Tadpoles Under Pressure

Use matched groups to predict growth and survival.

7.6 "Analyze and interpret data to predict how environmental conditions, genetic factors, and resource availability will impact the growth of individual organisms and populations of organisms in an ecosystem."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the conditions that differ between each pair of groups: A and B, A and C, and A and D. Circle the measurements you could use to predict how those differences affect growth or survival.

Four Groups in a Wetland

1. At a wetland field station, researchers followed four groups of tree frog tadpoles for four weeks. Each group began with 20 tadpoles of the same age. The researchers recorded average body length and how many tadpoles were still alive at the end. The groups differed in water temperature, daily algae supply, or an inherited tendency to grow quickly.

2. Groups A and B had the same inherited growth type and water temperature, but B received less algae. Groups A and C had equal food and temperature, but C inherited a slower growth type. Groups A and D had equal food and the same inherited growth type, but D lived in cooler water.

TADPOLES AFTER FOUR WEEKS

Group	Water; daily algae supply	Inherited growth type	Average length (mm)	Tadpoles left
A	22 °C; plentiful	Quick	32	18
B	22 °C; scarce	Quick	20	10
C	22 °C; plentiful	Slow	27	17
D	16 °C; plentiful	Quick	23	14

3. These results show patterns, not guarantees about every frog. A tadpole can be shorter than its group's average, and a pond can change when a dry spell reduces its algae. If conditions stay similar, researchers can use differences between matched groups to predict which tadpoles may grow longer and which groups may have more survivors.

2 ANSWER WITH EVIDENCE

Use the passage

1. If algae stays scarce for group B, how would you expect its average length and number of survivors to compare with group A? Use the data.

2. What does comparing groups A and C suggest about how inherited growth type affects average length when food and temperature are the same?

3. If cooler water continues, what does comparing groups A and D suggest about growth and survival in group D?

4. A new group has the slow growth type, scarce algae, and 22 °C water. Predict its average length compared with A's, using two comparisons from the table. Can you predict an exact length?

3 YOUR TURN

Your own words

A new group of 20 tadpoles has the slow growth type, plentiful algae, and 16 °C water. In three sentences, predict how its average length and number of survivors might compare with group A, use two comparisons from the data, and explain why you cannot give exact numbers.

ANSWER KEY

Tadpoles Under Pressure

GRADE 7 · 7.6

PART 1 · READ AND MARK

Underline the conditions that differ between each pair of groups: A and B, A and C, and A and D. Circle the measurements you could use to predict how those differences affect growth or survival. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	If algae stays scarce for group B, how would you expect its average length and number of survivors to compare with group A? Use the data.	**Expect a shorter average length and fewer survivors. B averaged 20 mm with 10 survivors, compared with A's 32 mm and 18 survivors.**
2	What does comparing groups A and C suggest about how inherited growth type affects average length when food and temperature are the same?	**The slow growth type may lead to shorter tadpoles. C averaged 27 mm, while A averaged 32 mm under the same food and temperature conditions.**
3	If cooler water continues, what does comparing groups A and D suggest about growth and survival in group D?	**D may have shorter tadpoles and fewer survivors. D averaged 23 mm with 14 survivors, compared with A's 32 mm and 18 survivors.**
4	A new group has the slow growth type, scarce algae, and 22 °C water. Predict its average length compared with A's, using two comparisons from the table. Can you predict an exact length?	**It may average less than A's 32 mm. B was shorter than A with scarce algae, and C was shorter than A with the slow growth type. An exact length cannot be predicted because the table does not show both differences together.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I predict the new group may average less than A's 32 mm and have fewer than A's 18 survivors. Slow-growth group C averaged 27 mm compared with A's 32 mm, while cooler group D averaged 23 mm and had 14 survivors compared with A's 18. I cannot give exact numbers because the table does not show cooler water and the slow growth type together.

Accept predictions supported by the matched-group comparisons, including cautious wording about survival. Students should not add or subtract the measured differences to claim an exact outcome for a new combination of conditions.