

Checking Riley's Notes: Cycles, Counts and Who Decides

Learning target: I can find and explain errors in claims about predator-prey records, human population data, per capita calculations and how solutions are chosen, and rewrite each claim so it is accurate.

Error analysis

About 40 min

Pairs

MS-LS2-5 · practice

MS-ESS3-4 · supports

MS-ETS1-2 · supports

writing

discussion

independent practice

Name _____

Date _____

Period _____

Directions

Riley made study notes for this chapter. Some notes are correct and some contain errors. Use the fact box to check every note. In Part A, decide whether each note is correct and name the mistake. In Part B, rewrite the notes that are wrong so a classmate could study from them. Work with a partner for Part A if your teacher allows, but write your own rewrites.

You will need: This worksheet, Pencil, Calculator

Riley's notes

Riley's study notes (copied exactly)

Note	What Riley wrote
1	The fur records PROVE that lynx cause the hare crashes, because the lynx peak always comes after the hare peak.
2	Pelt counts tell us exactly how many hares and lynx were alive each year.
3	There are about 7 billion people on Earth, and the population is growing faster every single year.
4	The human population will crash soon, just like the hares, because all populations cycle.
5	Per capita water use in Riverside (50,000 people, 7,500,000 liters a day) = $7,500,000 \times 50,000 = 375,000,000,000$ liters per person.
6	In Long Island Sound, the algae used up the oxygen by doing photosynthesis.
7	A town should test its solution, compare the results with its goals, and change the design if it falls short.
8	Scientists should choose which solution a town uses, because science tells you the right answer.

Fact box: evidence Riley could have checked — Hare experiment (Yukon, Krebs and others, 1995): compared with an unchanged forest block, fencing out mammal predators gave about 2 times as many hares, adding food about 3 times, and doing both about 11 times. **Fur records:** count animals trapped and traded; the number depends on trappers, effort and fur prices as well as on the animals. **World population (United Nations):** 7 billion in 2011, 8 billion in 2022, about 8.2 billion in 2025; each billion since 1974 has taken 11 to 13 years; the next is projected around 2037; the population is projected to peak at about 10.3 billion in the mid-2080s, mainly because families are having fewer children. **Photosynthesis:** releases oxygen. **Decomposition:** bacteria use oxygen as they break down dead matter.

Part A: Diagnose

- For each note, write 'correct' or 'error'. If it is an error, name what went wrong in a few words (for example: 'treats a pattern as proof', 'out-of-date number', 'wrong operation').

Correct or error?	What went wrong
Note 1	
Note 2	
Note 3	
Note 4	
Note 5	
Note 6	
Note 7	
Note 8	

Part B: Rewrite

- Rewrite note 1 so it is accurate. Use the hare experiment numbers from the fact box.

- Rewrite note 2 so it is accurate, and give one reason a pelt count could rise even if the number of animals did not.

4. Rewrite note 3 with accurate, dated numbers. Then explain how the population can still be rising while it is not 'growing faster every single year'.

5. Rewrite note 4. Explain what the United Nations projects and why, and why a human population does not have to follow a hare-style boom and crash.

6. Redo note 5 correctly. Show the operation and give the answer with units. Then explain in one sentence how you can tell Riley's answer is impossible.

7. Rewrite note 6 so it describes what really uses up the oxygen in the Sound's bottom water.

8. Rewrite note 8. Explain what science **can** do when a town compares solutions and what science **cannot** do. Then name the three kinds of criteria a town should weigh.

Part C: Which mistake matters most?

9. Suppose a town council used Riley's notes to choose between two solutions for protecting a local wetland. Which **one** wrong note could lead to the worst decision? Explain what the council might do wrong and how the corrected note would help.

Three checks for every note

For each note ask: (1) Does it match the fact box? (2) Does it claim more than the evidence shows (words like 'prove', 'exactly', 'always', 'every')? (3) If it has a calculation, is the answer a sensible size for one person? A note can be wrong in more than one way; name the biggest problem first.

Write a trap of your own

Write one new note about this chapter that sounds convincing but contains a subtle error, such as calling every non-native species invasive or saying a 'biodegradable' bag disappears in the ocean. Trade with a partner, diagnose each other's notes, and write a correction that includes the evidence that disproves the trap.