

Grafting *Coleus* Plants

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Introduction

This is an exercise I use with my non-science major botany students. Prior to doing this exercise we discuss the structure and function of the conducting tissues in plants. We compare the arrangement of the primary xylem and phloem in monocots and dicots, and talk about the changes that occur during secondary growth in dicots. Then I show the *Coleus* plants to the students and have them guess whether they are monocots or dicots based on morphological features. (I use *Coleus*, a member of the Mint plant family or Lamiaceae, as their stems are square, making it easier for students to orient their cuts. Any other member of the Mint family should work just as well.) Finally, I introduce the idea of grafting plants. I have students come up with reasons why grafting might be the desired, or even necessary, method of propagation. If time permits, it's fun to have students try to determine how best to cut and join plants together.

Materials needed

Coleus plants, approximately 6 – 8 inches tall, 1 per student
Razor blades
Cotton swabs or wooden applicators

Waterproof adhesive tape
 Petroleum jelly
 Plastic bags

Procedures

1. Divide students into pairs. Have each pair of students locate two plants whose stems are approximately the same size in diameter. The stem diameter should be about the same as a pencil. It will be more dramatic if you have two different varieties of *Coleus* available.
2. Identify a node (point of leaf attachment) somewhere near the midpoint of the stem on each plant. The node needs to be at least 2-3 inches above the soil and 2-3 inches from the shoot tip. However, the nodes do not have to be in the same exact spot on each plant.
3. With a razor blade make a horizontal cut through the stem immediately above and below the node. Stress to students to make the cut as close to the node as possible (Figure 1). You should now have the top portion of the stem (the scion) and the lower portion of the stem (the rootstock) still in the pot. The small node section may be discarded.

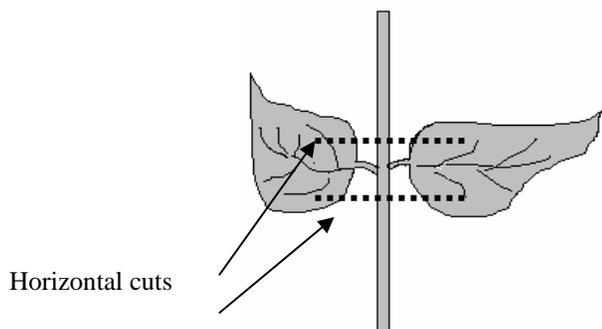


Figure 1

4. Swap scions with your partner. Remove all of the leaves on the scion except for the top one or two pair. This is necessary to reduce water loss through evapotranspiration. The scion should be no longer than four inches or it might be too top heavy. Leaves and small lateral branches may need to be removed from the top portion of the rootstock as well.
5. The next few steps will prepare the scion and the stock so that the stems may be fitted together. Take the scion and starting at the cut end of the stem, make a diagonal cut approximately 1 inch long. (Figure 2).

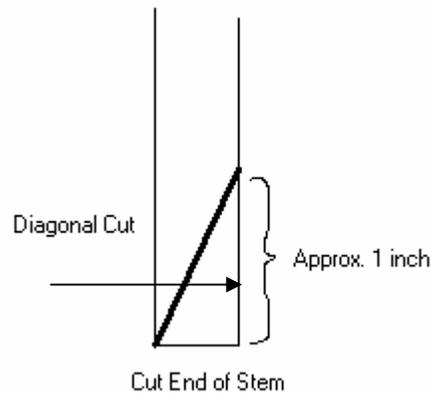


Figure 2

6. Next, starting at the pointed end, identify a spot about one third of the way down along the diagonal cut surface. Make a cut about 1/2 inch deep, parallel to the axis of the stem. (Figure 3)

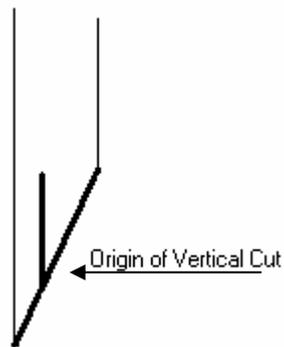


Figure 3

7. Repeat the same process with the rootstock. Be careful not to make the vertical cuts too close to the edge of the stem, or a piece of the stem may break off.
8. Now it's time to fit the two pieces together. Carefully line up the cut surfaces of the scion and stock, nudge the vertical cuts open and interlace the stem "wedges" with one another. (Figure 4)



Figure 4

9. Cut a short piece of adhesive tape (1 –2 inches long) and wrap it around the stems where they join. Repeat with another piece of tape if necessary (try to keep tape use to a minimum). Ideally, the scion should be able to remain in place without the addition of tape.
10. Use a cotton swab to cover the surface of the tape with a thick coat of petroleum jelly, which provides a watertight seal. Pay special attention to the spaces between the tape and the stem: these areas must be covered as well to prevent water loss.
11. Finally cover the plant with a plastic bag and cut small slits in the top corners of the bag. Place the plant in diffuse sunlight, or under grow lights. Water the plants from the bottom of the pot for several weeks. When the scion starts producing new leaves, remove the plastic bag.

Ordering Information

Coleus plants: These can be ordered from Carolina Biological Supply (800-334-5551). They have a green and white variety (AA-15-7310, \$5.30 each) and a multicolored variety (AA-15-7312, \$5.20 each). Wards (800-962-2660) also carries both varieties (green and white, 86 W 6825, or multicolored, 86 W 6800, \$5.19 each for either variety). I would advise ordering them well in advance (6 - 8 weeks) so that you may take stock of the available stems. Plants will need to be repotted and may require some pruning.

Plastic bags: I order polyethylene gusset bags from US Plastics (800-537-9724), stock #47122, dimensions = 4 x 2 x 12 inches, 1 case of 1000 = \$22.22. With a little stretch, these fit nicely around a 4inch square pot, and are tall enough to accommodate most plants.