

Cooler Box Clues

Use evidence and science ideas to evaluate a lunch box design.

3.1.d.iii “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 sentence that tells how heat moves. Circle the sentence that describes the liner design, then write 1 beside the conclusion sentence and 2 beside the fair critique sentence.

A Lunch Box Test

- ① Maya’s class wanted a lunch box that would keep an apple cool at recess. They knew that heat moves from warmer places to cooler places. The room was warmer than the cold apple, so heat could move into the lunch box. The class chose to test coverings that might slow this heat transfer during the morning.
- ② First, students put equal cups of cold water inside three small boxes. One box had no covering, one had a single layer of paper, and one had crumpled paper around the cup. After thirty minutes, the uncovered water was warmest. Water in the box with crumpled paper stayed coolest. Crumpled paper held many tiny air spaces.
- ③ The class concluded that crumpled paper was the best covering in this test because its air spaces slowed heat transfer into the box. Their explanation connects the test result to the science idea. They designed a lunch box liner with crumpled paper sealed between two sheets. A fair critique is that they tested only one time. Testing again with more cups would make their conclusion stronger.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 Use one test result and the science idea to explain why the class chose crumpled paper.

2 How does the lunch box liner apply the science idea about heat transfer?

3 What is the class's conclusion, and what evidence supports it?

4 What fair critique does the passage give, and how would the suggested change improve the conclusion?

3 YOUR TURN _____ Your own words

Design a sleeve for a cup of warm soup. Write four sentences: describe the sleeve, explain how it uses heat movement, give a fair test and conclusion, and name one way to make the test stronger.

PART 1 • READ AND MARK

Underline the sentence that tells how heat moves. Circle the sentence that describes the liner design, then write 1 beside the conclusion sentence and 2 beside the fair critique sentence. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	Use one test result and the science idea to explain why the class chose crumpled paper.	The box with crumpled paper stayed coolest. Its tiny air spaces slowed heat transfer into the box.
2	How does the lunch box liner apply the science idea about heat transfer?	The liner seals crumpled paper between two sheets. The paper's air spaces slow heat moving into the lunch box.
3	What is the class's conclusion, and what evidence supports it?	The class concluded that crumpled paper was the best covering in this test. The water in that box stayed coolest after thirty minutes.
4	What fair critique does the passage give, and how would the suggested change improve the conclusion?	The class tested only one time. Repeating the test with more cups would provide more evidence and make the conclusion stronger.

PART 3 • YOUR TURN (SAMPLE ANSWER)

I would make a sleeve with felt and trapped air spaces. Heat moves from the warmer soup toward the cooler room, and the air spaces would slow heat leaving the cup. I would compare equal cups of soup after twenty minutes, one with the sleeve and one without it, to support my conclusion that the sleeve keeps soup warmer. I would repeat the test with more cups because one comparison may not be enough.

Accept equivalent explanations that use evidence from the passage and correctly connect air spaces to slower heat transfer. For the open response, accept different sensible sleeve materials, a fair comparison, and a reasonable way to improve the test.