

Task: Terrific Tiles! Grade Level: Third

Key APS Mathematics Standards:

1. Measures the areas of common quadrilaterals and analyzes the relationship between multiplication arrays and area.
 2. Uses money concepts in everyday situations and makes change for a variety of amounts up to \$1.00.
- The Proficiency Levels for this task are based on the third grade version of the task.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Novice	<p>1. There are no solutions or the solutions have no relationship to the task.</p> <p>2. The student does not understand that the task is a multiple step problem and any attempt s/he makes to solve the task will only approach one aspect of the problem.</p> <p>For Example: Finding the area of the floor.</p>	<p>1. The student cannot start the task or s/he has started the task using manipulatives or representations but cannot complete the task.</p> <p>2. The student cannot demonstrate, using manipulatives or representations, how to determine the area of the floor/tiles, the number of tiles needed, or the cost of the tiles.</p> <p>Sample Strategies: The student attempts to find the area of the floor (54 sq. ft.), but cannot make a connection between the size of the tiles and the number of tiles needed to cover the floor.</p>	<p>1. There is little or no communication, the student did not label the work, and their thinking is difficult to follow.</p> <p>2. The student cannot write his/her results, uses little or no geometry terms or symbols, and has no system for tracking their calculations for finding the area of the floor, the number of tiles needed, or the cost of the tiles.</p>
Apprentice	<p>1. The student understands that the task is a multiple step problem, but cannot use the information at each of the steps to progress the problem.</p> <p>For Example: The student uses an appropriate strategy to find the area of the floor and one tile, but cannot use this information to determine the number of tiles needed or the cost of the tiles.</p>	<p>1. The student uses an appropriate strategy to start the task but cannot progress the problem to an accurate solution.</p> <p>2. The student can calculate the area of the floor/tile, but does not (or cannot) use the information to find an accurate solution to the problem.</p> <p>Sample Strategies: The student can calculate the area of the tile (36 sq. in.) and the floor (54 sq. ft), but can't determine the # of tiles needed (216). OR The student calculates the area, determines the # of tiles, but cannot determine the # of bundles (44) needed because s/he doesn't understand how to work with the remainders.</p>	<p>1. The student has attempted to communicate his/her findings by labeling their work, but does not attempt to summarize their work by stating their final answer.</p> <p>2. The student can state his/her results and uses some geometry terms or symbols in their explanation of how s/he calculated the area, the number of tiles needed, or the cost of the tiles.</p> <p>3. The student has not established an accurate system (charts, t-tables, graphs) for tracking their calculations: the area of the floor, the number of tiles needed, or the cost of the tiles.</p>
Practitioner	<p>PROFICIENCY: The student understands that the task is a multiple step problem, and the key steps for solving the task include: finding the area of one tile and the floor; determining the number of tiles needed to tile the floor; and the cost of the tiles.</p>	<p>PROFICIENCY: The student uses an accurate and appropriate strategy to solve the task. S/he calculates the area of the floor/tiles, determines the # of tiles (216) and bundles (44) needed, and calculates the cost of the tiles (\$44).</p> <p>Sample Strategies: The student can calculate that 43 bundles plus 1 tile will be needed to tile the floor, therefore they will need to buy an extra bundle of tiles to tile the entire floor.</p>	<p>PROFICIENCY:</p> <p>1. The student can represent his/her work in a clear, organized manner, and uses appropriate geometry terms and symbols in his/her explanation of how they calculated the area, the number of tiles needed, and the cost of the tiles.</p> <p>2. The student has created an efficient system (charts, t-tables, graphs) for tracking their calculations: the area of the floor/tiles, the number of tiles needed, and the cost of the tiles.</p>
Expert	<p>1. The student understands that the task is a multiple step problem, and the key steps for solving the task include: finding the area of one tile and the floor; determining the number of tiles needed to tile the floor; and the cost of the tiles.</p> <p>2. The student includes a written rule, generalization, or observation about their understanding of geometry.</p>	<p>1. The student uses an accurate and appropriate strategy to solve the task. S/he calculates the area of the floor/tiles, determines the # of tiles/bundles needed, and calculates the cost of the tiles (\$44).</p> <p>Sample Strategies: The student calculates the number of tiles in one square foot (4), expands that out to 6 square feet (24 tiles), then multiplies 24 by 9 (the # of rows) to get a total of 216 tiles.</p> <p>2. Based on the above strategy, the student makes an observation about the area.</p> <p>For Example: "There are 4 tiles in one square foot, the floor is 54 sq. ft., so an easier way to find the # of tiles would be to multiply $4 \times 54 = 216$."</p>	<p>1. The student can represent his/her work in a clear, organized manner; uses appropriate geometry terms and symbols in the explanation; and has created an efficient system (charts, t-tables, graphs) for tracking their calculations.</p> <p>2. The student includes a written rule, generalization, or observation about their understanding of geometry.</p>

Task: Terrific Tiles! Grade Level: Fourth

Key APS Mathematics Standards:

1. *Solves problems involving perimeter and area using a variety of techniques.*
2. *Counts, makes change, and solves mathematical problems involving money.*

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Novice	<p>1. There are no solutions or the solutions have no relationship to the task.</p> <p>2. The student does not understand that the task is a multiple step problem and any attempt s/he makes to solve the task will only approach one aspect of the problem.</p> <p>For Example: Finding the area of the floor.</p>	<p>1. The student cannot start the task or s/he has started the task using manipulatives or representations but cannot complete the task.</p> <p>2. The student cannot demonstrate, using manipulatives or representations, how to determine the area of the floor/tiles, the number of tiles needed, or the cost of the tiles.</p> <p>Sample Strategies: The student finds the area of the floor (150 sq. ft.), but cannot make a connection between the size of the tiles (9 sq. in.), and the number of tiles needed to cover the floor.</p>	<p>1. There is little or no communication, the student did not label the work, and their thinking is difficult to follow.</p> <p>2. The student cannot write his/her results, uses little or no geometry terms or symbols, and has no system for tracking their calculations for finding the area of the floor, the number of tiles needed, or the cost of the tiles.</p>
Apprentice	<p>1. The student understands that the task is a multiple step problem, but cannot use the information at each of the steps to progress the problem.</p> <p>For Example: The student uses an appropriate strategy to find the area of the floor and one tile, but cannot use this information to determine the number of tiles needed or the cost of the tiles.</p>	<p>1. The student uses an appropriate strategy to start the task but cannot progress the problem to an accurate solution.</p> <p>2. The student can calculate the area of the floor/tile, but does not (or cannot) use the information to find an accurate solution to the problem.</p> <p>Sample Strategies: S/he finds the area of the floor (150 sq. ft.), the area of the tile (9 sq. in.), and divides to find the number of tiles (16.6 sq. ft.). Then uses the answer to finish the task.</p>	<p>1. The student has attempted to communicate his/her findings by labeling their work, but does not attempt to summarize their work by stating their final answer.</p> <p>2. The student can state his/her results and uses some geometry terms or symbols in their explanation of how s/he calculated the area, the number of tiles needed, or the cost of the tiles.</p> <p>3. The student has not established an accurate system (charts, t-tables, graphs) for tracking their calculations: the area of the floor, the number of tiles needed, or the cost of the tiles.</p>
Practitioner	<p>PROFICIENCY: The student understands that the task is a multiple step problem, and the key steps for solving the task include: finding the area of one tile and the floor; determining the number of tiles needed to tile the floor, and the cost of the tiles.</p>	<p>PROFICIENCY: The student uses an accurate and appropriate strategy to solve the task. S/he calculates the area of the floor/tiles, determines the # of tiles/bundles needed, and calculates the cost of the tiles.</p> <p>Sample Strategies: The student determines that 16 tiles are needed to cover 1 square foot, and then multiplies 16 by 150 to determine that 2,400 tiles are needed to cover the floor. The student calculates the # of bundles to be 240, and the total cost of tiling the floor to be \$840.00.</p>	<p>PROFICIENCY:</p> <p>1. The student can represent his/her work in a clear, organized manner, and uses appropriate geometry terms and symbols in his/her explanation of how they calculated the area, the number of tiles needed, and the cost of the tiles.</p> <p>2. The student has created an efficient system (charts, t-tables, graphs) for tracking their calculations: the area of the floor/tiles, the number of tiles needed, and the cost of the tiles.</p>
Expert	<p>1. The student understands that the task is a multiple step problem, and the key steps for solving the task include: finding the area of one tile and the floor; determining the number of tiles needed to tile the floor; and the cost of the tiles.</p> <p>2. The student includes a written rule, generalization, or observation about their understanding of geometry.</p>	<p>1. The student uses an accurate and appropriate strategy to solve the task. S/he calculates the area of the floor/tiles, determines the # of tiles/bundles needed, and calculates the cost of the tiles.</p> <p>Sample Strategies: The student uses a more sophisticated strategy to calculate the area of the floor/tile by converting the length (15') and width (10') of the floor to inches (180" x 120") and then multiplying the length and width (21,600 sq. in.) to determine the area of the floor.</p> <p>2. Based on the above strategy, the student makes an observation about the area.</p> <p>For Example: "The area of the floor is measured in squares, each tile is a square, so I will need 2,400 square tiles to cover the floor."</p>	<p>1. The student can represent his/her work in a clear, organized manner; uses appropriate geometry terms and symbols in the explanation; and has created an efficient system (charts, t-tables, graphs) for tracking their calculations.</p> <p>2. The student includes a written rule, generalization, or observation about their understanding of geometry.</p>

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Novice	<p>1. There are no solutions or the solutions have no relationship to the task.</p> <p>2. The student does not understand that the task is a multiple step problem and any attempt s/he makes to solve the task will only approach one aspect of the problem.</p> <p>For Example: Finding the area of the floor.</p>	<p>1. The student cannot start the task or s/he has started the task using manipulatives or representations but cannot complete the task.</p> <p>2. The student cannot demonstrate, using manipulatives or representations, how to determine the area of the floor/tiles, the number of tiles needed, or the cost of the tiles.</p> <p>Sample Strategies: The student finds the area of the floor (150 sq. ft.), but cannot make a connection between the size of the tiles (9 sq. in.), and the number of tiles needed to cover the floor.</p>	<p>1. There is little or no communication, the student did not label the work, and their thinking is difficult to follow.</p> <p>2. The student cannot write his/her results, uses little or no geometry terms or symbols, and has no system for tracking their calculations for finding the area of the floor, the number of tiles needed, or the cost of the tiles.</p>
Apprentice	<p>1. The student understands that the task is a multiple step problem, but cannot use the information at each of the steps to progress the problem.</p> <p>For Example: The student uses an appropriate strategy to find the area of the floor and one tile, but cannot use this information to determine the number of tiles needed or the cost of the tiles.</p>	<p>1. The student uses an appropriate strategy to start the task but cannot progress the problem to an accurate solution.</p> <p>2. The student can calculate the area of the floor/tile, but does not (or cannot) use the information to find an accurate solution to the problem.</p> <p>Sample Strategies: The student cannot accurately convert the feet to inches or inches to feet, s/he multiplies $15 \times 10 = 150$ sq. ft., and then multiplies 150 by 12 to convert to square inches (1,800). The student bases their final answers on this conversion.</p>	<p>1. The student has attempted to communicate his/her findings by labeling their work, but does not attempt to summarize their work by stating their final answer.</p> <p>2. The student can state his/her results and uses some geometry terms or symbols in their explanation of how s/he calculated the area, the number of tiles needed, or the cost of the tiles.</p> <p>3. The student has not established an accurate system (charts, t-tables, graphs) for tracking their calculations: the area of the floor, the number of tiles needed, or the cost of the tiles.</p>
Practitioner	<p>PROFICIENCY: The student understands that the task is a multiple step problem, and the key steps for solving the task include: finding the area of one tile and the floor; determining the number of tiles needed to tile the floor; and the cost of the tiles.</p>	<p>PROFICIENCY: The student uses an accurate and appropriate strategy to solve the task. S/he calculates the area of the floor/tiles, determines the # of tiles/bundles needed, and calculates the cost of the tiles. The student can convert feet to inches or inches to feet.</p> <p>Sample Strategies: The student calculates the area of the floor/tile by converting the length and width of the floor to inches (180" x 120") and then multiplying to determine the area of the floor (21,600 sq. in.). Next, divides by 9 to calculate the # of tiles (2,400). Then the student calculates the # of bundles to be 240, and the total cost of tiling the floor to be \$840.00.</p>	<p>PROFICIENCY:</p> <p>1. The student can represent his/her work in a clear, organized manner, and uses appropriate geometry terms and symbols in his/her explanation of how they calculated the area, the number of tiles needed, and the cost of the tiles.</p> <p>2. The student has created an efficient system (charts, t-tables, graphs) for tracking their calculations: the area of the floor/files, the number of tiles needed, and the cost of the tiles.</p>
Expert	<p>1. The student understands that the task is a multiple step problem, and the key steps for solving the task include: finding the area of one tile and the floor; determining the number of tiles needed to tile the floor; and the cost of the tiles.</p> <p>2. The student includes a written rule, generalization, or observation about their understanding of geometry.</p>	<p>1. The student uses an accurate and appropriate strategy to solve the task. S/he calculates the area of the floor/tiles, determines the # of tiles/bundles needed, and calculates the cost of the tiles. The student can convert feet to inches or inches to feet.</p> <p>Sample Strategies: The student can convert 150 sq. ft to inches by multiplying by 144 (1 foot squared) to determine the area of the floor (21,600 sq. in.). Then divides by 9 to calculate the # of tiles (2,400). Finally the student calculates the # of bundles to be 240, and the total cost of tiling the floor to be \$840.00.</p> <p>2. Based on the above strategy, the student makes an observation about the area. For Example: "I realized that the units of the floor needed to be in square inches, and that just multiplying by 12 would not be enough. Then I realized that I was dealing with squares so I squared 12 and got 144 and multiplied that by 150 to get 21,600."</p>	<p>1. The student can represent his/her work in a clear, organized manner; uses appropriate geometry terms and symbols in the explanation; and has created an efficient system (charts, t-tables, graphs) for tracking their calculations.</p> <p>2. The student includes a written rule, generalization, or observation about their understanding of geometry.</p>