

Growing New Plants

Learning Objectives

To Understand

- Growing new plants from seeds, roots, stems, leaves and spores.
- Dispersal of seeds.
- Large scale production of crop.

To Find Out

- Growth of new plants from seeds.
- Germination of seeds.
- Crop cultivation for human use.

Let's Begin

Plants are the main source of food for both animals and human beings. We eat the flowers, seeds, stems, roots, bulbs, tubers, fruits and leaves of many plants. This is the reason we need to grow new plants to get regular supply of food.

Write the part of the plant from which these food items are obtained.



Growth of new plants occur by the process called reproduction. **Reproduction** is the process of producing babies of their kind by all living things. Plants reproduce through various ways like from seeds, roots, stem and even from the nodes that arise from the edges of the leaves.

Reproduction by Seeds

Seeds are present inside the fruits. When these seeds are sown in the soil, they give rise to the new plant. Let us understand the structure of a seed.

Activity 1.1

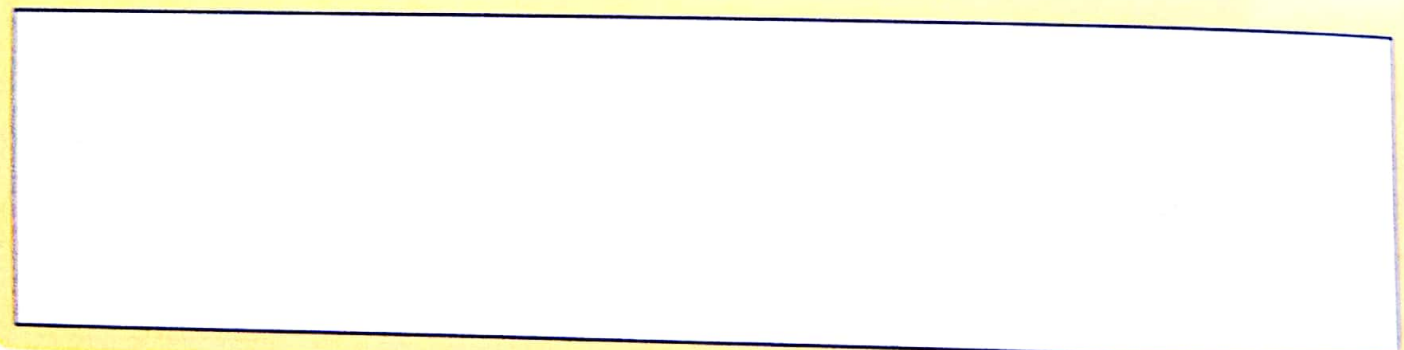
Aim : To identify the structure of a seed.

Materials Required : Few gram seeds, water and a plate.

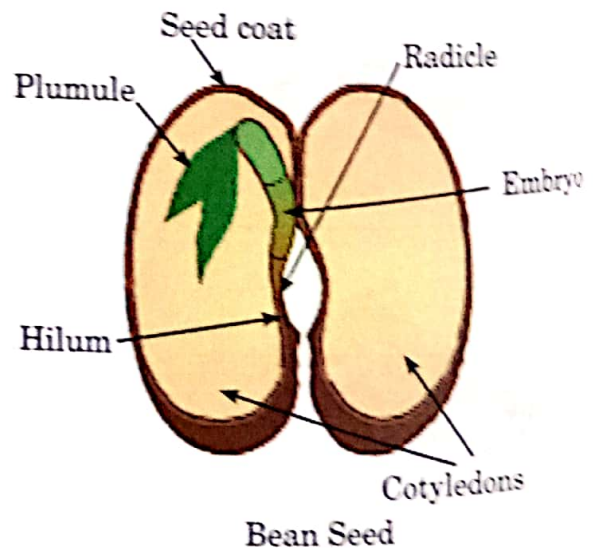
Procedure

1. Soak gram seeds in water for a day.
2. The next day, you will find the seeds swollen due to the absorption of water.
3. Now, carefully and gently remove the outer thick covering of the seed. This is known as the outer 'seed coat'. Inside the outer thick seed coat, there is a thin membranous inner seed coat.

Observation : After removing both the seed coats, observe the inside of the seed. Draw it in the space given below.



A tiny hole called **micropyle** allows the seed to absorb water. The seed coat has a little opening called **hilum**. It is through hilum that the seed absorbs water. The seed coat works as a shield to protect the seed and the baby plant inside it. Inside the seed coat are two thick and large parts — **cotyledons** or **seed leaves** that store food for the growth of a new plant. Between the two cotyledons is a structure called **embryo** (baby plant) that grows to form the new plant. The lower part of this embryo is known as **radical**. It grows to form the root system. The



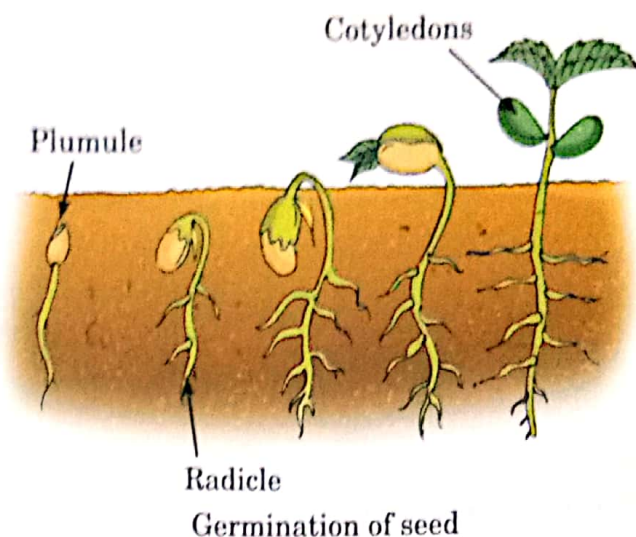
upper part of the embryo is known as **plumule** that grows to form the shoot system of the new plant.

Some seeds like beans, pulses, peas have two cotyledons; and some like rice, maize and wheat have a single cotyledon.

All seeds cannot grow into plants. Some of them are eaten by birds or animals and some may die due to harsh weather conditions.

Germination of Seeds

A seed needs water, air and suitable temperature to grow and form a new plant. The process by which a seed grows into a new plant is known as **germination**.



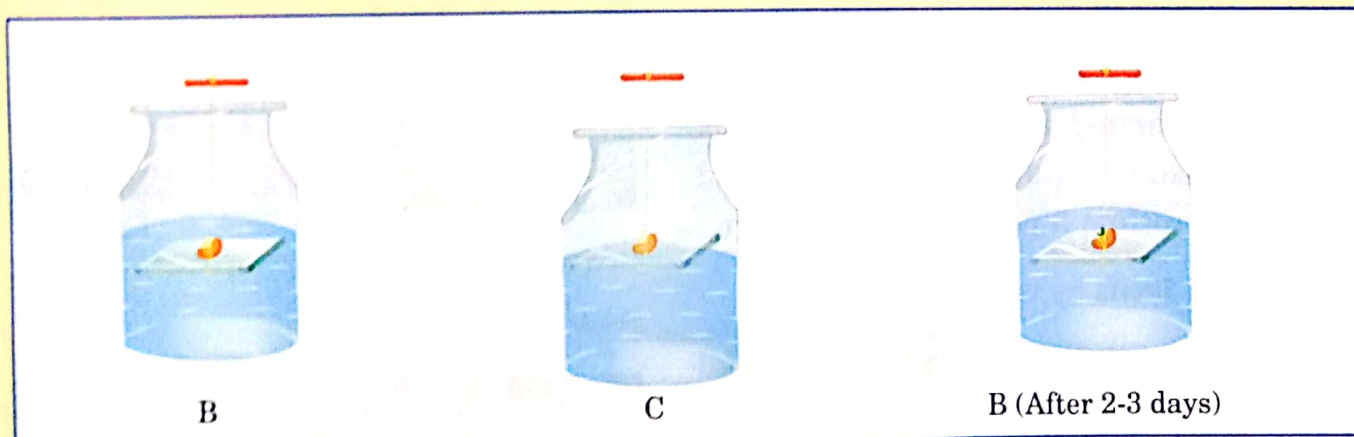
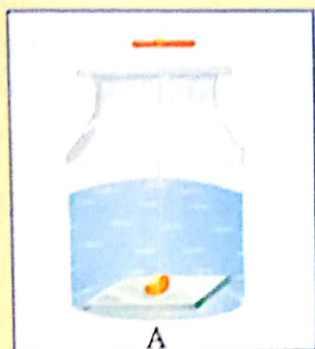
Activity 1.2

Aim : To understand the conditions required for seed germination.

Materials Required : Three bean seeds, water, beaker, three glass strips and a thread.

Procedure :

1. Take three bean seeds.
2. Mark them as A, B and C.
3. Tie the seeds attached to a glass strip with the help of a thread.
4. Take a beaker, half filled with water.
5. Now put the slides with the seeds in the beaker in such a way that seed A gets completely soaked in water, seed B is partly in water and partly in air and seed C is completely in the air as shown in the figure.



6. Leave the beaker in a moderately warm place (temperature about 37°C).

- Observe the seeds after 2 to 3 days.

- Observation** :
- The seed in beaker A does not germinate.
 - The seed in beaker B shows germination.
 - The seed in beaker C does not germinate.

Conclusion : This is because only seed B gets both water and air which are necessary for germination. Seed A does not get air or oxygen and seed C does not get water. However, a suitable temperature was there for all the three seeds.

Let's Recapitulate

State whether true (T) or false (F).

1. Seed absorbs water through hilum.
2. Cotyledons or seed leaves store food for a growth of a new plant.
3. The process by which seeds disperse into the new plant is known as germination.
4. Radical grows to form the root system.

Seed Dispersal

In case many seeds grow close to each other, they will compete for food, water and sunlight. Therefore, it becomes necessary for the seeds to be dispersed away from the parent plant. The process of spreading seeds to different places is called **seed dispersal**.

Seeds are dispersed in a number of ways. They may be carried by wind, water or animals. In some plants, the fruits explode, releasing a number of seeds in the air.

Dispersal by Wind

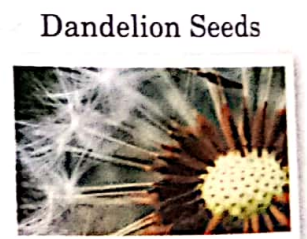
The seeds of some plants are very light in weight. They also have stiff wings that allow them to fly long distances. Such seeds are easily carried by wind. Examples of plants whose seeds are dispersed by wind are maple, cotton, hiptage and dandelion.

Dispersal of Seeds by Water

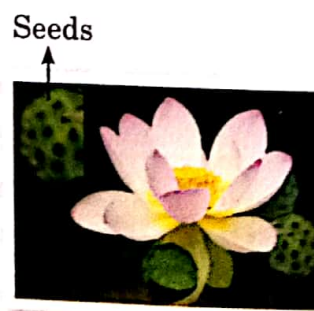
Plants which grow in rivers, oceans and ponds or near water bodies use water for dispersal of seeds. Some fruits are so light that they can float on water and are carried



Cotton Seeds



Dandelion Seeds



Lotus Seeds



Maple Seeds

to far-off places. The coconut is a heavy seed, but the seed is covered with spongy layers of fibre filled with air that helps it to float on water. Foxglove, water lily and lotus are other examples of plants whose seeds are dispersed with the help of water.

Dispersal of Seeds by Animals

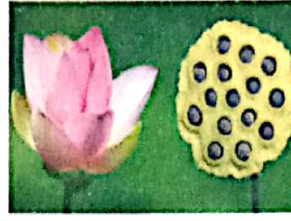
Animals eat fruits like the apple, mango, raspberries, grapes, etc., and throw the seeds anywhere. Sometimes, they ingest the seeds along with which are then deposited far away in the animal droppings. When these seeds find moist soil and suitable conditions for growth, they give rise to the new plant.

Some plants produce seeds that have hooks. The hooks stick to the animal fur and get scattered far and wide as the animal moves from place to place. Examples of plants whose seeds are dispersed by animals are mistletoe, berries and cocklebur.

Dispersal of Seeds by Explosion

Fruits of some plants like pea, bean, balsam, peanut and castor, etc., burst open when they are ripe and scatter the seeds in all directions. This mechanism of dispersal is called **explosion**.

Water Lily Seeds



Coconut Seeds

Mistletoe Seed



Cocklebur Seeds



Berry Seeds



Pea Seeds



Bean Seeds

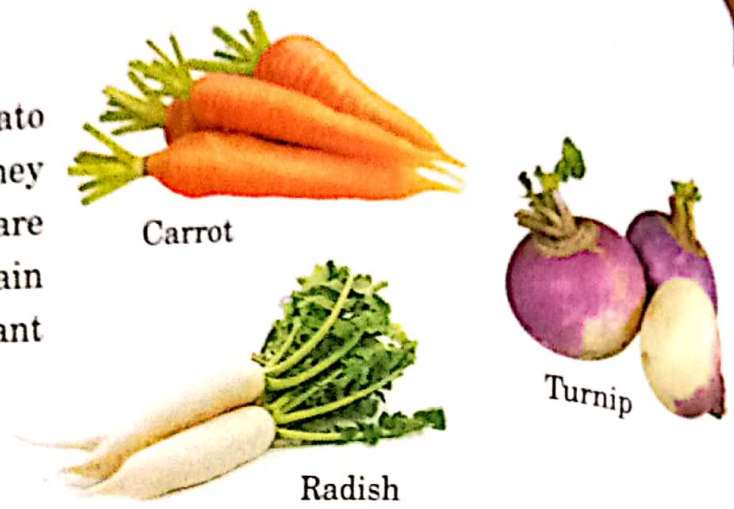
Let's Recapitulate

Fill in the blanks.

1. The process of spreading seeds to different places is called _____.
2. Cotton seeds disperse by _____.
3. Seeds are _____ by number of ways.
4. Some plants like pea, bean, balsam and peanut scatter the seeds in all directions. This mechanism of dispersal is called _____.

Reproduction by Roots

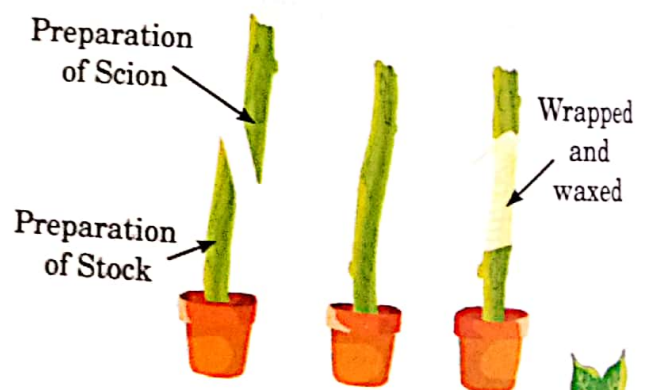
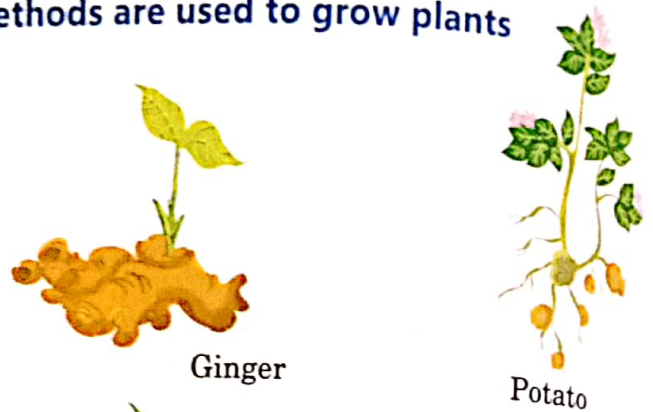
Radish, turnip, carrot and sweet potato have roots that store food in them. They are swollen because of stored food and are called '**tuberous root**'. The roots contain a small bud which gives rise to a new plant under favourable conditions.



Reproduction by Stems

Some plants also grow by stem. Different methods are used to grow plants using stems.

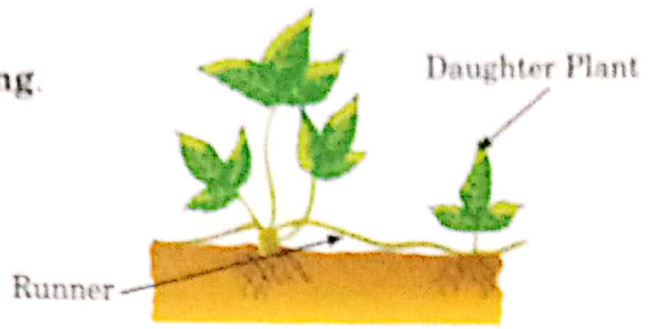
- (i) **From underground stems:** These are the stems which grow under the ground. For example, onion, potato and ginger. These stems have small buds called **eyes**. A piece of stem with an eye can grow into a new plant.
- (ii) **Stem cuttings:** In money plant, rose and bougainvillea, we cut a part of the stem containing bud and plant it in the soil. This process is known as **stem cutting**. In the soil, this stem develops roots and finally grows into a new plant.
- (iii) **Grafting:** Grafting can be seen in plants like apple, mango and rose. When we cut a part of the stem and attach it to the stem of another plant, it is called **grafting**. The cut part of the stem is known as **scion** and the part of the stem which is left is called the **stock**.
- (iv) **Layering:** A branch of raspberry or jasmine plant is bent on the ground. A portion of this branch is covered with soil and its tip is exposed. The covered part of the branch develops roots after



Reproduction in plants by stem

a few days. Then it is cut off from the parent plant. This process is called **layering**.

- (v) **Runners:** Strawberry plant is an example of a runner. It has horizontal stems which grow near the ground. These are called **runners**. They grow roots at regular intervals and produce new plants.



Activity 1.3

Take a money plant. Cut a piece of the stem such that it contains a few leaves. Cut another piece of stem between any two leaves. Dip one end of each piece in water and observe for the next few days. Which one grows and gives rise to new leaves? What do you conclude from this activity?

Reproduction by Leaves

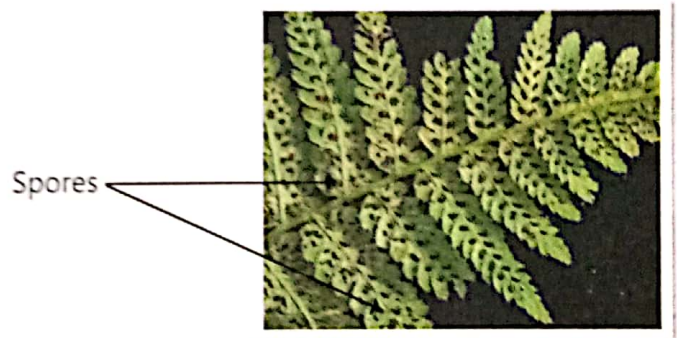
The leaves of certain plants, such as bryophyllum, produce **buds** called **plantlets** on their leaf margins. Upon developing, these buds drop and grow into new plants when they find moist soil. Begonia plants also reproduce in this manner.



Bryophyllum

Reproduction by Spores

Spores are very small and light structures in plants like ferns and mosses. In these plants, new plants grow from these tiny structures. They can survive for a long time in even adverse conditions.



Fern

Let's Recapitulate

Match the following and complete the sentences.

- | | |
|---|---------------------|
| 1. Begonia reproduces by | a. stored food |
| 2. Plants like strawberry have | b. spores |
| 3. In ferns, new plants grow from | c. money plant |
| 4. Roots of radish and turnip have | d. buds |
| 5. New plant grows from the cut stem in | e. horizontal stems |

Crop Production

A **crop** is a cultivated plant that is grown on a large scale for example cereals, pulses, vegetables. This large scale production of crops for food is called **agriculture**. The growing of crops in the fields by farmers is known as **cultivation**.

Different crops require different weather for their growth. So farmers grow a variety of crops according to the weather, based on a specific time of the year.

Some crops like maize and rice require heavy rains. Such crops are grown from June to October. They are known as **kharif crops**. Crops like wheat, beans and legumes require light winter rains. These are planted in November and harvested in the month of April. These crops are known as **rabi crops**.

Following are the different steps in agriculture:

1. **Ploughing the field:** Ploughing is the preparation of soil for sowing the seeds. The purpose of ploughing is to turn over the upper layer of soil and bring the fresh nutrients to the surface. It helps in loosening of soil, burying the weeds and allows the soil to hold moisture. Ploughing is done using tractor and oxen.
2. **Sowing the seeds:** Seeds are sown by farmers manually or through machines which have grooves called **seed drills**.
3. **Addition of fertilizers:** Fertilizers are substances that provide nutrition to the soil. There are two types of fertilizers.
 - a) **Manure:** It is a natural fertilizer made from the remains of dead and decaying plants or from cow dung.
 - b) **Chemical fertilizers:** These are man-made fertilizers, e.g, phosphates, nitrates and urea.
4. **Irrigation:** The field is then watered regularly. This is called **irrigation**. Now a days, modern methods of irrigation like sprinklers are much popular.



Ploughing by Oxen



Ploughing by Tractor



Sowing Seeds



Adding Fertilizers



Irrigation

5. **Crop protection:** Crops need to be protected from herbivorous animals. For this, a fence is created around the field. Pests like mice, rats and insects are also killed by spraying chemicals called **insecticides** and **pesticides**. DDT and gammaxene are some common insecticides. Scarecrows are put up in fields to ward off birds.



Scarecrow



Harvesting

6. **Harvesting:** When the crop is ripe, it is cut down. This process is known as **harvesting**. It can be done by the farmers manually or with the help of machines.

Let's Pronounce Together

irrigation	cotyledons
dispersal	germination
harvesting	rabi
kharif	

LET'S REVISE

- Plants reproduce through seeds or through their different parts.
- A seed consists of a seed coat, micropyle, embryo and cotyledons.
- A seed needs air, water and sunlight to germinate.
- Dispersal of seeds is important for plant survival.
- A crop is a cultivated plant that is grown on a large scale.
- Crops grown from June to October are known as kharif crop while crops grown from November to April are known as rabi crops.

Glossary

- **Reproduction** : Process of producing babies of their own kind by living things.
- **Germination** : The process by which seed grows into a new plant.
- **Seed dispersal** : The process of spreading seeds to different places.
- **Ploughing** : The process of loosening the soil for sowing seeds.
- **Irrigation** : The process of watering the soil.
- **Manuring** : The process of adding manure to fields.
- **Insecticides** : Chemicals used to kill insects in the field.
- **Harvesting** : The process of cutting fully grown crops from fields.
- **Kharif crops** : The crops sown from June to October.
- **Rabi crops** : The crops sown from November to April.

Practice Time

A. Tick the correct option.

- The food for the growth of a new plant is stored in the _____.
a. seed b. embryo
c. seed coat d. cotyledon
- Water is needed for germination because it _____.
a. allows stored food to become available for use by embryo
b. makes the seed swell up
c. kills the seed
d. cleans the seed
- The small root emerging from a germinating seed is called _____.
a. radicle b. cotyledon
c. plumule d. seed coat
- Which one of the following grows from underground stem?
a. Potato b. Sugarcane
c. Bryophyllum d. Sweet potato
- Rabi crops are usually grown from _____.
a. June – October b. November – January
c. November–April d. June – August

B. Match the following.

- | | |
|--------------|---------------------------------|
| 1. Dandelion | a. Dispersal by water |
| 2. Wheat | b. Part of the stem that is cut |
| 3. Rice | c. Rabi crop |
| 4. Scion | d. Kharif crop |
| 5. Lotus | e. Dispersal by wind |

C. Fill in the blanks.

- Seeds are present inside the _____.
- The seed coat allows _____ to enter the seed which is required for germination.
- The process through which a seed is taken away from the mother plant to a suitable place for germination is called _____.
- The large scale production of crops for food is called _____.
- Wheat and beans are planted in _____.
- _____ seeds have one cotyledon.

D. State whether the following statements are true or false.

1. New plants mostly grow from leaves. _____
2. There is a tiny opening in the seed coat called hilum. _____
3. Roots and shoots shrink and cotyledons grow in size. _____
4. Cocklebur is an example of dispersal of seed by wind. _____
5. Manure is a natural fertilizer. _____

E. Give one word for each.

1. A plant grown in a particular area for a particular period of time for consumption by human beings _____
2. The seed covering that protects the seed _____
3. Protecting the land from weeds and pests is done by spraying these chemicals _____
4. A small opening on the seed coat of seeds _____
5. Potatoes grow from these _____

F. Short Answer Questions.

1. Name the parts of plants from which vegetative propagation takes place.
2. What makes a coconut float on water although the seed inside it is heavy?
3. Name two ploughing methods used by farmers.
4. Name one plant each that can be propagated by stem, root and leaf.
5. Define dispersal.
6. Define germination.

G. Long Answer Questions.

1. Explain the process of reproduction from seeds.
2. List five reasons why seeds need to be dispersed.
3. What is the role of fertilizers? Explain.
4. Name some pests which destroy crop.
5. Define agriculture.
6. Differentiate between dispersal by wind and dispersal by water.
7. Describe the structure of a gram seed. Explain with the help of diagram.

H. Draw the diagram of the structure of the following and label the parts.

1. Bean seed
2. A seed with one cotyledon
3. A seed with two cotyledon