



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.

Level	Description
5	<p>The student has provided clear and convincing evidence that he/she:</p> <ul style="list-style-type: none">• completed a valid scientific investigation over a period of time• <i>produced a formal and detailed scientific research report or paper that reflects the standards generally required for publication in a scientific journal</i>• developed, proposed and evaluated inquiry questions to identify an issue or phenomenon that could be investigated scientifically• <i>included a concise and well-structured one paragraph abstract that is representative of the entire investigation</i>• had well-defined aims and clearly expressed the subject of the investigation• included a concise and comprehensive summary of relevant <i>peer-reviewed</i> research in the field and its reliability <i>interrogated and</i> assessed• <i>communicated and collaborated with scientific researchers and institutions, both nationally and internationally, to seek advice and validate proposed procedures</i>• 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• <i>used appropriate statistical tests of confidence to data sets and considered the degree of uncertainty for each set of data collected</i>• 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 <i>or portfolio</i>, detailing the investigative process, from brainstorming, through data collection and analysis to the final conclusion

	<ul style="list-style-type: none"> • formally acknowledged those who contributed to the project <i>and cited sources of information and data using an appropriate footnoting and referencing style</i> • 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	<p>The student has provided substantial evidence that he/she:</p> <ul style="list-style-type: none"> • completed a well-planned scientific investigation over a period of time • <i>produced a formal scientific research report or paper that comes close to attaining the standards generally required for publication in a scientific journal</i> • proposed and developed inquiry questions that could be investigated scientifically • <i>included a representative summary of the investigation in a one paragraph abstract</i> • had realistic aims and well-described the subject of the scientific investigation • included a summary of relevant <i>peer-reviewed</i> information and checked its reliability • <i>communicated with experts in the field of interest, both nationally and internationally, for engagement and enrichment</i> • 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 • <i>used appropriate statistical tests of confidence to data sets</i> • 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 <i>and incorporated appropriate referencing techniques when citing sources of information and data</i> • communicated the report with effective use of language, visuals and sequencing
3	<p>The student has provided evidence that he/she:</p> <ul style="list-style-type: none"> • completed a scientific investigation that shows evidence of careful planning • <i>produced a research report with a formal structure in the style of a scientific paper</i> • proposed relevant inquiry questions that could be investigated scientifically • <i>included a summary of the investigation in a one paragraph abstract</i> • had measurable aims and the subject of the investigation was clearly described • collected background research with some relevance to the subject of investigation • <i>sought out professional advice from experts in the field of interest</i> • 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

	<ul style="list-style-type: none"> • used thorough scientific methodology including the control of variables • identified obvious trends, patterns and relationships in the data • <i>used statistical tests to determine correlation between two variables</i> • 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 <i>referenced any source of information used</i> • communicated the report with good use of language, visuals and sequencing appropriate to the intended audience
2	<p>The student has provided evidence that he/she:</p> <ul style="list-style-type: none"> • completed a scientific investigation with moderate planning • <i>produced a research report with a structure loosely resembling a scientific paper</i> • launched into the investigation without evidence of questioning • <i>included a poorly-structured abstract</i> • had some tentative aims and the subject of the investigation was adequately described • performed limited or general background research • <i>communicated with an expert at some stage of their project</i> • 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 • <i>used formative statistical tools to measure central tendencies of a data set</i> • 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	<p>The student has provided evidence that he/she:</p> <ul style="list-style-type: none"> • submitted a project with limited planning • <i>failed to format their scientific report as a scientific paper</i> • <i>failed to include an abstract, summarising the investigation</i> • had no clear aim and the subject of the investigation was vaguely described • performed nominal or irrelevant background research • <i>performed a project without any collaboration with external experts</i> • 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 • <i>failed to use any form of statistical analysis</i> • 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