

CSI:Botany

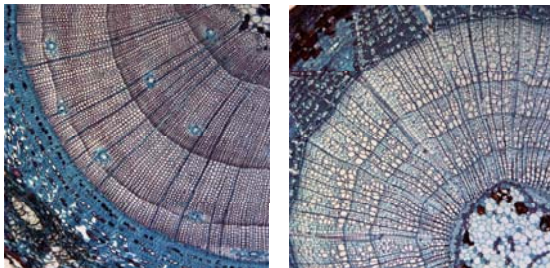
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The Activity

You are working for a company called *Fallen Trees*, which investigates tree poaching. Your job, with your recently acquired knowledge from completing a very interesting lab on plant anatomy, is to determine if any of the furniture at a local warehouse could be from pine trees stolen from a nearby protected heritage forest. The master carpenter claims all of his furniture is from 100% oak from his own land. However, some of his select line of furniture has a strong resemblance to pine. Wood samples have been taken from four pieces of his select line furniture from the warehouse. Determine the cut (tangential, radial, cross) of each section and if the sections are from oak or pine. Based on your initial results, does this case require further investigation?

Set Up and Background

To address these questions, students must look at unknown slides of either oak or pine showing cross, radial longitudinal or tangential longitudinal sections that are set up for them under compound microscopes. The instructor can choose which specific sections to use. I set up four compound microscopes and label the scopes with various furniture style names: Art Nouveau Chest – wood section #1, Shaker Chest – wood section #2, Victorian Chest – wood section #3, and Early American Chest – wood section #4. Additional resources include pine and oak wood blocks showing the different cuts and stereodiagrams (or schematic images) of the wood cuts and simplified plane section drawings.

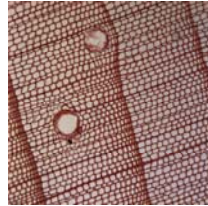


Pine stem c.s.

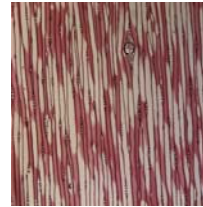
Tilia stem c.s.

Students in lab look at *Pinus* (pine) maceration for tracheids, *Quercus* (oak) maceration for vessel elements, *Pinus* stem cross section (c.s.) and *Tilia* (Basswood) stem c.s.

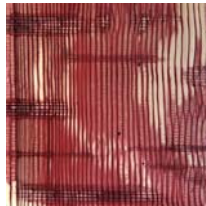
Pine



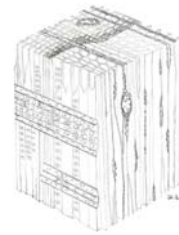
cross section (c.s.)



tangential longitudinal section (t.l.s.)

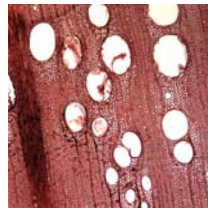


radial longitudinal section (r.l.s.)

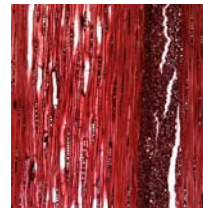


Wood Cuts

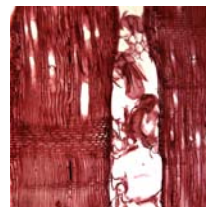
Oak



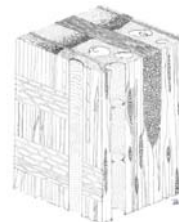
cross section (c.s.)



tangential longitudinal section (t.l.s.)



radial longitudinal section (r.l.s.)



Additional Resources

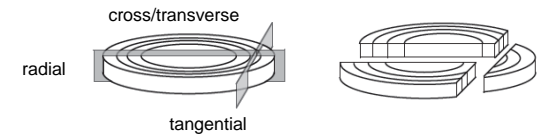


Pine wood block



Oak wood block

This exercise is a 10-15 minute activity that includes more wood cuts to challenge the students to visualize how cells are organized and would appear in different sections. This visualization should also help the student see how wood architecture contributes to the successful function of water transport and support. Additional resources include the pine and oak block schematic images, wood blocks and the three plane section drawings (below).



Tree Theft in the Real World

Traditionally the cut surface, shape and number of tree rings are used to match the stump to the suspect wood; now DNA can be used, with the combination of both methods preferred.

One example from the Pacific Forestry Centre in British Columbia (Canada) used molecular markers to determine if a large old cedar was removed illegally from a park.

In Eastern North America there are trees such as the Black Walnut in old growth forests that are worth thousands of dollars (extreme cases worth 10-20K) that have been illegally removed.

Tree poaching happens more often than we think; however if not caught in the act, it is often difficult to determine the perpetrator.

Your Crime Scene

You do not have to restrict yourself to the pine and oak wood slides, any wood slides that show the basic differences between conifer and angiosperm wood would work. The scenario could also change to a murder weapon or other component of a criminal case that involves wood fragments.