

materials

Mixtures and solutions: filter sand, start the salt wait

Lesson at a glance

Open with a clear jar of dissolved salt and a hands tally: has the salt gone, or is it still there? Hold it beside a sandy-water jar to name mixture versus solution, then model filtering and a thin salt-solution dish for slow windowsill evaporation. Groups recover sand through filter paper today, choose how thin to pour their salt layer, and record prediction, filtering observation and the empty-looking dish on the Investigation Journal page, leaving space for crystals later in the week.

Learning objectives

- Predict and explain where dissolved salt goes in a solution
- Recover undissolved sand by filtering today, and set up a thin salt-solution dish for slow windowsill evaporation to check across later days
- Conclude from today's evidence that undissolved sand can be filtered out, and that dissolved salt was not caught by the filter and remains in the liquid, with crystals later in the week as the missing proof

Before the bell – prep

Night before: dissolve ~2 tsp table salt in warm water in a clear jar and cool until fully clear; stir dry sand into a second jar. Set group trays (cups, funnel, filter paper, shallow dish, spoons, labels). Pick one sunny sill or warm (not scorching) radiator shelf; print one Investigation Journal page each.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
table salt	1	class	supermarket	any fine cooking salt
clean dry sand	1	group	school kit	washed fine grit, crushed clean eggshell, or dry rice grains (all stay undissolved for the filter half). Do not use sugar as the filter solid; sugar dissolves and is only useful as an optional extra dissolved example beside the salt jar
clear plastic cups or small jars	3	group	classroom	clean yoghurt pots or jam jars
filter paper circles	2	group	school kit	strong kitchen roll or a coffee filter cone
plastic funnel	1	group	school kit	top half of a clean plastic bottle with the cap removed, used upside down as a funnel
shallow dishes or saucers	1	group	classroom	jar lids or clean plastic food trays
plastic teaspoons or craft spoons	1	group	classroom	lollipop sticks for stirring
trays	1	group	classroom	large plastic lids or a covered desk with newspaper
labels and pencils	1	group	classroom	masking tape and a marker
jug of clean water	1	class	classroom	tap water in bottles
cloths or paper towels for spills	1	class	classroom	old tea towels
Investigation Journal page	1	pupil	classroom	plain A4 page ruled into three headed sections: prediction and salt-layer choice; filtering observation; salt dish now and later

Safety watch-point

No tasting. Work over trays, wipe spills at once, wash hands after sand and salt water. Radiator shelf must be warm not scorching; plastic dishes stable and unable to slide off.

Teaching moves

- **Getting Started:** Hold up only the clear salt jar. Take a quick hands tally—gone forever / still there / not sure—without correcting. Keep the sandy jar out of sight until the next step.
- **Dissolved is not gone:** Bring out the sandy jar beside the clear one. Board only mixture and solution plus ‘dissolved is not gone’. Save the words filtering and evaporation for the modelled cycle.
- **What do you think?:** Think-pair-share on where dissolved salt goes and what filtering will catch. Capture two or three worded predictions on the board to return to later; do not mark them right or wrong.
- **How we get materials back:** Model the full cycle out loud over a tray: fold filter paper into a cone, pour sandy water slowly, point to wet sand and liquid below; then pour a thin salt layer into a shallow dish, date-label it, and place it on the agreed sill. Say clearly: no cooker or kettle—slow and safe only; crystals are days away.
- **Filter and set up the dishes:** Hand out journal pages with the trays. Groups own the salt-layer thickness choice (thin film dries sooner in cool Irish weather). Watch for overflow and torn paper; redirect anyone claiming they have ‘got the salt back’ today.
- **Observe and record:** Put three beats on the IWB: prediction and salt-layer choice; filtering observation; salt dish now with space for later. Circulate so observations stay factual and inferences are labelled as thinking.
- **What the evidence shows:** Return to board predictions. Hold one class standard: sand proved today; salt conclusion waits for crystals. Practise one observation sentence and one inference sentence before feedback; close with a shared board line.
- **Reflect and tidy:** Keep the spoken close to the shared proof line, then run a proper wet exit: two pupils check every dish is labelled and stable on the sill; stack kit to dry; wipe tables; wash hands. Plan one-minute crystal checks on later days.

What it should show

Filtering should leave wet sand in the paper and clearer water in the cup below; dissolved salt is not caught. Salt dishes look empty of solid today. Crystals usually begin within a few school days on a warm sill (longer in cool damp weather). Odd sand results often mean pouring too fast overflowed the cone—re-run slowly with a fresh fold.



Misconceptions & interventions

- **The salt has vanished or turned into water.** — Point at the clear jar: the salt particles are still in the liquid, just too small to see. Filtering will not catch them—that is why the class starts the evaporation wait.
- **The filter will catch the salt as well as the sand.** — Trace the path: sand grains are too big for the tiny holes; dissolved salt rides through with the water. Compare what is in the paper with what is in the cup.
- **We got the salt back today because we poured the solution into the dish.** — Hold up a dish: still clear liquid, no solid yet. Name it a waiting experiment; the proof is crystals later in the week, not the pour.



Differentiation

Emerging	Developing	Proficient
• Pre-fold one filter cone and offer a sentence strip: 'The filter caught _____. The water went _____.' • Pair at the teacher table for the slow pour and the thin salt-layer choice.	• Add a short why for the salt-layer thickness and one sand success check on the journal page. • Compare two groups' thickness choices and predict which dish may show crystals sooner.	• Ask whether filtering could ever recover dissolved salt and what evidence would prove it. • Stretch to name why chemists match the separating method to whether the solid has dissolved.



Cross-curricular hook

Link to Maths measures: compare thin versus deeper salt layers and estimate drying time in cool classroom conditions.

