Cool Cup Choices

Use evidence to judge a heat-control design.

5.1.d.ii "constructing and critiquing conclusions and explanations describe how scientific ideas apply to design solutions"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the test result that supports the students' conclusion. Circle the conclusion, then number the two scientific ideas that explain why the design could work.

The Ice Cup Test

1. Fifth graders designed a container to keep an ice cube from melting during recess. They knew that heat moves from warmer air into colder ice. They also knew that foam traps air, and trapped air slows heat transfer. Each team placed one equal ice cube in a small cup. The teams tested their cups outside for twenty minutes on the same sunny day.

2. One team wrapped its cup in foam and covered it with shiny foil. Another used foil only. A third used neither material. The foam-and-foil cup had the most ice left. The students concluded that combining foam and foil made the container work best. Their explanation was that foam slowed heat moving through the cup, while shiny foil reflected some sunlight away from it.

3. Jalen said, "Foil alone is useless because the foam-and-foil cup won." His claim does not fit all the evidence. The foil-only cup may still have kept more ice than the cup with no materials, but the teams did not report that comparison. To improve the design, students should measure the ice left in every cup and repeat the test. Then they can make a stronger conclusion about which material helps most.

2 ANSWER WITH EVIDENCE

Use the passage

1. What two scientific ideas did the students use to explain how their cup design worked?

2. Does the test result support the conclusion that the foam-and-foil container worked best? Use evidence from the passage.

3. Why does Jalen's claim about foil alone not fit all the evidence?

4. What two actions should students take to make a stronger conclusion about the materials?

3 YOUR TURN

Your own words

Design a sleeve to keep a cold water bottle cool outside. Write three sentences that name a scientific idea, describe how your sleeve uses that idea, and give an invented test result that supports a conclusion about your design.

ANSWER KEY

Cool Cup Choices

GRADE 5 · 5.1.d.ii

PART 1 · READ AND MARK

Underline the test result that supports the students' conclusion. Circle the conclusion, then number the two scientific ideas that explain why the design could work. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What two scientific ideas did the students use to explain how their cup design worked?	**Foam traps air, and trapped air slows heat transfer. Shiny foil reflects some sunlight away from the cup.**
2	Does the test result support the conclusion that the foam-and-foil container worked best? Use evidence from the passage.	**Yes. Of the three cups tested, the foam-and-foil cup had the most ice left after twenty minutes.**
3	Why does Jalen's claim about foil alone not fit all the evidence?	**The passage does not report whether the foil-only cup kept more ice than the cup with no materials. Without that comparison, Jalen cannot conclude that foil alone is useless.**
4	What two actions should students take to make a stronger conclusion about the materials?	**They should measure the ice left in every cup and repeat the test.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Heat moves from warmer air into the cold bottle. I would make a foam sleeve with a shiny outer layer because foam slows heat transfer and shiny foil reflects sunlight. In a test, the bottle with the sleeve stayed 4 degrees Celsius cooler than an uncovered bottle, so the sleeve helped keep it cool.

Accept scientifically accurate ideas about slowing heat transfer, such as insulation trapping air or a shiny surface reflecting sunlight. The student conclusion should match the invented test result and explain how the design feature applies the scientific idea.