



PURPOSE

The purpose of a report is to interpret, explain, and disseminate knowledge through the investigation of a hypothesis. A report is an argumentative piece and the discussion of results serves to justify your conclusions. For a university assignment, this generally requires you to demonstrate your understanding of the results you have obtained and how they relate to a theory you are learning or a research question you have been given.

Those reading reports also have their own goals: to gather information and gain satisfaction that the findings are legitimate – that they are well supported by the evidence presented. Therefore, the way you explain the interpretation and significance of your results is key to helping your reader understand the data or conclusions you are presenting, as well as where you are in your learning journey.

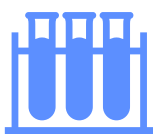
When discussing your results, there are three main questions to consider:

1. Does the data support your hypothesis?
2. What are the implications of your findings?
3. What are the potential limitations of the experimental design and conclusions drawn?



ADDRESSING & EVALUATING THE HYPOTHESIS

Often, a clear way to begin the discussion is to explain whether the data supports the hypothesis. Using this as a starting point helps to create a logical progression of ideas in your discussion. Ask yourself: what happened? Why? What does it mean?



When speaking directly to the hypothesis, remember that experiments, especially those that are done over a limited amount of time with few replicates, are used to *support* or *indicate* a truth, not to *prove* a truth. Therefore, use words like **supported** or **indicated** and avoid the use of **proved/disproved** or **correct/incorrect**.

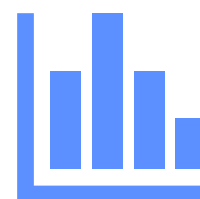
When making these claims, remember that they must be based on evidence (data) and be defensible. Explain **how** and **why** you have reached the conclusion: the clearer you make the connection between the data and the claims you are making, the stronger your argument will be.

HOW TO DISCUSS DATA (FIGURES AND TABLES)

When discussing your results, think about how you can help your reader understand the data you are presenting. Think about the data in the context of the experiment or trial you have conducted, the process or theory you are studying, and previous work in the field.

HOW TO REFER TO DATA

- Refer to tables as tables and all other images (graphs, photos, schematics) as figures
- Refer to all figures, tables, equations and calculations in-text when discussing them (e.g. Figure 1 shows that...)
- Place figures, tables and equations immediately when they are first mentioned in the text (unless instructed otherwise)
- The figures should stand alone (this means they can be easily interpreted and understood by reading the figure caption), but the discussion should **explain** the interpretation and significance of these results as they relate to the aims outlined in the introduction



[SEE THE GUIDE ON USING GRAPHS AND TABLES](#)



EXPLAIN THE TRENDS OBSERVED

Here is where you discuss what the data is showing. Rather than simply describing a graph or figure, look at the big picture: explain what you want your reader to see when they look at the figure and what the takeaway message should be. You will have already provided a figure caption with the description, so avoid the temptation to repeat yourself.



For example, if you are monitoring weight increase over a weeklong period, rather than stating the specific weight gain for each day, look at the overall trend: is it linear, exponential, or oscillating?

'Despite an overall increase in weight, there was no discernible trend in weight gain across the week measured (Figure 2).'

RELATE RESULTS TO THEORY



In the academic community, results are reported to create conversation and build on existing knowledge, and are therefore clearly linked to the literature. You need to do the same in your assignments. Use theory to reason about the trends and results observed and demonstrate your understanding of the big picture.

DISCUSS THE IMPLICATIONS OF THE RESULTS

It is important to explain why your results are significant. This is often a great way to end your discussion of the data, whether that be the discussion of a single figure or the entire section, as well as link your findings back to the hypothesis or aims. Discuss the consequences your findings have for the field or phenomenon you are investigating and link it to the literature.



The ending of the report can be based on further theoretical understanding. For example:

'Understanding how this mechanism works on a molecular level will allow a deeper understanding of the collective behaviour at play.'

Or, discuss further practical applications:

'This system can now be scaled up to successfully manage incoming student admissions at a faculty level.'

WHEN THINGS DON'T GO TO PLAN

SUGGESTING IMPROVEMENTS TO THE EXPERIMENTAL PROCEDURE

Suggesting improvements to the experimental design demonstrates your understanding of the experiment and the data you have collected. However, avoid outlandish or unlikely reasons for the weaknesses in your experiment and avoid blaming others such as lab partners. Consider:

- If you had an opportunity to conduct the experiment again, what would you do differently?
- Is there anything you have learnt that would help you to collect accurate or effective data next time?

HOW TO DISCUSS UNEXPECTED DATA OR OUTLIERS

There is a temptation to simply label unexpected data as 'outliers' and ignore them in both your interpretation and discussion. However, you must acknowledge any anomalous data or unexpected results and explain why/if you have chosen to omit them from your analysis. Remember that any time you deliberately ignore data that doesn't fit into your narrative, you are altering and skewing your results.



THE STRUCTURE OF DATA DISCUSSION

The following examples demonstrate how to describe trends or results observed in the data, as well as the reasoning for this (theory), and the implication(s) of the result.

EXAMPLE ONE: LINKING TO PRACTICAL IMPLICATIONS

Trends or results observed

The growth rate of plants with increased *Azospirilla* and *Pseudomonas* concentrations at the rhizosphere can be seen in figure 2 to be up to three-times higher than those with lower bacterial concentrations over the 2 months measured.

Reasoning for this (theory)

This may be due to the crucial role nitrogen fixing and root-disease suppressing bacteria play in plant health, with increased bacterial presence working as a natural fertiliser (Flinders University, 2021).

Implications of the results

While the results of this study are limited to the growth of a single plant species, understanding the role of bacteria in the rhizosphere may lead to more efficient use of Plant Growth-Promoting Rhizobacteria across a broader range of flora, and a reduction in the need for artificial fertilisers or pesticides.

EXAMPLE TWO: LINKING TO THEORETICAL IMPLICATIONS

Trends or results observed

As shown in figure 7, the addition of NaOH to HCl increased the temperature of the solution from 20°C to 40°C over 1 minute. This is due to the exothermic reaction of a strong aqueous acid and a strong aqueous base to create the neutralised solution of NaCl, water and energy (as heat) (Flinders University, 2021), represented by Equation 1,

Reasoning for this (theory)



Equation 1

Implications of the results

Potential energy in the breaking and creation of chemical bonds as well as the transfer of kinetic energy from newly formed water molecules to existing water molecules, demonstrates a conservation of energy (Silberberg & Amateis, 2020); energy which cannot be created or destroyed but was exchanged and released as heat (Brown et al., 2013).



Take note of the use of references in the discussion of results above. These are used as evidence to support the conclusions and implications made.

You'll note that the above examples use the third-person passive voice in the past tense. Scientific writing should be **clear**, **concise**, and **specific**.

[SEE THE GUIDE ON WRITING STYLE](#)

REFERENCES

Brown, T. L., LeMay, E., Bursten, B. E., Murphy, C., & Woodward, P. (2013). *Chemistry: The Central Science* (Vol. 3). Pearson Education Australia.

Flinders University. (2021). *CHEM1234 EXAMPLE Essential Chemistry Course Book*. Flinders University.

Silberberg, M. S., & Amateis, P. (2020). *Chemistry: The Molecular Nature of Matter and Change* (Vol. 9). McGraw-Hill Education