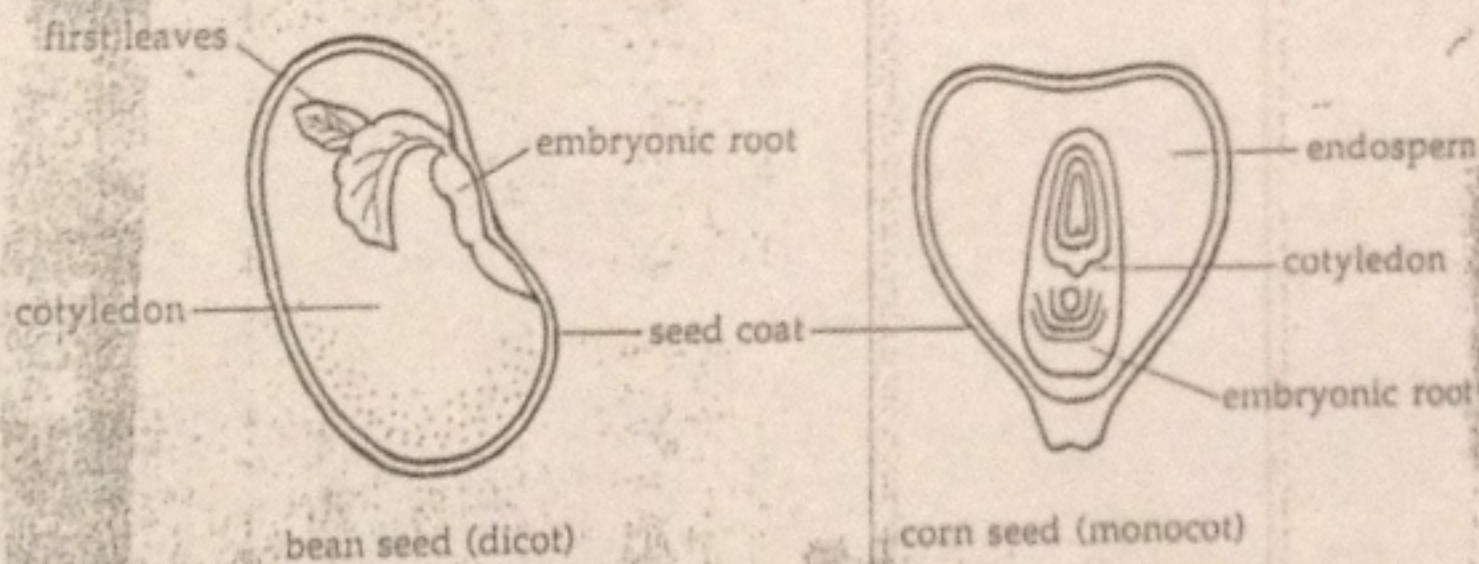


# Beginning with Seeds

**Y**ou can hold 100 radishes in one hand, 1,000 carrots in the other, and a meadow in your front pocket - for within every seed lives a tiny plant or embryo, complete with leaf, stem, and root parts.

The seed coat protects the embryo while a temporary food supply nourishes it, either as an endosperm packed around the young plant or stored in special leaves called cotyledons (see illustration). Most seeds are either monocots, having one cotyledon, or dicots, with two. Seeds remain inactive until conditions are right for them to begin to grow, or germinate.



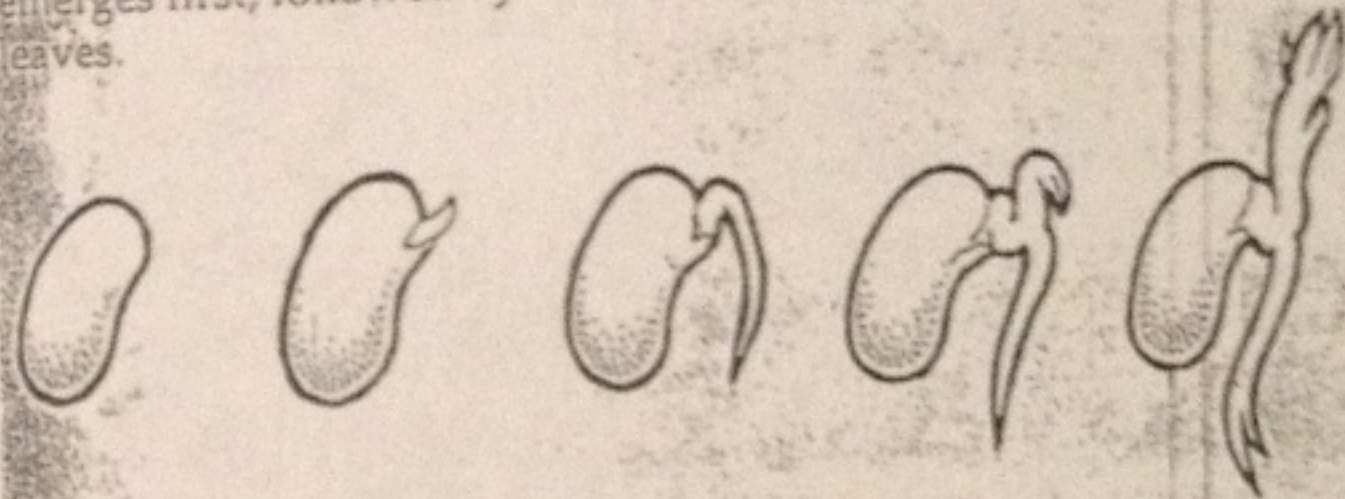
All seeds require oxygen, water, and the proper temperature range in order to germinate. Oxygen and moisture, initially taken in through the seed coat and later by the root, help the seed get energy from its food supply. Different types of seeds have specific temperature requirements and/or preferences for germination. Some require warmer temperatures (70 to 75 degrees F is ideal for tomatoes), while others germinate better in cool temperatures (45 to 65 degrees F is ideal for lettuce).

Many seeds also require proper light conditions to germinate. Some require light to germinate and others are inhibited from germinating by light.

Seeds have their own source of nutrients (in the cotyledons

or endosperm) to sustain them through early life, so they do not require additional nutrients. The proteins, fats, and carbohydrates stored for the benefit of the young plant are what make seeds such a rich and vital food source for humans and other animals.

When a seed is exposed to proper conditions for germination, water is taken in through the seed coat. The embryo's cells begin to enlarge and the seed coat breaks open. The root emerges first, followed by the shoot, which contains the stem and leaves.



Our treatment of seeds during germination affects their chances of survival. If seeds (particularly small ones) are planted too deeply, the young plants can use up their food reserves before they ever reach light and begin to make their own food. If planted in soil that's too dry, seeds may not obtain the necessary moisture to germinate. Soaking wet soil, on the other hand, may prevent seeds from getting oxygen or may cause them to rot.

## Special Seed Needs

Because some seeds have very hard seed coats, they will germinate more quickly after being soaked or scarred to allow water to penetrate. This adaptation helps prevent them from germinating until there's adequate moisture for survival. The seeds of many desert plants, for example, will grow only after exposure to large amounts of water.

Other seeds, like those of apples, require a period of chilling before they will germinate. This adaptation prevents some temperate-climate seeds from sprouting immediately after they drop from the plant in autumn and facing the winter as fragile seedlings.

## A BEGINNING LOOK AT PLANTS (MONOCOTS)

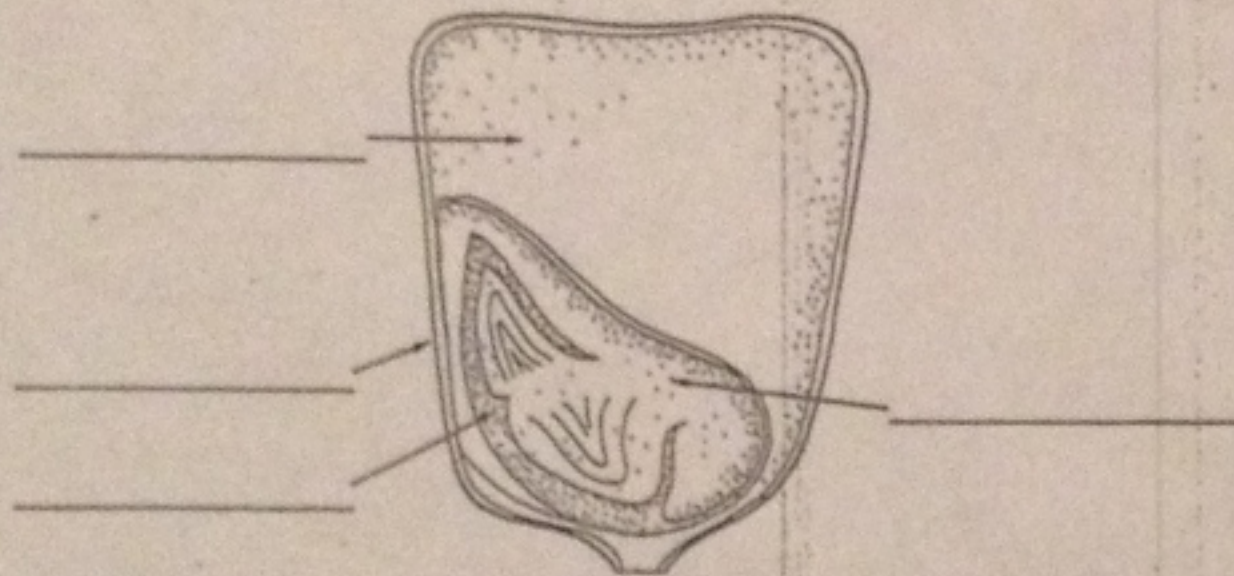
Look closely at a corn seed that has been soaked in water. Does it slip off easily like the bean covering did? Does this seed split naturally into two pieces like the bean did? Your answer to each of these questions will be, "No."

The corn seed does have an outside covering or seed coat, but it doesn't slip off and it may be difficult for you to tell it is there. The corn seed does not split naturally at all. In fact, you will need to cut it in half.

Even when the seed is cut, it is often difficult to see the tiny embryo. Use a hand lens to try to see the part that will become the leaves. One cotyledon will surround the embryo. It is a lighter color than the rest of the seed. The remainder of the seed is called the endosperm. It provides food for the developing plant.

The corn seed is a monocotyledon or monocot. Mono comes from the Greek word monos meaning one.

Use the underlined words to label the picture below.



Corn Seed is a \_\_\_\_\_

Monocots are also flowering plants. Their leaves usually have parallel veins. Their flowers usually

have three petals or multiples of three. There are more than 50,000 species of monocotyledons.

## A BEGINNING LOOK AT PLANTS (DICOTS)

Green plants are probably the most important living things on Earth. Plants are the basis of man's food. Life could go on without people, or dogs, or butterflies, or sharks, but if all the green plants were taken away, life on Earth would soon cease to exist.

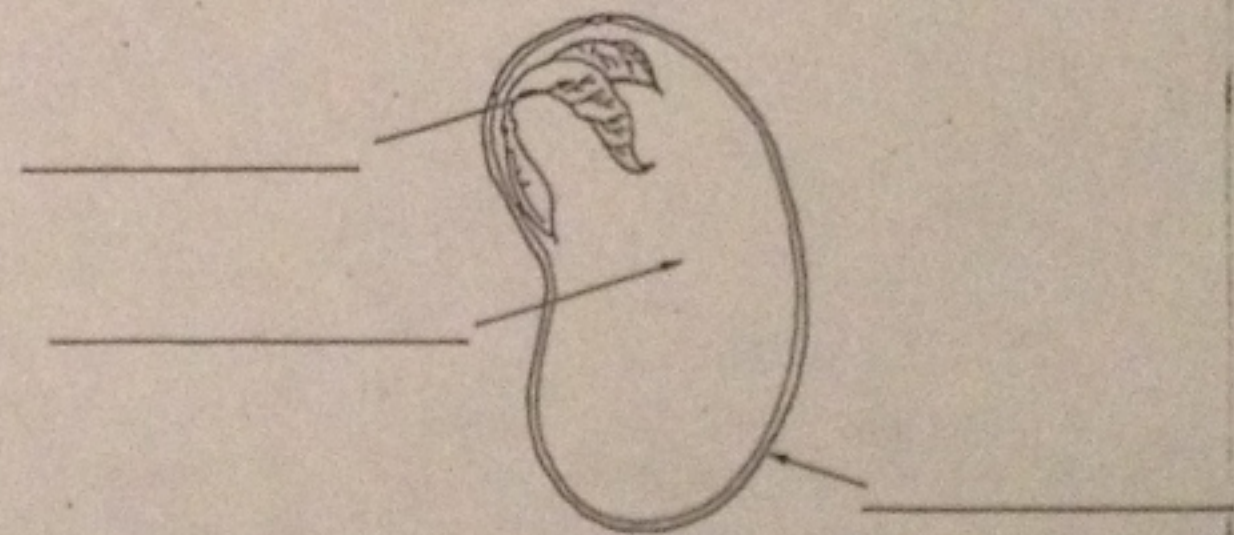
On the other hand, as long as plants have enough sunlight, water, air, and some minerals, they could get along nicely without animals.

Begin the study of plants by looking closely at a bean seed that has been soaked in water. Does it have an outside skin or covering?

This is the seed coat. This coat will probably slip easily off the seed. Do you see a slit running around the seed? Careful! Use your fingernail into this slit, and the seed will split into two parts. Look for the tiny plant inside the seed. This is the embryo, or baby plant. Use a hand lens if you have one. Can you see the two small leaves?

The large part of the seed is called the cotyledon. It supplies food to the young plant when it starts growing. The bean seed has two cotyledons. Therefore, it is called a dicotyledon or dicot, for short. Di comes from the Greek word dis meaning two.

ACTIVITY Use the underlined words to label the picture below.



Bean Seed is a \_\_\_\_\_

Find other seeds to examine. If they split naturally into two parts, they are dicots.

### NOTE

Dicots are flowering plants. Their leaves have branching veins. Their flowers usually have four or five

petals or multiples of those numbers. There are about 200,000 species of dicotyledons.