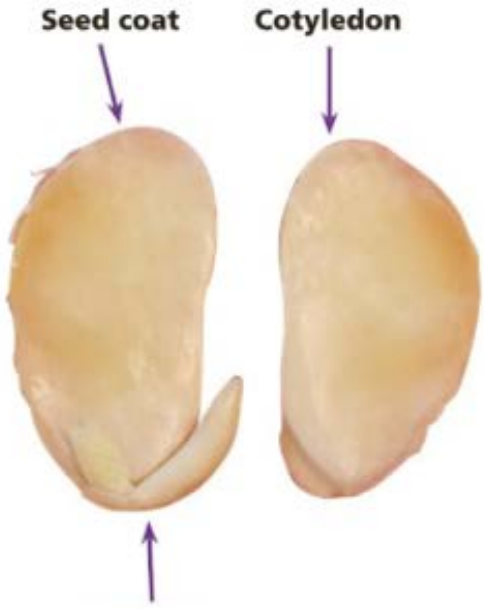
Germination

A seed is a living organism. To be more exact, a seed contains a living organism. The tiny structure inside a seed is the embryo. An embryo is a living baby plant. The embryo is in a dormant, or inactive, stage. The embryo is waiting for the right conditions to start growing.

But there is more to a seed. The largest part of the seed is food storage. The storage structures are called **cotyledons**. Some seeds, such as beans, peas, and sunflowers, have two cotyledons. Seeds of grasses, such as corn, rice, and wheat, have one cotyledon.

The embryo and cotyledons are wrapped in a tough outer layer called the seed coat. Some seed coats are thin, like the coat on bean and pea seeds. Other seed coats are tough and woody, like the shell on a peanut or sunflower seed. And there are seeds with coats so hard you need a tool to open them. Coconuts, walnuts, almonds, and other nuts have very hard seed coats. The seed coat protects the embryo.



A coconut

A bowl of mixed nuts

Sunflower seeds

Starting to Grow

Germinated seeds

The signal for the embryo to start growing is water. When water makes it through the seed coat, the embryo and the cotyledons soak it up. The cotyledons swell. The embryo starts to grow. The swelling cotyledons break open the seed coat so that more water can get in. This is called germination. It is the first step in seed growth.

Soon the embryo starts to develop structures. The first structure to come out of the seed is the **root**. The root usually comes first because the root brings water and **nutrients** into the plant. Then the stem and first **leaves** come out. The stem gives the plant support as it grows.

The baby plant is now a seedling. The cotyledons stay attached to the seedling. The seedling is using the food stored in the cotyledons to grow. As soon as the seedling gets its first leaves, it can make its own food. By that time the seedling has used most of the food in the cotyledons.

The germination process is the same for most seeds. The thing that changes from seed to seed is how long it takes for the seed to germinate. Some seeds can germinate right away. Other seeds take years to germinate. Why the difference?

Bean seedlings