

Models Under Review

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

6.1.e.iii “developing and using models evaluate limitations of models”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the parts of the stream-table model and what each part represents. Circle each detail that shows a limit of the model, then number the possible improvements.

Testing Erosion in a Tray

- ① To study how rain reshapes land, a class built a stream-table model. They placed damp sand in a shallow tray, made a small hill, and poured the same cup of water at the top during each trial. The water cut channels and carried grains downhill. In this model, sand represented loose ground, the tray represented a small part of a landscape, and flowing water represented rain runoff. The class used the model to compare what happened when the hill was bare or covered with small pebbles.
- ② After several trials, the group noticed that pebbles slowed moving sand near the hill. They could observe this change easily because the tray kept the area small and the water amount controlled. Yet the model did not include plant roots, insects, different soil layers, or changing rainfall. Its smooth sand also behaved differently from packed clay or rocky soil. Therefore, the model could show one possible pattern of erosion, but it could not predict exactly how every real hillside will change.
- ③ The class evaluated the model before using its results to make a claim. They decided it was useful for testing how a ground cover can affect moving sand when water volume stays the same. To improve it, they could add pieces of sponge as plant cover, layer different materials, or repeat trials with light and heavy water flows. Even these changes would not include a full watershed, weather over many years, or every kind of soil. A model becomes more useful when its parts and limits match the question being investigated.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Name one part of the stream-table model and the real feature it represented.

2 Identify two things that the model did not include. Why do these missing parts limit the model?

3 Could the class use this model to predict exactly how every hillside will change? Use one detail from the passage to explain.

4 Which improvement would help the class investigate changing rainfall, and why?

3 YOUR TURN _____ Your own words

Choose a science question and plan a model that could help investigate it. Write exactly four sentences: state your question and model, explain what it can show, name one limit, and describe one improvement.

PART 1 • READ AND MARK

Underline the parts of the stream-table model and what each part represents. Circle each detail that shows a limit of the model, then number the possible improvements. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Name one part of the stream-table model and the real feature it represented.	Sand represented loose ground, the tray represented a small part of a landscape, or flowing water represented rain runoff.
2	Identify two things that the model did not include. Why do these missing parts limit the model?	Answers may name plant roots, insects, different soil layers, or changing rainfall. Missing these features means the model cannot represent all conditions on a real hillside.
3	Could the class use this model to predict exactly how every hillside will change? Use one detail from the passage to explain.	No. The model used smooth sand and did not include features such as plant roots, different soil layers, or changing rainfall, so it could not predict every real hillside.
4	Which improvement would help the class investigate changing rainfall, and why?	They could repeat trials with light and heavy water flows. This would model different amounts of rainfall or runoff.

PART 3 • YOUR TURN (SAMPLE ANSWER)

My question is how energy moves through a grassland food chain. My model uses yarn arrows connecting grass, rabbits, and foxes. It shows energy moving from a producer to consumers, but it does not show how much food each animal finds. I would add more species and number tokens to show changing populations.

Accept equivalent model parts, limitations, and improvements when they match evidence from the passage. For the open task, accept varied scientific questions if the student clearly connects the model's parts, use, limitation, and revision.