



## GUIDELINES FOR STUDENTS WRITING A REPORT ON A SCIENCE RESEARCH/ TECHNOLOGY or COMPUTER SCIENCE PROJECT

- The maximum length of your report is to be **five** A4 pages.
- In addition to your five page report a one page executive summary must be sent which is separate to the report.
- The Executive Summary should give brief statements of your aim, what you did, your main results and your conclusions in straightforward language that a non-expert can understand. It should not exceed one page or 500 words.
- Please use Calibri font size 12 for text, single spaced within paragraphs, with a one line or 6 pt space between paragraphs, and at least 2cm left and right margins in your report and executive summary.
- Photographs, graphs, data tables, raw data and log book material should be attached to your report as supplementary material or as an appendix.
- The Report should be clear and concise. The essence of a science or technology project is your personal thinking process. As well as documenting what you did, your Report should provide the judges with insight about your thinking process, from the early 'information gathering' stages, through the project work itself, to your final conclusions. The guidelines given below are not exhaustive. If you think something else is important, but not covered in the guidelines, feel free to add it.
- Please make sure the mentor (if applicable) completes the form in regards to their input into this work.
- **Your Report must be your own written work.** Plagiarism (inclusion of text segments copied from text from books, journals, the web or any other source, or presenting other people's ideas as your own) is not allowed and your work will not be considered. Checks will be carried out and so to put it simply – **DON'T**.
- Properly referenced citation of references and source material for your project is an important part of research and is encouraged. **Your reference list should include enough information for the reader to look up your sources.**

### Plagiarism

Plagiarism is broadly defined as presenting someone else's work in a way that would lead those you present to, to assume it is your own. There are many forms of plagiarism. This usually refers to the content of written reports but can include other intellectual property such as adoption of other people's plans or concepts. There are two key "**don'ts**": (i) Don't include in your written report, any text you have found on the internet or anywhere else, even a single sentence, unless you rephrase the idea in your own words and reference it as a citation, or place the material in quotation marks to indicate it is not your own writing, if it is reported word for word. (ii) Don't repeat other people's experiments or technology projects to obtain new data and present those as your own where you are not the person responsible for the thinking process that underpins and creates the project in its present form.

Set out your report under these headings if you have undertaken a **science** research project

- Write your name at the top of each page
  - Give your work a title
  - **Introduction:** State the topic you investigated, and where the idea came from. Provide key points of background information that you began with. Selectively and succinctly summarise additional material collected later by information search.
  - **Aim/Hypothesis:** The background information should lead you logically to either a deductive hypothesis (from this information we predict ...) or an aim (e.g. to find out what happens if ...) to be tested by data collection, usually in a designed experiment.
  - **Method:** Describe here the measurements conducted. Reveal your thinking process by identifying (for example) why particular measurements were undertaken, what difficulties were perceived or needed to be overcome, and factors likely to affect the interpretation of the results. Give more technical details like controlled and uncontrolled variables where relevant. Describe the equipment used, and all other important details relating to the design of the experiment. Describe statistical analyses performed. Ideally there should be enough detail to allow someone reading your report to be able to repeat the experiment. The data collection described should be consistent with the hypothesis or aim(s) identified in the previous section. A photo or schematic diagram will often be very helpful.
  - **Results:** Selectively, but as comprehensively as is practicable, summarise your data to illustrate the key points learned from them. Present your data primarily in Table or Figure format, with a few text sentences that highlight key points that will be mentioned in discussion below. Where statistical analysis has been carried out indicate relevant information such as standard errors or statistical significance levels. Judges need to see the raw data to see how you obtained the Tables and Figures you present in your report, therefore include the complete set of raw data as an appendix
  - **Discussion** Here provide the reader with a critical analysis of the data collected and what they mean. For example: Were there difficulties carrying out the experiment or collecting particular data? What have you identified as possible sources of error and uncertainty in your data collection or experimental technique, how significant are these potential errors and do they affect the conclusions? With the benefit of hindsight is there anything you would do differently? Were your results obtained consistent or inconsistent with the initial hypothesis or met the aims identified? Are there alternative possible explanations for the data? Where possible compare your findings with other available information, and provide a reference (with details listed below) for interested readers to follow up. Are there follow up questions that arise that were not foreseen at the beginning?
  - **Acknowledgements:** It is very important for you to note any help that was received whether it was from a mentor, teacher, parents, etc and what help they provided.
  - **References:** Please list internet sites, books and articles which you have referenced in your *Introduction*, *Method* or *Discussion* sections. There should be enough detail to allow a reader to locate the information for themselves.
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Set out your report under these headings if you have undertaken a **Technology** project

- Write your name at the top of each page.
- Give your work a title
- **Context:** State the issue that your project addressed (e.g. deaf people can't hear the doorbell) and other relevant background information like what drew your attention to this need. If there was a client or stakeholder who engaged you to carry out this work, indicate who they were and their interest in the project. Provide other key points of background information that you began with. Selectively and succinctly summarise additional relevant material collected later by information search that was formative to your initial planning of the project.
- **Need/Aim/Outcome** (adjust as relevant to your project): The context information supplied should lead you logically to define (i) a need (perhaps with some data indicating the size of the need and the benefits of addressing it) and (ii) the intended outcome of your project in relation to the need. This will almost always include implementation of the technology process but there may be other facets as determined by the context. The principal guideline is that what is included should be presented to an excellent standard.

Summarise these points in your initial Brief. Include the specifications for your project in this brief. If you modify the brief during the development of your project as a result of consultation with your client and your stakeholders, provide details of these consultations and include any modified Brief(s) in your report.

- **Technology Process** Fundamental to the technology process is consideration of alternative potential solutions to the need or issue identified, and the construction, testing, and improvement of prototypes. In this section please give the judges as clear an insight as possible to the technology process you implemented during your project
- **[Potential solutions:** Describe here the alternative approaches you considered prior to developing your first prototype with supporting information on pros and cons of each as applicable. This section might well include a survey of similar products already available, the strengths and weaknesses of each of those, and any points of difference between existing products and your proposed development
- **[Prototype design and testing: (i)** Describe here your prototype. Diagrams and/or photos and/or computer programming code are likely to be useful and should be selected to illustrate the thinking process you went through in preparing your project. Where your technology item has been machined from plans, provide a copy of those plans. Where a piece of computer code is central to what you did provide both a succinct conceptual outline of what the code does in the text of your report and a copy of the code in an appendix in cases judges need to check some point. In a similar way, highlight any other important features of your work for review by the judges. (ii) Systematically record the steps taken to test the performance of your prototype and improve. Include design details and logical justification for changes made.
- **Evaluation:** Fundamental to the technology process is consideration of alternative potential solutions to the need or issue identified, and the construction, testing, and improvement of prototypes. In this section please give the judges as clear an insight as possible to the technology process you implemented during your project
- **Evaluation:** Here provide the reader with a critical analysis of your project and degree of success in reaching the intended outcome. Points that may be relevant include among others: unexpected problems and how they were overcome; unexpected solutions and how they were found/exploited; any issues that intended users may have with this technology item in its present form, any risk of injury to users or damage to their property when the item is used; further developments needed or planned. Some evidence of user feedback might be included here or in the section on prototype design and testing as relevant. If there were human or animal ethics issues in testing your product during development mention how these were dealt with either here

or in the previous section.

- Evaluate your prototype against the final Brief that was developed during the development of your prototype. Include client and stakeholder feedback.
- Give recommendations and conclusions arising from the project. These may be embedded in the discussion, a bullet point list at the end, or both. (Judges will assess, in their opinion, the soundness of your conclusions.) Note that if the information from the *Context* section and the final conclusions are placed side by side they should be seen to fit together!
- **Acknowledgements:** Please acknowledge any help you have received whether it was from a mentor, teacher, parents, etc and what help they provided
- **References:** Please list internet sites, books and articles which you have referenced in your *Introduction, Method* or *Discussion* sections. There should be enough detail to allow a reader to locate the information for themselves.

Set out your report under these heading if you have completed an **Electronics/Software** project.

- Write your name at the top of each page
- Please add the title of your project at the top of the 1<sup>st</sup> page
- **Concept/Introduction:** (delete one as applicable)

State what you set out to do with relevant background information. For example was this a client request, your own idea (if so what sparked your interest), a hobby, a reaction to a perceived deficiency with an existing product, or lack of an existing product for a particular need, etc. What is novel or a point of difference about your project compared to existing products?

- **Information gathering:** Briefly overview the information you collected before commencing this project, to help you with your planning and implementation. Where did the information come from (information, teacher, Bright Sparks, other mentor)? What are the key points of information (include internet links or references as appropriate)
- **Design and Construction/Methodology** (delete one as applicable)

[In an organised way, describe for the judges your planning and building process. (i) Overview the design process; what were the key steps? Use of photos and/or diagrams is often helpful. (ii) Problems and solutions: In any project of this kind there are inevitable choices to be made relating to both HARDWARE and SOFTWARE used. Please state WHY key choices were made. A good way to do this is to identify alternatives considered for key components, your thinking about the pros and cons of the alternatives, and the reasons for the final choice you made.

[Where creation of programming code, adaptation of a microprocessor/microcontroller to perform a non-factory function, or some other inventive effort was a significant part of your project, please report this with enough detail to allow an expert judge to understand how you perceived the problem and how you solved it. For example, key features of **circuit diagrams, programming code**, or similar component pieces of information necessary to complete the project as a whole should be explained succinctly and conceptually in the text section with a copy of the circuit diagram or code in an appendix for checking by the judges if required. If the details are not included or are too sketchy for verification, you might not be given credit for the work

done.

- **Evaluation:** Here provide the reader with a critical analysis of your project and degree of success in reaching the intended outcome. Avoid assertions like “it works”. Provide objective data on key performance specifications like: what is the response time, the accuracy, the failure rate, (from testing), etc. Then make deductive logical assessments from the performance data. [(If relevant) Where to from here? Is there a logical next step in the development of your project?
- **Acknowledgments:** Please acknowledge any help you have received whether it was from a mentor, teacher, parents, insights gained from observing another project, etc and what help they provided
- **References:** Please list internet sites, books and articles which you have referenced in your *Introduction*, *Method* or *Discussion* sections. There should be enough detail to allow a reader to locate the information for themselves.