

# RUBRIC: STIR CRAZY!

## Key APS Mathematics Performance Standards:

### Target Performance Standards:

#### Grade 8 Mathematics Standard:

1. **Represents, describes, and analyzes** numerical patterns and relationships using tables, graphs, words, and standard algebraic notation.

#### Grade 7 Mathematics Standard:

2. **Applies** counting principles to determine sample space (e.g., tree diagrams, fundamental counting principle, combinations, and permutations).

#### Grade 6 Mathematics Standard:

3. **Converts** accurately from one unit to another accurately within the same system (e.g., 36 inches = 3 feet or 2 kilometers = 2000 meters).

- 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"> <li>❖ 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.</li> <li>❖ The student understands that s/he needs to:                             <ul style="list-style-type: none"> <li>• Determine the total number of stir-fry combinations the restaurant serves.</li> <li>• Calculate the different meal combinations using the 'Counting Principle'. The student may make computation errors with their calculations or not be able to apply the counting principle to solve the task.</li> </ul> </li> <li>❖ The student does not attempt to solve the second part of the task because s/he does not understand enough mathematics to solve for the total amount of beef.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The student has started the task by using manipulatives and representations, but does not address all of the steps needed to solve the task.</li> <li>❖ The student does not use an effective strategy to solve the problem or makes errors in their calculations.</li> </ul> <p><b>Sample Strategy:</b>  <b>Step 1:</b> The student tries to determine the total stir-fry meal combinations.</p> <ul style="list-style-type: none"> <li>• Starts by listing the different combinations, realizes that there are too many combinations to list. The student cannot apply the counting principle to find the combinations.</li> </ul> <p><b>Step 2:</b> The student cannot do step 2 because they do not have the information from step 1 to calculate the amount of beef.</p>	<ul style="list-style-type: none"> <li>❖ There is little or no communication, the student did not label the work, and/or their thinking is difficult to follow.</li> <li>❖ <b>Summary:</b> 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 different meal combinations, the total weight of the beef, and the weight conversions.</li> <li>❖ <b>Representations:</b> The student has no system (charts/t-tables/graphs) to track the calculations to determine the total number of stir-fry combinations and the total weight of the beef in pounds.</li> </ul>

<p><b>Apprentice</b></p>	<ul style="list-style-type: none"> <li>❖ 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.</li> <li>❖ The student understands that s/he needs to: <ul style="list-style-type: none"> <li>• Determine the total number of stir-fry combinations the restaurant serves.</li> <li>• Calculate the different meal combinations using the ‘Counting Principle’, the student may make computation errors with their calculations.</li> <li>• Calculate the total weight of the beef used to create the different beef stir-fry meals, the student may make computation errors with their calculations.</li> </ul> </li> </ul> <p>The student may be able to convert the weight of the meat from ounces to pounds (one pound = 16 ounces), however because of computation errors, the weight conversion will be based on inaccurate amounts.</p>	<ul style="list-style-type: none"> <li>❖ 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.</li> <li>❖ Task calculations include: <ul style="list-style-type: none"> <li>• Calculate the meal combinations.</li> <li>• Calculate the total weight of the beef needed to make the beef stir-fry meals.</li> <li>• Convert the weight of the beef from ounces to pounds.</li> </ul> </li> </ul> <p><b>Sample Strategy:</b>  <b>Step 1:</b> Applies the Counting Principle to determine the total stir-fry meal combinations.  <ul style="list-style-type: none"> <li>• <math>4 \text{ (meats)} \times 18 \text{ (veggies)} \times 4 \text{ (nuts)} \times 7 \text{ (sauces)} = 2,016 \text{ stir-fry combinations.}</math></li> </ul> <b>Step 2:</b> Calculates the amount of meat for the stir-fry meals.  <ul style="list-style-type: none"> <li>• <math>2,016 \text{ (meals)} \times 3 \text{ (ounces of meat)} = 6,048 \text{ ounce of meat}</math></li> </ul> </p> <p>➤ The student does not realize they are only looking for the beef weight and does not convert the weight to pounds.</p>	<ul style="list-style-type: none"> <li>❖ 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.</li> <li>❖ <b>Summary:</b> The student states his/her final answer; and uses some mathematical language and symbols to explain (in writing) how s/he calculated the different meal combinations, the total weight of the beef, and the weight conversions.</li> <li>❖ <b>Representations:</b> The student has not established an accurate system (charts/t-tables/graphs) to track the calculations to determine the total number of stir-fry combinations and the total weight of the beef in pounds.</li> </ul>
--------------------------	--	--	---

<p><b>Practitioner</b></p>	<p style="text-align: center;"><b>Proficiency</b></p> <ul style="list-style-type: none"> <li>❖ The student understands that the task is a multiple step problem and that the answer at each step, progresses the problem.</li> <li>❖ The student understands that s/he needs to: <ul style="list-style-type: none"> <li>• Determine the total number of stir-fry combinations the restaurant serves.</li> <li>• Calculate the different meal combinations using the 'Counting Principle'.</li> <li>• Calculate the total weight of the beef used to create the different beef stir-fry meals.</li> <li>• Convert the weight of the meat from ounces to pounds (one pound = 16 ounces).</li> </ul> </li> </ul>	<p style="text-align: center;"><b>Proficiency</b></p> <ul style="list-style-type: none"> <li>❖ The student uses one effective strategy to correctly solve all of the steps of the task.</li> <li>❖ Task calculations include: <ul style="list-style-type: none"> <li>• Calculate the meal combinations.</li> <li>• Calculate the total weight of the beef needed to make the beef stir-fry meals.</li> <li>• Convert the weight of the beef from ounces to pounds.</li> </ul> </li> </ul> <p><b>Sample Strategy:</b>  <b>Step 1:</b> Applies the Counting Principle to determine the total stir-fry meal combinations.</p> <ul style="list-style-type: none"> <li>• <math>4 \text{ (meats)} \times 18 \text{ (veggies)} \times 4 \text{ (nuts)} \times 7 \text{ (sauces)} = 2,016 \text{ stir-fry combinations.}</math></li> </ul> <p><b>Step 2:</b> Calculates the amount of beef for the stir-fry meals.</p> <ul style="list-style-type: none"> <li>• <math>2,016 \text{ (meals)} \div 4 \text{ (different kinds of meat)} = 504 \text{ meals with beef}</math></li> <li>• <math>504 \text{ (meals)} \times 3 \text{ (oz. of beef)} = 1,512 \text{ ounces of meat}</math></li> </ul> <p><b>Step 3:</b> Converts the weight of the beef to pounds.</p> <ul style="list-style-type: none"> <li>• <math>1,512 \text{ (ounces of beef)} \div 16 \text{ ounces} = 94.5 \text{ pounds of beef.}</math></li> </ul>	<p style="text-align: center;"><b>Proficiency</b></p> <ul style="list-style-type: none"> <li>❖ The student can represent his/her work in a clear, organized manner.</li> <li>❖ <b>Summary:</b> The student states his/her final answer. The student uses appropriate mathematical language and symbols to explain (in writing) how s/he calculated the different meal combinations, the total weight of the beef, and the weight conversions.</li> <li>❖ <b>Representations:</b> The student has created an efficient system (charts/t-tables/graphs) to track the calculations to determine the total number of stir-fry combinations and the total weight of the beef in pounds.</li> </ul>
----------------------------	---	---	---

<p><b>Expert</b></p>	<ul style="list-style-type: none"> <li>❖ The student understands that the task is a multiple step problem and that the answer at each step, progresses the problem.</li> <li>❖ The student understands that s/he needs to:</li> <li>❖ The student understands that s/he needs to: <ul style="list-style-type: none"> <li>• Determine the total number of stir-fry combinations the restaurant serves.</li> <li>• Calculate the different meal combinations using the 'Counting Principle'.</li> <li>• Calculate the total weight of the beef used to create the different beef stir-fry meals.</li> <li>• Convert the weight of the meat from ounces to pounds (one pound = 16 ounces).</li> </ul> </li> </ul> <p><b>Task Extension:</b> The student includes a written rule, equation, generalization, and/or observation about their mathematical insights about combinations and algebraic reasoning.</p>	<ul style="list-style-type: none"> <li>❖ The student uses more than one accurate and appropriate strategy to solve all of the steps of the task.</li> <li>❖ Task calculations include: <ul style="list-style-type: none"> <li>• Calculate the meal combinations.</li> <li>• Calculate the total weight of the beef needed to make the beef stir-fry meals.</li> <li>• Convert the weight of the beef from ounces to pounds.</li> </ul> </li> </ul> <p><b>Sample Strategy:</b> See the Practitioner's Strategy for solving the task. Second Approach:</p> <p><b>Step 2:</b></p> <ul style="list-style-type: none"> <li>• <math>2,016 \text{ (meals)} \times 3 \text{ (ounces of meat)} = 6,048 \text{ ounce of meat}</math></li> </ul> <p><b>Step 3:</b> Weight conversion</p> <ul style="list-style-type: none"> <li>• <math>6,048 \text{ ounces} \div 16 = 378 \text{ total pounds of meat}</math></li> <li>• <math>378 \div 4 = 94.5 \text{ pounds of beef}</math></li> </ul> <p>❖ <b>Task Extension:</b> The student realize that each of the stir-fry meals require 3 ounces of meat, and extends the meat order. Total beef = 94.5 pounds, total chicken = 94.5 pounds, total pork = 94.5 pounds, total shrimp = 94.5 pounds. The restaurant will need to order <math>94.5 \times 4 = 378</math> pound of meat for the month.</p>	<ul style="list-style-type: none"> <li>❖ The student can represent his/her work in a clear, organized manner.</li> <li>❖ <b>Summary:</b> The student uses appropriate mathematical language and symbols to explain (in writing) how s/he calculated the different meal combinations, the total weight of the beef, and the weight conversions.</li> <li>❖ <b>Representations:</b> The student has created an efficient system (charts/t-tables/graphs) to track the calculations to determine the total number of stir-fry combinations and the total weight of the beef in pounds.</li> <li>❖ <b>Task Extension:</b> The student includes a written rule, equation, generalization, and/or observation about their mathematical insights about combinations and algebraic reasoning.</li> </ul>
----------------------	--	--	--