Heat Under Test

Compare two trials to judge claims about surface warming.

FSL.3D.5 "Select and explain why a hypothesis, prediction, or conclusion is, or is not, supported by two or more data presentations or theoretical models."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Circle the model and rival claim in paragraph 3. Write 1 beside table values and field-log results that support the model, and 2 beside values and results that challenge the rival claim.

Does Color Matter in the Shade?

1. A science club tested whether sunlight, rather than paint color alone, explains why dark surfaces get hotter. They painted identical metal trays black or white and placed one of each in sun and one of each in shade. All four began at 20°C. After 20 minutes, students recorded the surface temperatures in the table.

SCIENCE CLUB TRAY TEMPERATURES

Tray color	Location	Start	After 20 minutes
Black	Sun	20°C	38°C
White	Sun	20°C	29°C
Black	Shade	20°C	22°C
White	Shade	20°C	22°C

2. A different class repeated the test with new trays on another day. Their field log lists temperature increases of 15°C for black in sun and 8°C for white in sun. In shade, both colors rose 1°C. These increases are not final temperatures; they show how much each tray warmed during that class's trial.

3. One model says dark paint absorbs more incoming sunlight than light paint, so black trays should warm more in sun but not necessarily in shade. A rival claim says black paint makes a tray warmer than white paint even without sunlight. To judge either claim, compare the table's starting and ending temperatures with the other class's increases.

2 ANSWER WITH EVIDENCE

Use the passage

1. Do both trials support the model about dark paint absorbing sunlight? Use results from the table and the field log.

2. Is the rival claim about black paint and shade supported by both trials? Explain with results from each.

3. A student predicts that black trays warm at least twice as much as white trays in sun. Does this prediction fit both trials? Show how you checked.

4. Another student concludes that a tray cannot warm at all in shade. Is this conclusion supported by the two trials? Explain.

3 YOUR TURN

Your own words

Design a follow-up test using a different surface material. Predict how black and white versions will warm in sun and shade, support your prediction with one number from the table and one from the field log, and describe a result that would challenge it.

ANSWER KEY

Heat Under Test

HIGH SCHOOL · FSL.3D.5

PART 1 · READ AND MARK

Circle the model and rival claim in paragraph 3. Write 1 beside table values and field-log results that support the model, and 2 beside values and results that challenge the rival claim. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Do both trials support the model about dark paint absorbing sunlight? Use results from the table and the field log.	**Yes. In sun, the black tray warmed 18°C and the white tray 9°C in the table. The field log also shows greater warming for black in sun, 15°C compared with 8°C.**
2	Is the rival claim about black paint and shade supported by both trials? Explain with results from each.	**No. In the table, both shaded trays ended at 22°C. In the field log, both shaded trays warmed 1°C.**
3	A student predicts that black trays warm at least twice as much as white trays in sun. Does this prediction fit both trials? Show how you checked.	**No. It fits the table: black warmed 18°C and white warmed 9°C. It does not fit the field log: black warmed 15°C, which is less than twice the white tray's 8°C.**
4	Another student concludes that a tray cannot warm at all in shade. Is this conclusion supported by the two trials? Explain.	**No. Both shaded trays warmed 2°C in the table, and both shaded trays warmed 1°C in the field log.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would test identical black and white ceramic tiles in sun and shade for 20 minutes. I predict the black tile will warm more than the white tile in sun, but the two tiles will warm about the same in shade. In the table, black metal in sun rose 18°C while white metal rose 9°C; the field log reports rises of 15°C and 8°C. My prediction would be challenged if the black ceramic tile warmed much more than the white ceramic tile in shade.

Accept answers that compare temperature changes rather than final temperatures when judging warming. For the follow-up, accept a testable prediction using a new material, accurate evidence from both trials, and a result that would challenge the prediction.