

*Task Specific Rubric*

*License Plates*

*Grade 2*

## A Few Notes about Rubrics, Benchmark Papers and Scoring...

- Proficiency levels are determined by the content and performance standards, teachers should always compare the student's performance to the standards to assess proficiency levels.
- The benchmark papers and task specific rubric are designed to help the teacher analyze student thinking and understanding at each of the four performance levels: **Novice**, **Apprentice**, **Practitioner**, and **Expert** (NAPE).
- It is recommended that teachers use the task specific rubric given for the assessment to identify the specific math skills that make up each section of the four performance levels for the task.
- Teachers should also review the benchmark papers provided to get a sense of the mathematics that students will use to solve the task.
- The benchmark papers and task specific rubric are generalizations of what student work could look like. **It is not possible to anticipate every answer a student can give, so in scoring student work the teacher must use these generalizations to come to their own conclusions as to where a student is performing on the assessment.**
- Teachers should use the three analytic criteria of Understanding, Strategies and Communication to determine a student's holistic performance on a task. The holistic score reflects the overall student's performance on the task and indicates the student's understands the mathematics concepts being assessed in the task.



# Rubric: License Plates

## Target APS Mathematics Performance Standards

### Strand I – Global Mathematical Processes

- Develops a logical sequence of arguments leading to a valid conclusion or solution to a problem.

### Strand II – Number Sense and Operations

- Decomposes and recombines numbers in logical ways to solve problems.

### Strand V – Patterns, Functions and Algebraic Concepts

- Develops and applies more complex patterns and relationships in real-life and mathematical problem situations.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
<b>Unscorable</b>	✓ The student demonstrates no understanding of the mathematics in the problem.	✓ The student does not attempt to implement a strategy or procedure for solving the problem.	✓ The student does not attempt to use mathematical representations, language or symbols to communicate a solution to the problem.

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
<b>Novice</b>	<ul style="list-style-type: none"> <li>✓ The student understands the circumstantial situation and comes up with some solutions.</li> <li>✓ The student understands that s/he must have 3 digit license plates, but does not understand that the digits must total 6.</li> <li>✓ The solution does not address the mathematics presented in the task.</li> </ul>	<ul style="list-style-type: none"> <li>✓ Some evidence of reasoning is present, but no organization is used.</li> <li>✓ Implements an appropriate strategy incorrectly.</li> </ul> <p><u>Sample strategy:</u></p> <ul style="list-style-type: none"> <li>✓ The student draws several license plates, some with three and some with two digits.</li> <li>✓ They do not always total 6.  <div style="display: flex; gap: 10px;"> <span style="border: 1px solid black; padding: 2px;">185</span> <span style="border: 1px solid black; padding: 2px;">124</span> <span style="border: 1px solid black; padding: 2px;">42</span> <span style="border: 1px solid black; padding: 2px;">123</span> <span style="border: 1px solid black; padding: 2px;">510</span> </div> </li> </ul>	<ul style="list-style-type: none"> <li>✓ There is little communication of the procedures used.</li> <li>✓ The student cannot write/verbalize his final answer.</li> <li>✓ Little or no mathematical language and symbols used.</li> </ul>
Level	Understanding	Strategies, Reasoning, & Procedures	Communication
<b>Apprentice</b>	<ul style="list-style-type: none"> <li>✓ The student fully understands that s/he must find license plate combinations of three digits totaling 6, and finds many correct solutions</li> <li>✓ The student never comes to the realization that there are 28 possible 3-digit combinations.</li> </ul>	<ul style="list-style-type: none"> <li>✓ The strategy used to find the solutions is random trial and error.</li> <li>✓ Even though the student seems to understand the fact that s/he needs to switch a set of digits to find all the possible combinations, s/he often does not complete the procedure.</li> </ul> <p><u>Sample Strategy:</u></p> <ul style="list-style-type: none"> <li>✓ Student begins with  <div style="display: flex; gap: 10px;"> <span style="border: 1px solid black; padding: 2px;">024</span> <span style="border: 1px solid black; padding: 2px;">402</span> <span style="border: 1px solid black; padding: 2px;">204</span> </div> </li> <li>✓ But does not follow through with  <div style="display: flex; gap: 10px;"> <span style="border: 1px solid black; padding: 2px;">420</span> <span style="border: 1px solid black; padding: 2px;">240</span> <span style="border: 1px solid black; padding: 2px;">042</span> </div> </li> </ul>	<ul style="list-style-type: none"> <li>✓ The student explains his/her reasoning and uses some basic math language without being clearly organized.</li> <li>✓ The student represents some sets of 3 digits totaling 6, but does not demonstrate a specific strategy to find the 28 solutions.</li> </ul>

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
<b>Practitioner/Proficient</b>	<ul style="list-style-type: none"> <li>✓ The student fully understands that s/he must find license plate combinations of three digits totaling 6.</li> <li>✓ Through his/her work, the student realizes that there are 7 basic number combinations that can be manipulated to create a total of 28 number sentences totaling 6.               <ul style="list-style-type: none"> <li>1) <math>6 + 0 + 0 = 6</math></li> <li>2) <math>5 + 1 + 0 = 6</math></li> <li>3) <math>4 + 2 + 0 = 6</math></li> <li>4) <math>4 + 1 + 1 = 6</math></li> <li>5) <math>3 + 2 + 1 = 6</math></li> <li>6) <math>2 + 2 + 2 = 6</math></li> <li>7) <math>3 + 3 + 0 = 6</math></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>✓ The strategy used to find the solutions is used consistently throughout the task.</li> <li>✓ Mathematical procedures are used appropriately, with correct representation and notation or with minor errors.*</li> <li>✓ The student demonstrates how s/he finds the different number combinations and how s/he manipulates the digits to find the total combinations possible.</li> </ul> <p><u>Sample strategy:</u>  <math>1+2+3=6</math>    <math>1+3+2=6</math>  <math>3+2+1=6</math>    <math>2+3+1=6</math>  <math>3+1+2=6</math>    <math>2+1+3=6</math></p>	<ul style="list-style-type: none"> <li>✓ The explanations are concise and clear as to how the student organized the problem and solutions.</li> <li>✓ The student uses accurate mathematical language and symbols to explain his/her answers.</li> <li>✓ The student clearly states that he has found all the possible combinations of three digits that total 6.</li> </ul> <p><u>Representation:</u></p> <ul style="list-style-type: none"> <li>✓ The student can represent the license plates using drawings, charts and/or tables to tract his groupings of the 3 digits.</li> </ul>

\*Minor Errors: Makes mistakes that do not change the understanding of the mathematical concept

Level	Understanding	Strategies, Reasoning, & Procedures	Communication
<b>Expert</b>	<ul style="list-style-type: none"> <li>✓ The student fully understands the problem.</li> <li>✓ In a well-organized approach he conveys the fact that there are seven basic number combinations that can be manipulated to create a total of 28 number sentences totaling 6.</li> <li>✓ The student understands the commutative properties of recombining 3 digits to total 6.</li> <li>✓ The student grasps the concept of an increasing pattern with the amount of the different digits totaling 6.</li> </ul> <p><u>Sample:</u>  <math>2+2+2=6</math> (one combination possible)  <math>0+3+3=6</math> (three combinations possible)  <math>5+1+0=6</math> (6 combinations possible)</p>	<ul style="list-style-type: none"> <li>✓ The student’s strategy is logical and well organized. He knows how to switch around the digits on the plates to commute all the possible combinations.</li> <li>✓ The student systematically shows that with 3 different numbers within the 3 digit combinations there are 6 possible combinations, with 2 different numbers within the 3 digits there are 3 possible combinations, and with 1 number within the 3 digits there’s only 1 possible combination.</li> </ul>	<ul style="list-style-type: none"> <li>✓ The student can represent and communicate his/her work in a clear and organized manner.</li> <li>✓ The student uses appropriate mathematical language and symbols in his/her explanation of the 28 possible combinations.</li> <li>✓ The student makes evident his/her understanding of the pattern of increasing commutations with increasing diversity of digits.</li> </ul>