Models Under Test

Compare what different models can show and miss.

5.2.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, circle each limitation, and number each detail about a model's size, scale, properties, materials, or data. These details help you judge how useful a model is.

Testing a Beach Breakwater

1. An engineering team wanted to protect a beach from strong waves. Before building a real breakwater, the team made models. A model is a representation used to study an object, system, or idea. It can be smaller, larger, or different from the real thing. The team compared what each model could show and what it could not show.

2. First, they built a small breakwater from sand, pebbles, and a plastic tray. They poured water to make waves. This physical model let the team watch water move around different wall shapes. It was inexpensive and easy to change. However, the tray was much smaller than the beach. Its waves, sand, and wall materials did not have all the properties of ocean water, beach sand, and concrete.

3. Next, the team used a computer model with measurements of wave height, water depth, and shoreline shape. This digital model could quickly test many storm sizes without using much material. It could represent a long stretch of coast at a chosen scale. Still, its results depended on the data and rules put into the program. It could miss changes caused by animals, plants, or unexpected weather.

2 ANSWER WITH EVIDENCE

Use the passage

1. What is one advantage and one limitation of the physical breakwater model?

2. How could the physical model's materials make its results less like a real beach?

3. What could the digital model test quickly, and what information did it use?

4. Why should the team be careful when using results from the digital model?

3 YOUR TURN

Your own words

Choose one place or system you want to study, such as a school garden or playground. Complete both rows to compare two different models, including each model's material or data, size or scale, one advantage, and one limitation.

MODEL	MATERIAL OR DATA	SIZE, SCALE, OR DETAIL	ADVANTAGE	LIMITATION

ANSWER KEY

Models Under Test

GRADE 5 · TEKS 5.2.A

PART 1 · READ AND MARK

Underline each advantage, circle each limitation, and number each detail about a model's size, scale, properties, materials, or data. These details help you judge how useful a model is. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What is one advantage and one limitation of the physical breakwater model?	**Advantage: It let the team watch water move around wall shapes and was easy to change. Limitation: It was much smaller than the beach, and its materials did not have all the properties of the real materials.**
2	How could the physical model's materials make its results less like a real beach?	**The tray's water, sand, and wall materials did not have all the properties of ocean water, beach sand, and concrete.**
3	What could the digital model test quickly, and what information did it use?	**It could test many storm sizes quickly. It used measurements of wave height, water depth, and shoreline shape.**
4	Why should the team be careful when using results from the digital model?	**Its results depended on the data and rules in the program. It could miss changes caused by animals, plants, or unexpected weather.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

MODEL	MATERIAL OR DATA	SIZE, SCALE, OR DETAIL	ADVANTAGE	LIMITATION
Cardboard model of a school garden	Cardboard, clay, and toothpicks	1 centimeter represents 1 meter	Easy to move paths and plant beds before building	Does not show how real plants grow
Digital model of the same school garden	Computer map using garden measurements and sunlight data	Shows the 20-meter by 10-meter garden in detailed overhead view	Can test several path plans quickly	Results depend on accurate measurements and sunlight data

Accept equivalent advantages and limitations that are supported by the passage. For the open table, each row should describe a model and include material or data, size or scale or detail, one accurate advantage, and one realistic limitation.