→ **SMARTER BALANCED PERFORMANCE TASK**

Focus Standards and Claim	Claim 4 7.EE.B.4

Stimulus	**Stacks of Cups** Your science classroom uses cups for many experiments. Your teacher ordered lots of cups from a catalog. The catalog is not very good. It has the following picture, but no other useful information. Your teacher wants you to help her get organized for when the cups arrive next week. Using only the information shown in the picture, she asks you to figure out some other specific measurements.
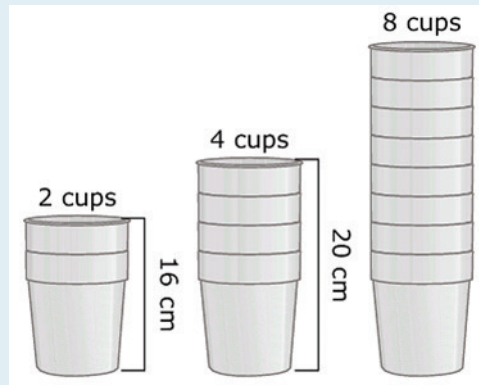
Item Prompt	Your teacher wants to sell School Spirit Cups with your school logo on them. She asks you to design this new cup such that a stack of 10 of them will be 125 cm tall. Describe key measurements of the School Spirit Cups and explain how they will meet your teacher's specifications.

Scoring Guide

SCORE	2 POINTS	1 POINT	0 POINTS
	Student describes the key dimensions of the cup (height of cup, height of lip (if necessary)) and explains how 10 cups will reach a height of exactly 125 cm.	Student describes the key dimensions of the cup (height of cup, height of lip (if necessary)) that would satisfy the constraints, but does not explain how 10 cups will reach a height of exactly 125 cm.	Student does not describe key dimensions that would satisfy the constraints.

Sample Responses

Student Sample A

2 POINTS

Lip = 8 cm

Base = 45cm

8 (lip) x 10 (amount of cups) = 80

+45 (base)

Height of stack = 125cm

SCORE RATIONALE

Though this would be a very tall cup, the response includes the key elements requested in the problem. The student demonstrated mathematically that the dimensions would meet the requirements of the teacher's specifications. The response earns full credit of 2 points.

Student Sample B

2 POINTS

12 x 10

120 + 5 = 125

Each cup would have to have a rim that is 12 cm tall and a base that is 5 cm tall.

12 + 5 = 17 for one cup.

SCORE RATIONALE

The response includes the key dimensions of the cup requested in the problem, though the cup would have an unusual shape. The student demonstrated mathematically that the dimensions would meet the requirements of the teacher's specifications. The response earns full credit of 2 points.

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Student Sample C

2 POINTS

The entire cup is 35 with the lips being 10, when you stack it, there will be a full cup and 9 lips.

$h = 35 + 10(n-1)$

$125 = 35 + 10(9)$

$125 = 35 + 90$

SCORE RATIONALE

The student described the dimensions of the cup and demonstrated that the design would work by setting up an equation and substituting the appropriate values into the equation. The student accounted for the lip of the bottom cup being included in the total height of that cup by reducing the number of cups to n - 1 in the equation. This effectively represents a total of 10 lips in the stack. The response earns full credit of 2 points.

Student Sample D

2 POINTS

The lips can be 10 cm and the base can be 25 cm.

$125 = b + (10 \times L)$

$125 = 25 + (10 \times 10)$

$125 = 25 + 100$

$125 \text{ cm} = 125 \text{ cm}$

It works!

SCORE RATIONALE

The student described the dimensions of the cup and showed that the dimensions would work algebraically with an appropriate equation. The student substituted the value 10 for the lips and the value 25 for the base. The response earns full credit of 2 points.

Student Sample E

1 POINT

Lip = 10cm

Base = 25cm

If the lip of the cup is 10cm and the base is 25cm then 10 cups will equal 125cm.

SCORE RATIONALE

The student gave dimensions that would satisfy the constraints, but the response does not include an explanation of how 10 of the cups would reach a height of exactly 125 cm. The response earns partial credit of 1 point.

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Student Sample F

1 POINT

The base is 75cm and each cup lip is 5cm it equals 125cm.

SCORE RATIONALE
The student gave dimensions that would satisfy the constraints, but the response does not include an explanation of how 10 of the cups would reach a height of exactly 125 cm. A cup with these dimensions would be exceedingly tall. The response earns partial credit of 1 point.

Student Sample G

1 POINT

1 cup = 35 height then 2 cups = 45 height then 3 cups = 55 height

I just go up by 10 cm each time after the first one.

SCORE RATIONALE
The response includes evidence that the student had in mind a set of dimensions that would work, and a reasoning process for determining the height of 10 cups. However, the response does not include an explicit identification of the dimensions of the key parts of the cup and does not carry the explanation through to 10 cups to show that the dimensions would meet the design specifications for a stack of 10. The response earns partial credit of 1 point.

Student Sample H

1 POINT

If you make the cup 35 cm (base: 25 cm, lip = 10 cm) then you could do 10 cups.

SCORE RATIONALE
The dimensions in this response would satisfy the constraints, but the response does not include an explanation of how the dimensions would do so. Although this can be inferred, the response earns partial credit of 1 point.

Student Sample I

0 POINTS

The school logo wants a stack of 10 and 125 cm tall. The call will have 30 cup and 15.750 cm tall.

SCORE RATIONALE
The student gave values that would not meet the specifications for the cup and the stack, and the number of cups does not fit the given description. The response earns 0 points.

Student Sample J

0 POINTS

They will meet standards if they are made 12.5 cm tall exact.

SCORE RATIONALE
The student described a cup that is 1/10 of the target stack height, suggesting that he/she considered the cups independently, rather than stacked together as presented. The response does not include an explanation or dimensions that would satisfy the constraints, and earns 0 points.

Student Sample K

0 POINTS

1. You tack the measurement of the cups you have right now. Problem 3.

2. Your add that measurement until you get 125 cm tall. 72 + 53 = 125cm

3. Than find how many cups in a stack will it take to get 125cm

Your will need 13 cups in a stack of 10 to get 125cm.

SCORE RATIONALE
The response includes evidence of misunderstanding the given constraints, and does not provide a coherent solution strategy. The explanation suggests a reasoning process, but does not refer to dimensions that would satisfy the requirements of the problem. The response earns 0 points.

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