

living-things

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

Lesson at a glance

Open with a whole-class ruler-drop demo: a volunteer pinches a falling 30 cm ruler with no countdown, then the class names what eyes, brain and fingers just did. Groups choose one comparison (eyes ready versus distracted, or writing hand versus other hand), write a prediction on the Investigation Journal results table, and split into pairs to run three trials each set-up. Pair middle distances are pooled on the IWB data-recorder into a bar chart. Close with display-only talk on what the evidence shows for sport and 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 one 30 cm ruler per measuring pair before the lesson, not one per group of four. Agree the class distraction question (favourite colour or $7 + 5$) so every distracted trial uses the same method. Optional: one feely bag per group with 4–5 soft classroom objects only if time remains after middles are done. Open the data-recorder interactive on the IWB.

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. Feely-bag objects soft only. Pupils who prefer not to catch drop or record instead.

Teaching moves

- **Getting Started:** Demo only: no rulers out yet. Hold the zero end between a volunteer's open thumb and finger about 2 cm apart, drop without countdown, and let the class call roughly where it was caught. Ask whether that was a slow plan or a fast reaction; gather three or four answers into one sentence naming eyes, fingers and brain working together.
- **Your brain and senses:** Board only two words: reaction and reaction distance. Let the class supply brain and senses from the demo. Model the full prediction stem once aloud (I wonder / I predict / I test / I observed / I think) so groups can copy the shape. Finish with the thumbs check before planning starts.
- **What will we find out?:** Groups choose one comparison from the two on the board and write (1) which comparison and (2) which set-up will be shorter and why on the prediction lines at the top of the Investigation Journal table. Re-voice fair-test constants: same ruler, zero between fingers, same starting gap, same catcher, three trials, middle value. Anyone who prefers not to catch drops or records.
- **Catch the ruler:** Model drop, pinch and read at the upper finger edge once more; remind them bigger number means slower reaction. Give pairs the full 12–14 minutes: one ruler each, three trials per set-up, circle the middle (or labelled average of two if needed). If ready versus distracted, every dropper uses the shared question at the exact drop moment. Skip the feely bag unless both middles are already done.
- **Notice what changed:** Push I noticed... and I felt... before any conclusion. Prompt concrete checks matching their comparison: early or late catch, changed finger gap under distraction, more misses with the other hand. If a pair changed two things at once, name it honestly as less fair.
- **Pool our catch distances:** Drive the data recorder on the IWB. Each measuring pair calls its two middle (or labelled average) values only: no recalculating on the board. Pool one comparison first if groups split. Ask which bar is tallest and whether taller means faster or slower, then switch on class average when enough pairs share the same two set-ups.
- **What does the evidence show?:** Point at bars and middle values, not opinions. Separate measured longer distance from the inference that the brain was busier. Link to a GAA goalkeeper or a cyclist at lights near school, and to researchers who use reaction-time evidence for safer training, signs and road layouts. Celebrate pairs who spotted an unfair trial.

What it should show

Ready or writing-hand catches often land roughly 15–30 cm; distracted or other-hand trials are often several centimetres longer. Overlap and high numbers are real data, not failure. A pair whose distracted catches look faster usually anticipated the drop or widened the finger gap: re-run from a still start with the shared question timed to the release.

Misconceptions & interventions

- **The hand just knows and moves on its own: the brain is not really involved.** Trace the path on the demo: eyes see the ruler move, the brain gets the message, then the fingers pinch. Have them say the three-step chain aloud before the next trial.
- **A taller bar or bigger centimetre number means a faster reaction.** Hold two rulers at 15 cm and 25 cm catch marks and ask which catch took longer. Re-voice: longer reaction distance means slower reaction.
- **Changing hand and adding a question in the same trial still counts as a fair comparison.** Stop and ask what the one thing we change is. Have the pair re-run with only their chosen comparison so the class chart bars mean the same thing.

Differentiation

Emerging	Developing	Proficient
• Offer the sentence starter I think the catch distance will be longer when... because... on the prediction lines; pair them as recorder or dropper if catching feels pressured. • Accept a labelled average of two fair trials per set-up if three clean trials are not realistic.	• After both middles are circled, add one careful I noticed... note about finger gap, timing or misses before pooling. • Compare their pair middle with the class average on the data-recorder and say whether they were faster, slower or similar.	• Critique fairness aloud: name one thing that stayed the same and one slip that could have skewed a trial. • Stretch the evidence talk: link a longer reaction distance to a GAA save or a crossing near school and say what the numbers imply for safety.

Cross-curricular hook

Tie to Maths Data: pupils pool middle values, read the tallest bar and compare pair results with the class average.