

Rubric: Sam the Slippery Spider

Key APS Mathematics Content and Performance Standards:

Target Performance Standards – Grade 5

1. **Selects** the appropriate operation involving addition, subtraction, multiplication, and division from situational story problems, and **uses** relationships among the four basic operations to solve them.
2. **Uses** patterns and numerical rules to represent and solve problems.
3. **Selects, applies, and translates** among mathematical representations to solve problems.

- 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 understand that Sam the Spider needs to travel 24 cm up the dragline, and may understand that Sam travels 10 cm up and 4 cm down the dragline each day, but cannot track the distances traveled accurately. ❖ The student does not understand that s/he must determine the number of days it will take Sam the Spider to travel 24 cm. 	<ul style="list-style-type: none"> ❖ The student has started the task using manipulatives and representations, but does not use an effective strategy to determine how many days it will take the spider to travel 24 cm, and therefore cannot complete the task and/or find a correct solution. <p>Sample Strategy: The student uses centimeter graph paper to show the progress of Sam's climb, but does not show accurate data.</p> <p>For example: Sam moves up the dragline 10 cm, then 4 cm, then 10 cm, for a total of 24 cm.</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 distances and days traveled on the dragline by the spider. ❖ Representations: The student has no system (charts/t-tables/graphs) to track the calculations for the distances and days traveled by the spider.

<p>Apprentice</p>	<ul style="list-style-type: none"> ❖ The student understands that s/he must determine the number of days it will take Sam the Spider to travel 24 cm. ❖ The student may understand that Sam travels 10 cm up the dragline each day, and 4 cm down the dragline each evening, but cannot track the distances traveled accurately. 	<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. ❖ The student records Sam's progress through counting or tally marks and does not realize that using mathematical operations (+, -, x, ÷) is the most efficient strategy to solve the task. ❖ The student uses equations to solve the task but does not calculate the solutions accurately. <p>Sample Strategy: Sam moves up the dragline 10 cm, then down 4 cm, then up 10 cm to 14 cm, then down 4 cm to 10 cm, then up 10 to 20, then down 4 to 16, then up 10 to 26. It will take Sam 4 days to travel 26 cm.</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 distances and days traveled on the dragline by the spider. ❖ Representations: The student has not established an accurate system (charts/t-tables/graphs) to track the calculations for the days and the distances traveled by the spider.
<p>Practitioner</p>	<p style="text-align: center;">Proficiency</p> <ul style="list-style-type: none"> ❖ The student understands that: <ul style="list-style-type: none"> • S/he is finding the number of days it will take Sam the Spider to travel 24 cm. • Sam travels 10 cm up the dragline each day, and 4 cm down the dragline each evening, and can accurately track Sam's progress using a graphic representation. • Using a mathematical operation (+, -, x, ÷) is the most efficient strategy to solve the task. 	<p style="text-align: center;">Proficiency</p> <ul style="list-style-type: none"> ❖ The student uses one efficient strategy to correctly solve the task and records Sam's progress along the dragline using manipulatives or representations. ❖ The student must also use an equation to determine the distances traveled each day on the dragline and the total number of days it takes Sam to travel 24 cm. <p>Sample Strategy: The student uses a picture representation of Sam's climbing progress <u>and</u> equations.</p> <p>Day 1: $0 + 10 = 10$ cm (ground level) $10 - 4 = 6$ cm</p> <p>Day 2: $6 + 10 = 16$cm $16 - 4 + 12$ cm</p> <p>Day 3: $12 + 10 = 22$ cm $22 - 4 = 18$ cm</p> <p>Day 4: $18 + 10 = 28$ cm $28 - 4 = 24$ cm</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 states his/her final answer. The student uses appropriate mathematical language and symbols to explain (in writing) how s/he calculated the distances & days it took Sam to climb the dragline. ❖ Representations: The student has created an efficient system (charts/t-tables/graphs) to track the calculations for the spider's distances and days traveled.

<p>Expert</p>	<ul style="list-style-type: none"> ❖ The student understands that: <ul style="list-style-type: none"> • S/he is finding the number of days it will take Sam the Spider to travel 24 cm. • Sam travels 10 cm up the dragline each day, and 4 cm down the dragline each evening, and can accurately track Sam's progress using a graphic representation. • Using a mathematical operation (+, -, ×, ÷) is the most efficient strategy to solve the task. ❖ Task Extension: The student includes a written rule, equation, generalization or observation about their understanding of the number sense involved with Sam's journey. 	<ul style="list-style-type: none"> ❖ The student uses one or more strategies to correctly solve the task. ❖ The student records Sam's progress using representations <u>and</u> equations to determine the distances traveled each day and the total number of days it takes Sam to travel 24 cm. ❖ Sample Strategy: The student also includes a representation of Sam's journey. <ul style="list-style-type: none"> • Day 1: $10 - 4 = 6$cm each day so, $6 + 6 + 6 + 6 = 24$cm. • It will take Sam 4 days to travel 24 cm. ❖ Task Extension: At the end of each day Sam climbs 6 cm. The quickest way to solve the problem is $24 \div 6 = 4$ days 	<ul style="list-style-type: none"> ❖ The student can represent his/her work in a clear, organized manner. ❖ Summary: The student states his/her final answer. The student uses appropriate mathematical language and symbols to explain (in writing) how s/he calculated the distances & days it took Sam to climb the dragline. ❖ Representations: The student has created an efficient system (charts/t-tables/graphs) to track the calculations for the spider's distances and days traveled. ❖ Task Extension: The student includes a written rule, equation, generalization, and/or observation about number sense involved with the spider's journey.
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