SEED GERMINATION AND SEEDLING GROWTH

Introduction: Monocot and dicot plants have two unique methods of germination and growth. The basic parts of the seed are the similar, but how they emerge from their protective seed coat is unique. Apical meristems develop on both and grow. The corn will develop coleoptiles. This laboratory will explore growth of the two types of seeds. Research and print out drawings of corn seedling growth and bean seedling growth. Label all the key parts of each germinating seeds. Use these as reference to label and complete your drawings of the plants.

Objectives:
1. Observe and record the early development of corn and bean seedlings.
2. Compare monocot and dicot seedling development.
3. Determine which parts of seedling are growth regions.

Materials:
2 Clear plastic cups
2 pieces of high absorbency paper towels
Permanent marker
Forceps and scalpel
2 fresh corn seeds
2 fresh bean seeds
Water
Centimeter ruler

Method:
1. Use the scalpel blade to make 4 small slices in the bottom of one of the plastic cups.
2. Fold one paper towel in half and make sure it fits around the inside of the inside cup.
3. Take out the paper towel and soak it with water.
4. Re-line the inside cup so the paper towel sticks to the side of the cup.
5. Using the forceps, carefully insert a corn or bean seed between the towel and the cup. The seed should be a little less than half way down the width of the cup.
6. Alternate putting the seeds in the cup, bean, corn, bean until all the seeds are in the cup.
7. Take the permanent marker and number the seeds so you know which seed is which. Don’t forget your name as well!!!
8. Take the second paper towel and crumble it into a loose ball. Put this ball into cup so it pushes on the paper towel holding the seeds.
9. Carefully soak this towel. Some extra water will then drip out the drainage holes in the bottom.
10. Put this cup into the second outer cup. If the water line that forms is above the seeds, dump some of the water out.
11. Keep the paper towels moist, and be sure the water line is always below the level of the seeds.
Data and Observations:
1. Make initial observations about the seeds. Measure the length and get an average of the corn seeds and the bean seeds. Make an observation measurement sheet to record the data and observations.
2. Make daily drawings (or take detailed pictures) of the seedlings and measurements. **LABEL** the parts of the seeds as they emerge and change.

Conclusion:
1. Define the following terms: hypocotyl, epicotyl, cotyledon, endosperm, seed-coat, primary leaves, secondary leaves, tap root, secondary root, terminal bud, apical meristem, node, and internode.
2. Construct a graph with four lines, two lines (example red and blue) comparing the rate of growth of the roots and two lines (example yellow and green) comparing the rate of growth of the stems. (X axis days, Y axis length)
3. Which part of the hypocotyls of the two seedlings seemed to grow the fastest between the bean and the corn?
4. Which epicotyls of the two seedlings seemed to grow the fastest?
5. Describe the difference between the between the development of monocot and dicot hypocotyls.
6. Describe the differences between the development of the monocots and dicot epicotyls.
7. What is a major difference between the roots of a monocot and a dicot?
8. What is the difference in the leaf development between the first set of true leaves on the dicot and then the second set of seeds on the dicot?

What to turn in:
A Final Report consisting of the following:
1. All of the observations made during the experiment as well as all data that was collected during the experiment period organized into a table.
2. The answers to the conclusion questions above.
3. A final concluding statement about the seed germination process and the difference between monocots and eudicots.