

Focus  
Standards  
and Claim

Claim 4  
5.MD.C.5

Stimulus

### Picking a Pet

Your class is trying to decide what type of animal to get for the class pet. Your teacher is letting the class vote to choose a goldfish, a turtle, or a hamster as the class pet.

All 20 students in your class voted for both their 1st choice and their 2nd choice for the class pet. The results are shown in Table 1.

**Table 1. Class Pet Votes**

Student	1st Choice	2nd Choice	Student	1st Choice	2nd Choice
1	Turtle	Hamster	11	Turtle	Hamster
2	Goldfish	Hamster	12	Turtle	Goldfish
3	Goldfish	Turtle	13	Hamster	Turtle
4	Hamster	Turtle	14	Hamster	Goldfish
5	Goldfish	Turtle	15	Turtle	Goldfish
6	Turtle	Goldfish	16	Goldfish	Turtle
7	Hamster	Goldfish	17	Turtle	Goldfish
8	Turtle	Goldfish	18	Turtle	Goldfish
9	Goldfish	Hamster	19	Turtle	Hamster
10	Goldfish	Hamster	20	Goldfish	Hamster

## Item Prompt

Your principal surprises you by buying your class a turtle. He brings the turtle to your class along with a sheet from the pet store titled "Turtle Tank Rules".

The rules state:

- Tank walls must be at least 1 foot tall so the turtle can't climb out.
- There must be at least 400 square inches of floor space for the turtle to walk around on.

Your teacher says the volume of the tank must be smaller than 5000 cubic inches so it doesn't take up too much room in the classroom.

Give the dimensions of a tank that would work for your new turtle. Use words and numbers to explain how your tank satisfies the "Turtle Tank Rules" and your teacher's requirement.

**Volume of a rectangular prism = length x width x height**

## Scoring Guide

SCORE	2 POINTS	1 POINT	0 POINTS
	The student gives dimensions that satisfy all three constraints (height, base area, and volume) and provides an explanation as to why the chosen dimensions meet all requirements.	The student gives dimensions that satisfy all three constraints (height, base area, and volume), but does not provide an explanation as to why the chosen dimensions meet all requirements OR the student gives dimensions that satisfy two of the three constraints and provides an explanation that supports those dimensions.	Student only gives dimensions to satisfy one of the constraints and does not provide any valid explanation.

## Sample Responses

### Student Sample A



The dimensions that I used work because it is one foot tall, there is 416 space for the turtle to walk, and it is less than 5000 inches so it doesn't take up too much space.

Length = 26 in long

Width = 16 in

Height = 12 in tall

#### SCORE RATIONALE

This response provides three dimensions that satisfy the requirements. An explanation as to how these dimensions meet the height, base area, and volume constraints is also provided. This student's response demonstrates a full and complete understanding of the modeling process and Claims 4D and 4B being assessed. Full credit.

### Student Sample B



Since the floor has to be at least 400 sqi I decided the width 40 and length 10. Which equals 400. Then I multiplied 400 by 12 and got 1800 square inches. Since 12in is equal to 1 ft the tank is big enough for the turtle and it can't climb out. Also it is not too big for the classroom since 4800 in is under 5000 inches.

#### SCORE RATIONALE

This response demonstrates a full and complete understanding of the essential mathematical content and practices essential to this task. The student provided three dimensions that meet the requirements, and provided a justification for these choices that clearly demonstrates how the chosen dimensions satisfy the tank rules. The incorrect product included in the explanation (1800 square inches) is extraneous to the complete explanation given, and the response earns full credit.

## Student Sample C



Length = 50 inches

Width = 8 inches

Height = 12 inches

**SCORE RATIONALE**

This response provides three dimensions that meet all three constraints. However, the student did not provide any explanation as to how the chosen dimensions meet the requirements. The response demonstrates evidence of Claim 4 Target B, but not Claim 4 Target D, and earns partial credit of 1 point.

## Student Sample D



The dimensions of a functional tank for the turtle could be 8in. by 50in. by 12in. This tank is functional because it follows the teachers "Turtle Tank Rules."

Length = 50 in

Width = 1 ft or 12 in

Height = 8 in

**SCORE RATIONALE**

This student provides two dimensions that meet the constraints (area and volume), however the tank would not be tall enough. The explanation demonstrates a solid understanding of the problem, but unfortunately the response earns only 1 point because the chosen height does not meet the first Turtle Tank Rule.

## Student Sample E



$12 \times 100 = 1200 \times 4 = 4800$

The dimensions are One hundred four and twelve because One hundred times four is four hundred and four hundred times twelve is 4800

$l = 100 \text{ in}$

$w = 4 \text{ in}$

$H = 12 \text{ in}$

**SCORE RATIONALE**

This response provides three dimensions that satisfy the requirements mathematically (though a tank that is 4 inches wide would be too narrow for most pet turtles). The student stated in words what the measurements are, and included a relevant calculation, but the response does not include an explanation as to how the dimensions meet the constraints. This response demonstrates partial evidence of the modeling processes being assessed by the task, and receives 1 point.

## Student Sample F



$$2 \times 700 \times 3 = 4,200$$

**SCORE RATIONALE**

This response provides values that would satisfy two of the criteria (area and volume, or height and volume), but does not provide any explanation as to which value is which dimension, and how they meet the requirements. The absence of labels and explanation suggests a lack of comprehension of the requirements of the task. There is not enough evidence of Claim 4 Target B or D to earn any points.

## Student Sample G



length: 400

width: 1 ft

height: 1 ft

1 foot = 12 inches

$$400 \times 1 = 400$$

$$400 \times 12 = 4800$$

4800 inch squared

**SCORE RATIONALE**

This response provides dimensions that meet two constraints, height of 1 foot and area of at least 400 square inches. However, the provided calculations indicate an incorrect volume for these dimensions. The student neglected to convert feet to inches for one of the dimensions. While mathematical calculations are provided, there is no written explanation to justify the choice of dimensions. With the absence of an explanation and only two correct dimensions, this response does not provide sufficient evidence of the modeling processes being assessed to earn points.

## Student Sample H



Length = 500

Width = 10

Height = 1 foot

**SCORE RATIONALE**

The dimensions in this response satisfy two of the constraints (height and area), but the response does not provide an explanation for the choices. This response demonstrates merely an acquaintance with the mathematical and process skills essential to this task, and earns 0 points.