



**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 |
| **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 |
| **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 |
| **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 |
| **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 |