

Clues in Water

Use and evaluate comprehension strategies before, during, and after reading.

12.P.EICC.3 "Comprehension Strategies: Engage with a range of complex texts for a variety of tasks and purposes, accessing and using strategies for comprehension* before, during, and after reading as part of the meaning-making process."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Before reading the paragraphs, turn to writing Stage 1 and record a question based only on the title. Return here: underline claims, circle supporting examples, and number cautions as you read. Then answer the questions and complete Stage 2. Keep your original question visible.

Reading Environmental DNA

- ① At the edge of a Pacific estuary, biologists can learn about wildlife without seeing it. Animals shed skin cells, scales, mucus, and waste into water. Those traces contain environmental DNA, often called eDNA. By filtering a water sample and sequencing genetic material, researchers can detect traces associated with a species. This method can reveal elusive fish or amphibians that visual surveys miss, especially in murky water. Yet a detection alone does not count animals or establish that living individuals are at the sampling site.
- ② That distinction matters when agencies use eDNA to guide decisions. A sample collected downstream may contain DNA carried by currents from another location, and genetic traces can remain after an organism has left. Results also depend on where, when, and how water is collected. To reduce error, scientists take repeated samples, compare them with controls designed to catch contamination, and pair genetic findings with netting, visual counts, or acoustic monitoring. The goal is not to replace field observation but to build a more complete picture from several kinds of evidence.

- ③ Used carefully, eDNA can change the questions investigators ask. Instead of asking only, "What did we catch today?" they can ask whether a species appears across seasons or whether an invasive organism has reached a new watershed. The method is especially useful for early detection, when a small population may be hard to find. Still, the strongest conclusion comes from interpreting a positive result alongside its limits and other observations. The passage therefore presents eDNA as a powerful clue, not a final verdict by itself.

2 ANSWER WITH EVIDENCE Use the passage

- ① Use your underlining to state the author's overall claim about eDNA in one sentence.

- ② Which two details from paragraph 2 explain why a positive eDNA result cannot, by itself, prove that a species is currently at the sampling site?

- ③ How does paragraph 3 change the question investigators can ask, and what purpose does that change serve?

- ④ Explain how the final sentence changes how you should interpret the evidence in paragraph 1.

3

YOUR TURN

Your own words

Use these stages at the indicated times. Stage 1 comes before the passage; Stage 2 follows your annotations and answers. Evaluate what your actual reading changed or clarified. A plan for future reading does not complete this task.

1. Before reading: set a question

Preview only the passage title. Write a question you want the text to answer and a tentative prediction. Leave this record unchanged when you return after reading. Then read and mark the passage and answer the questions.

2. After reading: test your understanding

Write 90–120 words answering your original question. Explain whether your prediction changed or was confirmed, using two specific annotated details from different paragraphs. Explain how one annotation strategy helped you avoid a mistaken inference. Identify one question the passage leaves unanswered.

PART 1 • READ AND MARK

Before reading the paragraphs, turn to writing Stage 1 and record a question based only on the title. Return here: underline claims, circle supporting examples, and number cautions as you read. Then answer the questions and complete Stage 2. Keep your original question visible. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Use your underlining to state the author's overall claim about eDNA in one sentence.	eDNA is a useful tool for detecting and monitoring species, but it should be interpreted with other evidence rather than treated as conclusive proof.
2	Which two details from paragraph 2 explain why a positive eDNA result cannot, by itself, prove that a species is currently at the sampling site?	DNA may have been carried downstream from another location, and genetic traces may remain after the organism has left.
3	How does paragraph 3 change the question investigators can ask, and what purpose does that change serve?	It shifts from asking what was caught on one day to asking about patterns across seasons or the spread of invasive species, which supports early detection and broader monitoring.
4	Explain how the final sentence changes how you should interpret the evidence in paragraph 1.	It shows that detecting DNA is a useful clue about a species, but a detection alone does not establish that living individuals are currently at the sampling site or count the animals present.

PART 3 · YOUR TURN (SAMPLE ANSWER)

Illustrative before-reading record: Can a water sample show that a fish is living at the collection site? I predict that finding its DNA proves it is there.

Possible 90-120-word reflection: My question was whether a water sample proves that a fish is living at the collection site. Reading changed my prediction. Paragraph 1 says a detection alone does not count animals or establish living individuals at that site. Paragraph 2 explains why: currents may carry DNA from elsewhere, and traces can remain after an organism leaves. Numbering those cautions stopped me from treating a positive result as a direct sighting. I now understand detection as evidence to interpret with sampling conditions and other observations. The passage does not tell me which sampling design would best test presence at a particular estuary.

Assess the unchanged before-reading record, actual passage annotations and the completed reflection together. Accept a confirmed prediction if the student explains why with two details from different paragraphs. The 90-120-word range applies only to Stage 2, not to Stage 1 or model labels. A single detection is not an animal count; this does not deny that specialized eDNA methods can inform abundance estimates. Background: U.S. Geological Survey, Resource Manager's eDNA Toolbox, <https://www.usgs.gov/centers/upper-midwest-environmental-sciences-center/science/resource-managers-edna-toolbox>. This sheet supplies one informational-text practice within a broader sequence using varied complex texts; no field sampling or external article is required.