

Rubric: A Very Tall Lady

Key APS Mathematics Content and Performance Standards:

Target Performance Standards – Grade 5

1. **Uses** measures of money and time, U.S. and metric measures of length, weight, and volume to solve problems and **makes** estimates.
2. **Carries out** simple unit conversions, (e.g., from centimeters to meters) within a system of measurement.
3. **Communicates** mathematical thinking coherently and clearly to others.

- If the student does not attempt to solve the task or the work on the problem is completely unrelated to the task, the student's work for the task is considered "**Unscorable**" and should not be assigned a performance level of Novice, Apprentice, Practitioner, or Expert.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
Novice	<ul style="list-style-type: none"> ❖ The student understands that the task is a multiple step problem, but does not have the mathematical knowledge to complete the task and will only attempt to solve 1 or 2 aspects of the problem. ❖ The student understands that s/he must convert the height of the Statue of Liberty and the height of the girls to the same unit of measurement (inches/feet/yards), but may not be able to carry out the conversions accurately. For Example: The student may only address the conversion of the Statue of Liberty's height from yards to inches, and then not know where to go from there. ❖ The student demonstrates an understanding of mathematical operations (+, -, x, ÷) of whole numbers. but may not be able to compute the calculations or accurately interpret the remainders or decimal numbers. 	<ul style="list-style-type: none"> ❖ The student has started the task by using manipulatives and representations, but does not address all of the steps needed to solve the task. ❖ The student does not use an effective strategy to solve the problem or makes errors in their calculations. ❖ Task calculations include: <ul style="list-style-type: none"> • Converting the height of the Statue of Liberty in inches. • The number of girls it will take to equal the height of the Statue of Liberty. • Measuring 'your height' in inches. • The number of people 'your height' it will take to equal the height of the Statue of Liberty. <p>Sample Strategy: The student does not realize that the height of the Statue of Liberty is in yards and the height of the average girl is in inches: $102 \div 42 = 2.42$ girls. The student can't progress the problem because s/he can't make sense of the answer 2.42.</p>	<ul style="list-style-type: none"> ❖ There is little or no communication, the student did not label the work, and/or their thinking is difficult to follow. ❖ Summary: The student does not write his/her final answer, and/or uses little or no mathematical language and symbols to explain (in writing) how s/he calculated the height conversions for the Statue of Liberty. ❖ Representations: The student has no system (charts/t-tables/graphs) to track the calculations for the number of girls and the number of 'your heights' it will take to equal the height of the Statue of Liberty, or the height conversions for the Statue of Liberty.

Task Specific Rubric: A Very Tall Lady – Grade 5

APS/RDA/CHF: Performance-Based Mathematics Assessment 2001 – 02

*Proficiency Levels are aligned to the APS Mathematics Content and Performance Standards – Final 2001

<p>Apprentice</p>	<ul style="list-style-type: none"> ❖ 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. ❖ The student understands that s/he must: <ul style="list-style-type: none"> • Convert the height of the Statue of Liberty and the height of the girls to the same unit of measurement (inches/feet/yards), but may not be able to carry out the conversions accurately. • Find the number of girls (average height) it will take to equal the height of the Statue of Liberty, but may not be able to compute the calculations. • Accurately measure 'your height' in inches. • Find the number of people 'your height' it will take to equal the height of the Statue of Liberty, but may not be able to compute the calculations. • Apply mathematical operations (+, -, x, ÷) of whole numbers and demonstrate an understanding of remainders and decimal numbers, but may not be able to compute the calculations. 	<ul style="list-style-type: none"> ❖ The student has started the task using manipulatives or representations, has chosen a strategy to solve the task, attempts to address all of the steps of the task, but does not achieve a correct solution. ❖ The student may not know how to address all of the aspects of the task or may get an incorrect answer due to computation, conversion, or measurement errors. (See 'Task Calculations' in the Novice strategies section.) <p>Sample Strategy:</p> <p>Step 1: The student converts the height of the Statue of Liberty to inches: 1 yard = 36 inches, so 102 (yards) x 36 (inches) = 4,022 inches. (Error)</p> <p>Step 2: The student uses the incorrect height of the Statue of Liberty to determine the number of average height girls it will take to equal the Statue of Liberty: 4,022 inches ÷ 42 inches = 95.7 girls.</p> <p>Step 3: The student may or may not address the 3rd step of the task which asks them to measure their own height and find out how many students their height it will take to equal the Statue of Liberty. (See the 'Your Height' chart in the <i>Teacher Instructions</i>.)</p>	<ul style="list-style-type: none"> ❖ The student has communicated his/her understanding of the task by labeling their work, but the task is not clearly organized and the student's thinking is hard to follow. ❖ Summary: The student states his/her final answer; and uses some mathematical language and symbols to explain (in writing) how s/he calculated the height conversions for the Statue of Liberty, and the number of girls/'your heights' it will take to equal the height of the Statue of Liberty. ❖ Representations: The student has not established an accurate system (charts/t-tables/graphs) to track the calculations for the number of girls/'your heights' it will take to equal the height of the Statue of Liberty or the height conversions for the Statue of Liberty.
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<p>Practitioner</p>	<p style="text-align: center;">Proficiency</p> <ul style="list-style-type: none"> ❖ The student understands that the task is a multiple step problem and that the answer at each step, progresses the problem. ❖ The student must: <ul style="list-style-type: none"> • Convert the height of the Statue of Liberty and the height of the girls to the same unit of measurement (inches/feet/yards). • Find the number of girls (average height) it will take to equal the height of the Statue of Liberty. • Accurately measure 'your height' in inches. • Find the number of people 'your height' it will take to equal the height of the Statue of Liberty. • Apply mathematical operations (+, -, x, ÷) of whole numbers and demonstrate an understanding of remainders and decimal numbers. 	<p style="text-align: center;">Proficiency</p> <ul style="list-style-type: none"> ❖ The student uses an accurate and appropriate strategy to correctly solve all of the steps of the task. ❖ Task calculations include: <ul style="list-style-type: none"> • Converting the height of the Statue of Liberty in inches. • The number of girls it will take to equal the height of the Statue of Liberty. • Measuring 'your height' in inches. • The number of people 'your height' it will take to equal the height of the Statue of Liberty. <p>Sample Strategy: Step 1:The student converts the height of the Statue of Liberty to inches: 1 yard = 36 inches, so 102 (yards) x 36 (inches) = 3,672 inches. Step 2: The student divides the number of average height girls into the height of the Statue of Liberty: 3,672 inches ÷ 42 inches = 87.428571 girls. You can not have .4 of a girl so you will need a total of 88 girls. (Student must justify how s/he rounded their answer.) Step 3: The student will need to measure their own height in inches and then divide their height into the height of the Statue of Liberty. (See the 'Your Height' chart in the <i>Teacher Instructions</i>.)</p>	<p style="text-align: center;">Proficiency</p> <ul style="list-style-type: none"> ❖ The student can represent his/her work in a clear, organized manner. ❖ Summary: The student uses appropriate mathematical language and symbols to explain (in writing) how s/he calculated the height conversions for the Statue of Liberty and the number of girls/'your heights' it will take to equal the height of the Statue of Liberty. ❖ Representations: The student has created an efficient system (charts/t-tables/graphs) to track the calculations for the number of girls/'your heights' it will take to equal the height of the Statue of Liberty and the height conversions for the Statue of Liberty.
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<p>Expert</p>	<ul style="list-style-type: none"> ❖ The student understands that the task is a multiple step problem, and that the answer at each step, progresses the problem. ❖ The student must: <ul style="list-style-type: none"> • Convert the height of the Statue of Liberty and the height of the girls to the same unit of measurement (inches/feet/yards). • Find the number of girls (average height) it will take to equal the height of the Statue of Liberty. • Accurately measure ‘your height’ in inches. • Find the number of people ‘your height’ it will take to equal the height of the Statue of Liberty. • Apply mathematical operations (+, -, ×, ÷) of whole numbers and demonstrate an understanding of remainders and decimal numbers. ❖ Task Extension: The student extends the task by including a written rule, equation, generalization, or observation about their understanding of the geometry, measurement or algebra in the task. 	<ul style="list-style-type: none"> ❖ The student uses an accurate and appropriate strategy to solve all of the steps of the task. ❖ Task calculations include: <ul style="list-style-type: none"> • Converting the height of the Statue of Liberty in inches. • The number of girls it will take to equal the height of the Statue of Liberty. • Measuring ‘your height’ in inches. • The number of people ‘your height’ it will take to equal the height of the Statue of Liberty. ❖ See the ‘Sample Strategy’ in the <i>Practitioner</i> section of this Rubric. ❖ Task Extension: I realized once I found the height of the Statue of Liberty in inches, the equation would be: $3,672 \text{ inches} \div H = N$ $H =$ one person’s height, $N =$ Number of people it would take to equal the Statue of Liberty. 	<ul style="list-style-type: none"> ❖ The student can represent his/her work in a clear, organized manner. ❖ Summary: The student uses appropriate mathematical language and symbols to explain (in writing) how s/he calculated the height conversions for the Statue of Liberty and the number of girls/‘your heights’ it will take to equal the height of the Statue of Liberty. ❖ Representations: The student has created an efficient system (charts/t-tables/graphs) to track the calculations for the number of girls/‘your height’ it will take to equal the height of the Statue of Liberty and the height conversions for the Statue of Liberty. ❖ Task Extension: The student includes a written rule, equation, generalization, and/or observation about their mathematical insights for height comparisons and conversions.
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