

Making and Staining Fresh Plant Hand-Sections

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Introductory biology students often come to the course with very little knowledge of or interest in plants, and examination of prepared slides often generates little enthusiasm. To increase the students' interest in and enjoyment of plants, a standard staining procedure was modified to produce usable stained sections more rapidly. Of course, sections which have been cut with a microtome, fixed, and stained will be better than those the majority of students can produce with this method. However, the excitement the students exhibit when they produce their own slides in a short period of time makes up for the lack of clear detail in some of the slides, and quite a few of the slides are spectacular. This sectioning method does not work well with thin, soft material such as young roots. The tips of young carrots produce reasonably good sections, although they look significantly different from the traditional *Ranunculus* root sections. Cross-sections of stems of marigold, *Vinca rosea*, carnation, and brassica varieties are easy to make and look good, as do sections of many woody stems. It is best to look at leaf sections unstained at first and then stain some to see the arrangement of vascular tissue. The leaves of *Vinca rosea*, brassicas, carnations, and snapdragons have given good results.

Student Instructions: You will stain the material with 0.2% toluidine blue which stains tissues differently depending upon their chemical composition. Lignified cell walls, such as those of fibers, tracheids, and vessels, stain blue or bluish-green. Cell walls that are not lignified stain shades of purple.

1. Place the material on a clean slide and hold it down with your index finger so that only a very small portion is exposed. Press the flat edge of a new razor blade against your fingertip, angled slightly away from your finger. Make a series of 10 or more sections with a rapid, short, slicing motion, pushing the blade back very slightly each time without moving your finger. Wash the slices off the razor blade onto a clean glass slide with a little water and a dissecting needle.
2. Spread out the sections and discard any that are obviously too thick. Keep partial sections since they often have at least one edge which is quite thin.
3. Carefully draw off the water by placing a kimwipe at the edge and letting it soak up the liquid.
4. Add 1 or 2 drops of 0.2% toluidine blue stain to the sections on the slide and let it stain for 5 to 15 seconds.
5. Quickly draw off the stain just as you did the water.
6. At once, add a few drops of water to wash off any remaining stain and draw off this water.
7. Add more water. Blot it off again if it looks blue.
8. Add water and carefully spread out the sections.
9. Put on a cover slip and examine the slide. If the sections are stained too darkly, wipe off the slide and try again. If the sections are not stained darkly enough, either make a new slide and leave the stain on for longer, or draw off the water and stain the section a little more.
10. Be sure to adjust the light and the fine focus so that you see all there is to see.