**Young Scientist Awards**

**JUDGING RUBRIC: MANSW Working Mathematically, Years 7-9**

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| **Rubric 7-9** | **1** | **2** | **3** | **4** | **5** |
|  | ***The student has provided evidence that he/she:*** | ***The student has provided evidence that he/she:*** | ***The student has provided evidence that he/she incorporated various components of Working Mathematically in their investigation or innovation:*** | ***The student has provided evidence that he/she incorporated various components of Working Mathematically in their investigation or innovation:*** | ***The student has provided clear and convincing evidence that he/she incorporated the interrelated components of Working Mathematically in their investigation or innovation:*** |
| **Communicating** | **- used everyday language and diagrams to describe their investigation or innovation.** | **- used some mathematical language, symbols and diagrams, along with some everyday language to explain their investigation or innovation.** | **- used a variety of mathematical language, symbols, diagrams, tables and graphs to communicate their mathematical strategies and** **accurately describe and discuss their results.**  | **- used more sophisticated mathematical language, symbols, diagrams, tables and graphs to effectively explain results obtained and accurately communicate their mathematical strategies used.**  | **- demonstrated sophisticated mathematical strategies using clear, concise and meaningful terminology, visuals and sequencing to effectively communicate these strategies.** |
| **Problem Solving** | **- attempted to use mathematical strategies to solve problems within their investigation or innovation.** | **- used some mathematical strategies to solve problems within their investigation or innovation.** | **- selected and applied mathematical strategies to formulate and explore problems within their project.** **-identified a problem or matter of interest, choosing suitable questions to seek data.** | **- demonstrated evidence of more sophisticated strategies used to plan and develop their project.****- identified a problem or matter of interest, posing suitable questions for data collection.** | **- used sophisticated, efficient and even innovative strategies to formulate, solve and verify problems within their project.****- investigated a problem or matter of interest, posing insightful questions to underpin collection of relevant data.** |
| **Reasoning** | **- provided some reasoning for the procedure selected but offered limited explanation for the mathematical concepts used or the data collected.** | **- attempted to explain the mathematical thinking and the strategies used.****- offered some explanation for their choice of data collection and any conclusions reached.** | **- explained their mathematical thinking, justified their choices and the conclusions they reached.****- discussed and explained most trends, patterns and relationships in the data collected.**  | **- effectively explained their mathematical thinking and justified strategies used and conclusions reached within their project.****-discussed and explained trends and relationships in data collected, including basic statistical analysis.** | **- used logical thought and critical thinking to explain and justify mathematical strategies used to compare and contrast related ideas and conclusions reached.****- made valid conclusions based on a thorough analysis of data collected.** |
| **Understanding** | **- demonstrated minimal understanding of the mathematical concepts used.** | **- demonstrated basic understanding of the mathematical concepts applied.** | **- demonstrated an understanding of the mathematical concepts applied.** | **- connected related ideas, represented concepts in different ways and accurately interpreted mathematical information.** | **-adapted and transferred mathematical concepts, made connections between related concepts and accurately interpreted mathematical information.** |
|  **Fluency** | **- demonstrated minimal use of mathematical calculations.**  | **- attempted to use some mathematical calculations.****-detail missing from diagrams and tables.** | **- demonstrated competence when performing mathematical calculations.** **- included some of the elements of tables, graphs and diagrams needed to make sense of the information presented.** | **- clear evidence of effective mathematical calculations and appropriate procedures.****- included most elements of tables, graphs and diagrams needed to make sense of the information presented.** | **- demonstrated sophisticated, accurate, effective and fluent mathematical calculations and procedures.****- included all necessary elements (conventions) in tables, graphs and diagrams to make sense of the information being presented.** |