

Hold the Soil

Use measurements and a scientific model to explain erosion and evaluate a solution.

7.3.A “develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories;”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each measured piece of evidence, circle the explanation or model, and number the proposed solution 1 and its test plan 2 to show how evidence supports scientific thinking.

A Garden Runoff Investigation

- ① At Riverbend Middle School, students investigated why a rain garden lost soil. They placed collection trays below three equal slopes and poured the same amount of water on each. One slope was bare soil, one had grass, and one had mulch. The trays measured sediment carried away by runoff.

SEDIMENT COLLECTED AFTER EQUAL WATER TESTS

Slope Surface	Sediment in Tray (g)
Bare soil	120
Grass	35
Mulch	18

- ② The measurements supported an explanation. Plant roots hold soil particles together, while mulch covers the ground and slows raindrops. Students made a simple model: faster water moving across uncovered soil carries more sediment. The model predicts that ground cover should reduce erosion during future storms.
- ③ Based on the data and model, the team proposed adding mulch to bare paths near the garden. They predicted less sediment would reach drains because mulch reduces the force of raindrops and slows surface water. To check the solution, they would repeat the tray test after adding equal mulch and compare sediment amounts with bare soil.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Which slope lost the most sediment? Give the measurement that supports your answer.

2 What scientific explanation connects ground cover to less erosion?

3 What does the students' model predict about ground cover during future storms?

4 How would the team test whether mulch is an effective solution?

3 YOUR TURN _____ Your own words

A school measures pavement temperatures on one sunny afternoon: an unshaded lunch area is 40°C, and a shaded lunch area is 29°C. Write 3 or 4 sentences that use both data values to explain the difference with a scientific model, propose a solution, and describe one way to test the solution.

PART 1 • READ AND MARK

Underline each measured piece of evidence, circle the explanation or model, and number the proposed solution 1 and its test plan 2 to show how evidence supports scientific thinking. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Which slope lost the most sediment? Give the measurement that supports your answer.	The bare-soil slope lost the most sediment, 120 g.
2	What scientific explanation connects ground cover to less erosion?	Roots hold soil particles together, and mulch covers the ground and slows raindrops.
3	What does the students' model predict about ground cover during future storms?	It predicts that ground cover will reduce erosion during future storms.
4	How would the team test whether mulch is an effective solution?	They would repeat the tray test with equal mulch added and compare the sediment amount with bare soil.

PART 3 • YOUR TURN (SAMPLE ANSWER)

The unshaded lunch area was 40°C, while the shaded area was 29°C. My model is that shade blocks some solar radiation, so less energy reaches the pavement and its temperature rises less. The school should add shade sails and measure both areas on several sunny days to see whether the temperature difference continues.

Accept explanations that accurately connect shade and reduced solar energy to lower pavement temperature. The solution must be supported by both data values and include a reasonable test, such as repeated temperature measurements with a comparison area.