

materials

Warming and cooling materials

Lesson at a glance

Hold up a firm chocolate square and cold butter and invite quick predictions about gentle warming. Pupils record warm-and-cool predictions on the Investigation Journal page, then watch a teacher-only warm-water tray demo of each material in a foil dish. Dishes move to a cool plate for eyes-only firming, then the class revoices soft/shiny/runny versus thicker/firmer before finishing the observe section and a short prediction match.

Learning objectives

- Predict and observe how gentle warming and cooling can change some materials
- Describe what changed when chocolate and butter were warmed and then cooled

Before the bell – prep

Night before: chill butter and, if possible, a plate or ceramic tile in the fridge. Gather chocolate squares, foil dishes, a shallow tray, and a jug for hand-warm (not hot) water. Set dishes and water only when the demo starts; keep cold butter firm until then.

Materials

Item	Qty	Per	Source	Low-cost substitute
chocolate squares	2	class	supermarket	a few squares broken from a plain cooking-chocolate bar
butter pieces	2	class	supermarket	a small knob of margarine or a dairy-free spread that softens with gentle warmth
small foil dishes or bottle-cap dishes	2	class	supermarket	clean metal bottle caps or small jam-jar lids
shallow tray for warm water	1	class	classroom	a clean roasting tin or deep baking tray
jug of warm water	1	class	classroom	a large mug of warm tap water poured carefully into the tray
cool plate or mat for the cooling step	1	class	classroom	a ceramic tile or upturned clean lid kept in a cool spot
Investigation Journal page	1	pupil	classroom	a plain A4 page with space to draw and write a prediction and observations



Safety watch-point

Teacher handles tray and dishes only. Use hand-warm water — never hot, boiling, or flame. No tasting. Wipe spills at once; wash hands if needed.



Teaching moves

- **Getting Started:** Hold up one solid chocolate square and a small piece of cold butter so everyone can see. Take three or four ideas on what gentle warming might change — look, feel, or shape — and accept all without correcting. Link lightly to a warm schoolbag or sunny windowsill.
- **Our question and predictions:** Read the question aloud. Pupils complete only the prediction part of the Investigation Journal (draw or write with stems: I think the chocolate/butter will... because...). Invite two or three shares; do not confirm outcomes before the tray.
- **Warming on the tray:** Fill the tray with hand-warm water only; pupils stay back while you handle dishes. Model the chocolate cycle aloud (wonder–predict–test–observe–think), tip the dish so edges show, then warm the butter the same way. Every 30–60 seconds take whole-class judgements: thumbs-up on first change, one word (soft/shiny/runny/firm), which is changing more.
- **Watching them cool:** Lift both foil dishes onto the pre-chilled cool plate away from the tray. Name the watch signals (thicker edge, less shine, slower drip), give about two quiet minutes, and pace with short thumbs-up and one-word prompts. Eyes only — no writing and no touching.
- **Record what we noticed:** Bring the cool dishes back into view and build two short board lists first (when warmed; as they cool) using shared words. Then pupils finish only the observe lines plus a quick prediction match on the Investigation Journal. Circulate with: What did you see when it was warm? What do you see as it cools?
- **What did we notice?:** Think–pair–share on what changed when warmed and when cooled, then take three contributions and revoice with warming and cooling. Follow with one everyday prompt (schoolbag chocolate, sunny butter, ice lolly on a warm day). Stress the material is still there.

What it should show

Both soften on warm water; butter often melts faster into a runny pool while chocolate goes soft, glossy and more runny at the edges. On the cool plate both begin to firm — thicker edges, less shine, slower drip; butter soft-solid, chocolate duller and thicker. Little change usually means water too cool — refresh with slightly warmer (still not hot) water and wait.



Misconceptions & interventions

- **It disappeared — the chocolate/butter is gone when it looks runny.** — Point at the pool in the foil dish and say: same material, different look and feel. Revoice: it changed when warmed; it did not vanish.
- **Only fire or something really hot can change materials.** — Gesture to the hand-warm tray: no flame, just gentle warm water. Link back to a coat pocket or sunny windowsill so everyday warmth counts.

Differentiation

Emerging	Developing	Proficient
• Allow a drawing plus an oral because for the prediction; scribe key observe words (soft, runny, firmer) from the board list. • Seat nearer the tray demo so changes in shine and shape are easy to see.	• Prompt a simple compare: which changed faster on the warm water, chocolate or butter? • Ask them to tick prediction close/not close and finish the short because stem.	• After recording, sketch one everyday place they have noticed warming or cooling change a material. • Challenge: name one cooling signal they spotted first (thicker edge, less shine, or slower drip).

Cross-curricular hook

Link to SPHE/home routines — safe noticing of food softening in a warm lunch box or on a sunny Irish windowsill, always with an adult.