

Color Detective: Flower Petal Chromatography

SAFETY FIRST! This experiment will use *acetone*. This is an organic solvent and evaporates quickly. Use in a well-ventilated area (outside is best). Also stay away from all flames!

Introduction: Flowers might be more complicated than you think. While they might appear to be just one color, they are often made of several colors! With this experiment you will be able to figure out what colors are in these flowers using a technique called chromatography.

Chromatography is a method of separating mixtures. The components of a mixture are separated based on a quality, such as the different sizes of the components or their attraction to other materials. Today we will separate flower pigments based on their attraction to a liquid called *acetone*. Acetone is a common chemical in our homes and is also called nail polish remover.

In a chromatography experiment, there is a mobile phase (usually liquid, here we are using acetone) and a stationary phase (usually solid, here we are using paper). The mixture starts at one end of the stationary phase. The mobile phase then moves from one end of the stationary phase to the other and carries the components of the mixture with it. Some components are more attracted to the mobile phase than others so they move faster and farther!

Martin Lab at UC Irvine YouTube Video: <https://youtu.be/3RIUspAjDFM>

Supplies:	Acetone (nail polish remover)	Spotter (straw)	Flowers
	Mortar (ceramic bowl)	Paper strips	
	Pestle (grinding rod)	Jar with lid	

Set-up:

1. 3 types of flowers for this experiment are provided in a jar. Start by separating the three types. The purple ones are rosebuds, the orange ones are lily flowers, and the yellow ones are strawflowers.
2. Take all of one type of flower and place them in the mortar.
3. Add a little acetone, just enough to soak the flowers.
4. Use the mortar and pestle to grind up the flowers. Spend at least 5 minutes grinding until the flowers are crushed to very small pieces and the acetone has become a bright color. When grinding the flowers, press the petals into the side of the mortar with the pestle (use some force!) and use a twisting motion to crush the petals. If it starts to dry out, add a little more acetone.
5. Take one of the black straws and dip it into your crushed flower petals. This will pull up a drop of acetone with the flower pigments.
6. Put this drop of flower mixture about $\frac{1}{2}$ of an inch from the bottom of one of the paper strips. If the color looks very faint, let the spot dry, and then spot it again. Repeat until you have a bright colorful spot.
7. Now make sure the jar is empty and clean of any flowers. Add about $\frac{1}{4}$ of an inch of acetone into the jar.
8. Place your paper strip into the jar with the color spot right above the liquid and lean it against the side of the jar. The spot *must* be above the liquid for the experiment to work! If the spot goes into the acetone, try again with a new paper strip.
9. Place the lid on the jar and watch the acetone travel up the paper. The color pigments from the petals will start to move with it! Wait until the acetone gets $\frac{3}{4}$ of the way up the paper. This can take about 10 minutes.
10. Take the paper out and let it dry. Observe the pigments in the flowers.
11. Clean out your mortar and pestle and start again with a different type of flower.

Questions:

What colors do you see with each type of flower? Do some have more than one?
Which colors do you think are more attracted to the acetone?

Further experiments: Try this experiment with other things, such as flowers or leaves you find around your home, colorful fruits or vegetables, or markers! Also try other liquids instead of acetone, such as rubbing alcohol or water. If you run out of paper strips, you can use watercolor paper.