

Pond Prediction Model

Use evidence to examine what a life science model can and cannot show.

LS.1.e.ii “developing and using models evaluate limitations of models”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each model feature or change that helps make a prediction, and circle each detail that shows why the model has limits.

A Model for Willow Pond

- ① At Willow Pond, scientists wanted to predict how a long drought might affect a frog population. They built a simple model with boxes for rain, pond water, algae, tadpoles, adult frogs, and herons. Arrows showed relationships. More rain led to more pond water. More pond water supported more algae, a food source for tadpoles. The model helped the team organize evidence and make a testable prediction: if drought lowered water levels, fewer tadpoles would survive to become adult frogs.
- ② During two dry summers, the team measured water depth and counted tadpoles at several pond edges. The counts dropped as shallow areas dried. This pattern supported the model's main prediction, so the team used it to suggest protecting deeper pond sections during drought. However, the model treated all tadpoles as if they had the same chance of surviving. In real ponds, some tadpoles are eaten, some are diseased, and some find cooler water. The simple model could not show these differences.
- ③ To improve the model, the scientists added separate boxes for shallow and deep water. They also added arrows for predation and disease. This revised model could compare several survival conditions instead of one average condition. Still, it had limits. It did not include every predator, the effect of sudden storms, or differences among individual frogs. Measurements also came from only one pond. The model is useful for asking questions and guiding choices, but it cannot guarantee exactly how many adult frogs will live after the next drought.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What did the simple model predict would happen to tadpoles if drought lowered pond water levels?

2 What observation from the dry summers supported the model's prediction?

3 Identify one limitation of the simple model. Explain what real pond difference it did not show.

4 How did the revised model improve the original model? Name one addition and one remaining limit.

3 YOUR TURN _____ Your own words

Choose a garden ecosystem. In the box, draw a model with labeled boxes and arrows to show how a change could affect one organism. Write two sentences: one prediction your model makes and one limitation of your model.

PART 1 • READ AND MARK

Underline each model feature or change that helps make a prediction, and circle each detail that shows why the model has limits. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What did the simple model predict would happen to tadpoles if drought lowered pond water levels?	Fewer tadpoles would survive to become adult frogs.
2	What observation from the dry summers supported the model's prediction?	Tadpole counts dropped as shallow pond areas dried.
3	Identify one limitation of the simple model. Explain what real pond difference it did not show.	The model assumed all tadpoles had the same survival chance. It did not show differences such as predation, disease, or finding cooler water.
4	How did the revised model improve the original model? Name one addition and one remaining limit.	It added separate shallow and deep water boxes or arrows for predation and disease. It still left out factors such as every predator, sudden storms, individual differences, or evidence from other ponds.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Drawing: sunlight → bean plants → aphids → ladybugs → birds. If fewer ladybugs live in the garden, aphids will increase. My model is limited because it does not show weather or disease.

Accept predictions that logically follow the student's arrows. Accept limitations that identify a reasonable missing factor, assumption, or limited scope and explain that the model cannot represent it.