



# Young Scientist Awards

## JUDGING RUBRIC: MANSW Working Mathematically, Years 11-12



| Rubric 11-12           | 1  | 2  | 3   | 4  | 5   |
|------------------------|--|--|---|--|---|
|                        | <i>The student has provided evidence that he/she:</i>  | <i>The student has provided evidence that he/she:</i>  | <i>The student has provided evidence that he/she incorporated various components of Working Mathematically:</i>   | <i>The student has provided evidence that he/she incorporated various components of Working Mathematically:</i>  | <i>The student has provided clear and convincing evidence that he/she incorporated the interrelated components of Working Mathematically:</i>   |
| <b>Communicating</b>   | - used everyday, non-mathematical language and diagrams to describe solutions.   | - used some mathematical language, symbols and diagrams, along with some everyday language.  | - used a variety of mathematical language, symbols, diagrams and graphs to communicate mathematical strategies and accurately describe and discuss results or solutions obtained.                               | - used more sophisticated mathematical language, symbols, diagrams and graphs to effectively explain results or solutions obtained and precisely communicated mathematical strategies used.  | - demonstrated sophisticated mathematical strategies using precise, concise and meaningful terminology, visuals and sequencing to effectively and elegantly communicate these strategies.   |
| <b>Problem Solving</b> | - attempted to use mathematical strategies to solve problems.  | - used some mathematical strategies to solve problems.<br>- identified a problem or matter of interest, choosing suitable questions to seek data or look for patterns. | - selected and applied mathematical strategies to formulate and explore problems.<br>- investigated a problem or matter of interest, choosing suitable questions to seek data or identify patterns.             | - demonstrated evidence of more sophisticated strategies used to plan and develop solutions.<br>- investigated a problem or matter of interest, posing suitable questions for exploring patterns or gathering data.                    | - used sophisticated, efficient and even innovative strategies to formulate, solve and verify problems.<br>- investigated a problem or matter of interest, posing insightful questions to underpin collection of relevant data or exploration of observed patterns. |
| <b>Reasoning</b>       | - provided some reasoning for the strategies selected but offered limited explanation for the patterns used or the data collected. | - attempted to explain the mathematical thinking and the strategies used.<br>- offered some explanation for the choice of patterns used or the data collected.         | - demonstrated independent mathematical thinking, justifying strategies used and conclusions reached.<br>- discussed and explained trends, patterns and relationships in the data collected or solutions found. | - effectively demonstrated independent mathematical thinking and justified strategic thinking used and conclusions reached.<br>-discussed and explained trends in data collected or solutions derived, including statistical analysis. | - used logical thought and critical independent thinking to explain and justify mathematical strategies used to support conclusions which are appropriate to the context.<br>- made valid conclusions based on a thorough statistical analysis of data.             |
| <b>Understanding</b>   | - demonstrated minimal understanding of the mathematical concepts used.  | - demonstrated basic understanding of the relationship between 'real-world' problems and mathematical models used.   | - demonstrated an understanding of strategies for pattern recognition, generalisation and mathematical modelling techniques.  | - understood and applied effective strategies for pattern recognition, generalisation and mathematical modelling techniques.<br>-made connections between experiences.   | - explicitly applied effective strategies for pattern recognition, generalisation and advanced mathematical modelling techniques<br>-made perceptive connections between experiences and concepts.  |
| <b>Fluency</b>         | - demonstrated minimal use of mathematical calculations.   | - used inefficient and inaccurate mathematical calculations.<br>-detail missing in visuals used to display patterns, data or results.                                  | - demonstrated competence when performing mathematical calculations.<br>- selected appropriate presentations for displaying patterns, data or results.  | - demonstrated effective and accurate mathematical calculations and structured procedures.<br>- selected suitable presentations utilising appropriate language, notation or visuals.   | - demonstrated effective, accurate, sophisticated and fluent mathematical calculations and procedures.<br>- neat and elegant presentation utilising well-ordered language, notation and visuals.  |