# Separating mixtures

**1. Identify a method for removing gravel from water and explain why it works.**

Use a sieve or filter. Large gravel particles are retained while water passes through.

**2. Which physical property allows a magnet to separate steel pins from wooden beads? Explain.**

Steel pins are attracted to the magnet, while the wood is not.

**3. Explain why a filter cannot remove dissolved sugar from water.**

The dissolved sugar molecules pass through ordinary filter paper with the water.

**4. Describe how to collect sugar crystals from a concentrated solution without boiling it dry.**

Evaporate some solvent to concentrate the solution, then cool or leave it to crystallise. Separate and dry the crystals.

**5. Explain how a separating funnel can isolate oil from water.**

The immiscible liquids form layers. The denser water forms the lower layer and is drained through the tap before the oil.

# Worked solutions · Questions 6–10

**6. Why should the ink start line in paper chromatography be drawn in pencil and placed above the solvent?**

Pencil graphite does not dissolve and travel like an ink dye. Keeping the spots above solvent stops them washing directly into the solvent reservoir.

**7. A dye travels 24 mm while the solvent front travels 60 mm. Calculate its Rf value and state whether the value has units.**

Rf = 24 ÷ 60 = 0.40. It is a ratio so it has no units.

**8. A flask holds muddy water with some dissolved salt. Describe how to collect clear, low-salt water.**

Filter out the mud. Distil the filtrate and collect the condensed water, leaving salt behind.

**9. A mixture contains iron filings, insoluble chalk and soluble salt. Give a procedure to recover the salt.**

Remove iron with a magnet. Mix with water to dissolve salt, filter out chalk, then concentrate the filtrate and collect salt crystals.

**10. Two dyes have the same Rf value in one solvent. Explain why that result alone does not prove they are identical and suggest a follow-up.**

Different substances can travel equally far under one set of conditions. Repeat with another solvent and compare both with known standards.