

Environmental Chemistry: Evidence and Boundaries

Student Worksheet | g10_u08_w30

I can: compare supplied local-system observations and write a claim that stays within the data, conditions, and model boundary.

Scope card: This is a paper data-model exercise. The table records three supplied observations from one modeled stream reach on one stated date. It supports comparisons among the printed entries only. It does *not* identify a cause or source, measure a chemical concentration, establish a health effect, predict another day or place, assess safety, or recommend a policy or action. Do not collect samples or conduct fieldwork.

modeled site and condition	pH	conductivity ($\mu\text{S}/\text{cm}$)	turbidity (NTU)
A: upstream reference point, 14 Oct, 10:00	7.2	310	3
B: tributary confluence, 14 Oct, 10:00	6.8	520	15
C: 1 km downstream, 14 Oct, 10:00	7.0	460	10

Reading note: pH, conductivity, and turbidity are different observations. A difference in one column is not a measurement of a specific substance or an explanation of why the difference occurred.

1. State the spatial and time boundary of this data card.

2. Name one condition or variable that is *not* supplied by the card.

3. Which printed site has the lowest pH?

4. Calculate the pH difference between A and B.

5. Calculate the pH range across A, B, and C.

6. Calculate the conductivity difference between A and B.

7. Calculate the turbidity difference between A and B.

8. Rank A, B, and C from lowest to highest conductivity.

9. Which site has the largest printed turbidity value?

10. Write a directly supported comparison between B and C using conductivity.

11. Write a directly supported comparison between A and C using pH.

12. Does the table identify a chemical substance responsible for any difference? Explain from the scope card.

13. Why is "B has a lower pH, so one named substance caused it" an unsupported claim?

14. State two different kinds of evidence missing before a source explanation could be evaluated.

15. Can the table establish that the same pattern occurs tomorrow? Why or why not?

16. Explain why a higher conductivity entry is not, by itself, a concentration measurement for one specific substance.

17. Critique: "Because B has the largest turbidity value, the table proves an effect outside the modeled reach."

18. Critique: "The data card tells us what action every community should take."

19. Write a one-sentence claim comparing A and B that includes at least two printed values and the date/site boundary.

20. Write a cautious CER: make one claim about the printed observations, cite two values, reason from the comparison, and state one limit on the claim.
