

Coffee Filter Chromatography

Do you think all black pens are the same? What do you think is the difference between a blue pen and a red one? Here is an experiment to help you find out!

Materials

- 3 pens with different colored water-soluble ink (including black)
- 1 glass jar or plastic cup
- 1 coffee filter
- 1 pie tin
- warm water
- 1 pencil

Instructions

1. Open the coffee filter and, with the pencil, draw a circle in the middle of the filter, and one inch inside the edge of the coffee filter.
2. Put an ink spot for each pen or marker you are going to test on the circle, then use the pencil to label each spot so you can remember which pen it came from.
3. Fill the bottom of the pie tin with just enough water to cover it.
4. Fold the coffee filter so it makes a cone and place it gently in the bottom of the pie tin. The bottom of the cone should be in the water, but the ink spots should be ok above it.
5. Set the experiment aside and check it every five minutes to see which colors have separated.

Why/how does this work?

Chromatography is a process that separates out a mixture of chemicals. In this case, the chemicals to be separated are the pigments in ink. A solvent (water) is used to carry the pigments up a porous paper. As solvent climbs up the paper, the pigments that are the lightest and the most chemically compatible with the solvent move to the highest points on the paper, while the heaviest and least compatible are left near the bottom.