PATIENCE LEARNING · FREE 1-DAY CASE

The Confident Fix

A free single-session case from the world of **The Reef**, the 11-day systems-science simulation.

GRADE 6 · SCIENCE (ECOSYSTEMS & INTERPRETING DATA) · ~45 MIN · 1 CLASS PERIOD

A coral reef is dying and your students have the data — but not the diagram. Two rescue plans are on the table. One sounds bold and helpful. The other sounds boring. Only the data can tell them which one actually saves the reef, and which one quietly makes it worse.

TEACHER QUICK-START

Objective: Students read ecosystem data, identify a cause-and-effect relationship between species, and evaluate two proposed interventions — learning that the most obvious-sounding fix can backfire.

Standards tie-in: NGSS MS-LS2-1, MS-LS2-4 (effects of resource availability and disruptions on populations in an ecosystem) and analyzing/interpreting data (SEP-4); argue from evidence (SEP-7).

What you need: Just this packet. Print the student pages (works individually or in teams of 3–4). No prep.

1. Set the scene (5 min). “You inherited a dying reef and four months of data. Two teams have plans. Your job: pick the one the data actually supports.”

2. Read the data (8 min). Teams study the reef data table and the two proposed fixes.

3. Analyze & decide (20 min). Find the pattern, then choose a plan and defend it with the numbers.

4. The reveal (8 min). Walk the answer key. The point: the bold-sounding fix feeds the problem; the boring one addresses the cause.

5. Reflection (4 min). Each student answers the reflection question.

STUDENT PAGE 1

The Reef File

You are the science team assigned to Marlow Reef. Over the last four months the coral has been dying and the reef is turning green with algae. Nobody handed you a diagram of how it all connects — but you do have the monitoring data. Here it is.

FOUR MONTHS OF REEF DATA

Month	Parrotfish counted	Algae covering the reef	Healthy coral
Month 1	40	15%	55%
Month 2	30	28%	48%
Month 3	18	45%	38%
Month 4	10	60%	30%

ONE FACT FROM THE FIELD GUIDE

Parrotfish eat algae. They scrape it off the reef all day, which keeps space open for baby coral to grow. That's the only biology fact you're given — the rest is in the numbers.

THE TWO PLANS

Plan A — Dr. Vance (bold): “The coral is starving! Let's add fertilizer nutrients to the water to feed the reef and grow the coral back fast.”

Plan B — Ranger Osei (boring): “Stop the overfishing that's taking the parrotfish. Protect them and let their numbers recover. It's slow and unexciting, I know.”

STUDENT PAGE 2

Your Call (Decision Sheet)

Team name: _____ Period: _____

Step 1 — Find the pattern. As the parrotfish numbers go DOWN each month, what happens to the algae? _____ And to the healthy coral? _____

Step 2 — Connect the cause. Using the field-guide fact (parrotfish eat algae), explain WHY fewer parrotfish would lead to more algae:

_____

_____

Step 3 — Test Plan A. Fertilizer feeds plant-like things in the water. Algae is a plant-like thing. If you add fertilizer, what will probably grow fastest — the coral, or the algae that's already winning?

_____

Step 4 — Your recommendation. Which plan do you choose, A or B? Defend it with the data. Be clear about what the numbers show:

_____

_____

_____

ANSWER KEY (for the reveal)

Step 1 — The pattern:

As parrotfish fall (40 → 10), algae **rises** (15% → 60%) and healthy coral **falls** (55% → 30%). Parrotfish and algae move in opposite directions.

Step 2 — The cause:

Parrotfish eat algae. Fewer parrotfish means less algae gets eaten, so algae spreads and smothers the space baby coral needs. The dying parrotfish population is the driver, not a side effect.

Step 3 — Testing Plan A:

Fertilizer would feed the **algae** fastest — it's already winning. Plan A sounds like "helping the coral," but it pours fuel on the exact thing killing the reef. Bold, and backwards.

Step 4 — The judgment:

Plan B is right. Protecting the parrotfish attacks the actual cause: restore the algae-eaters and the algae retreats, giving coral room to recover. It's slow and unexciting — and it's the one the data supports. A strong answer names the parrotfish-algae link as the reason, not just "B sounds safer."

The big idea:

The exciting fix (do something big and direct!) fed the problem. The boring fix (protect one quiet fish) addressed the cause. In a system, the loudest solution and the correct one are often not the same — you have to follow the data through the connections.

REFLECTION (graded on thinking, not the "right" answer)

"Plan A sounded more helpful. What in the data told you the boring plan was the one that would actually work?"

SCORING THE THINKING

	3 — Strong	2 — Developing	1 — Beginning
Reads the data	Names both patterns (algae up, coral down)	One pattern	Misreads the table
Finds the cause	Links parrotfish loss to algae growth	Mentions the link vaguely	No connection
Evidence over boldness	Rejects Plan A using the data	Leans B without reasons	Picks the bold plan
Explains clearly	A reader can follow it	Partly clear	Unclear

READY FOR THE FULL SIMULATION?

This was one reef, one month of data. The Reef is eleven days.

In the full 11-day simulation, teams inherit a struggling reef with days of incoming data and no diagram of how it fits together. They discover the system themselves — why the algae is winning, what the parrotfish have to do with it, and which of their confident fixes quietly made things worse. Graded on reasoning, never on saving the reef.

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