



# 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"><li>• completed a <b>valid</b> scientific investigation over a <b>period of time</b></li><li>• <i>produced a formal and detailed scientific research report or paper that reflects the standards generally required for publication in a scientific journal</i></li><li>• <b>developed, proposed</b> and <b>evaluated</b> inquiry questions to identify an issue or phenomenon that could be investigated scientifically</li><li>• <i>included a concise and well-structured one paragraph abstract that is representative of the entire investigation</i></li><li>• had <b>well-defined</b> aims and <b>clearly expressed</b> the subject of the investigation</li><li>• included a <b>concise</b> and <b>comprehensive</b> summary of relevant <i>peer-reviewed</i> research in the field and its <b>reliability</b> <i>interrogated and</i> assessed</li><li>• <i>communicated and collaborated with scientific researchers and institutions, both nationally and internationally, to seek advice and validate proposed procedures</i></li><li>• formulated a <b>testable hypothesis</b> based on prior research and/or previous observations</li><li>• demonstrated <b>deep knowledge</b> and <b>understanding</b> of related science concepts</li><li>• accurately <b>identified</b> and took steps to <b>minimise</b> potential investigative risks</li><li>• addressed an issue of <b>social</b> or <b>scientific significance</b></li><li>• had been <b>innovative</b> or <b>creative</b> in their approach, content, methodology or communication to the audience</li><li>• <b>identified</b> and <b>assessed</b> a range of procedures and provided <b>convincing arguments</b> for the procedure selected</li><li>• <b>justified</b> the selection of equipment and technologies to optimise the <b>accuracy</b> of the collected data</li><li>• identified <b>independent</b> and <b>dependent variables</b> and took deliberate steps to regulate and keep <b>controlled variables</b> constant</li><li>• made relevant observations using <b>replicated trials</b></li><li>• recorded data in an <b>organised, sequential</b> and <b>logical</b> manner using correct units</li><li>• used <b>analytical tools</b> to <b>evaluate</b> trends, patterns and relationships in collected data</li><li>• <i>used appropriate statistical tests of confidence to data sets and considered the degree of uncertainty for each set of data collected</i></li><li>• used <b>critical thinking</b> to synthesise information and construct <b>evidence-based arguments</b></li><li>• engaged in <b>peer feedback</b> to <b>evaluate</b> arguments and <b>conclusions</b></li><li>• suggested <b>creative</b> and <b>worthwhile</b> directions for future research in a succinct way</li><li>• included a <b>comprehensive</b> log book <i>or portfolio</i>, detailing the investigative process, from brainstorming, through data collection and analysis to the final conclusion</li></ul>

	<ul style="list-style-type: none"> <li>• <b>formally acknowledged</b> those who contributed to the project <i>and cited sources of information and data using an appropriate footnoting and referencing style</i></li> <li>• used <b>clear, concise and consistent</b> scientific language and terminology that is <b>meaningful</b> for the intended audience or purpose</li> <li>• selected and used <b>suitable</b> forms of <b>visual, written and/or digital</b> forms of communication</li> </ul>
4	<p>The student has provided substantial evidence that he/she:</p> <ul style="list-style-type: none"> <li>• completed a <b>well-planned</b> scientific investigation over a <b>period of time</b></li> <li>• <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></li> <li>• <b>proposed</b> and <b>developed</b> inquiry questions that could be investigated scientifically</li> <li>• <i>included a representative summary of the investigation in a one paragraph abstract</i></li> <li>• had <b>realistic</b> aims and <b>well-described</b> the subject of the scientific investigation</li> <li>• included a <b>summary</b> of relevant <i>peer-reviewed</i> information and checked its <b>reliability</b></li> <li>• <i>communicated with experts in the field of interest, both nationally and internationally, for engagement and enrichment</i></li> <li>• proposed a <b>hypothesis</b> based on prior research or previous observations</li> <li>• had a <b>detailed knowledge</b> and <b>understanding</b> of the science concepts used in the investigation</li> <li>• conducted a carefully <b>considered</b> risk assessment prior to experimentation</li> <li>• selected equipment and technologies to improve the <b>accuracy</b> of the collected data</li> <li>• had been <b>innovative</b> or <b>creative</b> in content or methodology</li> <li>• gathered experimental data over a <b>number of trials</b> using appropriate technologies</li> <li>• recorded data in a <b>systematic</b> manner using <b>correct units</b></li> <li>• identified <b>independent</b> and <b>dependent variables</b> and worked to control them</li> <li>• <b>analysed</b> and <b>explained</b> trends, patterns and relationships in the data collected</li> <li>• <i>used appropriate statistical tests of confidence to data sets</i></li> <li>• synthesised collected data and constructed <b>evidence-based arguments</b></li> <li>• used <b>critical thinking</b> to derive conclusions, suggesting ideas for future research</li> <li>• included a log book <b>detailing</b> the different stages of the investigative process</li> <li>• <b>acknowledged</b> and provided details of any assistance given <i>and incorporated appropriate referencing techniques when citing sources of information and data</i></li> <li>• communicated the report with <b>effective</b> use of language, visuals and sequencing</li> </ul>
3	<p>The student has provided evidence that he/she:</p> <ul style="list-style-type: none"> <li>• completed a scientific investigation that shows evidence of <b>careful</b> planning</li> <li>• <i>produced a research report with a formal structure in the style of a scientific paper</i></li> <li>• <b>proposed</b> relevant inquiry questions that could be investigated scientifically</li> <li>• <i>included a summary of the investigation in a one paragraph abstract</i></li> <li>• had <b>measurable</b> aims and the subject of the investigation was <b>clearly</b> described</li> <li>• collected background research with <b>some relevance</b> to the subject of investigation</li> <li>• <i>sought out professional advice from experts in the field of interest</i></li> <li>• proposed a <b>relevant hypothesis</b></li> <li>• had a <b>good knowledge</b> and <b>understanding</b> of the science concepts used in the investigation</li> <li>• had some <b>innovative</b> or <b>creative</b> ideas but did not develop them</li> <li>• conducted a <b>risk assessment</b> prior to experimentation</li> <li>• used appropriate equipment and technologies for better <b>accuracy</b></li> <li>• gathered first-hand data <b>with replication</b></li> </ul>

	<ul style="list-style-type: none"> <li>• used thorough scientific methodology including the <b>control of variables</b></li> <li>• identified <b>obvious</b> trends, patterns and relationships in the data</li> <li>• <i>used <b>statistical tests to determine correlation between two variables</b></i></li> <li>• used critical-thinking to formulate conclusions that were <b>supported</b> by experimental data</li> <li>• provided <b>supporting</b> documentation in the accompanying log book</li> <li>• put forward some <b>good</b> and <b>practical</b> ideas for future improvements</li> <li>• <b>acknowledged</b> any assistance given and <i>referenced any source of information used</i></li> <li>• communicated the report with <b>good</b> use of language, visuals and sequencing appropriate to the intended audience</li> </ul>
2	<p>The student has provided evidence that he/she:</p> <ul style="list-style-type: none"> <li>• completed a scientific investigation with <b>moderate</b> planning</li> <li>• <i>produced a research report with a structure <b>loosely resembling a scientific paper</b></i></li> <li>• launched into the investigation without <b>evidence of questioning</b></li> <li>• <i>included a <b>poorly-structured abstract</b></i></li> <li>• had some <b>tentative</b> aims and the subject of the investigation was <b>adequately</b> described</li> <li>• performed <b>limited</b> or <b>general</b> background research</li> <li>• <i>communicated with an <b>expert at some stage of their project</b></i></li> <li>• had <b>minimal</b> understanding of the science concepts used in the investigation</li> <li>• lacked <b>innovative</b> or <b>creative</b> ideas</li> <li>• considered <b>experimental risks</b> but did not conduct a formal <b>risk assessment</b></li> <li>• used equipment and technologies without considering <b>accuracy</b></li> <li>• gathered <b>some</b> first-hand data <b>without replication</b></li> <li>• <b>controlled</b> some <b>variables</b></li> <li>• identified <b>limited</b> trends, patterns and relationships in the data</li> <li>• <i>used <b>formative statistical tools to measure central tendencies of a data set</b></i></li> <li>• formulated conclusions that were <b>not fully supported</b> by experimental data</li> <li>• provided <b>limited</b> or <b>disorganised</b> documentation in the accompanying log book</li> <li>• put forward <b>some</b> ideas for future improvements</li> <li>• received some assistance but <b>did not provide details</b> of the assistance given</li> <li>• communicated the report with <b>adequate</b> use of language, visuals and sequencing</li> </ul>
1	<p>The student has provided evidence that he/she:</p> <ul style="list-style-type: none"> <li>• submitted a project with <b>limited</b> planning</li> <li>• <i>failed to format their scientific report as a scientific paper</i></li> <li>• <i>failed to include an <b>abstract, summarising the investigation</b></i></li> <li>• had no <b>clear</b> aim and the subject of the investigation was <b>vaguely</b> described</li> <li>• performed <b>nominal</b> or <b>irrelevant</b> background research</li> <li>• <i>performed a project <b>without any collaboration with external experts</b></i></li> <li>• had an <b>inadequate</b> understanding of the science concepts used in the investigation</li> <li>• selected equipment and technologies that were <b>inaccurate</b></li> <li>• <b>failed</b> to recognise or control <b>variables</b></li> <li>• <b>failed</b> to identify trends, patterns and relationships in the data</li> <li>• <i>failed to use any form of statistical analysis</i></li> <li>• manufactured conclusions <b>lacking</b> supporting information and scientific accuracy</li> <li>• <b>neglected</b> to include a log book</li> <li>• <b>neglected</b> to acknowledge assistance given</li> <li>• communicated the report with <b>poor expression</b> and <b>inadequate</b> use of visuals</li> </ul>