

living-things

The brain, senses and fast reactions: how fast can you react?

Lesson at a glance

Open with a whole-class demo: drop a 30 cm ruler between a volunteer's fingers with no countdown and ask what the brain and senses did in that instant. Name reaction and reaction distance, then groups choose one comparison—eyes ready versus distracted, or writing hand versus other hand—and write a prediction on the Investigation Journal results table. Pairs run three trials each set-up, circle the middle value, and call those summaries into the IWB data-recorder bar chart. Close with talk on what the bars show and why quick reactions matter in sport and on Irish roads.

Learning objectives

- Explain that the brain takes in information from the senses and can trigger very quick reactions before we plan every step
- Help design and run a reaction-time investigation comparing conditions such as eyes ready versus distracted
- Record and compare reaction distances across trials and discuss how reaction-time research keeps sport and roads safer

Before the bell – prep

Count out one 30 cm ruler per measuring pair (not per group of four). Open the data-recorder interactive ready for pair middle values. Optional only: one feely bag per group with 4–5 soft classroom objects if time allows after both middles are done.

Materials

Item	Qty	Per	Source	Low-cost substitute
30 cm ruler	1	pair	classroom	a sturdy strip of card marked in centimetres with a pen
feely bag (soft cloth or paper bag)	1	group	classroom	an opaque sock or clean pillowcase sleeve
safe feely-bag objects (rubber, large button, cotton wool, coin, short pencil stub)	5	group	classroom	classroom stationery and clean natural objects such as a smooth shell
Investigation Journal page (results table)	1	pupil	provided printable	a ruled table in the pupil's copybook with two lines at the top for comparison and prediction, then columns for condition and three trials

Safety watch-point

No swinging or throwing rulers; keep rulers away from eyes and ears. Soft objects only in any feely bag. Pupils who prefer not to catch drop or record.

Teaching moves

- **Getting Started:** Hold the ruler zero-end between a volunteer's open thumb and finger (about 2 cm gap) and drop with no countdown. Let the class call roughly where it was caught, then ask whether that was a slow plan or a fast reaction. Keep it to one surprising catch—do not hand out rulers or name fair-test rules yet.
- **Your brain and senses:** Link the demo to two board words only: reaction and reaction distance. Say the must-say script once aloud—wonder, predict, test three ready and three distracted, observe, think—so pupils hear the full inquiry arc before they plan. End with the thumbs check: can the brain react before we plan every step?
- **What will we find out?:** Name both comparisons on the IWB, then let groups choose one. Every pupil writes the comparison and a which-will-be-shorter prediction on the top lines of the Investigation Journal results table. Revoice fair-test constants: same ruler, zero between fingers, same starting gap, same catcher, three trials, middle value. Anyone who prefers not to catch can drop or record.
- **Catch the ruler:** Model drop–pinch–read once more; stress bigger number means slower. Split planning groups into pairs with one ruler each; every pair runs the group's chosen comparison. If distracted is chosen, the dropper asks one simple question at the drop moment—same method class-wide. Protect 12–14 minutes for three trials each set-up and both middle values circled; skip the feely bag if time is tight.
- **Notice what changed:** Push I noticed... and I felt... before any meaning talk. Prompt concrete noticing matched to their comparison: early or late catch, finger gap drift, misses on the other hand, whether the question caused a high catch. If two things changed at once, name it honestly as less fair.
- **Pool our catch distances:** Drive the data-recorder in explore mode. Each measuring pair calls its two middle values (or labelled average of two)—enter from paper only. Pool one comparison first if groups split. Ask which bar is tallest and whether taller means faster or slower before using classAverage.
- **What does the evidence show?:** Point at bars or middle values, separate measured distance from 'the brain was busier'. Weave the Nature of STEM hook—GAA goalkeeper or cyclist at lights near school—and keep it hopeful: measuring reaction time helps safer roads and better training. Celebrate pairs who spotted an unfair run.

What it should show

Ready or writing-hand middles often land roughly 15–30 cm; distracted or other-hand trials are often several centimetres longer. Taller bars mean slower reactions. A pair with oddly short distracted catches may have anticipated the drop or widened the finger gap—re-run from a still start with the shared question method.

Misconceptions & interventions

- **My hand just knows when to pinch—the brain isn't really involved.** — Trace the path on the demo: eyes see the move, brain gets the message, then fingers pinch. Ask what would happen if the catcher looked away so the sense never fired.
- **A bigger number on the ruler means I was faster.** — Hold two sample catches (e.g. 15 cm vs 25 cm) and revoice: longer drop before the pinch means the reaction took more time—taller bar, slower reaction.
- **I can change hand and add a question in the same trial to make it harder.** — Stop and ask the three fair-test questions: What is the one thing we change? What do we measure? What must stay the same? Have them re-run with only their chosen comparison.

Differentiation

Emerging	Developing	Proficient
• Offer the sentence starter I think the catch distance will be longer when... because... and sit at the teacher table for the first fair drop. • Accept a labelled average of two fair trials if three clean catches are not yet secure; role can stay dropper or recorder.	• After both middles are circled, add one careful I noticed... about finger gap or anticipation on the results table. • Predict whether the next group's distracted bar will sit higher before it is entered on the class chart.	• Critique another pair's run: name one thing that stayed the same and one that may have drifted. • Link their bars to a GAA save or a crossing near school—why a longer reaction distance leaves less time to move.

Cross-curricular hook

Tie to Maths Data—pool pair middle values into the bar chart and read which set-up is higher (slower).