Lesson 2 · living-things

One Organ in Action: Investigating the Heart

Lesson at a glance

Open by having pupils find their own pulse at the neck and wonder what dancing or running does to it. After a short read on the heart as a pump, model a full pulse investigation aloud at the IWB, then groups sort the planner cards and choose which activities to compare on their FairTestPlanner page. Groups count resting and active pulse for 15 seconds, three times each, circling the middle value, then pool middle values into a class pattern in a display-only science-talk.

Learning objectives

- Investigate how the heart works harder during activity by measuring pulse
- Design and run a fair test, choosing which activities to compare
- Repeat measurements and use the middle value to make results trustworthy

Before the bell — prep

Have one stopwatch (or the IWB clock) per group and a clear stretch of floor to push desks back into. Decide in advance which delivery model you'll use — whole-class counting windows called from the front if every group fits, or groups taking turns in a marked-off area if space is tight. Wrist counting works for anyone who can't feel the neck pulse. Open the FairTestPlanner interactive before the bell.

Materials

Item	Qty	Per	Source	Low-cost substitute
stopwatch	1	group	school kit	the class clock with a second hand, or the fair-test-timer on the IWB
Investigation Journal data table page	1	pupil	classroom	lined paper ruled into a simple table with columns for rest, each activity, count 1, count 2, count 3 and middle value

Safety watch-point

Any pupil who shouldn't exercise becomes a timekeeper or recorder, never left out. Watch for anyone light-headed during the active bursts and let them sit straight away.

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Teaching moves

- **Getting Started:** Let everyone find their own pulse first — two fingers under the jaw, stay still. Reassure the ones who can't feel it and point them to the wrist. Take a few out-loud guesses about dancing, then move on. Don't hand out stopwatches yet.
- **How the Heart Works:** Read the two short paragraphs, pointing at your own chest for the heart's fist-size and middle position. Pre-empt the common 'heart is on the left' idea — it sits in the middle, tilted slightly left. Ask a pupil for their own example before revealing each table row.
- **Model the Pulse Cycle:** Model the whole cycle aloud: I wonder... I predict... I'll keep this the same... I counted... I think... Count your own pulse for 15 seconds against the clock, march for a burst, count again. Say the conclusion sentence word for word so groups copy the thinking, not just the counting.
- **Plan Your Fair Test:** Drive the FairTestPlanner on the IWB and sort the five cards with the class: the activity → Change, how fast the heart beats → Measure, and counting time, who counts and the stopwatch → Keep the same. Be explicit that the group's real choice is which activities to compare and how many — not whether to keep the counting time fair.
- **Measure and Record:** Push desks back. Run resting count first, then one minute of the chosen activity, then count again — three goes each. Walk the room and model finding the pulse for slower counters. Show the middle value simply: line three counts up smallest to biggest, circle the middle; if two tie, that's the middle.
- **Pool and Discuss the Class Results:** Collect a resting figure and a busiest-activity figure from a few groups on the board. Draw out the pattern aloud — the heart beats faster the harder the body works — and ask why muscles need more blood. This is display-only talk; nobody types anything.

What it should show

Expect every group's active middle value to be clearly higher than its resting one, and the harder the activity the bigger the jump. A group whose active count barely rose usually picked a gentle activity (walking on the spot) or stopped moving before counting — check they counted straight after a full minute of effort. A wildly high resting count usually means they miscounted or couldn't find a steady beat.

Misconceptions & interventions

- **Pupils think the heart is on the left side of the chest.** — Point to the middle of your own chest as you read — the heart sits in the centre, tilted only slightly left. Have pupils place a hand mid-chest, not on the left.
- **Pupils take the highest of their three counts because 'that's the real one'.** — At the board, line up an example like 18, 22, 20 and show the middle is 20 — one odd high count can throw the result, which is why we trust the middle, not the biggest.

Differentiation

Emerging	Developing	Proficient
• Pair a slower counter with you or a confident partner to find and hold the pulse before they start. • Let them compare just two activities — resting and one active — and use a pre-marked recording row.	• Have them add a third activity so they see the pulse step up across more levels. • Ask 'why?' — what does the body need more of when muscles work hard?	• Challenge them to spot which group kept the fairest test and explain what made it fair. • Ask them to predict whose middle value should be steadiest and why repeating helped.

Cross-curricular hook

Tie to the Maths Data strand — pupils pool middle values and read the pattern across the class results.