Golden Banana: Can We Trust a Map Made Only by Returners?

Plan 35-45 minutes: predict on paper, then check on one projected computer. The local-model lesson needs a computer to run its download. Split advanced calculations across two sessions.

Learning goal

Recover departure denominators, spend three expedition tokens gathering evidence and state what the data still cannot establish.

Before starting

Read fractions and simple percentages; training data or model evaluation helps. No coding required.

Materials

Two mission-board worksheet pages, three expedition tokens and returned/unreturned cards; one teacher-operated computer.

Class sequence (5 / 10 / 10 / 10 min, plus 5-10 min discussion)

1. Predict (5 min): show only returned reports A=3,B=3,C=0. Choose a gate and name missing information; no C reports does not mean nobody tried C.

2. Try (10 min): reveal departures/returns A=5/3,B=3/3,C=2/0. Supply denominators, calculate observed fractions and reconsider the decision.

3. Observe (10 min): give each group three new expedition tokens. State whether the goal is returns or information about less-known gates. Send one mission, reveal one outcome and record both kinds.

4. Challenge (10 min): as a separate paper puzzle, restart from initial C=0 returns / 2 departures and add one return, giving 1/3. Do not reuse the freely explored board. Does this guarantee safety or locate earlier traps?

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Worked example

Two returns from four departures give an observed 2/4=50%. Three return reports alone do not reveal the denominator, and returning need not mean finding the golden banana.

Check understanding: ask before showing an answer

Does B’s past 3/3 guarantee the next return? Does C’s 0/2 prove no exit? Which data disappear when we keep only returners?

Expected answers and worksheet check

Neither. Observed fractions are A=3/5=60%, B=3/3=100%, C=0/2=0%; tiny samples are not true safety probabilities. Equal return counts of three do not compare rates. The separate paper puzzle adds one return to initial C=0/2, giving 1/3≈33.3%; it neither reuses the freely explored board nor spends another lab token. It does not locate earlier failures or guarantee the future. Unreturned missions belong in the denominator; retain gate, departure and outcome. Exploring C may gather information; prioritizing returns may favor B from current evidence, without guarantees.

Keep the claim within its limits

This classroom version uses fixed mission cards, not the original random maze or live multiplayer rooms. Unreturned reports do not reveal trap coordinates. Missingness can arise from how data are collected.

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Teacher setup

Begin with the returners-only view and collect choices before revealing the full board. These are practice cards, not live player data; reset restores the same deck.

Lock the gate before revealing an outcome. Fixed decks: A unreturned/returned/returned, B returned/returned/unreturned, C returned/unreturned/returned. Reports do not reveal unseen paths or trap locations.

Evidence and assessment

Assess whether children request denominators, retain failures and distinguish observed rates from guarantees. Do not grade only by three expedition outcomes.

Support and extension

Support: circle three returned cards among five without percentages. Extend: design records where publishing successes misleads another group, then reveal the complete board.

At home

Give a parent two groups with three successes each but different numbers of attempts. Ask what information is needed.

Continue learning

Teaching a Computer: When Training Data Misleads / After Full Marks: Did the Model Really Learn? / Snake Planning: Why Did the Nearest Apple Trap Me?

Teacher reference (links also on the lesson page)

Lucas Academy: original game: https://snake-lab-coder.lucasacademy.org/?game=golden-banana