

Paper chromatography

Equipment (per individual)

- Chromatography paper
- Dropping pipette
- Beaker, 100 cm³
- Capillary/melting point tube (or toothpick) x 3
- Wooden splint (or pencil)
- Distilled water
- Ruler
- Paper clip
- White tile
- Ink samples x 3 (see notes)
- Hairdryer (optional)
- Gloves (optional)

Find the full method in the supporting resources, available from: rsc.li/3MSQltm.



Additional optional equipment

Teachers may request ethanol to demonstrate the experiment using a different solvent. Use a lid and wear eye protection (safety glasses to EN166 F) when using the alcohol.

They may also ask for ninhydrin spray or UV lights to reveal the spots on a TLC plate. Find out more at: rsc.li/3TaQdcv.



Preparation

Cut the chromatography paper so it is long enough to go around the splint/pencil and reach the bottom of the beaker. Secure with a paper clip. Size the paper to be wide enough for learners to add three samples on the pencil line but also sit perpendicular inside the beaker without the edges touching the side of the beaker. With a large class you can double everything and have six spots on the paper. They can then cut the chromatogram so each learner has the three samples.

Prepare and try out the inks. You can give it out in small containers as each learner requires very little. Five to six learners can share one container of ink. You need to provide:

- A water-soluble black ink that will separate into different colours to which you have added a pure, coloured soluble ink.
- A non-water-soluble black ink. Eg, a black felt tip with a narrow nib that will not dissolve in water.
- A water-soluble, pure coloured ink.

The final chromatogram will look similar to this:

Sample 1 separated into colours including the added orange ink. This is just an example so the order of the colours does not matter.

Sample 2 has not moved from the origin line.

Sample 3 is pure orange ink.

The actual colour does not matter – it just needs to be a pure colour that is not already in the black ink so learners can identify that the doctored sample 1 contains this colour.

Teachers may request hairdryers to dry the chromatograms in the lesson so learners can stick it in their files and find the R_f values.



Safety

- Read our standard health and safety guidance (available from: [rsc.li/3MwtYKg](https://www.rsc.li/3MwtYKg)) and carry out a risk assessment before running any live practical.
- Refer to SSERC/CLEAPSS Hazcards and recipe sheets. Hazard classification may vary depending on supplier.
- Gloves are optional and learners can use polythene gloves to protect their hands from staining. Chemical resistant gloves are only necessary for learners who have an allergy to the chemicals used in this experiment.

Chemical supplied for the practical

Preparation

Samples of inks.

Not usually considered as hazardous but check the supplier's safety data sheets.

Ethanol
C₂H₆O(l)



DANGER

Highly flammable liquid and vapour.

or

IDA (Industrial Denatured Alcohol), 95%
C₂H₆O(l)



DANGER

Highly flammable liquid and vapour.

Harmful if swallowed. May cause damage to organs.

CLEAPSS Hazcard HC040A.

IDA is usually used instead of ethanol as it is suitable and cheaper than pure ethanol.

Disposal

- Put used chromatography paper, toothpicks and splints (if used) in the general waste.
- Dispose of capillary tubes in the glass bin.
- Only use a very small amount of ethanol to show a different mobile phase if requested. Leave it to fully evaporate in a fume cupboard or reuse for other purposes.