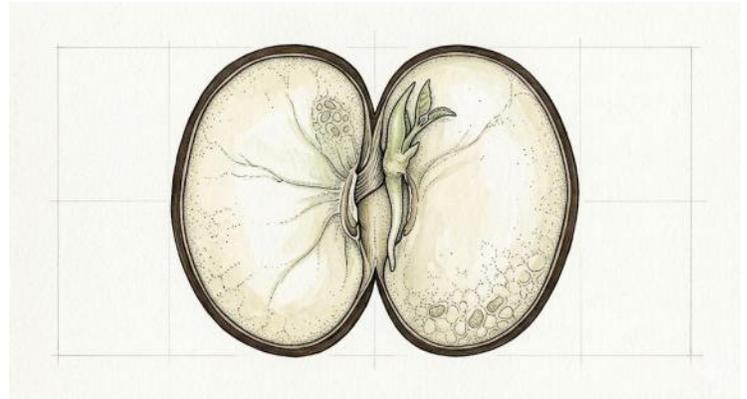


Inside a Seed Science Activity

Learning Objective: Students will identify and describe the three main parts of a seed (seed coat, embryo, and cotyledon) and explain their functions.

Materials Needed

- Large dry lima beans (2 per student)
- Small cups of water
- Magnifying glasses
- Paper towels
- Science journals or a recording sheet



Procedure

Step 1: Pre-Soak (Teacher Preparation)

At least 12 to 24 hours before the lesson, place the lima beans in a cup of water.

The "Why": Dry seeds are in dormancy. Water softens the tough outer layer and signals the seed to "wake up."

Step 2: External Observation

Give each student one dry bean and one soaked bean. Have them use their magnifying glasses to compare the two.

Observe: The soaked bean is larger, softer, and the skin might be wrinkly.

Identify: The tiny scar on the side of the bean is the hilum. This is where the seed was attached to the pod.

Step 3: Removing the Seed Coat

Have students gently rub the soaked bean between their fingers. The thin, papery skin should slip off easily.

The Part: This is the Seed Coat.

The Function: It acts like a suit of armor, protecting the baby plant from insects, disease, and extreme temperatures.

Step 4: Finding the "Lunchbox"

Carefully pry the two halves of the bean apart using a fingernail along the curved edge.

The Part: The two large, fleshy halves are the Cotyledons.

The Function: Since seeds are underground and can't use the sun yet, the cotyledon is a "lunchbox" full of stored food to give the plant energy to grow.

Step 5: Finding the Baby Plant

Look closely at the top of one of the cotyledon halves. You will see a tiny, curled structure that looks like a miniature root and leaf.

The Part: This is the Embryo.

The Function: This is the actual "baby" that will grow into the adult plant.

In their journals, have students draw what they saw inside their bean and answer these "Detective Questions":

Prediction: If we removed the cotyledon (the food) but left the embryo (the baby) in the dirt, do you think it would grow? Why or why not?

Analysis: Why do you think the seed coat needs to be tough and hard when the seed is dry?

Observation: Describe how the embryo looked under the magnifying glass. Did it look like a tiny version of a full-grown plant?

Extension: The Window Sprout

Have students take their second soaked bean (the one they didn't dissect) and place it in a Ziploc bag with a damp paper towel. Tape it to a sunny window. Over the next week, they can watch as the embryo uses the energy from the cotyledon to push its first root downward!