**Monocot and Dicot Seed Structure**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   
  
**Introduction:**

In this activity students will be examining the seed structure and development of two members of the Angiosperm group of plants.

**Objective:**

Students will distinguish between the structures of a monocot and dicot seed.

**Materials:**

Dicot seeds – such as bean seeds

Monocot seeds – such as corn seeds

Paper towels

Container or Ziploc bags

**Instructions:** to begin this lab, students need to germinate monocot and dicot seeds in a rag doll.

1. Students can complete this activity alone or in small groups.
2. Provide each student or group 10 monocot and 10 dicot seeds.
3. Provide each student or group 4 paper towels.
4. Instruct students to wet the paper towels and to lay the towels out on the desk top. Students are then to place the dicot and monocot seeds on to the paper towels. Each group of seeds will be wrapped in a paper towel . The paper towels should be damp but not so wet water runs off. Once the seeds have been placed on the bottom towel, cover them with a top towel and then roll up the towels to create a (rag doll).
5. Place wrapped seeds (rag dolls) in zip lock baggies.
6. Mark your packet with your name, date and seed type.
7. Check your seeds daily for germination. Record your observations on the Observation Chart listing any germination or changes to the seeds. Begin making observations 24 hours after making the rag dolls. Also, make observations of any differences between the monocots and dicots once they begin germinating.

**Observation Chart -**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Plant type | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 | Day 6 | Day 7 |
| Monocot  Plant Name: |  |  |  |  |  |  |  |
| Dicot  Plant Name: |  |  |  |  |  |  |  |

**Observation Results:**

**Questions:**

Which day did your first seed germinate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Which day did your last seed germinate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

How many seeds did not germinate? .

Make a sketch showing the differences between the germinated seed of a monocot and dicot?

For the following section, use two of your seeds that have been in the paper towel.

To complete this assignment, you will need to use your text book and websites for reference.

**Materials**:

* Corn Seeds
* Bean Seeds
* Iodine Reagent & dropper
* Scalpel or Single Edge Razor Blade
* Hand Lens
* Soil
* Pots or containers for planting

**Anatomy of the Corn seed**:

**External Structure**:

* Dried corn seeds that have been soaked in water prior to the experiment.
* Take one seed and place it on a paper towel
* Examine the corn seed making note of its seed coat (testa), silk scar, and embryo.
* Draw and label the seed with its lighter side up facing you.

**Internal Anatomy**:

* Place the corn seed on the paper towel so that the side showing the embryo faces you.
* Using a scalpel carefully cut through the center of the light colored area (embryo). The seed should be cut in half.
* Turn the two pieces upward showing the cut surfaces. Place a drop of iodine reagent on each cut surface.
* Note the color change: black or purple is the endosperm, gray is the cotyledon, and the white area is part of the embryo.
* Using a hand lens examine the embryo.
* Using the space below, draw and label the endosperm, epicotyl, apical meristem, radicle, and the hypocotyl.

|  |  |
| --- | --- |
| **tExternal Corn Anatomy** | **fInternal Corn Anatomy** |

**Anatomy of the Lima Bean**:

**External Structure**:

* Soak dried lima beans in water prior to using them in the lab.
* Obtain a seed and place it on a paper towel.
* Draw and label the outer area of the seed locating the following parts: hilum, seed coat (testa), micropyle.

**Internal Structure**:

* Using a scalpel, cut through the seed coat **only on the outer curvature of the seed**. **Do not cut the bean in half**.
* Carefully peel away the seed coat.
* Using your fingers, and working at the outer curve, separate the bean into 2 halves. Be careful not to damage the embryo plant.
* Each of the two large halves is a cotyledon. Examine the embryo plant and draw and label it in the space below locating the following parts: epicotyl, hypocotyl, radicle, and cotyledons.
* Draw and label both seeds using colors. Also color and label the internal parts.

|  |  |
| --- | --- |
| **gggghhhhgExternal Bean Anatomygghggg** | **uuugggggInternal Bean Anatomygguuuggg** |

**Summary**:

1. Where does the seed store its food?

2. What part of the embryo plant develops into the roots?

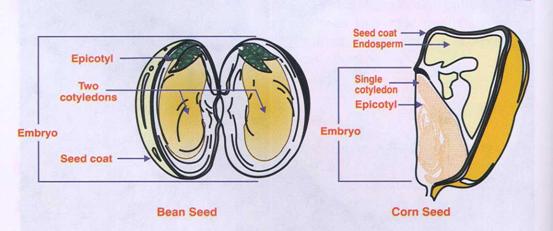
3. Why did the endosperm turn purple or black?

4. What is the function of the cotelyden?

5. How many seed leaves does corn have?

**Finally: Take your remaining seeds and plant them in the containers provided and place in the greenhouse. These seeds can continue to grow and later be used to point out more differences between monocots and dicots.**

**Student Reference Page**

This page will help you complete the monocot and dicot seed structure assignment. For additional reference use your text book and websites.