

The lungs: how we breathe

Lesson at a glance

Open with hands on chest and tummy so pupils feel what moves as they breathe. Demo a finished bottle model, pulling the base sheet to fill the lung balloon and pushing it up to empty it, then name lungs and diaphragm. Pairs seal the base on a half-built kit; on the class signal they watch their model breathe. They predict on the Investigation Journal, count breaths for 30 seconds at rest and after one minute of star jumps, then write why breathing sped up.

Learning objectives

- Build a simple model that shows how the diaphragm helps the lungs fill and empty
- Count breaths at rest and after moving and compare the two
- Explain in their own words that breathing speeds up when muscles work harder and need more from the air

Before the bell – prep

Adult-only night-before prep: cut bottle bases off; fix a lung balloon airtight in each lid so it hangs inside. Default kit is half-built. Keep one finished demo bottle and spare pre-built lids ready. Balloons, tape, optional straws; Investigation Journal pages printed.

Materials

Item	Qty	Per	Source	Low-cost substitute
clear plastic bottle with base removed and lid airway prepared by an adult	1	pair	supermarket	a large clear plastic cup with the base carefully cut out by an adult and a balloon sealed over the rim as the lung if a bottle lid is awkward
balloon for the lung	1	pair	supermarket	a small party balloon from a multipack
balloon or thin rubber sheet for the diaphragm	1	pair	supermarket	a piece of stretchy washing-up glove taped over the base
short drinking straw	1	pair	classroom	skip the straw and fix the lung balloon directly in a hole in the lid
masking tape	1	group	classroom	sticky tape
stopwatch or classroom clock with a second hand	1	class	classroom	teacher counts seconds aloud
Investigation Journal page	1	pupil	classroom	a ruled page with headings for prediction, breaths at rest, breaths after moving, and one conclusion sentence

Safety watch-point

Adult-only bottle cutting and lid prep. No sharing balloons or straw mouthpieces. Stop anyone dizzy from jumps; no breath-holding contests; clear space for star jumps.

Teaching moves

- **Getting Started:** Keep bottles away. Ask two or three pupils what moved under their hands — chest rise is the common answer; tummy movement is useful later when you name the diaphragm. Link forward: the heart speeds up when we move — might breathing change too?
- **How our lungs work:** Show the finished bottle first, then run the live pull-and-push before long definitions. Say the worked cycle aloud: pull base — lung fills; push base up — lung empties. Name lungs and diaphragm briefly. Head off the idea that lungs suck air in by themselves: the diaphragm makes the chest space bigger so air is pushed in.
- **Build a lung in a bottle:** Pairs confirm the pre-fixed lung, stretch and tape the base sheet sealed, then hands up for your seal check. You do the gentle test pull — no free pair testing yet. At about 10 minutes, any failed seal joins the demo bottle; protect observation and the breath-count journal over perfect kits.
- **Watch the model breathe:** On one class signal, pairs pull the sheet down then push it up. Revoice: pull-down fills, push-up empties; in the body the diaphragm mostly relaxes upward rather than being shoved. Fold failed-seal pairs at the demo bottle so nobody misses the idea.
- **Count breaths at rest and after moving:** Agree the rule aloud: one breath = one in and one out together; practise two or three slow breaths. Reveal only the current beat on the board. Call start and stop for both 30-second counts and the one-minute move. Pupils who should not jump become timekeepers or partner counters.
- **Record and make sense:** Leave the causal line on the IWB: muscles work harder and need more from the air, so breathing speeds up. Pupils finish prediction, both counts, and one own-words conclusion on paper. Whose count changed most, how the bottle helped, what would make the count unfair — with no fitness ranking.

What it should show

Pulling the base sheet fills the lung balloon; pushing it up empties it. Rest counts often sit around 8–12 breaths in 30 seconds; after star jumps the second count is higher. A flat or falling second count usually means counting only in-breaths, talking during the count, or a half-hearted move — re-agree the breath rule and re-run the after count if time allows.

Misconceptions & interventions

- **Pupils think the lungs suck air in by themselves.** — Point at the bottle: when the diaphragm sheet pulls down the space gets bigger and outside air is pushed in. Trace pull-down → fill on the demo model.
- **Pupils think their real diaphragm is shoved upward the way they push the balloon sheet on the model.** — Say the bridge line: on the bottle we push to show the move; in quiet breathing the diaphragm mostly relaxes and domes back up on its own.
- **When counting, pupils tally only the in-breath or lose the rest-versus-after comparison.** — Rehearse the shared rule — one breath is one in and one out together — and keep both counts to the same 30 seconds on your start/stop call.

**Differentiation**

Emerging	Developing	Proficient
• Keep the half-built default: pair only seals the base, or joins the demo bottle for the watch step. • Pupil who should not do star jumps times the class or counts a partner's breaths and still records both numbers.	• Prompt a fuller because-clause on the prediction and conclusion (muscles need more from the air / oxygen). • Ask what would make the two counts unfair (different times, counting only the in-breath).	• Confident pairs try a second, tighter base seal and compare which model responds more clearly. • Stretch talk: link faster breathing after moving to the idea that the heart also speeds up when muscles work harder.

Cross-curricular hook

Tie to Maths Measures and Data — compare two 30-second counts and talk about the difference without ranking fitness.

