

Cooler Roof Choices

Use test data to judge and improve a design.

6.1.c.iv "interpreting, analyzing, and evaluating data use data to evaluate and refine design solutions"

NAME _____

DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two details that show which roof cooled the soil best, and circle the planned change that will test the revised design.

Testing Garden Shade Roofs

- ① A team designed a shade roof for a garden. Their goal was to lower the temperature of a tray of soil during a sunny hour. The team built three roofs with the same size and height. Roof A used one layer of cotton cloth. Roof B used two cloth layers. Roof C used a reflective sheet over one cloth layer.

SOIL TEMPERATURE TEST RESULTS

Roof Design	Starting Temperature	Ending Temperature
Uncovered tray	24°C	39°C
Roof A, one cloth layer	24°C	36°C
Roof B, two cloth layers	24°C	33°C
Roof C, reflective sheet and cloth	24°C	29°C

- ② Each tray held the same amount and type of soil. The team placed all trays in the garden at the same time and measured temperature before and after one hour. The data show that all roofed trays stayed cooler than the uncovered tray. The reflective roof had the lowest ending temperature.
- ③ Roof C met the cooling goal best, but the team noticed its reflective sheet tore at two corners after a windy day. They decided not to choose a design from temperature data alone. For a revised Roof C, they planned to attach the sheet with wider fabric tabs, then repeat the temperature test and record whether the roof stayed intact.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Which roof design performed best in the temperature test? Use a number from the data table as evidence.

2 How many degrees cooler was Roof C than Roof B at the end of the test?

3 Why did the team decide that temperature data alone were not enough to choose a final roof design?

4 How would the revised Roof C test help the team evaluate whether the new design is better? Use both kinds of evidence named in the passage.

3 YOUR TURN _____ Your own words

Plan three tests for a garden shade roof. In each row, name one prototype change, the data you would collect, and a rule for using that data to decide whether to keep the change.

PROTOTYPE CHANGE	DATA TO COLLECT	DECISION RULE

PART 1 • READ AND MARK

Underline two details that show which roof cooled the soil best, and circle the planned change that will test the revised design. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Which roof design performed best in the temperature test? Use a number from the data table as evidence.	Roof C performed best. Its ending temperature was 29°C, the lowest temperature in the table.
2	How many degrees cooler was Roof C than Roof B at the end of the test?	Roof C was 4°C cooler than Roof B.
3	Why did the team decide that temperature data alone were not enough to choose a final roof design?	Roof C had the best cooling result, but its reflective sheet tore at two corners after a windy day. The team also needed to consider durability.
4	How would the revised Roof C test help the team evaluate whether the new design is better? Use both kinds of evidence named in the passage.	The team would measure soil temperature again to see whether the roof still cools the soil. They would also record whether it stays intact, which tests durability.

PART 3 • YOUR TURN (SAMPLE ANSWER)

PROTOTYPE CHANGE	DATA TO COLLECT	DECISION RULE
Add tie-down cords	Ending soil temperature and number of tears after a windy day	Keep it if it stays as cool as the original roof and has no tears
Use a thicker reflective sheet	Ending soil temperature and number of tears	Keep it if the temperature is lower and the sheet does not tear
Add two side vents	Ending soil temperature and number of tears	Keep it if the temperature is lower and the roof stays intact