Best Rain Plan

Compare design solutions using criteria, constraints, and evidence.

6.1.d.iii "constructing and critiquing conclusions and explanations generate and compare multiple solutions to problems based on how well they meet the criteria and constraints"

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each criterion or constraint the club must meet. Number the evidence the club uses to support or critique a design conclusion.

Rainwater for the Garden

1. At Riverbend Middle School, the garden club wanted to collect rainwater for vegetable beds. Their goal was to choose a system that could store enough water for dry weeks. The principal gave three criteria: the system had to hold at least 200 liters, cost no more than $300, and be safe for students to use. The roof downspout was available, but the space beside it was only 1 meter wide. The club could not block the walkway.

2. They investigated three designs. A narrow 250-liter barrel cost $280 and fit the space, but its tall shape could tip unless it was strapped to a wall. Two connected 120-liter barrels cost $260, fit beside the downspout, and could be strapped together. A 300-liter open trough cost $190, but it was 1.5 meters wide and had no lid. The club noted that the trough failed the space constraint and was unsafe because students could reach the water inside it.

3. After comparing the designs, the club chose the two connected barrels. Together, they held 240 liters, so they met the storage criterion. Their $260 cost met the budget, and their narrow arrangement left the walkway open. The club's explanation also included a safety step: secure the barrels to a wall and use lids. A student first suggested the single barrel because it held enough water. The group critiqued that conclusion because it ignored the added work needed to prevent tipping.

2 ANSWER WITH EVIDENCE

Use the passage

1. What one constraint did the open trough fail? Use evidence from the passage.

2. Which design did the club choose? Give the two number facts that show it met the storage and budget criteria.

3. What safety step did the club include in its explanation for the connected barrels?

4. Why was “it held enough water” not enough evidence to choose the single barrel?

3 YOUR TURN

Your own words

A class needs a container to carry 12 sealed soil-sample cups. It must cost $20 or less and fit on a 30 cm shelf. In the table, generate three container solutions, compare each to all requirements, and write a conclusion or critique for each one.

CONTAINER SOLUTION	EVIDENCE ABOUT REQUIREMENTS	CONCLUSION OR CRITIQUE

ANSWER KEY

Best Rain Plan

GRADE 6 · 6.1.d.iii

PART 1 · READ AND MARK

Underline each criterion or constraint the club must meet. Number the evidence the club uses to support or critique a design conclusion. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What one constraint did the open trough fail? Use evidence from the passage.	**It failed the space constraint because it was 1.5 meters wide, but the available space was only 1 meter wide.**
2	Which design did the club choose? Give the two number facts that show it met the storage and budget criteria.	**The club chose two connected barrels. They held 240 liters and cost $260.**
3	What safety step did the club include in its explanation for the connected barrels?	**The club said to secure the barrels to a wall and use lids.**
4	Why was "it held enough water" not enough evidence to choose the single barrel?	**A choice also had to meet the budget, space, and safety requirements. The single barrel needed added work to prevent tipping.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

CONTAINER SOLUTION	EVIDENCE ABOUT REQUIREMENTS	CONCLUSION OR CRITIQUE
Plastic bin	Holds 12 cups, costs $12, and is 28 cm wide.	Meets all requirements and is the best choice.
Cardboard box	Holds 12 cups, costs $4, and is 25 cm wide, but it can soften when wet.	Meets the listed requirements, but it may not be durable.
Metal tray	Holds 12 cups and costs $18, but it is 35 cm wide.	Reject because it does not fit on the shelf.

Accept equivalent evidence-based answers to the passage questions. For Your Turn, accept varied solutions when students compare each one to the cup capacity, cost, and shelf-width requirements and give a logical conclusion or critique.