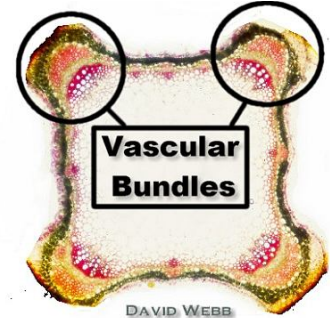


Tissue Printing Laboratory Exercise

Materials:

Several types of plants
Scissors and/or razor blades
Forceps
Paper
Colored pencils
Nitrocellulose (1.5 inches x 0.5 inches strips)
Microscope (top lighting, compound; dissecting scope)



Protocol:

1. Make thin sections of the plant stems using a razor blade. Sections can be a few millimeters to a centimeter thick. Sections can be length-wise or perpendicular to the stem. The latter are easier to print.
2. Use the forceps to place the tissue on the nitrocellulose. The tissue should be placed with the most structural side flat on the nitrocellulose.
3. Place a small piece of paper over the tissue.
4. Press on the paper so that the tissue is pushed into the nitrocellulose. Apply pressure evenly for 20 seconds.
5. Carefully remove the paper and the tissue.
6. The impression of the cellular structure of the tissue should be in the nitrocellulose. Additionally, proteins, like chlorophyll, will be transferred on to the nitrocellulose.
7. Examine the impression under the microscope.
8. Sketch the impressions for the different types of plants.
9. Indicate the features that you observe and for what they might be used. Describe any differences and similarities you observe between the features of different tissue types and plants.

Ideas:

Coleus plants have square stems and their vascular bundles are in the 'corners' of their stems. They are very good to use for tissue printing. Also, their physiology is very different from what most students expect.

You can use several different types of plants: monocots and dicots, succulents, food crops, etc. Their structures are all different. So, the students can make many hypotheses about them. Also, coleus comes in several varieties of colors. Again, this can be a useful point of inquiry.

While the stems of plants are often the easiest to use for tissue printing, all the other parts of the plant can be used as well. Students can compare the structure of cells that have different functions.