Comparing Designs with Evidence

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

Compare designs against their stated requirements before applying a preference. Use measurements from the same test conditions.

1 A design must cost no more than $15. Which cost satisfies this requirement?

(1) $13

(2) $16

(3) $17

(4) $20

2 Two feasible containers have different masses and heat losses. Explain why deciding which is better requires knowing the priority. [1]

Answer and work

3 Which control makes a comparison of heat loss fairer?

(1) Start every trial with the same mass of water at the same temperature.

(2) Start each trial at a different temperature.

(3) Measure the containers for different lengths of time.

(4) Use a different outcome for every design.

4 Explain why a design with the smallest heat loss can still be rejected when there is a strict mass limit. [1]

Answer and work

Comparing Thermal Containers

Use the information below to answer the questions.

A lab tests four containers with the same water mass, starting temperature, and test duration. The container must have mass at most 400 g and cost at most $15. Among designs meeting both limits, choose the smallest temperature drop.

Design	Mass (g)	Cost	Temperature drop (°C)
P	350	$14	6.0
Q	390	$15	4.0
R	420	$14	3.0
S	370	$17	5.0

5 Which designs meet both limits?

(1) P and Q

(2) P and R

(3) Q and S

(4) All four

6 Select a design and justify it using all three measurements. [1]

Answer and work

7 How much smaller is Q’s temperature drop than P’s? [1]

Answer and work

8 If the cost limit falls to $14 while the mass limit stays 400 g, which design now satisfies both?

(1) P only

(2) Q only

(3) R only

(4) P and R