

Fixing Talia's Field Notebook: Nine Claims About Interactions

Learning target: I can find the errors in another student's graph and claims about species interactions, explain which idea went wrong, and rewrite each claim so it is scientifically accurate.

Error analysis

About 40 min

Individual

MS-LS2-2 · practice

writing

independent practice

visual modeling

Name _____

Date _____

Period _____

Directions

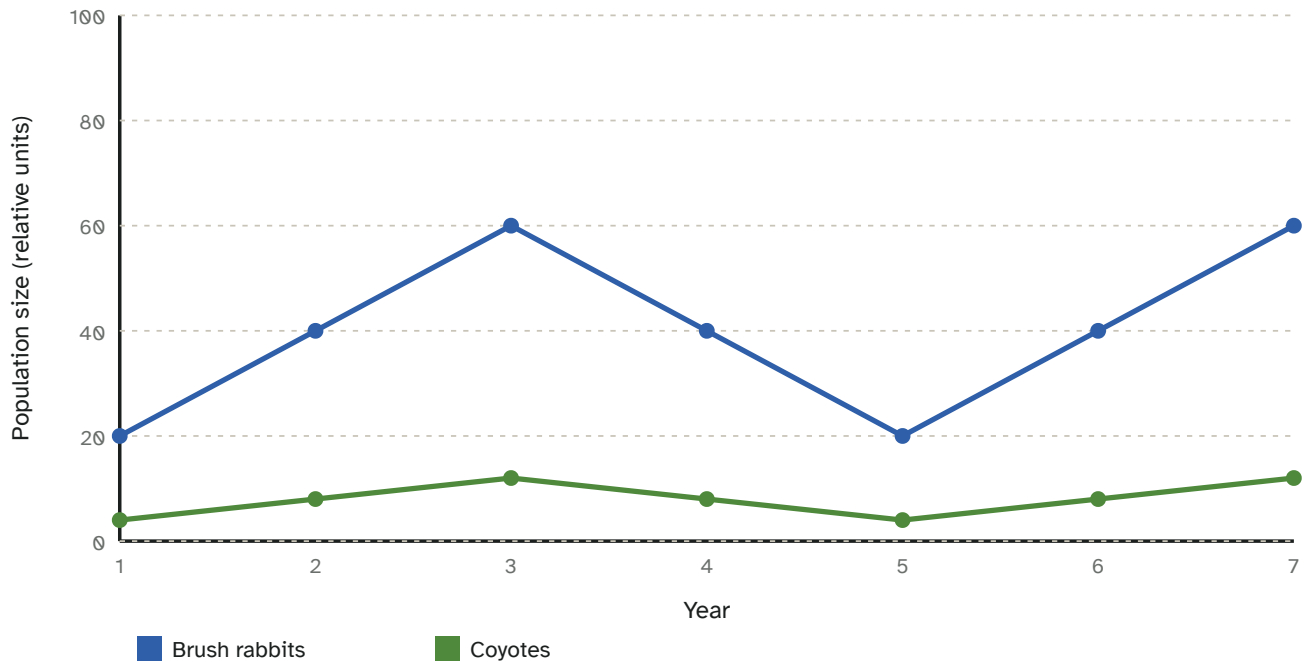
Talia spent a week at a nature camp on the California coast. She wrote nine claims in her field notebook and drew a graph from memory. Some claims are right and some contain a common mistake. Read the camp facts first. In Part A, decide whether each claim is correct, and if it is not, name the idea that went wrong in a few words. In Part B, explain and rewrite the incorrect claims and redraw her graph. Be specific: 'wrong' is not an explanation.

You will need: This worksheet, Pencil, Ruler

Camp facts Talia was given — Coyotes hunt brush rabbits in the coastal scrub; rabbits and small rodents make up much of their diet. Black-tailed deer browse the leaves and twigs of shrubs; inside fenced plots where deer cannot reach, the same shrubs grow taller and make more seeds. Gray whales pass the coast each spring with barnacles fixed to their skin; scientists have found no measurable harm to the whales. Ticks wait on grass stems, climb onto deer and drink their blood for several days before dropping off. Bees visit sage flowers for nectar and pollen, and pollen stuck to their bodies is carried to the next flower. European starlings and western bluebirds both nest in tree holes, and there are fewer holes than pairs of birds. Raccoons at camp ate crayfish, frog eggs, blackberries and fallen plums; about three-quarters of their food was fruit.

Talia's sketch: brush rabbits and coyotes over seven years

simulated data



Talia drew this sketch from memory to show what she thinks happens. It is not real data, and it contains a mistake.

1. My graph shows rabbits and coyotes rising and falling at the same time. That makes sense: the moment rabbits increase, coyotes increase too.
2. Coyotes are predators, so if nothing stops them they will keep eating rabbits until the last rabbit is gone. Predators always win in the end.
3. The best way to protect the brush rabbits would be to remove every coyote. Then no rabbits would be eaten, and the rabbit population would grow and stay healthy forever.
4. The barnacles on the gray whale are parasites, because they live on another animal's body.
5. Ticks are insects. They are predators of deer, because they feed on the deer.
6. Bees visit the sage flowers in order to help the plants make seeds. Mutualism means two species decide to cooperate.
7. When a deer browses a shrub, that is not predation, because the shrub does not die. So deer have no real effect on the shrub population.
8. Starlings usually win the nest holes, so for starlings the interaction is + and for bluebirds it is -. That is the same code as predation.
9. The raccoons are omnivores, even though most of what they ate was fruit, because they regularly eat both plants and animals.

Part A: Diagnose

1. Complete the table for all nine claims. If a claim is partly right, mark it incorrect and name only the part that is wrong.

Correct or incorrect?	If incorrect, the idea that went wrong (a few words)
Claim 1	
Claim 2	
Claim 3	
Claim 4	
Claim 5	
Claim 6	
Claim 7	
Claim 8	
Claim 9	

Part B: Explain, rewrite and redraw

2. Claim 1: Explain why the coyote population cannot rise at the same moment the rabbit population rises. Describe what has to happen inside the coyote population first.

-  Redraw Talia's graph correctly. Copy her rabbit line (lows in years 1 and 5, peaks in years 3 and 7). Then draw a coyote line, below the rabbit line, that keeps the same up-and-down shape but shows the lag. Mark one rabbit peak with R and the coyote peak that follows it with C, draw a bracket for the lag and write its length, and add a key.

3. Claim 2: Describe what usually happens to a predator population as its prey becomes scarce, and how that lets the prey recover. Rewrite the claim, and name one kind of situation in which a predator really can wipe out its prey.

4. Claim 3: Predict what would happen over several years to the rabbits, and to the plants they eat, if every coyote were removed. Then rewrite the claim.

5. Claims 4 and 5 label an interaction using the wrong clue. State the test that decides the label, then rewrite both claims correctly. Claim 5 also has a second error that is not about the interaction; fix it too.

6. Claim 6: Say what each partner actually gets, and explain why neither one has to 'decide' anything for the interaction to be a mutualism. Rewrite the second sentence as an accurate definition.

7. Claim 7: Use the camp facts to show that deer do affect the shrub population, and explain why this lesson counts browsing as predation. Rewrite the claim.

8. Claim 8: Explain why the species that usually wins a competition still gets a minus. Give the correct code and name for this interaction, and rewrite the claim.

9. Claim 9 is correct. Explain why an animal does not have to eat equal amounts of plant and animal food to be an omnivore.

Part C: The rules behind the mistakes

10. Claims 1, 2 and 3 all come from the same missing idea about how predator and prey populations affect each other. Name that idea, and write a two-sentence rule Talia could tape inside her notebook that would prevent all three mistakes.

11. Claims 4, 5, 7 and 8 each name an interaction from a misleading clue: where an organism lives, what it eats, whether the other partner dies, or who wins. Write the one question Talia should ask about each partner every time she labels an interaction, and say what she should do with the two answers.

Three checks for every claim

Run each claim through three checks. **Timing:** does it say two populations change 'at the same time' or 'the moment' something happens? Populations grow through births and young growing up, which takes time. **Feedback:** does it follow only one arrow (predators lower prey) and forget the arrow back (scarce prey lower predators; prey without predators run short of food)? **Effect:** does it label an interaction by where an organism lives, what it is called or who wins, instead of by whether each partner ends up helped (+), harmed (–) or unaffected (0)? A claim that fails any check is incorrect.

When the real world seems to agree with Talia

Some real cases look as if they support Talia's claims. Choose one. (a) Brown tree snakes, carried by accident to the island of Guam after World War II, wiped out most of the island's native forest birds. (b) A small reef fish called a cleaner wrasse usually eats parasites off larger fish, but it sometimes bites off a mouthful of the client's protective skin mucus instead. Write a paragraph explaining which of Talia's claims your case seems to support, what makes the case unusual, and why it does not prove her claim is true in general.