

Scientific Reports & Research Papers: Overview

This document presents the section order and paragraph format common to many fields of science.

Scientific writing includes Technical Reports and Research Papers used in disciplines such as archaeology, biology, chemistry, geography, geology, and physics.

A Technical Report or Research Paper document is organized in a way that clearly conveys the information in an expected order and format. This order and format facilitates the reading of complex content, while reducing distraction or confusion.

There are some variations by department and course, so check with your instructor for the specific order or format expected in your field of study.

Scientific Writing: Order & Sections

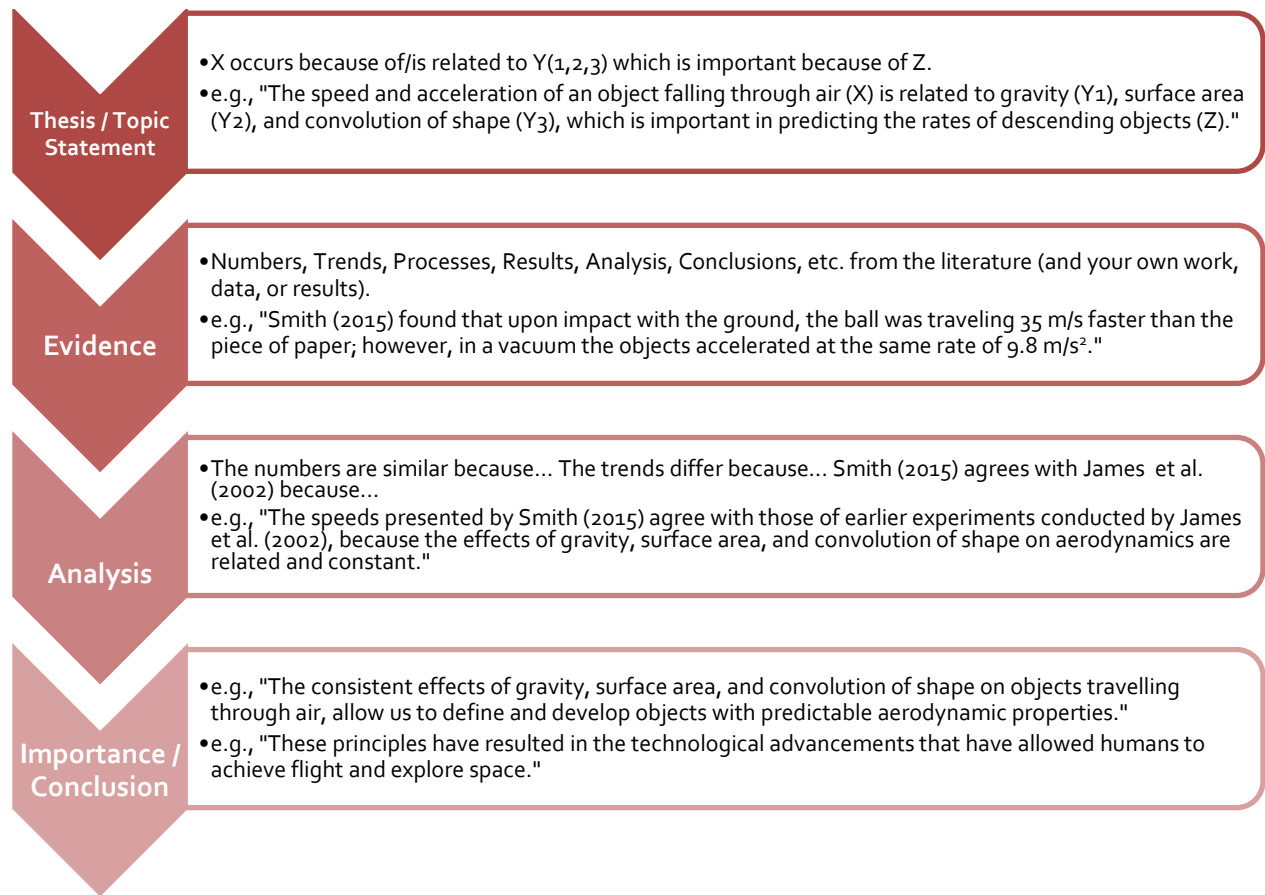


GENERAL GUIDELINES	
Abstract	<p>150 to 250 words. Encompasses key points for the entire work. Generally written last</p> <ul style="list-style-type: none"> o Instructors may assign a short Abstract before the report in order to generate report outlines o Context (1 sentence), Objectives (1 or 2), Hypothesis (1), Methods (1), Key Results (1 or 2) Key Discussion points (1 or 2), Key Conclusions (1 or 2) Significance of Work (1 or 2)
Introduction	<p>Background, Context, Theory, Purpose, Objectives, Hypothesis</p> <ul style="list-style-type: none"> o Provides the information necessary for the reader to understand the sections to come o Broadly define topic, provide theoretical background, place in context of other research o Clearly state objectives or hypothesis
Methods	<p>How the Experiment was performed, Equations/Analysis, Techniques, Equipment Used</p> <ul style="list-style-type: none"> o Description of study area/site, data collection / sources, definition of variables, assumptions o Should be detailed enough that others could duplicate your analysis, equations, formulae o Button by button description for software used is not necessary unless specified
Results	<p><u>What</u> the data shows, What was found (includes all of the results of your</p>

	study) <ul style="list-style-type: none"> ○ Point out general trends in your graphs, figures or data & note exceptions or outliers ○ Describe the results of statistical tests, and their significance, Focus on simple descriptions ○ A written narrative of the results...Explain WHAT occurred, not WHY it occurred
Discussion	<u>Why</u> did the results occur that way? Analyze, Interpret, and Explain your Results. <ul style="list-style-type: none"> ○ Discuss what your results mean with regard to your hypothesis or objectives. ○ How do your results compare to other studies (references)? Similar/Different? WHY? ○ What do your results mean in reality? Assumptions and limitations of your results?
Conclusion	Summary of Key Results, Discussion points, and the Importance of your work. <ul style="list-style-type: none"> ○ Clearly summarize key points of analysis and interpretation from your Results and Discussion ○ What are the limitations of your work? How does your analysis apply to the bigger picture? ○ How could your analysis be improved? What direction should be taken in the future?

Paragraph Structure

GENERAL GUIDELINES FOR INTRODUCTION & DISCUSSION SECTION	
Thesis / Topic Statement	1 or 2 Sentences <ul style="list-style-type: none"> ○ A paragraph begins with a Thesis/Topic sentence stating the main argument of the paragraph ○ This sentence should answer the question: What are you going to demonstrate/prove in this paragraph?
Evidence	3 or 4 Sentences <ul style="list-style-type: none"> ○ The evidence sentences include specific <u>numbers, concepts, trends</u>, etc. from both your work and from <u>2 or 3 related studies by different authors</u>. Avoid generalities eg. "large increase" ○ Use citations to demonstrate that what you claim in your thesis statement is true.
Analysis	2 or 3 Sentences <ul style="list-style-type: none"> ○ <u>Compare and contrast</u> the pieces evidence explaining <u>how and why</u> they agree or disagree. ○ And <u>Explain what the evidence means</u> in terms of: <ul style="list-style-type: none"> • Reality / Representation / Abstractions • Statistics / Models / Methods • Literature / Research Group / Laboratory
Conclusion / Importance	1 or 2 Sentences <ul style="list-style-type: none"> ○ The concluding sentence(s) should summarize or explain the importance of this paragraph. ○ Explain why or how the main idea of this paragraph is important? ○ How does it relate to the overall argument of your paper, or to other ideas you've presented?



*Note: The examples given above are fictional and are not meant to be factually correct

Additional Resources

University of Calgary Writing Support Services

- Sign up for writing appointments at the University of Calgary.
- See https://www.ucalgary.ca/ssc/writing_support/

Scitable by Nature Education

- See <http://www.nature.com/scitable/ebooks/english-communication-for-scientists-14053993/writing-scientific-papers-14239285>