A Brief Guide to Writing a
Formal Science Report

This is specifically for a general science report, the purpose of which is to give a balanced, illustrated account/analysis of a particular area of knowledge.

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Formal Report Format

A formal report consists of the following basic sections however, check with your supervisor as some organisations rearrange the headings or use different titles.

1 Title Page
   Title, Author + Position + Organisation, Audience + Position + Organisation, Date

2 Abstract/Executive Summary/Summary/Synopsis
   Summary of the essential elements of the report

3 Table Of Contents
   Outline of the complete report

4 Introduction/Background
   Background, Purpose and Scope, Method and Sources of Information

5 Discussion (body of the report)
   All the findings, facts and opinions are presented in continuous text

6 Conclusions
   Drawn from information presented in the discussion only

7 Recommendations
   Based on the conclusions, and offer some solutions if the report is of a problem solving nature.

8 Glossary
   List of unfamiliar terms

9 Bibliography and/or Reference List (as required)
   List of reference material referred to in text in alphabetical order

10 Appendices
   Used to display detailed data not immediately needed in the body of the report; for example statistics, letters, charts (Appendix - singular)

Some general rules:

1. Nearly every section is begun on a new page.

2. The one exception is the content of the Discussion section which is written in continuous text. This means that one section follows another on the same page.

3. Do not write on the back of the page in a report.
On the following pages we will look at the generally accepted rules for each section, with examples.

1. Title Page

- The title page must include:

  (a) Title of Report
  (b) Author, Position and Organisation
  (c) Audience, Position and Organisation
  (d) Date submitted

- The title should instantly and concisely **identify the content of the whole report**, not just part of it.

- You have one complete page so use it effectively. Consider balanced setting out, and a **clearly written title** rather than a fancy one.

![Electric Vehicles: Present technology and possible future developments](image)

Prepared for Ann Scott
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June 12th, 2006

*Note: “Prepared for” & “Prepared by” are optional*

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2. Abstract (Executive Summary or Synopsis)

A summary is a condensation of the material given in the report. The above words are interchangeable depending on which one your organisation prefers.

- The summary is written last but placed first so that the reader has an immediate overview of the essentials of the report. This includes:
  a) Purpose (what is the report about?)
  b) Scope (what areas the report will/will not cover)
  c) Methodology
  d) Findings?
  d) Conclusions?
  e) Recommendations?

- The writing style is formal with complete sentences and clear, concise vocabulary. Paragraph structure required.

- The abstract should not read like an introduction – should be largely in the present tense.

Abstract:

This short report examines electric vehicle technology, possible future technological developments, and the environmental, economic and social impacts. No current electric vehicle can equal the performance of an internal combustion engine. Lead acid batteries are heavy and thus reduce the payload, have a low range at high acceleration, low charging speeds and a comparatively short life. Development work is taking place on different types of battery, AC motors, hybrid vehicle technology, fuel cells and charging by induction. A country adopting electric vehicle technology will need a comprehensive network of recharging points, and probably increased generating capacity. Vehicle emissions will be reduced but not necessarily overall pollution, as more power stations may be needed. However, there may be substantial benefits in those countries where hydropower is a main source of energy. Social attitudes are expected to move away from high performance cars towards zero-emission vehicles. It is concluded that electric vehicle technology will be competitive within the first few decades of the 21st century.

3. Table of Contents

This is a numbered outline of the complete report.

- Gives both an overview and a quick reference to specific areas of interest.
- The table of contents shows all headings in the report. This includes section titles, major headings and sub headings.
- Each heading must have a page number.
- The formal numbering system begins at the Introduction. Anything placed before the Introduction is shown in the table of contents as Roman numerals.
- A very clear decimal numbering system is used.

<table>
<thead>
<tr>
<th>Table of Contents:</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Summary</td>
<td>(ii)</td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2. History of Electric Vehicles</td>
<td>2</td>
</tr>
<tr>
<td>3. Current Technology and its Problems</td>
<td>3</td>
</tr>
<tr>
<td>3.1 Batteries</td>
<td>3</td>
</tr>
<tr>
<td>3.2 AC Motors</td>
<td>3</td>
</tr>
<tr>
<td>3.3 Other aspects</td>
<td>4</td>
</tr>
<tr>
<td>4. Future Technological Development</td>
<td>5</td>
</tr>
<tr>
<td>4.1 Batteries</td>
<td>5</td>
</tr>
<tr>
<td>4.2 Fuel Cells</td>
<td>5</td>
</tr>
<tr>
<td>4.3 Charging by Induction</td>
<td>6</td>
</tr>
<tr>
<td>4.4 Hybrid Vehicles</td>
<td>7</td>
</tr>
<tr>
<td>5. Possible Impacts of Electric Vehicles</td>
<td>8</td>
</tr>
<tr>
<td>5.1 Environmental</td>
<td>8</td>
</tr>
<tr>
<td>5.2 Economic</td>
<td>10</td>
</tr>
<tr>
<td>5.3 Social</td>
<td>10</td>
</tr>
<tr>
<td>6. Conclusions</td>
<td>11</td>
</tr>
<tr>
<td>7. References</td>
<td>12</td>
</tr>
</tbody>
</table>

Appendices
Appendix 1: Recent electric vehicles 13
Appendix 2: Drive system components 14
4. Introduction/Background

*** Write the Title of the report at the top of this page ***

The introduction is very important because it ‘funnels’ readers into the subject matter and provides them with a sense of the background, purpose, thesis, scope and outline of the report. It contains the following ‘possible’ stages. The order may vary.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. orientation to topic</td>
<td>to give a general background to the report topic</td>
</tr>
<tr>
<td>2. statement of purpose/aim</td>
<td>to state the aim – the focus of the research</td>
</tr>
<tr>
<td>3. scope</td>
<td>to state the limitations – the areas to which the report is restricted</td>
</tr>
<tr>
<td>4. methodology</td>
<td>to indicate how the research was conducted/the sources used</td>
</tr>
<tr>
<td>5. statement of thesis/premise</td>
<td>to state the report’s main point/argument</td>
</tr>
<tr>
<td>6. statement of outline</td>
<td>to state the stages of the report that indicate the order in which it will proceed</td>
</tr>
</tbody>
</table>

The introduction may be set out as paragraphs OR be divided into the following subsections using decimal numbering.

Title of Report

1. Introduction
   1.1 Background
   1.2 Aims/Scope
      1.2.1
      1.2.2
   1.3 Methodology
   1.4 Premise and Outline
5. Findings + Discussion (Body of report)

a) Setting Out (see section 5e for example)
   - The body of the report is written in continuous text (that is, you do NOT start a new page for each new heading as you do in the rest of the report).
   - It is shaped like the body of an essay with logical paragraphing, but headings and subheadings are used to define particular areas.

b) Content
   - The body of the report contains all the facts and opinions needed for the reader to understand the purpose of it.
   - Planning is essential. After gathering information, establish an exact goal of what you wish to convey to the audience and define the scope, that is, what it will cover. Plan by brainstorming, grouping and outlining ideas.
   - You might like to establish the facts you have discovered first in a section headed “Findings,” followed by a “Discussion” of these findings establishing the main points of agreement and disagreement of these findings from the references you have read.

c) Style

   Analytical reports provide an analysis of facts leading to judgements, conclusions and recommendations. In the body of this report you can ask yourself:
   - What happened? (Chronological)
   - Why did this happen? (Cause? Effect?)
   - What should be done? (For example, compare solutions to a problem, or current practice to proposed new practice; assemble evidence; make a judgement.)
   - Draw conclusions. Make recommendations.

   For example: “Evaluate the effectiveness of the ‘one-child policy’ as a means of population control in China.”

   Descriptive/Informational reports emphasise facts, figures and descriptions rather than extensive judgements.

   For example: “Outline the field, laboratory and analysis procedures used to examine the development and maintenance of a small river and flood plain system.”

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d) Decimal numbering and indenting (Body continued)

- Leave at least a 5cm margin on the left hand side of the page so that binding does not interfere with writing.
- **Indent all headings and sub-headings** to clearly show separate sections.
- Allow at least 1cm indentation for each decimal heading and sub-heading

2. Australian Native Animals

2.1 Kangaroos

2.1.1 The Red Kangaroo

- **Double space between all headings and all paragraphs.**
- Use 1.5 spacing between each line of text.

A guide to decimal numbering and indenting.

1. Introduction
   1.1 Subheading
   1.2 Subheading
   1.3 Subheading
   1.3.1 Minor headings may be used at this level OR numbering may be used alone at the start of each new paragraph.
   1.3.2 Etc

2. Findings (results of investigation) and Discussion
   Initial wording prior to first subheading.
   2.1 Subheading
   2.2 Subheading
   2.2.1
   2.2.2
   Any additional tabulation below the minor heading should use bullet points.

2.3 Subheading
   2.3.1
   2.3.2

2.4 Subheading

3. Conclusion
   Initial wording prior to first subheading.
   3.1
   3.2

4. Recommendations
   4.1
   4.2
e) Tables, diagrams and charts (Body continued)

These are used to assist the reader in assimilating and understanding the information being presented. They must:

- present a good clear picture.
- be relevant.
- be integrated into the report, that is, have a caption to explain what they are, and be referred to in the text nearby.
- be referenced if taken from another source, just like a quote.

4. Presenting Tables in Report Writing

4.1 Description and use
Tables present information-usually numbers, but sometimes words-in columns and rows. They are used to show classifications and relationships of numerical or verbal data.

4.2 Columns compared to rows
Columns are easier to compare than rows since it is easier to run an eye down a column to compare data, than to run them across. In Table 12.1, it is very easy to see by running the eye down the columns that reindeer milk has by far the highest protein, fat and total solids content, and the lowest lactose content, of all the milks listed.

Table 12.1 Composition of milk from various mammals

<table>
<thead>
<tr>
<th>Mammal</th>
<th>Protein</th>
<th>Fat</th>
<th>Lactose</th>
<th>Total Solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow</td>
<td>3.40</td>
<td>3.72</td>
<td>4.90</td>
<td>12.74</td>
</tr>
<tr>
<td>Goat</td>
<td>3.20</td>
<td>3.90</td>
<td>4.50</td>
<td>12.40</td>
</tr>
<tr>
<td>Mare</td>
<td>2.49</td>
<td>1.59</td>
<td>5.90</td>
<td>10.38</td>
</tr>
<tr>
<td>Water buffalo</td>
<td>4.00</td>
<td>7.98</td>
<td>5.18</td>
<td>17.95</td>
</tr>
<tr>
<td>Sow</td>
<td>6.00</td>
<td>6.85</td>
<td>4.90</td>
<td>18.70</td>
</tr>
<tr>
<td>Camel</td>
<td>3.50</td>
<td>3.50</td>
<td>5.00</td>
<td>12.70</td>
</tr>
<tr>
<td>Reindeer</td>
<td>11.46</td>
<td>16.90</td>
<td>2.75</td>
<td>32.54</td>
</tr>
<tr>
<td>Sheep</td>
<td>6.00</td>
<td>7.00</td>
<td>4.50</td>
<td>19.00</td>
</tr>
<tr>
<td>Dog</td>
<td>7.10</td>
<td>8.30</td>
<td>3.70</td>
<td>20.40</td>
</tr>
<tr>
<td>Human</td>
<td>1.30</td>
<td>3.70</td>
<td>7.00</td>
<td>12.20</td>
</tr>
</tbody>
</table>


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Structuring the text within a section

A report should be written so that the reader can readily access the information. In addition to structuring by sections and sub-sections, a powerful technique is to structure within the text by using bold type and bullet or dot points. These should, however, be clearly contextualised and never dominate a report to the point where the reader is unclear about the relationship between the various parts of the information presented.

<table>
<thead>
<tr>
<th>Solid text</th>
<th>Dot Points</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Negative environmental aspects of windpower</strong></td>
<td><strong>Negative environmental aspects of windpower</strong></td>
</tr>
</tbody>
</table>
| While wind power has many advantages, there are a few negative environmental effects related to its use, especially as a wind farm may contain anything from fifty to hundreds of windmills clustered together which can be up to 30 metres high. Careful selection of the sites for wind farms can reduce this effect. The blades of a windmill can generate noise. This has been reduced by improved design, and most of the sound is masked by wind noise. This is generally not a problem from about 300 metres away. TV and radio interference can be caused by metallic blades. However, most modern windmill blades are now made from non-metallic composites which virtually eliminate this problem. Bird strikes can, in some sites, be a significant issue, birds of prey being particularly affected. | While wind power has many advantages there are a few negative environmental effects related to its use:  
- **Windmills have a significant visual impact,** especially as a wind farm may contain anything from fifty to hundreds of windmills clustered together which can be up to 30 metres high. Careful selection of the sites for wind farms can reduce this effect.  
- **The blade of a windmill can generate noise.** This has been reduced by improved design, and most of the sound is masked by wind noise. This is generally not a problem from about 300 metres away.  
- **TV and radio interference** can be caused by metallic blades. However, most modern windmill blades are now made from non-metallic composites which virtually eliminate this problem.  
- **Bird strikes** can, in some sites, be a significant issue, birds of prey being particularly affected. |


Points to note about using the bullet/dot point:

- The solid text on the left is hard to quickly access.
- Notice that the text in the right hand column has not been altered, just set out differently.
- This method must be used carefully as unintelligent bold type and bullet pointing can fragment a text into chaos!

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6. Conclusions (note the use of plural)

The conclusion of the report is important because it ties up the report and leaves the reader with the clearest understanding of the structure of the report and the main findings.

Possible Stages in a Conclusion

<table>
<thead>
<tr>
<th>Stage</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. restatement of purpose &amp; scope</td>
<td>to state the aim — the focus of the research and its limitations (in different words)</td>
</tr>
<tr>
<td>2. restatement of thesis/premise</td>
<td>to state the report’s main point/argument</td>
</tr>
<tr>
<td>3. summary of outline</td>
<td>to state the main stages and findings</td>
</tr>
<tr>
<td>4. concluding remarks</td>
<td>to leave the reader with a strong final thought that arises from the report — consequences, recommendations or suggestions for further research</td>
</tr>
</tbody>
</table>

Note: The conclusion should:
- be in paragraph form or introduced by a paragraph (not only in dot form)
- not contain any new information, and no detailed examples or statistics
- relate to the rest of the report
- place the most important stages and findings first, then in order to the least important.

CONCLUSIONS

While the current technology does not allow for the production of an electric vehicle that equals the performance of the internal combustion engine, electric vehicle technology will become competitive within the first few decades of the 21st century. This technology is a very necessary development for the reduction of vehicle emissions, and increasing resources will be allocated to research that focuses on more efficient forms of batteries and fuel cells. The current developments in AC motors, hybrid vehicles and recharging capacity and speed, are encouraging. There are also some positive indications that the preoccupation with speed is giving way to a greater concern about fuel efficiency, resource sustainability and vehicle emission. The dream of a ‘clean’, cheap and sustainable form of transport is one that most people share, but it is one that requires both political will and economic commitment to achieve.


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7. Recommendations

Recommendations are clear statements of the action which should result from the report. They are made on the basis of your research.

- Generally an informative report will not require recommendations, whereas an analytical report will require a separate recommendations section.

- The setting out should be the same as the rest of the report with headings and sub-headings.

- The wording should be uniform for each recommendation; for example, the following recommendations are taken from an evaluative report on “Review of the effectiveness of Sunsmart Solar Panel sales data”.

6. Recommendations

As a result of the preceding analysis, the following recommendations are suggested:

6.1 that due to its success Sunsmart Solar Panel sales information remain relatively unchanged for 2007

6.2 that the report requirement give a thorough explanation of the construction techniques, and further time be allotted to practise its various elements

6.3 that it be suggested to the specific businesses involved that employees be granted extra time to carry out this work.
8. Glossary of terms (new page in actual report)

After considering the expertise of the audience, it is necessary to make a list of those words which it is likely to find unfamiliar, plus any abbreviations or acronyms which are referred to often throughout the report.


The report should be referenced as for a normal essay with an alphabetical list of the references used, placed on the last page before appendices. Refer to the *La Trobe University Study Guide* for examples. This example uses the Harvard system.

9. Reference list (or Bibliography):


10. Appendices (new page in actual report)

- Place all data related to report, but not immediately needed, in this section. This may include statistics, letters, detailed maps and charts, photographs, surveys etc

- If you have only one entry the heading changes to the singular which is **APPENDIX**.

- Each appendix must be referred to at the relevant point in the text, but the reader should be able to understand the text without having to refer to the appendices. This is only for the specialist reader.

- Each appendix must have a number and a title.

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