

# One organ in action: investigating the heart

## Lesson at a glance

Open by feeling the wrist pulse and wondering what speeds the heart up. Pupils locate the heart on the body-diagram interactive between the lungs, then each group chooses a gentler and a livelier on-the-spot activity to compare with rest. They plan on the FairTestPlanner page, run three 15-second pulse trials per condition with stopwatches or the on-screen timer, and circle middle values on the DataTable. Class middle values pool into the data-recorder bar chart before a talk on why everyday activity keeps the heart strong.

## Learning objectives

- Locate the heart among the main organs of the human body
- Design and run a fair pulse investigation, choosing activities to compare and measuring with repeats
- Use pooled class evidence to explain what makes the heart work harder and how activity keeps it healthy

## Before the bell – prep

Print FairTestPlanner and DataTable Investigation Journal pages. Gather stopwatches (or cue the on-screen timer) and clear a small floor space for marching, walking or dancing on the spot. Check quietly who must sit out exercise and act as timekeeper or recorder only.

## Materials

| Item                         | Qty | Per   | Source             | Low-cost substitute                                                   |
|------------------------------|-----|-------|--------------------|-----------------------------------------------------------------------|
| stopwatch                    | 1   | group | school kit         | classroom clock with a second hand, or the on-screen timer on the IWB |
| Investigation Journal pages  | 1   | pupil | provided printable | ruled paper with two headed sections copied from the board            |
| scrap paper for trial counts | 1   | group | classroom          | the back of a reused worksheet                                        |

## Safety watch-point

Pupils who should not exercise (asthma flare, recent illness) are timekeeper or recorder only. Stop anyone pale, dizzy or short of breath. Light finger pressure only; activities stay on the spot in clear space.



## Teaching moves

- **Getting Started:** Keep it light: invite a few volunteers to find a wrist pulse with two fingers, never pressing hard. If the wrist fails, try the side of the neck gently or let a partner check. Collect only two or three ideas on what speeds the heart, then move on — no stopwatches or full investigation yet.
- **Where does the heart sit?:** Open the diagram-labeller on the IWB in display mode. Point to lungs, heart, stomach and intestines; dwell on the heart slightly left of centre between the lungs. Draw out that the lungs sit either side — do not put the answer up first. Head off the valentine-heart drawing: real heart is almost central, a little left, roughly fist-sized.
- **What shall we test?:** Fix the theme (pulse and activity) but let each group choose which two on-the-spot activities to compare with rest. Board the shared labels now: quieter choice = gentler activity; stronger = livelier. Hear two or three predictions with the stem 'I think ... will make the heart beat fastest because...'. Anyone who should not exercise becomes timekeeper or recorder.
- **Plan our fair test:** Drive the fair-test-planner interactive on the IWB: Change = the activity; Measure = how fast the heart beats; Keep the same = 15-second count, who we measure, one-minute exercise. Model your own rest-vs-march example with three readings and a middle value before groups write. Circulate and check every FairTestPlanner has only one thing in Change.
- **Measure our pulses:** Name the three jobs on the board: person measured, timekeeper, recorder. Practise finding the pulse once as a class. Rest first (sit one minute, three separate 15-second counts), then gentler, then livelier — each activity as three full activity-then-count rounds, never one bout then three delayed counts. Use the pacing lever: rest plus one clean activity is enough if time is tight; do not start a second activity with under about six minutes left.
- **Record our readings carefully:** Model middle value once on the board (22, 18, 20 → 18, 20, 22 → middle is 20) before groups circle theirs on the DataTable. Look for three trials per activity, middle value marked, units as beats in 15 seconds, and no conclusion sentences mixed into the numbers.
- **Pool the class results:** Before any numbers go in, have every group name which activity sits under gentler and which under livelier. Open the data-recorder; groups call out the shared bin label and their middle pulse only. Enter several rows per bin so the bar chart shows the class pattern. If one group's bar falls, ask what might have happened — useful science talk, not failure.
- **What keeps a heart healthy?:** Draw out that livelier activity raised the pulse so the heart is a muscle that strengthens with regular use — walking to school, yard games, swimming, cycling. Stress that today's counts only showed the pump working harder; the health message comes from longer studies. Close with calm breathing so elevated pulses settle.



### What it should show

Expect resting 15-second counts around the low twenties, with middle values rising from resting to gentler to livelier activity. Exact numbers vary widely by child — the rising pattern matters more than any textbook figure. A group whose pulse falls after activity often counted too late, mixed the method (one bout then three delayed sits), or started already breathless; re-run one clean activity-then-count round immediately.

### Misconceptions & interventions

- **Pupils draw or point to the heart as a cartoon valentine stuck on the far left of the chest.** — On the diagram-labeller, place a fist on your own chest almost in the middle and a little left. Say the real heart is roughly fist-sized, protected by the ribcage between the lungs.
- **Pupils think a faster pulse during exercise means something is wrong or dangerous.** — Link back to their own bar chart: the rise shows the heart meeting the body's need for more oxygen. Danger signs are dizziness, pain or feeling unwell — that is when we stop.
- **Groups do the activity once then take three sitting counts in a row and treat them as fair repeats.** — Stop and re-voice the method on the board: each trial is a full one-minute activity then an immediate 15-second count. Delayed sits measure a falling pulse, not the same state.

### Differentiation

| Emerging                                                                                                                                                                                                                                            | Developing                                                                                                                                                                                                                                    | Proficient                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Pair the recorder with a partner to order the three trial numbers and circle the middle value.</li> <li>• Accept rest plus one activity as a full valid set; pool those two middle values only.</li> </ul> | <ul style="list-style-type: none"> <li>• Prompt why two groups' resting middle values might differ even with the same method.</li> <li>• If time allows, rotate so a second pupil is measured for one full rest-plus-activity set.</li> </ul> | <ul style="list-style-type: none"> <li>• Fast finishers sketch a second prediction: what would happen after two full minutes of the liveliest activity?</li> <li>• Ask them to critique another group's fair test: did anything else change besides the activity?</li> </ul> |

### Cross-curricular hook

Tie to the Maths Data strand — order three trial counts, find the middle value, and read the tallest bar on the class chart.