Young Scientist Awards

**JUDGING RUBRIC: STANSW Scientific Investigation, Years 11–12**

This rubric has been designed to be all inclusive of the assessment requirements of the Science Extension Stage 6 Syllabus (in blue italics). The Young Scientist Year 11-12 category projects will be judged according to the outcomes in black. However, students are encouraged to reference the criteria in blue italics to extend and improve the depth and quality of their investigations.

**Note:** Teachers of Science Extension Stage 6 may use this document to assess Scientific Research Reports. Teachers of other Stage 6 Science Courses should only use the non-italicised criteria to assess Practical Investigation Depth Studies.

*Mandatory for prize winners*

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| 5     | The student has provided clear and convincing evidence that they:  
- completed a **valid** scientific investigation over a **period of time**
- had **well-defined** aims and **clearly expressed** the subject of the investigation
- formulated a **testable hypothesis** based on prior research and/or previous observations
- identified **independent** and **dependent variables** and took deliberate steps to regulate and keep **controlled variables** constant
- made relevant observations using appropriately **replicated trials**
- demonstrated **deep knowledge and understanding** of related science concepts
- used **critical thinking** to synthesise information and construct **evidence-based arguments**
- based their explanations on **plausible** scientific processes or causes
- addressed an issue of **social or scientific significance**
- have been **innovative or creative** in their approach, content, methodology or communication to the audience
- included a **concise and comprehensive** summary of relevant **peer-reviewed** research in the field and its **reliability** assessed
- accurately **identified** and took steps to **minimise** potential investigative risks
- **identified and assessed** a range of procedures and provided **convincing arguments** for the procedure selected
- **justified** the selection of equipment and technologies to optimise the **accuracy** of the collected data
- recorded data in an **organised, sequential and logical** manner using correct units
- used **analytical tools** to **evaluate** trends, patterns and relationships in collected data
- engaged in **peer feedback** to **evaluate** arguments and **conclusions**
- suggested **creative and worthwhile** directions for future research in a succinct way
- **developed, proposed and evaluated** inquiry questions to identify an issue or phenomenon that could be investigated scientifically
- included a **comprehensive log book or portfolio**, detailing the investigative process, from brainstorming, through data collection and analysis to the final conclusion
- **formally acknowledged** those who contributed to the project |
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| 4     | The student has provided substantial evidence that they:  
  - completed a well-planned scientific investigation over a period of time  
  - proposed and developed inquiry questions that could be investigated scientifically  
  - had realistic aims and well-described the subject of the scientific investigation  
  - included a summary of relevant information and checked its reliability  
  - proposed a hypothesis based on prior research or previous observations  
  - had a detailed knowledge and understanding of the science concepts used in the investigation  
  - conducted a carefully considered risk assessment prior to experimentation  
  - selected equipment and technologies to improve the accuracy of the collected data  
  - had been innovative or creative in content or methodology  
  - gathered experimental data over a number of trials using appropriate technologies  
  - recorded data in a systematic manner using correct units  
  - identified independent and dependent variables and worked to control them  
  - analysed and explained trends, patterns and relationships in the data collected  
  - synthesised collected data and constructed evidence-based arguments  
  - used critical thinking to derive conclusions, suggesting ideas for future research  
  - included a log book detailing the different stages of the investigative process  
  - acknowledged and provided details of any assistance given  
  - communicated the report with effective use of language, visuals and sequencing |
| 3     | The student has provided evidence that he/she:  
  - completed a scientific investigation that shows evidence of careful planning  
  - proposed relevant inquiry questions that could be investigated scientifically  
  - had measurable aims and the subject of the investigation was clearly described  
  - collected background research with some relevance to the subject of investigation  
  - proposed a relevant hypothesis  
  - demonstrated good knowledge and understanding of the science concepts used in the investigation  
  - had some innovative or creative ideas but did not develop them  
  - conducted a risk assessment prior to experimentation  
  - used appropriate equipment and technologies for better accuracy  
  - gathered first-hand data with replication  
  - used thorough scientific methodology including the control of variables  
  - identified obvious trends, patterns and relationships in the data  
  - used critical-thinking to formulate conclusions that were supported by experimental data  
  - provided supporting documentation in the accompanying log book |
|       | used clear, concise and consistent scientific language and terminology that is meaningful for the intended audience or purpose  
  - selected and used suitable forms of visual, written and/or digital forms of communication  
  - produced a formal and detailed scientific research report or paper that reflects the standards generally required for publication in a scientific journal  
  - included a concise and well-structured one paragraph abstract that is representative of the entire investigation  
  - communicated and collaborated with scientific researchers and institutions, both nationally and internationally, to seek advice and validate proposed procedures  
  - used appropriate statistical tests of confidence to data sets and considered the degree of uncertainty for each set of data collected  
  - cited sources of information and data using an appropriate footnoting and referencing style |
- put forward some **good** and **practical** ideas for future improvements
- **acknowledged** any assistance given and communicated the report with **good** use of language, visuals and sequencing appropriate to the intended audience

### 2

The student has provided evidence that they:
- completed a scientific investigation with **moderate** planning
- launched into the investigation without a **clear inquiry question** to drive the project
- had some **tentative** aims and the subject of the investigation was **adequately** described
- performed **limited** or **general** background research
- had **minimal** understanding of the science concepts used in the investigation
- lacked **innovative** or **creative** ideas
- considered **experimental risks** but did not conduct a formal **risk assessment**
- used equipment and technologies without considering **accuracy**
- gathered some first-hand data **without replication**
- **controlled** some **variables**
- identified **limited** trends, patterns and relationships in the data
- formulated conclusions that were **not fully supported** by experimental data
- provided **limited** or **disorganised** documentation in the accompanying log book
- put forward some ideas for future improvements
- received some assistance but **did not provide details** of the assistance given
- communicated the report with **adequate** use of language, visuals and sequencing

### 1

The student has provided evidence that they:
- submitted a project with **limited** planning
- had no **clear** aim and the subject of the investigation was **vaguely** described
- performed **nominal** or **irrelevant** background research
- had an **inadequate** understanding of the science concepts used in the investigation
- selected equipment and technologies that were **inaccurate**
- **failed** to recognise or control **variables**
- **failed** to identify trends, patterns and relationships in the data
- manufactured conclusions **lacking** supporting information and scientific accuracy
- **neglected** to include a log book
- **neglected** to acknowledge the assistance given
- communicated the report with **poor expression** and **inadequate** use of visuals