

# The Pigments of Leaves

In this experiment you will be comparing the pigments of various tree species

## MATERIALS NEEDED:

- \*Tree field guide or dichotomous key
- \*Digital camera (optional)
- \*Coffee filters or chromatography filter paper
- \*Isopropyl alcohol \*Clear Tape
- \*Coins \*Pencils
- \*Small transparent glasses or beakers



## EXPERIMENT PROCESS:

\*Collect green leaves from 3-5 different tree species. Identify the species using a field guide or dichotomous key. Create your hypothesis. Which tree species do you think will have the most pigments and why? Record the leaf color of each species in your data table (light green, yellow green, dark green, blue green, etc). You may also take pictures of the leaves.

\*If you are using coffee filters, cut them into 1 inch wide (2.5 cm) strips. The length of the strip should be equal to the height of the glasses or beakers you are using for the chromatography. Label the top of each strip of filter paper with one leaf species. Use a ruler to measure and draw a light pencil line 1 inch (2.5 cm) above the bottom of each filter paper strip. For the first leaf species, wrap a coin around the leaf with the waxy top side of the leaf facing outward. Rub the leaf along the pencil line on the filter paper until you make a dark green line of pigment. Repeat with the remaining leaf species and filter paper strips.

\*Set up enough small glasses or beakers for each leaf species you are testing. Pour isopropyl alcohol into each glass until it reaches a shallow depth of about 1 cm. For each completed filter paper strip, tape the top of the paper perpendicularly to a pencil. The pencil will be placed on top of the glass so that the filter paper will hang down into the glass. Put the filter paper into the glass, carefully so that the bottom of the paper strip touches the isopropyl alcohol. Do not submerge the paper past the green line of pigment. The pigment should remain above the alcohol so that it will not be dissolved into the solution itself. Instead, the alcohol should travel up the paper through capillary action, dissolving the pigment onto the paper and causing it to travel upwards. Repeat with each paper strip for each tree species.

\*Observe the papers as the alcohol travels up them. This may take 10-30 minutes. Do not touch the paper or disturb the glasses during this time. As soon as the alcohol reaches the top of the paper, remove the paper from the glass and let it dry. As the papers dry, observe and identify the bands of pigment. The pigments should be in the following order, from top to bottom: carotenes (orange), xanthophylls (yellow), chlorophyll a (yellow-green), chlorophyll b (blue-green), and anthocyanin (red). Record the species and pigments found in a data table. You may also want to take pictures of the chromatography papers or save them for your records and to display. Compare your results to your hypothesis and draw conclusions about the leaf species pigments.