NZJSJ

Writing Reports Guide

written and produced by

New Zealand Junior Science Journal

student-led, educational initiative for youth

Writing A Report

a guide for young students

From the New Zealand Junior Science Journal

student-led, educational initiative for youth

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Welcome

Congratulations for opening the NZJSJ's Writing Reports Guide! This is a free resource, authored by the New Zealand Junior Science Journal, a national science research journal for our youth. This guide is designed as a helpful course for young scientists who are interested in submitting to our journal.

Here you will learn about the two types of reports you may choose to write: **Core Concepts** or **Independent Investigations** (See table of contents for further instruction).

Through this guide you will learn how to think creatively, resilience, and most importantly, curiosity in your work. It is important to remember that the process we detail in this guide has been adapted for our young researchers to learn from, and that other publications may disagree with our style. We acknowledge that and can only hope our guide serves as a basis for your future scientific endeavours. However, it is always helpful to read other manuscripts and guides, listen to teachers or others input, and most importantly, use your own critical thinking.

What is NZJSJ?

The New Zealand Junior Science Journal (NZJSJ) is an innovative programme for students by students. Here we adapt report writing into an easy-to-understand format for all young people. The NZJSJ is committed to promoting science learning to our young Aotearoa community. In fact, during the last two decades, the performance of New Zealand students in science has dramatically fallen. Here, we aim to bridge this gap through **research** and **scientific investigation**.

Who is this for?

We are aimed at young students in New Zealand, with a strong interest in the Sciences. During submissions periods for autumn or spring issues we are open to two age categories: Y7&8's and 9&10's.

Part I: Writing a Core Concept Report

A Core Concept is a big idea or question that you choose to explore and research. You gather information from books, articles, or trusted websites and then explain in your own words what the idea is, how it works, and why it is important. You can include observations, examples, or experiments to support your explanation. Some core concept ideas you could research include how cybersecurity threats like crypto hacking affect computers, how artificial intelligence can be trained to recognise patterns in data, how climate change alters ocean currents and weather systems, or how gene editing could change how diseases are treated. We ask that your report falls into one of the following categories (if it comes under multiple, when submitting choose the best fit):

- Physics
- Chemistry
- Astronomy
- Geology
- Meteorology
- Oceanography
- Environmental Science
- Botany
- Zoology
- Microbiology
- Genetics
- Ecology
- Mathematics
- Computer Science
- Statistics
- Engineering
- Medicine
- Agricultural Science
- Pharmacology
- Biochemistry
- Biophysics
- Environmental Chemistry
- Astrobiology

This is a basic overview of a Core Concept report-style writing. Following this, we will break down each section of the report in great detail.

Abstract

An abstract is a short summary of your report that tells the reader what your work is about, what you did, and what you discovered in the process. A good abstract includes your topic or question, what you investigated, and a summary of your main results or conclusions. It should not include extra details, long explanations, or references. Even though it appears at the beginning of the report, an abstract is typically written after you finish all the other sections. We recommend that an abstract should be about 300 words or less in one single paragraph, which is long enough to explain your research clearly but still concise and clear.

A good abstract includes your topic or question, what you investigated, and a summary of your main results or conclusions. It should not include extra details, long explanations, or references.

Introduction

The introduction is the first part of your report where you explain your topic and grab the reader's interest. It sets the stage for your work by answering the basic questions: What is this report about and why does it matter? In this section you should clearly state the topic you are investigating and may include some background information or define key words to help the reader understand the topic better. For example, if your report is about how computer vision enables self-driving cars to navigate safely, you might explain that computer vision is "a branch of artificial intelligence that allows computers to interpret and understand images or videos".

An introduction also explains why your topic is interesting or important. You may mention real-life examples, problems, or questions that relate to your topic (although do not go too in-depth as the next section will explore this in greater detail).

Finally, your introduction should end with a statement of purpose. This tells the reader exactly what your report will cover. For instance, "In this report, I will explore how climate change affects ocean currents and what impacts these changes have on the environment". This helps the reader to know what to expect and sets up the rest of your report.

All of the above should be covered in one to two paragraphs.

Explanation of Core Concept

The explanation of your chosen core concept is the main part of your report where you describe the topic in detail. This is where you show that you understand your chosen concept and can explain it clearly to others. Ensure to use your own words, and may

find it helpful to include definitions, diagrams, tables, figures, research references, and examples to explain difficult ideas.

Below are questions you may want to think about when writing this section:

- How does it work?
- Why does it happen?
- What are the main parts or features?
- Are there different types or examples
- What do research studies or data say about this topic?

Real-life Relevance

The real-life relevance section explains why your core concepts matters in the real world. Here you will connect your scientific idea to everyday life and show how it affects people, animals, technology, or the environment. This section helps the reader understand why your topic is important, not just how it works.

In this section you can describe real-world examples, current uses, or future possibilities related to your topic. For example, if you are writing a comparative study between traditional broad-spectrum antibiotics with targeted treatments designed to fight specific bacteria, you might discuss how the differences between the two treatments affect patient recovery, side effects, and the way doctors choose the best treatment in real hospitals.

Discussion

The discussion section is where you interpret your findings and explain what they mean. You can explore patterns, relationships, or surprising results, and connect them to the bigger picture. Try asking yourself questions like:

- What do my results show?
- Were there any unexpected findings?
- How does this compare with another research?
- Why might these results have happened?

For example, if your report is about how different types of light affect plant growth, you might analyse data from multiple studies showing that blue light promotes taller stems while red light encourages leaf development. You could compare these findings with other research to see whether the results are consistent and explain why these differences might occur, such as differences in how plants absorb and use light for photosynthesis. You could also consider limitations in the studies you reviewed, such as small sample sizes or variations in experimental conditions, and suggest areas for

further research. Finally, you could suggest improvements for future experiments, such as testing additional light colours or using larger samples sizes.

It is important to note that the explanation of core concept and the discussion serve different purposes in a research report. The explanation section focuses on describing the topic, presenting facts, definitions, and processes, and helping the reader understand how the concept works. Meanwhile, the discussion is about interpreting and analysing findings, exploring patterns, comparing results with other research, and considering why certain outcomes occurred.

Conclusion

The conclusion is the part of your report where you will summarise the main points and findings of your research. This section should clearly state what you have learned about your core concept and why it is important. Avoid introducing new information, instead you can:

- Summarise main points from your explanation of the core concept
- Highlight the more important findings or results from your discussion
- Connect back to the real-life relevance of your topic
- Suggest possible next steps or further research

References

The references section is where you list all the sources used in your report. This includes books, websites, articles, research studies, or any other materials that helped with gathering information. See Guidelines (Page 12) for further information.

Part II: Writing an Independent Investigation Report

An Independent Investigation is a report where you design and carry out your own research or experiment to answer a scientific question. Unlike a Core Concept report, which focuses on explaining existing knowledge, an Independent Investigation lets you explore a question, test a hypothesis, and collect your own data. For example, a student may choose to investigate how music affects concentration while studying.

We ask that your report falls into one of the categories detailed in Page 5. Below, we will break down each section of the report.

Abstract

See Page 5.

Introduction

See Page 6.

Real-life Relevance

See Page 7.

Methodology

The methodology section explains how you carried out your investigation. This is where you describe the steps you took so that someone else could repeat your investigation and check your results. Your methodology should be clear, detailed, and organized, including the materials, equipment, and procedures you used.

When writing your methodology, consider including:

- Materials and equipment: List everything you used in your investigation
- Procedure: Describe each step in numbered steps
- Variables: Identify the independent variable (what you changed), the dependent variable (what you measured), and controlled variables (what you kept the same)
- Data collection: Explain how you recorded your observations or measurements, including how often you collected data and in what units

- Safety considerations: Mention any precautions you took to stay safe during your investigation

Results

The Results section is where you present the data and observations you collected during your investigation. In this section, you do not interpret or explain the results, as that comes later in the Discussion.

When writing your Results section, you can include:

- Tables
- Graphs or charts
- Observations (Describe anything you noticed that is important but not numerical, such as changes in colour, shape, or behaviour)

Discussion

The discussion section is where you interpret your results, explain what they mean, and connect them to your research question. This is where you show critical thinking, reflect on patterns in your data, and explore why certain outcomes happened through scientific knowledge.

When writing your discussion, you might ask yourself:

- What do my results show?
- Were there any unexpected findings?
- How do my results compare with other research or studies?
- Why might these results have happened?
- What limitations or challenges could have affected my results?

For example, if your investigation is how temperature affects the rate of yeast fermentation, you might discuss why yeast produced more carbon dioxide at warmer temperatures than in cooler ones. You could explain this by describing how enzymes in yeast work faster in moderate heat but may become less effective at very high temperatures.

Weaknesses and Strengths

The weaknesses and strengths section is where you reflect on your investigation and evaluate how well it was conducted, linking these inspections to science when appropriate.

Strengths are the parts of your investigation that were done well. For example, you might have:

- Followed your method carefully and recorded data consistently
- Used reliable equipment or trusted sources
- Observed clear patterns in your results
- Kept variables controlled to make your experiment fair

Weaknesses are the parts that could have been improved. For example, you might notice:

- A small number of participants or samples, which could affect accuracy
- Unexpected errors in measurement or data recording
- Variables that were difficult to control, such as temperature or noise
- Limited time or resources for the investigation

Conclusion

The conclusion is the final part of your report, where you summarise your main findings and answer your research question. This section should be clear and concise, highlighting what you learned from your investigation without introducing any new information.

In your conclusion, you can:

- Restate your research question and whether your results helped answer it
- Summarise the main findings from your Results and Discussion sections
- Highlight any important patterns, trends, or relationships
- Connect your findings to the real-world relevance of your topic
- Suggest possible next steps or further research

References

See Page 1.

Part III: Guidelines

References

The references section is where you list all the sources you used in your report. Using APA style helps keep your references consistent and shows clearly where your information came from.

When writing your report:

- Use in-text citations whenever you quote, paraphrase, or refer to information from a source
- Include a Bibliography or Reference list at the end of your report, listing all the sources you cited in alphabetical order by the author's last name

If you are unsure how to format your references in APA style, you can follow an online guide such as the Purdue Online Writing Lab (OWL) APA Guide or use the APA Style website.

Figures

Figures are pictures, diagrams, illustrations, or photographs that help explain your topic or show your results. They make your report easier to understand and can show information more clearly than words alone.

When using figures:

- Make sure each figure is labelled and has a caption that explains what it shows
- Refer to your figures in the text of your report so the reader knows when to look at them (e.g.
- Keep your figures clear, neat, and easy to read

Important submission tip: When submitting, upload your figures as separate files as well. This ensures the figures stay high quality and are easier to format for printing or publication.

Tables

Tables are used to organise and present data clearly. They make it easier for the reader to compare numbers, see patterns, and understand your results.

When creating tables:

- Include a clear title at the top that explains what the table shows

- Label columns and rows with headings and include units of measurement where needed
- Refer to your table in the text so the reader knows when to look at it

Equations

Equations are used to show calculations or scientific formulas in your report. They help explain the relationships between variables or how results were calculated.

When including equations, make sure each one is written clearly and labelled if you refer to it in your text. Explain what each symbol or variable represents so the reader can understand it. Use a consistent style for all equations throughout your report.

Captions

Captions are short descriptions that explain what a figure, table, or equation shows. They help the reader understand your visuals without needing to read the entire text. Every figure, table, or equation in your report should have a caption.

A good caption clearly summarises the content, identifies the variables or objects shown, and gives context if needed. When you refer to a figure, table, or equation in your text, make sure the reader can easily find it and understand what it represents. Captions make your report more professional and easier to follow.

Graphs

Graphs are used to show data visually, making it easier to see trends, patterns, or comparisons. They can be used instead of or alongside tables to help readers understand your results quickly.

When creating graphs, make sure they are clear and easy to read. Label the axes with the correct units, give your graph a descriptive title, and make sure the data is accurate. Refer to your graph in the text so the reader knows when to look at it.

Length

Your report should be two to five pages in total length (not including bibliography or endnotes).

Formatting

When formatting your report, you should follow the templates uploaded on the NZJSJ website. You can delete or add sections as needed but make sure to keep the margins

and layout already set in the documents. All text should be typed in size 10, Times New Roman to ensure your report looks neat and consistent.

Plagiarism

Plagiarism is when you use someone else's work, ideas, or words without giving them credit. It is very important to always use your own words and acknowledge any sources you used in your report. Copying from books, websites, or other people's reports without referencing them is not allowed and is considered cheating.

Success Criteria

Core Concept	*Independent Investigation*
• Clearly explains a scientific idea and demonstrates understanding • Captions for figures and tables show understanding of the content • Word choice is appropriate, precise, and clear for scientific writing • References are well-formatted, reliable, and relevant • Includes real-life relevance and a discussion that shows critical thinking • Formatting, citations, and length are correct • The science explored is appropriately challenging for the student's level	• Demonstrates the ability to ask a scientific question, plan, and carry out an experiment • Captions for figures, tables, and equations show clear understanding of the data • Word choice is appropriate and precise • References are well-formatted, trustworthy, and relevant • Includes a clear methodology, detailed results, thoughtful discussion, reflection on strengths and weaknesses, and a conclusion that answers the research question • Formatting, citations, and length are correct • The investigation uses scientific concepts that are suitably challenging for the student's level