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Biology: \_\_\_\_\_

Date: \_\_\_\_\_

Unit I

The Nature of Science

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I

## Seed Dissection Lab

### Purpose

The purpose of the lab is to dissect a bean seed in order to identify all of the parts of an embryonic plant (including the cotyledons, radicle, epicotyl, hypocotyl, and seed coat).

### Background Information:

1. There are two kinds of seed-bearing plants: the flowering plants are called “angiosperms”, and the non-flowering plants are called “gymnosperms”. Most seed plants are the flowering kind. There are over 250,000 species of flowering plants, and only about 600 non-flowering plants. Corn and beans are angiosperm seeds.
2. A seed is a tiny life-support package. Seeds generally have three parts: a tough covering (seed coat), an embryonic plant consisting of the plumule (embryonic leaves), epicotyl (upper stem), hypocotyl (stem of adult plant), and radicle (roots), and a food supply (cotyledon). The hilum is the site of attachment to the ovary. In beans, the hilum is a dent in the side of the seed.
3. The outer covering of the seed is called the seed coat. The seed coat helps protect the inside of the seed from insects, disease, and damage. Sometimes the seed coat is smooth and paper-thin like that of a pinto bean. A coconut’s seed coat, however, is rough, thick, and hard. A seed cannot develop into a plant until the seed coat is broken.
4. The embryo is the tiny plant inside the seed. The embryo gives rise to the root, stem and leaf structures.
5. Surrounding the embryo is the food supply. The food supply is the seed’s only source of nourishment as it pushes up through the soil and grows into a young plant. When the food supply is gone, a green plant begins to manufacture its own food through photosynthesis. The food supply for a bean is used up in about two weeks.
6. Various environmental conditions trigger germination, including moisture level, light level, and temperature. When these conditions are met, the seed germinates.
7. Germination is the process through which the embryo inside the seed begins to grow. As the seed germinates, it develops roots, a stem, and then leaves. If a seed is not allowed to germinate within a certain length of time, the embryo inside the seed dies. Each plant species has a specific amount of time that a seed can survive before it uses up all of its stored food. The food supply is very important to the seed as it germinates. A bean seed without its food supply grows poorly, if at all. A seed with half of its food supply grows better, but a seed with both halves does the best of all. Seeds from some species of plants need to sprout within two weeks while others can wait as long as two thousand years. Some seeds need to undergo certain conditions, like the cold of winter or, even a forest fire, in order to sprout while others germinate as soon as they fall from the parent plant. Seeds germinate at different rates depending on how much food they have stored.

### Materials

1 Lima Bean, dried and 1 Lima Bean that has been soaked for 24 hours to soften  
Dissecting probe, Paper towels, Magnifying glass

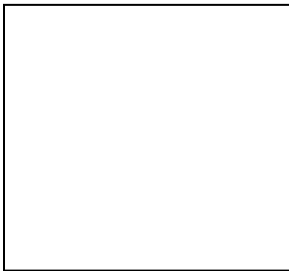
**Procedure**

1. Answer the pre-lab questions prior to beginning your dissection.
2. Place the seed on a paper towel or dissecting tray. Using the probes, carefully tease the seed coat away. Then, gently separate the cotyledons.
3. Illustrate what you see on your data sheet.
4. Use the magnifying glass to more closely observe the seed. Illustrate the enlarged bean showing the embryonic plant.
5. Label the illustration at the bottom of the page using the terms provided.

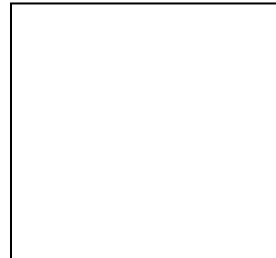
**Pre-Lab Questions**

1. Why were the seeds soaked in water overnight, prior to beginning the dissection?
2. What is the purpose of the cotyledon?
3. Where does the plant get its food once the seed has germinated?
4. What adult plant parts will each of the embryonic parts become?
5. Is the seed you are dissecting a monocot or a dicot? How can you tell?

**Diagram the following:**



Seed split open (step 1)



Seed under magnification (step 2)

**Label the parts of the following diagram. Be sure to use these terms: hilum, seed coat, plumule, epicotyl, hypocotyl, radicle, cotyledon.**

