

**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 newly-developed Science Extension Stage 6 Syllabus. Teachers of Science Extension Stage 6 may freely 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.

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| **Level** | **Description** |
| **5** | The student has provided clear and convincing evidence that he/she:* completed a **valid** scientific investigation over a **period of time**
* *produced a* ***formal*** *and* ***detailed*** *scientific research report or paper that reflects the* ***standards*** *generally required for publication in a scientific journal*
* **developed, proposed** and **evaluated** inquiry questions to identify an issue or phenomenon that could be investigated scientifically
* *included a* ***concise*** *and* ***well-structured*** *one paragraph abstract**that is**representative of the entire investigation*
* had **well-defined** aims and **clearly expressed** the subject of the investigation
* included a **concise** and **comprehensive** summary of relevant ***peer-reviewed*** research in the field and its **reliability** *interrogated and* assessed
* ***communicated*** *and* ***collaborated*** *with scientific researchers and institutions, both nationally and internationally, to seek* ***advice*** *and* ***validate*** *proposed procedures*
* formulated a **testable** **hypothesis** based on prior research and/or previous observations
* demonstrated **deep knowledge** and **understanding** of related science concepts
* accurately **identified** and took steps to **minimise** potential investigative risks
* addressed an issue of **social** or **scientific significance**
* had been **innovative** or **creative** in their approach, content, methodology or communication to the audience
* **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
* identified **independent** and **dependent variables** and took deliberate steps to regulate and keep **controlled variables** constant
* made relevant observations using **replicated trials**
* recorded data in an **organised, sequential** and **logical** manner using correct units
* used **analytical tools** to **evaluate** trends, patterns and relationships in collected data
* *used appropriate* ***statistical*** *tests of* ***confidence*** *to data sets and considered the* ***degree of******uncertainty*** *for each set of data collected*
* used **critical thinking** to synthesise information and construct **evidence-based arguments**
* engaged in **peer feedback** to **evaluate** arguments and **conclusions**
* suggested **creative** and **worthwhile** directions for future research in a succinct way
* 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 *and* ***cited*** *sources of information and data using an appropriate footnoting and* ***referencing*** *style*
* 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
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|  **4** | The student has provided substantial evidence that he/she:* completed a **well-planned** scientific investigation over a **period of time**
* *produced a* ***formal*** *scientific research report or paper that comes close to attaining the standards generally required for publication in a scientific journal*
* **proposed** and **developed** inquiry questions that could be investigated scientifically
* *included a* ***representative******summary*** *of the investigation in a one paragraph abstract*
* had **realistic** aims and **well-described** the subject of the scientific investigation
* included a **summary** of relevant ***peer-reviewed*** informationand checked its **reliability**
* ***communicated*** *with* ***experts*** *in the field of interest, both nationally and internationally, for* ***engagement*** *and* ***enrichment***
* 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
* *used appropriate* ***statistical*** *tests of* ***confidence*** *to data sets*
* 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 *and incorporated appropriate referencing techniques when citing sources of information and data*
* communicated the report with **effective** use of language, visuals and sequencing
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| **3** | The student has provided evidence that he/she:* completed a scientific investigation that shows evidence of **careful** planning
* *produced a research report with a* ***formal*** *structure in the* ***style*** *of a scientific paper*
* **proposed** relevantinquiry questions that could be investigated scientifically
* *included a* ***summary*** *of the investigation in a one paragraph* ***abstract***
* had **measurable** aims and the subject of the investigation was **clearly** described
* collectedbackground research with **some relevance** to the subject of investigation
* *sought out* ***professional advice*** *from* ***experts*** *in the field of interest*
* proposed a **relevant** **hypothesis**
* had ~~a~~ **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* ***statistical*** *tests to determine* ***correlation*** *between two variables*
* used critical-thinking to formulate conclusions that were **supported** by experimental data
* provided **supporting** documentation in the accompanying log book
* put forward some **good** and **practical** ideas for future improvements
* **acknowledged** any assistance given and ***referenced*** *any source of information used*
* communicated the report with **good** use of language, visuals and sequencing appropriate to the intended audience
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| **2** | The student has provided evidence that he/she:* completed a scientific investigation with **moderate** planning
* *produced a research report with a structure* ***loosely resembling*** *a scientific paper*
* launched into the investigation without **evidence** of **questioning**
* *included a poorly-structured* ***abstract***
* had some **tentative** aims and the subject of the investigation was **adequately** described
* performed **limited** or **general** background research
* *communicated with an* ***expert*** *at some stage of their project*
* 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
* *used* ***formative******statistical*** *tools to measure central tendencies of a data set*
* 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
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| **1** | The student has provided evidence that he/she:* submitted a project with **limited** planning
* ***failed*** *to* ***format*** *their scientific report as a scientific paper*
* ***failed*** *to include an* ***abstract****, summarising the investigation*
* had no **clear** aim and the subject of the investigation was **vaguely** described
* performed **nominal** or **irrelevant** background research
* *performed a project* ***without*** *any* ***collaboration*** *with external experts*
* 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
* ***failed*** *to use any form of statistical analysis*
* manufactured conclusions **lacking** supporting information and scientific accuracy
* **neglected** to include a log book
* **neglected** to acknowledge assistance given
* communicated the report with **poor expression** and **inadequate** use of visuals
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