Cooler Box Challenge

Plan a fair test and use data to improve a device.

5.1.b "planning and carrying out investigations collaboratively plan and conduct investigations to produce data identify independent variable, dependent variables..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the words that name what the team changed, circle the words that name what they measured, and number three conditions they kept the same to make the test fair.

Testing Lunchbox Linings

1. At Riverbend School, a team wanted to keep a lunchbox cool during a warm field day. They planned a testable question: Which lining material keeps 200 milliliters of water coolest after 20 minutes in sunlight? The team would build three small insulated holders from identical cardboard boxes. Each holder would have one lining, aluminum foil, felt, or bubble wrap, so the boxes could be compared fairly.

2. The independent variable was the lining material that the team changed. The dependent variable was the water temperature in degrees Celsius after 20 minutes. To keep the test fair, the team used the same box size, water volume, starting water temperature, sunlight location, and testing time. One partner measured 200 mL with a graduated cylinder. Another used a thermometer to measure temperature, and a third recorded the data.

3. Before testing, the team predicted bubble wrap would slow warming because it traps air. They tested all three holders at the same time and wrote each final temperature in a chart. After examining the data, they could identify the lining that kept water coolest. Their holders were devices designed to solve a specific problem, keeping food cooler. The team could improve the design later by testing a second layer of the best lining.

2 ANSWER WITH EVIDENCE

Use the passage

1. What testable question did the team plan to investigate?

2. What was the independent variable, and what was the dependent variable?

3. Name three constants the team used to make the test fair.

4. What data should the team record for each holder, and what problem were the holders designed to solve?

3 YOUR TURN

Your own words

Choose a problem that a small device could solve. In five or six sentences, describe your device, write a testable question, name what you will change and measure, list at least two constants, tell what metric data you will collect, and explain how team members will share the work.

ANSWER KEY

Cooler Box Challenge

GRADE 5 · 5.1.b

PART 1 · READ AND MARK

Underline the words that name what the team changed, circle the words that name what they measured, and number three conditions they kept the same to make the test fair. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What testable question did the team plan to investigate?	**Which lining material keeps 200 milliliters of water coolest after 20 minutes in sunlight?**
2	What was the independent variable, and what was the dependent variable?	**The independent variable was the lining material. The dependent variable was the water temperature in degrees Celsius after 20 minutes.**
3	Name three constants the team used to make the test fair.	**Answers include the same box size, water volume, starting water temperature, sunlight location, and testing time.**
4	What data should the team record for each holder, and what problem were the holders designed to solve?	**They should record the final water temperature in degrees Celsius after 20 minutes for each lining. The holders were designed to keep food cooler.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Our team will build a paper bridge that holds pennies without bending. Our testable question is, How does the number of folded paper layers affect the mass a bridge holds before it bends? We will change the number of layers and measure the mass held in grams with a balance. We will keep the paper size, bridge span, and type of pennies the same. We will record the mass for each bridge in a data table. One partner will build bridges, one will add and measure pennies, and one will record data.

Accept equivalent wording that correctly identifies the changed factor, measured result, and conditions held constant. For the open response, accept any safe, testable device investigation that includes all requested planning parts and metric data.