

Runoff Data Detectives

Use test results to compare designs and improve a solution.

6.1.c “interpreting, analyzing, and evaluating data organize data sets to reveal patterns that suggest relationships construct, analyze, and interpret graphical displays of data compare and contrast data collected by different groups and discuss...”

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline the test conditions, circle each runoff measurement in Table 1, and number the sentences that use data to make or check a design decision.

Which Garden Tray Works Better?

- ① An environmental club designed trays that slow rainwater runoff from a garden. Two teams built equal-sized trays. Team Pebble covered soil with small stones. Team Mulch covered soil with shredded leaves. Each team poured 500 milliliters of water onto its tray three times and measured water that ran out after one minute. They organized results in a table to compare.

TABLE 1. RUNOFF AFTER ONE MINUTE

Design	Trial 1 (mL)	Trial 2 (mL)	Trial 3 (mL)	Average (mL)
Pebble	340	330	350	340
Mulch	220	210	230	220

- ② Table 1 shows the runoff measurements. Mulch produced less runoff on all three trials. Its average was 120 mL lower than the pebble average. Both designs were tested three times with 500 mL of water, so the teams could compare results under matching conditions. The pattern suggested that shredded leaves held more water in the tray than small stones did.
- ③ To refine the design, the club chose mulch for the next prototype because less water left the tray. They did not claim that mulch would work best everywhere. They planned more trials with the same soil amount and water volume, then tests during real rain. Repeating measurements and controlling conditions would help them decide whether the pattern was reliable.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Which design had the lower average runoff, and how much lower was it?

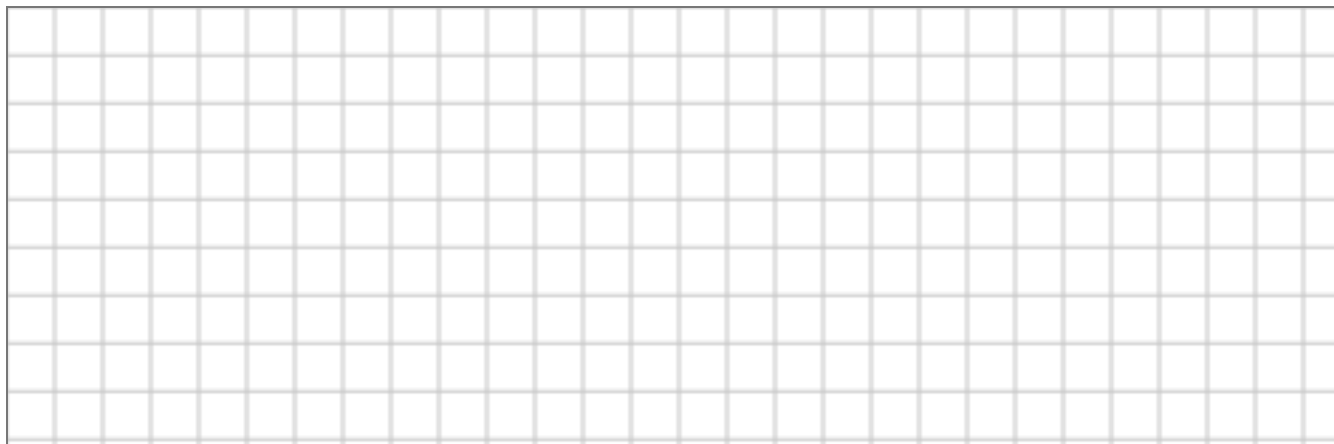
2 What similarity in the testing conditions made the two teams' results fair to compare?

3 What relationship do the data suggest between using shredded leaves and the amount of runoff?

4 What two next steps did the club plan to check whether the mulch pattern was reliable?

3 YOUR TURN _____ Your own words

A new test produced these runoff results: bark cover, 280 mL, 300 mL, and 290 mL; grass cover, 190 mL, 200 mL, and 210 mL. Make a bar graph of the average runoff for each cover, then write one sentence recommending a cover for the next prototype and use the data as evidence.



PART 1 • READ AND MARK

Underline the test conditions, circle each runoff measurement in Table 1, and number the sentences that use data to make or check a design decision. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Which design had the lower average runoff, and how much lower was it?	The mulch design had the lower average runoff. It was 120 mL lower than the pebble design.
2	What similarity in the testing conditions made the two teams' results fair to compare?	Both teams used equal-sized trays, tested three times, poured 500 mL of water, and measured runoff after one minute.
3	What relationship do the data suggest between using shredded leaves and the amount of runoff?	Using shredded leaves was associated with less runoff. The mulch tray had lower runoff in every trial and a lower average.
4	What two next steps did the club plan to check whether the mulch pattern was reliable?	They planned more trials with the same soil amount and water volume, then tests during real rain.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Title: Average Runoff After One Minute. x-axis: Soil cover. y-axis: Average runoff (mL). Bars: Bark, 290 mL; Grass, 200 mL. I recommend grass cover because its average runoff was 90 mL lower than bark cover.

Accept a correctly scaled bar graph with labeled axes, a title, and bars at 290 mL for bark and 200 mL for grass. The recommendation should select grass and cite its lower average runoff as evidence.