Cold Sleeve Choice

Use evidence, criteria, and limits to judge an engineering design.

5.2.D "evaluate experimental and engineering designs."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the test conditions and circle the facts the team used to judge which design to choose.

Testing Lunch Sleeves

1. Ms. Chen's class had an engineering challenge: make a reusable lunch sleeve that would slow ice melting for two hours. Each sleeve had to cost no more than $1.00 and weigh no more than 150 grams. Team River built three sleeves. Design A used felt, Design B used bubble wrap, and Design C used a layer of foil and paper.

2. To compare the designs fairly, the team put 100 grams of ice in each sleeve. They placed all sleeves on the same table, started at the same time, and waited two hours. They repeated the test three times. The table shows the average ice left, cost, and mass for each design.

LUNCH SLEEVE TEST RESULTS

Design	Ice Left After 2 Hours	Cost	Mass
A	78 g	$0.80	145 g
B	90 g	$1.30	160 g
C	72 g	$0.50	130 g

3. Design B kept the most ice, but it cost too much and weighed too much. Design A met both limits and kept more ice than Design C, so the team selected A. The team planned another test on a hotter day. Testing A again under different conditions could show whether it works reliably outside the classroom.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which design was the best choice when you consider all of the requirements? Use data from the table to support your answer.

2. Why did the team not select Design B, even though it kept the most ice?

3. Name two parts of the test that made the comparison fair.

4. How could testing Design A on a hotter day help the team evaluate the design?

3 YOUR TURN

Your own words

Invent two designs for an object that solves a simple problem. Describe one requirement, one limit, a fair test, and the rule you would use to choose the better design.

ANSWER KEY

Cold Sleeve Choice

GRADE 5 · TEKS 5.2.D

PART 1 · READ AND MARK

Underline the test conditions and circle the facts the team used to judge which design to choose. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which design was the best choice when you consider all of the requirements? Use data from the table to support your answer.	**Design A. It cost $0.80, weighed 145 g, and kept 78 g of ice, so it met both limits and outperformed Design C.**
2	Why did the team not select Design B, even though it kept the most ice?	**Design B cost $1.30 and weighed 160 g. It did not meet the cost or mass limits.**
3	Name two parts of the test that made the comparison fair.	**Answers may include: each sleeve started with 100 g of ice, all sleeves were on the same table, all started at the same time, all were tested for two hours, and the test was repeated three times.**
4	How could testing Design A on a hotter day help the team evaluate the design?	**It could show whether Design A works reliably under a different, hotter condition outside the classroom.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I will compare two paper-towel towers that must hold 20 pennies and use no more than two sheets of towel. I will add pennies one at a time to each tower on the same table and repeat three trials. I will choose the tower that meets the limit and holds the higher average number of pennies.

Accept answers that use the passage evidence and distinguish between a design's performance and its limits. For Part 3, accept varied objects and tests when the student includes a measurable requirement, a constraint, fair comparison conditions, and a decision rule.