

Bridge Model Detectives

Study how a small bridge model helps, and where it falls short.

4.2.A "identify advantages and limitations of models such as their size, scale, properties, and materials;"

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each advantage of the bridge model. Circle each limitation, or way the model does not match the real bridge.

Testing a Tiny Bridge

- ① When engineers plan a new footbridge across a creek, they may build a model before they build the real bridge. A model is a stand-in that helps people study an object or system. The team in this example made a bridge model from balsa wood, string, and cardboard. It was much smaller than the planned bridge, so it could fit on a classroom table.
- ② Because it was small, the team could carry the model easily and change a piece quickly. They placed small weights on it to compare how different shapes held up. This was an advantage because the team could test ideas without using large amounts of wood or spending much money. The model also let them notice where the string supports were too loose.
- ③ However, the model could not show everything about a real footbridge. Its balsa wood and cardboard did not have the same strength, weather resistance, or weight as steel and concrete. The smaller scale also meant that wind, rushing water, and the weight of many people were not copied exactly. The team could use the model for early tests, but it needed other tests before construction.

2

ANSWER WITH EVIDENCE

Use the passage

- 1

What two materials were used to make the bridge model?
- 2

How did the model's small size help the team? Give one way.
- 3

Name two properties that were different between the model materials and the real bridge materials.
- 4

Why could the small model not copy wind, rushing water, and the weight of many people exactly?

3

YOUR TURN

Your own words

Plan a model of a bus shelter or another object you know. In each row, name a size, scale, property, or material choice, then give one advantage and one limitation of that choice.

MODEL OBJECT AND CHOICE	ADVANTAGE	LIMITATION

PART 1 • READ AND MARK

Underline each advantage of the bridge model. Circle each limitation, or way the model does not match the real bridge. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What two materials were used to make the bridge model?	Any two: balsa wood, string, or cardboard.
2	How did the model's small size help the team? Give one way.	It was easy to carry, easy to change quickly, and it fit on a classroom table. Accept one.
3	Name two properties that were different between the model materials and the real bridge materials.	Any two: strength, weather resistance, or weight.
4	Why could the small model not copy wind, rushing water, and the weight of many people exactly?	Its smaller scale meant those forces and weights were not the same as on the real bridge.

PART 3 • YOUR TURN (SAMPLE ANSWER)

MODEL OBJECT AND CHOICE	ADVANTAGE	LIMITATION
Bus shelter, cardboard walls	Cardboard is inexpensive and easy to cut.	Cardboard becomes weak when wet.
Bus shelter, model is 20 times smaller	The model fits on a desk.	People cannot sit inside at the real size.
Bus shelter, clear plastic roof	The roof lets the builder see inside.	The plastic may bend differently than a full-size roof material.

Accept answers that accurately identify a model choice and a connected advantage and limitation. Student examples may use different objects, materials, sizes, scales, or properties than the sample.