

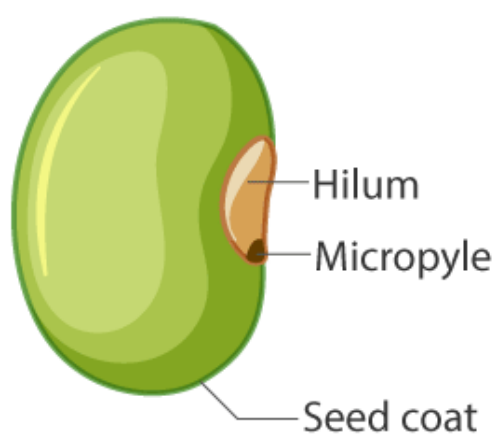
Chapter 2 - Seed Germination and Dispersal

Subject - Science

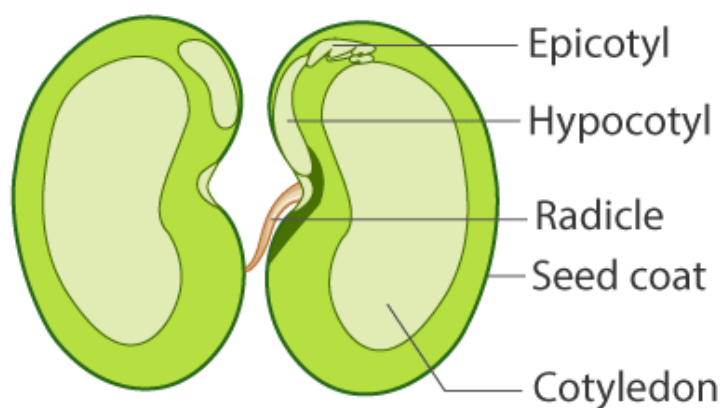
Class V

Seeds

Seeds are important source of food. All the grains we eat are seed. For example- rice, wheat, gram, kidney beans.



(a) Lateral view of a seed

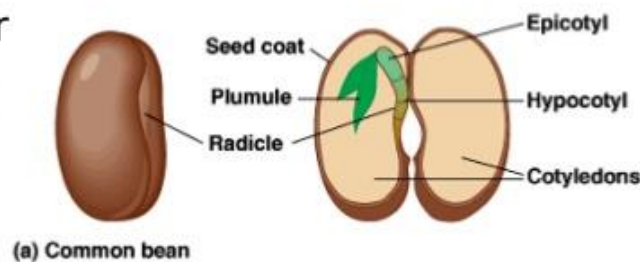


(b) A mature embryo with its parts

Structure of Seed

SEED STRUCTURE

- External
 - Seed coat (*testa*)
 - Hilum
- Embryo
 - Cotyledon
 - Epicotyl /
 - Plumule
 - Radicle



Seed coat: The outer protective covering of a seed. It protects the seed from physical damage.

Hilum: The seed coat has a tiny opening called the Hilum which absorbs water.

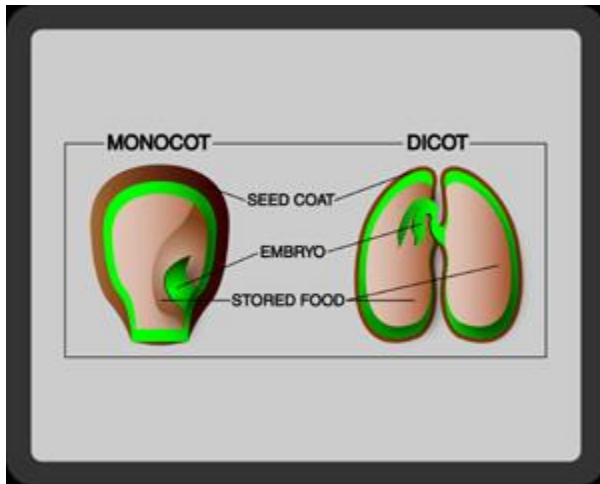
Cotyledons: Inside the seed coat there is a fleshy part of the seed. These fleshy parts are called Cotyledons.

Embryo: This is the baby plant inside the cotyledons. The part of a seed or bud that contains the earliest forms of a plant's roots, stem and leaves.

Types of Seeds

Monocotyledonous Seeds: Monocots have only one **seed** leaf inside the **seed** coat. It is often only a thin leaf, because the endosperm to feed the new plant is not inside the **seed** leaf.

Dicotyledonous Seeds: Dicots have two **seed** leaves inside the **seed** coat. They are usually rounded and fat, because they contain the endosperm to feed the embryo plant.

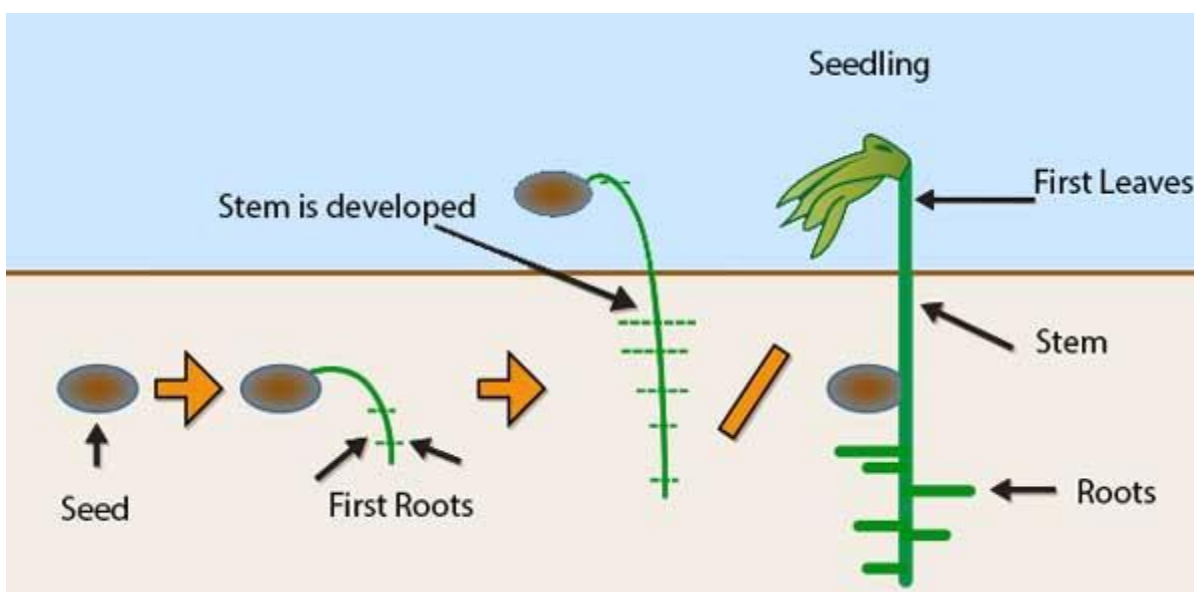


Seed Germination

Seed germination may be defined as the fundamental process by which different plant species grow from a single seed into a plant. This process influences both crop yield and quality.

Process of Germination

During Germination, when the seed receives adequate water, it swells. This leads to the bursting of its seed coat and giving rise to the baby plant, called **Seedling**. In the seed, the developing embryo gets its food from Cotyledons. The baby plant first develops its root from the radical which grows down into Earth. The plumule gives rise to shoot which grows upwards towards sunlight.



Conditions Necessary for Seed Germination

Water: It is extremely necessary for the germination of seeds. Some seeds are extremely dry and need to take a considerable amount of water, relative to the dry weight of the seed. But most seeds need enough water to moisten and not soak as it leaks away from a germination inhibitor in the seed. Water plays an important role in seed germination. It helps by providing necessary hydration for the vital activities of protoplasm, provides dissolved oxygen for the growing embryo, softens the seed coats and increases the seed permeability. It also helps in the rupturing of seed and also converts the insoluble food into soluble form for its translocation to the embryo.

Oxygen: It is an important and essential source of energy required for seed growth. It is required by the germinating seed for the metabolism and is used as a part of aerobic respiration until it manages to grow green leaves of its own. Oxygen can be found in the pores of sand particles, but if the seed is buried too deep it will be deprived of this oxygen.

Temperature: For a seed to germinate, it requires a moderate temperature of around 25-30°C. Quite obviously different seeds require different optimum temperatures. There are some seeds which require special requirements either lower or higher temperature between 5 to 40°C.

Light or darkness: This can act as an environmental trigger. Many seeds refuse to germinate until sunlight falls on them.

The process of seed germination, under the above mentioned favourable conditions, triggers the seed to undergo a rapid expansion growth of the embryo by culminating in rupture of the covering layers and emergence of the radical. This radical emergence is considered the completion of germination.

Seeds dispersal

Seed dispersal is the movement, spread or transport of **seeds** away from the parent plant.

Dispersal by Water

Many plants have seeds that use water as a means of dispersal. The seeds float away from the parent plant. Plants which grow beside water often rely on water to transport their seeds for them.

Dispersal by Wind

Seed dispersal is the movement, spread or transport of seeds away from the parent plant. Plants have limited mobility and rely upon a variety of dispersal vectors to transport their propagules, including both abiotic vectors such as the wind and living vectors like birds.

Dispersal by Animals

Animals disperse seeds in several ways. The fruit is digested by the animal, but the seeds pass through the digestive tract, and are dropped in other locations. Some animals bury seeds, like squirrels with acorns, to save for later, but may not return to get the seed. It can grow into a new plant.

Dispersal by Explosion

Some plants distribute their seeds by violently ejecting them so that they fall well away from the parent plant. This is explosive dispersal. An example of this is plants which belong to the Pea Family. They produce seed pods which dry in the sun.

QUESTIONS & ANSWERS

Q1. What is the function of Cotyledons?

A1. Cotyledons store food for growing embryo inside the seed.

Q2. What is Germination?

A2. Germination is the process of seeds developing into new plants. The most common example of germination is the sprouting of a seedling from a seed

Q3. What is Seed Dispersal?

A3. Seed dispersal is the movement, spread or transport of seeds away from the parent plant.

Q4. How is water helpful in seed dispersal? Give examples.

A4. Plants which grow beside water often rely on water to transport their seeds for them. They may produce light seeds which float.

Examples include water plantain, yellow flag, coconut shells and a family of mangrove plants.

Q5. Describe the process of Germination.

A5. During the beginning stage of the germination, the seeds take up water rapidly and this results in swelling and softening of the seed coat at an optimum temperature. By rupturing of the seed coats help to emerge the radicle and the plumule to form a primary root. This stage is referred to as an Imbibition.

After the emerging of the radicle and the plumule, the seed activates its internal physiology and starts to respire and produce proteins and metabolize the stored food. This is a lag phase of the seed germination.

This is a final stage of seed germination. In this stage, the cell of the seeds are elongated and divided, which brings out the root and radicle out of the seed and cotyledons are expanded which, are the true leaves of the new plant.

Q6. Explain methods to disperse seed through winds, giving at least two examples.

A6. Seeds from plants like dandelions, swan plants and cottonwood trees are light and have feathery bristles and can be carried long distances by the wind. Some plants, like kauri and maple trees, have 'winged' seeds. They flutter to the ground.

Seeds which have wings and hairy parachutes on them are carried by the wind.

E.g. – sycamore, ash, maple, lime, dandelion and thistle.