

# Deciduous Forests

Investigation Data Sheet



## How Do Autumn Leaves Change Color?

Even though trees in temperate deciduous forests look green through the summer, as the days get shorter and the temperature gets cooler, leaves begin to lose their green pigment, chlorophyll. The spectacular colors that remain are from other pigments that have always been present in the leaves. Paper chromatography is a technique that enables us to separate these plant pigments.

### Objective

Separate the colored pigments in green leaves using paper chromatography.

### Materials

- safety glasses and gloves
- isopropyl rubbing alcohol
- eye dropper
- half-inch strips of filter paper
- scissors
- mortar and pestle
- wooden craft sticks
- pencils
- masking tape
- small jars or beakers
- ruler
- a variety of green leaves

**Safety Notice:** All applicable laboratory safety rules must be followed. Students should not perform any experimental activity without the teacher's supervision and express permission. Students must follow safety guidelines and wear appropriate protective gear.

### Procedure

- Adjust the length of one filter strip so it will fit into a jar without touching the bottom when it is suspended from the opening. Then cut all other filter strips to the same length.
- Use masking tape to attach the filter paper to the middle of the pencil. This will allow us to suspend the filter paper in the jar.
- Carefully pour rubbing alcohol into the beakers or jars so that there is just enough liquid to come in contact with the bottoms of the strips of filter paper when they are suspended from the openings. *Read and carefully follow all warnings on the alcohol bottle.*
- Make a leaf pigment sample: Tear up a leaf into little bits. Put the bits of leaves into the mortar, add a few drops of alcohol to make a thick paste and grind the ingredients together with the pestle.
- Using a ruler, measure the filter paper and use a pencil to mark a spot 2 centimeters from the bottom. Using a wooden craft stick, rub the pigment sample onto your filter strip at the spot you marked.

### Data Table

	Predictions	Observations after 20 min	Observations after 40 min	Observations after 60 min	Observations after 80 min
Leaf #1					
Leaf #2					

- Make another leaf pigment sample with a leaf from another type of plant and rub this pigment sample on another piece of filter paper. Be sure to place the pigment sample 2 centimeters from the bottom of the filter paper, just as the first.
- Hang the filter strips in the alcohol-filled jars, making sure the alcohol is just touching the filter paper, but not the pigment samples. What kinds of pigments do you expect to see in each leaf? Record your predictions in the data table.

**What's Happening?** As the alcohol reaches the green plant pigment sample and dissolves it, it starts to carry the pigment sample up the filter paper, too. The sample is really a mixture of several different pigments of different colors. Some of these pigments are lighter than others, and dissolve better in alcohol; they're carried farther than the pigments that are heavier, or that don't dissolve as well in the alcohol.

- Observe your samples every twenty minutes and record your findings in the data table. How many different pigments were found in each type of plant?

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- Let the strips dry and tape them onto your worksheet as a record of the different leaf types. Compare the pigments found in each leaf type. How were they similar and what was different about them?

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### Conclusions

What pigment gives leaves their green color?

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Why do all the filter strips need to be the same length?

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