Probability teacher pack

Keep the reference group visible when interpreting a probability.

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

Learning goals

Keep the reference group visible when interpreting a probability.

Use the terms probability; conditional probability; base rate; independence; false positive. Show the reasoning behind an answer and identify where the example stops applying.

Reading route

1. The number underneath matters

2. The background changes the answer

3. Bayes is organized recounting

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.

Probability learner worksheet

Opening question

If a warning catches most faulty items, must most warned-about items be faulty?

Investigation

Draw 1,000 imaginary items. Ten are faulty. A warning flags 9 of the 10 faulty items and 99 of the 990 sound items. Make a two-by-two count table before calculating a percentage.

1. How many items receive a warning?

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

2. What fraction of warned items are faulty?

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

3. What fraction of all faulty items received a warning?

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

Transfer question

Repeat with 100 faulty items, 90 correctly flagged and 90 sound items flagged. Now 90/180 = 50% of warnings indicate a fault.

Exit question

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

Probability answers and teaching notes

Answer 1

9 + 99 = 108 items.

Answer 2

9/108 = 1/12, about 8.33%.

Answer 3

9/10 = 90%. This uses a different denominator from the previous answer.

Common wrong turn

P(warning given fault) is not the same question as P(fault given warning).

Extension discussion

Repeat with 100 faulty items, 90 correctly flagged and 90 sound items flagged. Now 90/180 = 50% of warnings indicate a fault.

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

Use colored paper counters to build a warning table. Keep the setting fictional rather than applying the numbers to a real medical test.