

Rubric: Fund Raising Riddle

Key APS Mathematics Performance Standards:

Target Performance Standards – Grade 8

1. **Manipulates** all real numbers, their properties, and operations.
2. **Develops and tests** strategies for solving multi-step equations.
3. **Interprets** data and **makes conclusions** from data.

- 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 needs to: <ul style="list-style-type: none"> • Raise money for the equipment. • Calculate the best way to raise the money – selling ice cream or have a bake sale, but may not be able to accurately compute the calculations. ❖ The student may not understand that they need to justify their decision with math facts, and if s/he does make a decision it will be based on inaccurate information to base their decision. 	<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. <p>Sample Strategy:</p> <p>Step 1: Find the cost of the equipment. $656.95 + 545 = \\$1,201.95$</p> <p>Step 2: Calculate the estimated sales figures for the ice cream and bake sales. Student cannot determine $1/6^{\text{th}}$ of 1100, so uses \$1 per bar for the entire school. The ice cream sales figures are \$1100. Student determines the bake sale figures as $30 \times .75 = \\$22.50$.</p> <p>Step 3: The student concludes that the ice cream sale is the better deal based on inaccurate math data.</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 cost of the equipment, the sales figures for the ice cream sales and bake sale, and their decision about the best way to raise the money. ❖ Representations: The student has no system (charts/t-tables/graphs) to track the calculations for the cost of the equipment, and the comparison of the sales figure for the ice cream sales and the bake sale.

Task Specific Rubric: Fund Raising Riddle – Grade 8

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 needs to: <ul style="list-style-type: none"> • Raise money for the equipment. • Calculate the best way to raise the money – selling ice cream or have a bake sale, but may not be able to accurately compute the calculations. • Justify their decision with math facts, but use inaccurate information to base their decision. 	<ul style="list-style-type: none"> ❖ The student has started the task using manipulatives or representations, has chosen a strategy to solve the task, but does not achieve a correct solution. ❖ Task calculations include: <ul style="list-style-type: none"> • Totaling the cost of the equipment. • Calculating the estimated cost of the ice cream sales and the bake sale. • Comparing the sales figures to decide which is the best way to raise the money. <p>Sample Strategy: Step 1: Find the cost of the equipment. $656.95 + 545 = \\$1,201.95$ Step 2: Calculate the estimated cost of the ice cream sales. $1/6 \times 1100 = \\$183.33$ Step 3: Calculate the estimated cost of the bake sales. $30 \text{ items} \times \\$ 0.75 = \\22.50 (Student does not account for the bake sale twice a week.) Step 4: Student concludes that the ice cream sales is the best way, but their decision is based on inaccurate mathematics.</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 cost of the equipment, the sales figures for the ice cream sales and bake sale, and their decision about the best way to raise the money. ❖ Representations: The student has not established an accurate system (charts/t-tables/graphs) to track the calculations for the cost of the equipment, and the comparison of the sales figure for the ice cream sales and the bake sale.
--------------------------	---	---	--

<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 understands that s/he needs to: <ul style="list-style-type: none"> • Raise money for the equipment. • Calculate the best way to raise the money – selling ice cream or have a bake sale. • Justify their decision with math facts. 	<p style="text-align: center;">Proficiency</p> <ul style="list-style-type: none"> ❖ The student uses one effective strategy to correctly solve all of the steps of the task. ❖ Task calculations include: <ul style="list-style-type: none"> • Totaling the cost of the equipment. • Calculating the estimated cost of the ice cream sales and the bake sale. • Comparing the sales figures to decide which is the best way to raise the money. <p>Sample Strategy:</p> <p>Step 1: Find the cost of the equipment. $656.95 + 545 = \\$1,201.95$</p> <p>Step 2: Calculate the estimated cost of the ice cream sales.</p> <ul style="list-style-type: none"> • Daily sales: $1/6$ of 1100 = \$183.33 • Total # of days to raise \$1202: $1202 \div 183 = 6.56$ days or 7 days. • I rounded the numbers because the money amounts are estimated sales figures. <p>Step 3: Calculate the estimated cost of the bake sales.</p> <ul style="list-style-type: none"> • Daily sales: 30 items x \$ 0.75 = \$22.50 • Total # of days to raise \$1202: $1202 \div 22.50 = 53.42$ days or 54 days. • I rounded the numbers because the money amounts are estimated sales figures. <p>Step 4: Justification for decision. The best way to raise the \$1202 is by selling ice cream because it will only take 7 days to raise the money. The bake sale will take and estimated 54 days to raise the same amount of money.</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 cost of the equipment, the sales figures for the ice cream sales and bake sale, and their decision about the best way to raise the money. ❖ Representations: The student has created an efficient system (charts/t-tables/graphs) to track the calculations for the cost of the equipment, and the comparison of the sales figure for the ice cream sales and the bake sale.
----------------------------	--	---	---

<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 understands that s/he needs to: <ul style="list-style-type: none"> • Raise money for the equipment. • Calculate the best way to raise the money – selling ice cream or have a bake sale. • Justify their decision with math facts. ❖ Task Extension: The student includes a written rule, equation, generalization, and/or observation about their mathematical insights about number concepts. 	<ul style="list-style-type: none"> ❖ The student uses more than one accurate and appropriate strategy to solve all of the steps of the task. ❖ Task calculations include: <ul style="list-style-type: none"> • Totaling the cost of the equipment. • Calculating the estimated cost of the ice cream sales and the bake sale. • Comparing the sales figures to decide which is the best way to raise the money. Sample Strategy: See the ‘Practitioner’ section of the rubric. ❖ Task Extension: After comparing the two sets of sales figures the student states, “ Each week the bake sale will only make 4% of the money needed to buy the equipment, however the ice cream sales will make 15% of the money needed each <u>day</u> of the sale. If the school needed to raise money for additional equipment, they can extend the sale and collect: <ul style="list-style-type: none"> In 10 days – approximately \$1830.00 In 15 days – approximately \$2745.00 In 20 days – approximately \$3660.00 	<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 cost of the equipment, the sales figures for the ice cream sales and bake sale, and their decision about the best way to raise the money. ❖ Representations: The student has created an efficient system (charts/t-tables/graphs) to track the calculations for the cost of the equipment, and the comparison of the sales figure for the ice cream sales and the bake sale. ❖ Task Extension: The student includes a written rule, equation, generalization, and/or observation about their mathematical insights about number concepts.
----------------------	--	---	--