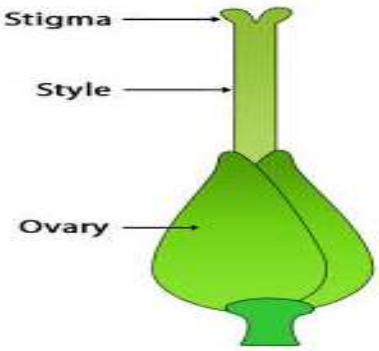


SEXUAL REPRODUCTION IN PLANTS

- The flowers of a plant are its reproductive organs that participate in the sexual reproduction process.
- The male reproductive parts of a plant are called Stamen.
- The stamen consists of Anther that has pollen grains. These pollen grains produce male gametes.



- The female reproductive parts of a plant are called Pistil.
- The pistil consists of three parts:
- Stigma – It is a sticky surface where pollen grains get attached.
- Style – It is a tube-like structure which connects the stigma and the ovary.
- Ovary – It contains eggs in which the female gametes or eggs are formed.

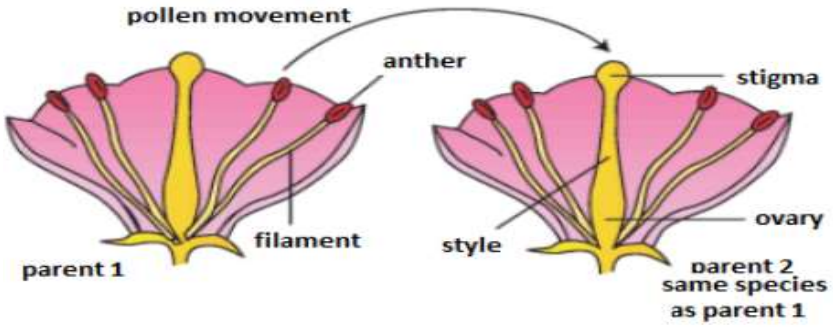


- Some flowers contain both stamen and pistil and are called Bisexual Flowers. E.g. Lily, rose, brinjal, hibiscus, petunia, mustard etc.
- Some flowers contain either the statement or the pistil and hence are called Unisexual Flowers. E.g. papaya, watermelon, cucumber, coconut etc.

- The new plant produced contains the characteristics of both plants that participate in the sexual reproduction.

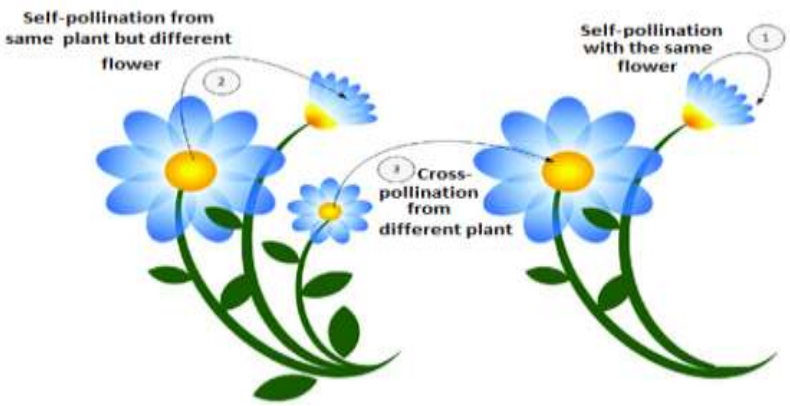
How the male gametes reach the female gametes in plants?

- The male gametes reach the female gametes by the process of pollination.
- Due to their lightweight, winds and water often carry them away to different plants. Sometimes the pollen grains also get attached to insects which carry them to different flowers.
- The male and female gametes fuse and form a zygote.



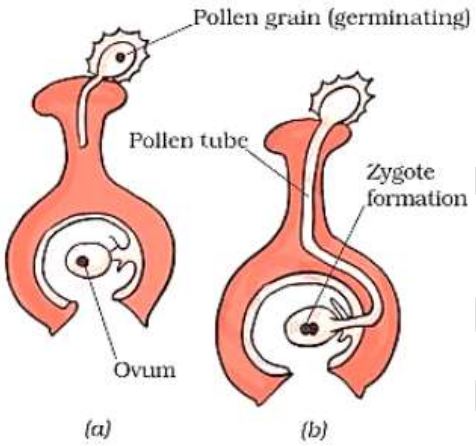
POLLINATION.

- This process of transfer of pollen grains from anther to stigma is called Pollination.
- There are two types of pollination:
- Self-pollination/ Autogamy: When the pollen grains land on the stigma of the same flower.
- Cross-pollination/ Xenogamy: When the pollen grains land on the stigma of a different flower, whether of similar kind or different kind.



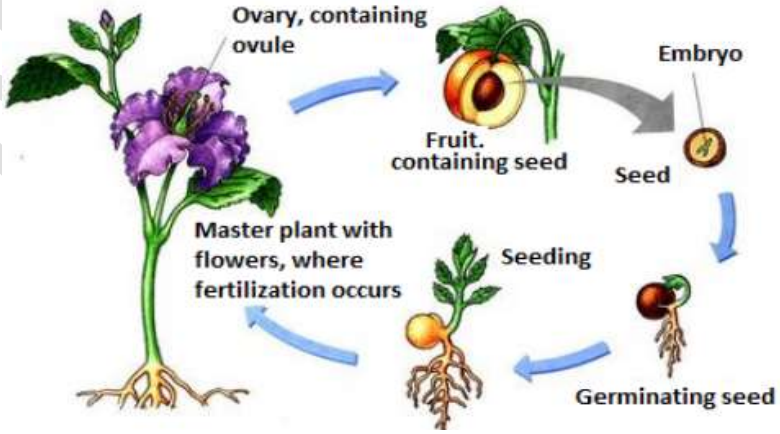
FERTILIZATION

- A zygote is formed as the fusion between the male and female gametes occurs.
- This process of formation of the zygote is called Fertilization.
- Then the zygote develops and turns in an embryo.



How fruits and seeds are formed?

- After the fertilization process, the ovary of the flowers grows and develops into a fruit.
- The remaining parts of the flower fall off.
- The ovules develop and form the seeds of the fruits.
- The embryo is enclosed inside the seeds.
- Some fruits are fleshy and juicy such as mango, apple and orange. Some fruits are hard like almonds and walnuts



What is seed dispersal?

- The transportation of seeds from the parent plant to different places is called seed dispersal.
- Seed dispersal allows growth of the same kind of plants in different regions.
- This is helpful because it minimizes the competition for food, sunlight, water and minerals among the plants of the same kind in the same area.
- It also allows them to grow in different habitats.
- Seed dispersal is carried out by wind, water, animal's etc.eg.
- Wind
- Seeds are winged and light to get carried by the wind. e.g.: maple and drumstick.
- Hairy seeds, e.g.: aak (Madar) and hairy fruit of sunflower.
- Water
- These seeds or fruits normally develop the ability of floating in the form of fibrous or spongy outer coat, e.g.: coconut.
- Animals
- Spiny seeds with hooks that are attached to the animal body and are hence carried to distant places. e.g.: Xanthium, Urena
- Few of the seeds disperse when the fruits burst out with a sudden jerk which get scattered away to a distance far from the parent plant. e.g.: Balsam and Castor.