Evidence teacher pack

Ask whether a comparison supports a causal explanation.

For learners around age 14 and curious adults. Three 40-minute sessions. Use with the current AHA Evidence manuscript. References use chapter titles so they work in both print and ebook.

Learning goals

Ask whether a comparison supports a causal explanation.

Use the terms comparison; confounder; random assignment; selection; absolute risk; relative risk. Show the reasoning behind an answer and identify where the example stops applying.

Reading route

1. The before-and-after trap

2. Random selection is a different job

3. Absolute and relative change

Teaching plan

Session 1: Ask the opening question before reading (5 minutes). Read the first selected chapter together (15). Draw the mechanism or compare two possible explanations (15). End with a one-sentence explanation (5).

Session 2: Read the remaining selected material (10 minutes). Complete the worksheet individually, then compare reasoning in pairs (20). Discuss the common wrong turn (10).

Session 3: Revisit one uncertain answer (10 minutes). Try the extension (15). Give a two-minute explanation without the book (10). Use the exit question (5).

Materials and access

Paper, pencil, the book and an optional calculator. Read diagrams aloud, allow spoken or drawn responses, and give extra time for vocabulary. No real accounts or specialist equipment are needed.

Evidence learner worksheet

Opening question

A parcel company changes its packaging and damage falls. Does that alone prove the packaging caused the change?

Investigation

Two comparable fictional groups each contain 200 parcels. Ten in the old-packaging group are damaged; six in the new-packaging group are damaged. Calculate the rates, then list what you need to know about how the groups were formed and measured.

1. What are the damage rates?

Show your reasoning, label units or evidence, and state any assumptions.

2. What is the absolute difference and relative reduction?

Show your reasoning, label units or evidence, and state any assumptions.

3. What could weaken a causal claim?

Show your reasoning, label units or evidence, and state any assumptions.

Transfer question

Propose random assignment of suitable parcels, consistent outcome definitions and a plan to record all outcomes before inspecting results.

Exit question

What would you now check before accepting a claim about this topic? Name one specific check and explain why.

Evidence answers and teaching notes

Answer 1

Old: 10/200 = 5%. New: 6/200 = 3%.

Answer 2

The absolute decrease is 2 percentage points. Relative decrease is (5 - 3)/5 = 40%.

Answer 3

Different routes, handling, parcel contents, selection, missing outcomes or inconsistent damage definitions could distort the comparison. Sampling uncertainty also matters.

Common wrong turn

A large relative percentage may accompany a small absolute difference. Random assignment and random sampling answer different questions.

Extension discussion

Propose random assignment of suitable parcels, consistent outcome definitions and a plan to record all outcomes before inspecting results.

Assess the explanation

Give one point each for a correct conclusion, visible reasoning, correct units or evidence, and a relevant limitation. A correct number with no explanation is not a complete answer. Accept equivalent wording and well-supported alternative interpretations where the question allows them.

If the learner gets stuck

Return to the diagram or the smallest example. Ask what is being counted, compared or transferred. Let the learner revise the answer after explaining the mistake; do not reward speed over understanding.

Family connection

Compare two invented headlines about the same numbers. Ask which includes the denominator and what information both omit.