Grade 4 Performance Task

Student Task

PLANTING TULIPS PERFORMANCE TASK

In this task, your class is helping the principal to plant flowers in front of the school. You will help decide the shape of the planter and how many tulips can fit into the container. Remember to calculate the total space needed, which includes the space between the tulip bulbs and the width of the tulip bulb.

Working with Measurements

1. Bernard and Sara recommend a rectangular planter that is 5 feet long and 2 feet wide. Bernard says that it will be easier to figure out how many tulips to plant if the measurements are in inches.

Fill in the blanks to show the number of inches for each measurement.

Length: 5 feet = _____ inches

Width: 2 feet = _____ inches

Figuring Out Digging Depth

2. The class will need to dig a hole to a depth of at least twice the length of the tulip bulb. Rosa measures the length of two different tulip bulbs. She finds one is $1\frac{1}{2}$ inches long and the other is $2\frac{1}{2}$ inches long.

Sam thinks that they should dig all of the holes 3 inches deep, but Rosa says that 3 inches is not deep enough. Who do you think is correct? Explain your reasoning.

Bulbs in the Rectangular Planter

3. The class finds a bag containing bulbs that are each $1\frac{1}{2}$ inches wide and decides to use them in their rectangular planter. Following the planting guidelines, answer the questions and show your calculations.

> PLANTING GUIDELINES: The distance between tulip bulbs should be 3 times the width of the bulb.

A. This picture shows a tulip bulb that is $1\frac{1}{2}$ inches wide. Use your ruler and mark an "X" where the next bulb could be planted.

B. Using your drawing, calculate the total length of space that is needed for each bulb with a $1\frac{1}{2}$-inch width. Your answer should include the width of the bulb shown.

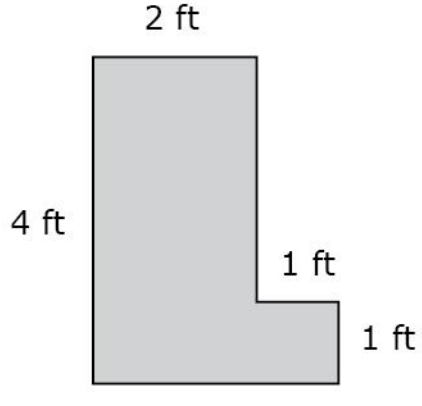
C. How many tulip bulbs with a $1\frac{1}{2}$-inch width can be planted in a single row that is 5 feet long?

D. How many tulip bulbs with a $1\frac{1}{2}$-inch width can be planted in a single column that is 2 feet long?

E. How many total tulip bulbs with a $1\frac{1}{2}$-inch width can be planted in the 5-foot by 2-foot rectangular planter? Explain or show your reasoning.

Selecting a Planter

4. Edward thinks that the L-shaped planter shown will hold more tulip bulbs than the 5-foot by 2-foot planter.



Following the same planting guidelines, how many tulip bulbs with a $1\frac{1}{2}$-inch width can the L-shaped planter hold?

Which planter shape (rectangle or L-shaped) holds more tulip bulbs? Explain or show your reasoning.

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Task Specifications

Item Id:	MAT.04.TULIPS.PT
Title:	Planting Tulips
Grade:	4
Content Domain(s):	Operations and Algebraic Thinking; Number and Operations—Fractions; Measurement and Data
Assessment Target(S):	Claim 1, Target I: Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit. Claim 3, Target E: Distinguish correct logic or reasoning from that which is flawed and—if there is a flaw in the argument—explain what it is. Claim 3, Target B: Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures. Claim 2, Target D: Identify important quantities in a practical situation and map their relationships (e.g., using diagrams, two-way tables, graphs, flowcharts, or formulas). Claim 2, Target B: Select and use appropriate tools strategically. Claim 2, Target A: Apply mathematics to solve well-posed problems arising in everyday life, society, and the workplace. Claim 3, Target A: Test propositions or conjectures with specific examples. Claim 3, Target D: Use the technique of breaking an argument into cases.
Score Points:	See Scoring Rubric
Task Purpose:	The purpose of this task is to assess student's ability to problem solve with fractions in the context of area/space.

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Scoring Rubric

Scoring Criteria for Planting Tulips Task

Scorable Parts	Points	Claims
1. Bernard says that it will be easier to figure out how many tulips to plant if the measurements are in inches.	0–2 Points Full credit for correctly converting feet to inches for both lengths. Accept other valid responses.	Contributes evidence to Claim 1, Concepts and Procedures
2. Sam thinks that they should dig all of the holes 3 inches deep, but Rosa says that 3 inches is not deep enough. Who do you think is correct? Explain your reasoning.	0–2 Points Full credit for stating Rosa is correct because the $2\frac{1}{2}$-inch bulb will need a hole 5 inches deep. Three inches is not deep enough.	Contributes evidence to Claim 3, Communicating Reasoning
3. A. Use your ruler and mark an "X" where the next bulb could be planted. B. Using your drawing, calculate the total length of space that is needed for each bulb with a $1\frac{1}{2}$-inch width. C. How many tulip bulbs with a $1\frac{1}{2}$-inch width can be planted in a single row that is 5 feet long? D. How many tulip bulbs with a $1\frac{1}{2}$-inch width can be planted in a single column that is 2 feet long? E. How many total tulip bulbs with a $1\frac{1}{2}$-inch width can be planted in the 5-foot by 2-foot rectangular planter? Explain or show your reasoning.	0–6 Points Full credit for: Marking an "X". There should be 3 inches between the edge of the bulb and the edge of "X". Finding 6 inches as the total length of space needed per bulb. Finding 10 bulbs will fit in a 5-foot long row. Finding 4 bulbs will fit in a 2-foot long column. Finding 40 total bulbs will fit in the 5-foot by 2-foot planter.	Contributes evidence to Claim 2, Problem Solving

4. Following the same planting guidelines, how many tulip bulbs with a $1\frac{1}{2}$-inch width can the L-shaped planter hold? Which planter shape (rectangle or L-shaped) holds more tulip bulbs? Explain or show your reasoning.	0–3 Points Finding 36 bulbs will fit in the L-shaped planter. Full credit is given for stating the rectangular planter will hold more bulbs and showing all supporting calculations for this answer. Responses should include the calculating of the number of bulbs for the L-shaped planter and comparing this to the number of bulbs for the rectangular planter (found in question 3 E).	Contributes evidence to Claim 3, Communicating Reasoning