

engineering

Build a little boat that floats

Lesson at a glance

Hold up a simple foil boat and ask which shape will float best and hold the most, linking to Irish harbours or a river boat. Teach float, load and improve with the demo boat, then groups fold a foil boat with a flat bottom and raised sides and check it on a water tray. They predict a counter load, add one by one until water comes in, make one shape change, and record prediction, first count and the improvement on the Investigation Journal page.

Learning objectives

- Make a small boat that floats in a water tray
- Predict how many counters it will hold, then observe and improve the shape once

Before the bell – prep

Fill shallow water trays and lay towels beside them before the make step. Tear foil sheets about 20 cm by 20 cm; put counters in small pots kept off make tables. Hold modelling clay yourself for leaky corners only; keep scrap paper and lolly sticks aside for sails after a successful empty float.

**Materials**

Item	Qty	Per	Source	Low-cost substitute
aluminium foil sheets (about 20 cm by 20 cm)	2	group	supermarket	used clean foil flattened carefully, or thin card coated with a small piece of foil
Investigation Journal pages	1	pupil	provided printable	plain A4 paper with the four record prompts written on the board
modelling clay (optional seal for leaky corners)	1	group	classroom	a small ball of play-dough
lolly sticks (optional sail after boat floats)	2	group	classroom	strips of stiff card
scrap paper for optional sail	1	group	classroom	a small offcut from a magazine page
shallow water tray or washing-up bowl	1	group	classroom	one large class tray with groups taking turns
plastic counters or coins	20	group	classroom	identical buttons or small pebbles
towels or cloths	2	group	classroom	newspaper layers for blotting spills

Safety watch-point

Wipe spills straight away; no splashing. Keep counters out of mouths; roll sleeves up before water work.

Teaching moves

- **What helps a boat float?:** Read float, load and improve one at a time from the board, pausing after each meaning and pointing to your foil demo boat. Hold the open boat beside a tight foil ball so children see shape, not weight alone, and ask whether high sides will hold more counters than a flat sheet.
- **Make your boat:** Hand out one foil sheet per child or pair only now — no clay, sticks or scrap on the make tables. Model once: flat bottom, four sides up, pinch the corners. Circulate for clear bottoms, raised sides and pinched corners; offer a pea-sized clay bit yourself only if a corner still leaks.
- **Load, watch and improve:** Run a two-minute demo at the front tray: predict, add counters one by one counting aloud, name when water comes in, then fold the sides higher once. Release groups; ask what they will change once and why. One improvement only — a second load is bonus if time; watching at a shared tray counts as real participation.
- **Record on your journal page:** Stop loading so pages stay dry. Pupils write or draw prediction, first load count, and the one shape change; emerging writers may draw or use a scribe. Second-try more/fewer/same only if they actually reloaded — otherwise mark no second try. Protect the full recording time; do not fold it into tidy-up.
- **What we noticed:** Two groups hold up boats and say one number and one improvement. Revoice high sides, wide bottom and pinched corners. If someone says only light boats float, point to a boat that held many counters because of its shape.

What it should show

Wide, shallow boats usually hold fewer counters; boats with higher pinched sides usually hold more before water creeps in. If every boat sinks at once, the foil is too small or corners are open — show pinching corners again. A boat that sinks empty is usually a crumpled ball, not a tray shape.

Misconceptions & interventions

- **Heavy things always sink and light things always float.** — Hold the open foil boat beside a tight foil ball of the same material. Point to the hollow middle and raised sides so talk stays on shape, not weight alone.
- **A crumpled ball of foil is a boat if it sits on the water for a moment.** — Point back to the look-fors: flat bottom, raised sides, pinched corners. Ask whether counters would stay in, then have them unfold and rebuild as a tray shape.

**Differentiation**

Emerging	Developing	Proficient
• Offer a pre-folded corner demo they can press and copy; accept a drawing or adult/peer scribe for the journal improvement line. • Pair at the teacher tray for the first empty float check before they load alone.	• Prompt one clear why for the single improvement (higher sides, wider bottom, tighter corners). • If time, bonus second load and mark more, fewer or the same on the journal page.	• After the empty boat already floats, add a small sail from scrap paper and a lolly stick and check it still floats. • Compare their boat with another group's and name one shape feature that held more counters.

Cross-curricular hook

Link counting the load to Maths number, and name Irish harbours, the Shannon or a local pond where children have seen boats.