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Chromatography with colors

Paper chromatography is a great way to separate colors. At the start of the 20th century, Russian botanist Mikhail Semyonovich became the first person to use this method to investigate plant pigments.

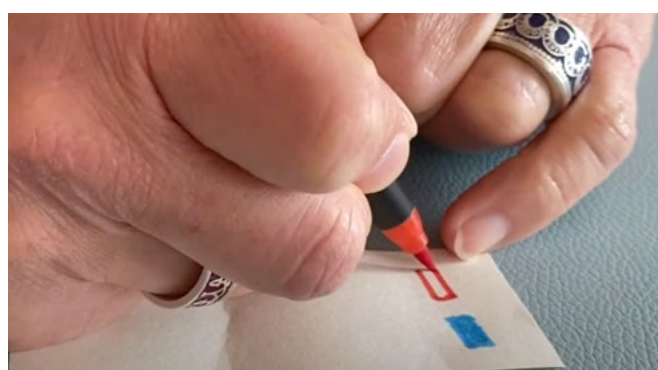
Chromatography can be used to separate a mixture of substances. They separate because their various parts stay in the mobile phase (in this case water) and stationary phase (paper) for different amounts of time.

What you'll need?

- absorbent paper or filter paper
- scissors
- food coloring
- wooden picks and skewers
- water-soluble markers in different colors
- 1 glass
- 2 small glasses to mix the food coloring

Instructions

- Mix blue and red food coloring each with some water.
- Cut a thin strip of absorbent paper (around 4 x 10 cm).
- Using a wooden pick, dab 1–2 drops of the color solution on the bottom of paper, around 1 cm from the edge.
- Fill around 1/4 of the glass with water and lay the skewer across the top of the glass.
- Hang the paper over the skewer so that its bottom edge is in the water, but the dots of color are not.
- Watch what happens.
- Afterward, try this with water-soluble markers and see how they separate. Get a new strip of paper, draw small squares at the bottom edge and hang it so that the paper just touches the water, but the colors don't.





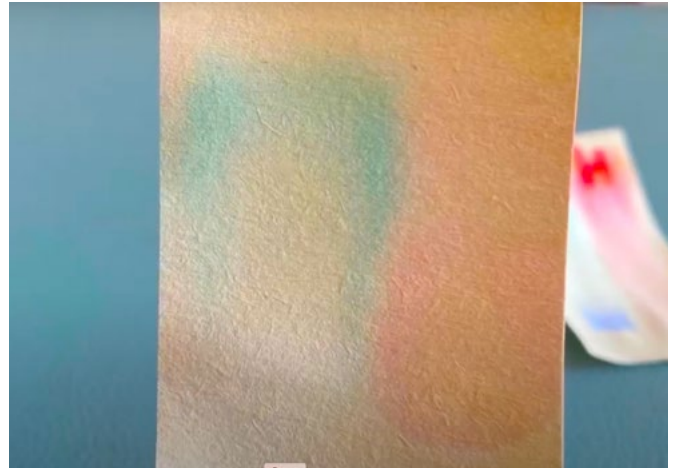
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What happens and how does it work?

- The water slowly climbs up the strip of paper, taking the color particles with it.
- However, different color particles act differently.
- Some stick to the paper more, while others dissolve better in the water – our mobile phase – and move further up the paper.
- When we use food coloring, the blue color particles move further up the paper than the red particles.
- If we use red and blue markers, the difference is even more obvious – but the other way around. Some of the blue hasn't moved up the paper at all, while the red has consistently travelled up the paper with the water.
- If we try this with black markers, we can see that the color black is made up of very different colors.



Keep on exploring!



If you have a few water-soluble black markers at home, compare them and find out which colors make up the black. If you have any other colors, try them as well.