How to write a term paper

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1. What is academic writing
2. What makes a good paper
3. How to develop your paper
Writing is like…
What is *scientific writing*?

**Content** – *original*
Your work, substantiated by others
Not to teach or provide general background

**Sensible** – *key characteristic*
Attacking a problem and produce a conclusion
Logic based on fact not anecdote and opinion

**Clarity** – *Must be understood.*
No literary embellishments: similes, metaphors
Understood by all

*The best English is that which gives the sense in the fewest short words.*
Instruction to Authors, *Journal of Bacteriology*
What is a *term paper*?

• An original work discussing a topic in detail.

• Procedures:
  – Choose a subject
  – Find sources of materials
  – Gather notes
  – Outline the paper
  – Write the first draft
  – Edit and rewrite
Papers are assessed not weighed
Plagiarism

- Writing is an academic conversation
  - Show respect for others
  - Confer authority upon yourself
- Plagiarism is fraud – like stealing
  - Phrase or distinctive word
  - An idea or solution to a problem
  - Maps, charts, tables…
- Culture shock for some
  - That’s what we’ve been taught to do!
  - How could I say it better than the authority?
  - A punishable crime
- See plagiarism hand-out in Fronter
Term…

Paper plan

- Research: brainstorm, structure
- Outline: restructure, structure
- Write: rewrite, draft, edit

60%

Critical thinking: style
What makes a *good* term paper

- Logical structure
- Integrates evidence with theory
- Four golden rules

\[ y = \sum_{i=1}^{n} c_i x^i \]
Logical Structure

**Title:** makes sense

**Introduction:** tells what the paper is about

**Body:** develops key points *logically*

**Conclusion:** reassess to make final statement

**List of references:** publications referred to
Evidence supports your idea

- Do vaccines work in tropical poultry?
- Vaccines reduce the likelihood of poultry disease.

Question

Claim

Evaluation

Evidence

- Interpret evidence
- Conduct experiment
- Collect data from literature
Four Golden Rules

1. Care about the reader
2. Write in your own words
   - Best way to understand a topic
   - Only way to demonstrate your understanding
   - Remember what you have claimed
3. Answer the question that is asked
   - Connect debate to literature
   - Select most relevant literature
4. Think about content, structure and logic
   - Unconnected ideas will confuse the reader
   - Theory and evidence logically indicate competence
How to get started

Strategy: outline a plan
- 60% of writing process
- Avoid binge-writing
- Create a timetable

Tactic: plan an outline
- Segment complex thoughts
- Develop logical statements
- Establish a thesis
Nail down your strategy
outline a plan

1. Create a timetable
2. Form a thesis
3. Determine a structure
   Explain
   Compare & Contrast
   Argue
What kind of structure?

1. **Expository** paper explains something
2. **Analytical** paper
   - breaks down an issue/idea into its components
   - evaluates the issue/idea
   - presents this breakdown and evaluation logically
3. **Argumentative** paper
   - Makes a **claim**: an opinion, a proposal, an interpretation
   - Justifies the claim with **evidence**: data, literature, reasoning
   - To convince the reader that the claim is **true** based on evidence

Most papers combine some of each.
Plan an outline

Why?

– Aids the process of defining boundaries
– Logically organizes ideas
– Shows hierarchical relationships
– Constructs an ordered overview
Draft an outline

How?

1. **Brainstorm**: *List* all the ideas
2. **Organize**: *Group* related ideas
3. **Order**: *Arrange* ideas from general to specific
4. **Label**: *Create* main and sub headings

*It is easier to change your outline than your first draft.*
Three Main Characteristics

How to apply to university
I. Visit and evaluate college campuses
II. Visit and evaluate college websites
   A. Note important statistics
   B. Look for interesting classes

1. Subordination: Headings general, subheadings specific
2. Coordination: Categories same value
3. Division: Groups divided into 2 or more parts

Tip: 3-5 divisions, but not more than 7
General Outline

• **Identify the subject**
  – Explain the problem
  – Provide background information
  – *Frame a thesis statement*

• **Analyze the subject**
  – Examine the first major issue
  – Examine the second major issue
  – Examine the third major issue

• **Discuss and conclude your findings**
  – Interpret the findings
  – Provide answers, solutions, or stance
  – Restate your thesis and point beyond it
IMRAD for collected data

• **Introduce the topic**
  – Explain the problem
  – Provide background information (references)
  – *Frame a thesis statement, research question, hypothesis*

• **Methodology**
  – Describe research plan
  – Instrumentation (theoretical/survey design)
  – Procedure and time frame
  – Assumptions and limitations

• **Results**

• **And Discussion/Conclusion**
  – Interpret the findings
  – Provide answers, solutions, or stance
  – Restate your thesis and point beyond it
Comparative Study

• Introduction
  – Establish Object A
  – Establish Object B
  – Explain why you analyze the two
  – *Present your thesis statement*

• Body (choose one)
  – A versus B, relative to subjects 1, 2, 3… *or*
  – Discuss subjects 1, 2, 3… relative to A and B

• Conclusion
  – Discuss the significant issues
  – Conclude
    • rate the advantage of each object, or
    • rank one object over the other
Why Compare and Contrast?

Defines a complex idea
Relates one thing in terms of another

- The difference between **force and frequency** in **concussions**
- **Bovine health benefits** of **antibiotics vs. vaccines**
- **Forage resources** that **accept climate change vs. those that ignore**

Evaluates – shows your original insight
Supporting examples – shows research
What is an argument?

- More than information
- You must
  - select a point of view
  - provide evidence
  - interpret
- Persuade

*I’ll make him an offer he can’t refuse.*
Argumentative Outline

• Introduction
  – Establish the problem
  – Summarize the issues
    • Key terminology
    • Make concessions
  – State your position (thesis statement)

• Body
  – Develop arguments to defend your stance
  – Give evidence from sources
  – Analyze the issues, both pro and con

• Conclusion
  – Conclude position logically from analysis
  – Emphasize your stance (thesis statement)
Write *and re-write* Thesis Statement

- "What is my point?“
  - No point = Nothing to write about
  - Point avoids "information dump“
  - Justifies development
- **Why?**
  1. Proof that you **understand** the material
  2. Demonstrate ability to **use your research**
  3. Constructs **logical** development
What is a Thesis Statement?

• Unifying aspect of a paper
  – "in a nutshell"
  – Points toward the paper's development
  – Often expressed in a sentence or two

• Does **not** ask a question
  – answers it
  – fills a gap
  – shows insight

• Avoid first person ("I will show…") Why?
• Refine, refine, refine
Thesis statement often answers *How? Why?*

Animal welfare in a tropical country is very different from the welfare of Norwegian livestock.

*So what? In what ways?*

**Because of the relative wealth** in industrial countries, the welfare of Norwegian livestock is very different from the livestock in developing, tropical countries.

*At least this says why the difference exists*

Animals in developing tropical countries faces different health threats than animals in Norway.

*Still does not present an argument to defend*
Weak Thesis Statements

Aquaculture in Norway and Malawi

• are both somewhat alike and somewhat different.

• one can see many similarities and many differences.

• both of them involved a single similarity.
While aquaculture is currently profitable in both Norwegian and Malawi, Norway provides government grants for capital development, subsidies for operations, and markets value-added products from this well-established industry, while Malawi depends solely on private investment, which jeopardizes the sustainability of its fledgling aquaculture industry.
The preacher's maxim

• Tell what you're going to tell them (introduction).
• Tell them (body).
• Tell them what you told them (conclusion).
The first draft

• Get it down
  – Don’t worry about grammar, style
  – Write simply
  – Correct on paper, not the screen
• Start with the easiest
• Include references - EndNote
Introduction

• Put yourself in your reader's position
• Catch the reader’s attention
• Justification and objectives
  – Statement of the problem & purpose
  – Significance of the study
  – Research questions or hypotheses
Introduction

Vital Statements

Statement of **Problem**

- Focus of your paper: one sentence with 1-3 paragraphs of elaboration
- Are looking for
  - something wrong
  - in issue that needs explaining
  - new methods (old do not work)

  Climate change reduces forage resources for ruminants, thus…

- Elaborate on the problem.
  - how the problem relates to important topics (business, environment, governance…)
  - give concrete illustrations

Statement of **Purpose**

- A single statement or paragraph that explains what you intend to do
  - Method of investigation
  - Principle results of investigation
  - Principle conclusion(s) suggested by results

  The goal of this study is to
  - overcome the difficulty with ...
  - discover what ...
  - understand the causes or effects of ...
  - refine our current understanding of ...
  - provide a new interpretation of ...
  - understand the relationship of …

  To accomplish this…
Scholarly literature

- Peer-reviewed scientific journals
- Text books or internet sources
  - normally not used in scientific papers
  - use sparingly
  - an adjunct to the primary literature.
- Popular magazines are not considered scholarly literature
The Working Title

First and last thing a reader will see
Factual but stand out
Declarative rather than neutral:
  *Influence of climate change on forage resources*
  *Climate change reduces forage resources*
Positive, brief and specific
Verbs instead of abstract nouns
  *Treatment of single-cell protein for aquafeed*
  *How to treat single-cell protein for aquafeed*
Avoid abbreviations
  ‘OCs o-t-c’ was actually used in *The Lancet* (1993)
  Oral contraceptives over-the-counter
Don’t worry, you’ll change it
How to make your first draft easier to write

1. **Break the complex into simple components** Try for consistent progress. Go for the *easiest* tasks that have a specific beginning and end.

2. **Prioritize tasks** Make a list. Set deadlines.

3. **Limit time** Use a calendar and estimate time to achieve tasks.

4. **Put placeholders** If the right words won’t come, skip it and keep writing.
   
   *Tip: When you “know” you need to write something particular, but can’t find the words to do it, put a placeholder as a reminder.*

5. **Take a break.** Get away from your writing – overnight if possible. Why?
   (1) It let’s you see what you really wrote, not what you meant to write,
   (2) It helps you see the writing from the reader’s view, not the writer’s.
   (3) You’re more apt to view work as if someone else wrote it.
1\textsuperscript{st} Draft – Watch out

- Strive for completion not perfection
- Focus on logic not style
  
  “Blood samples were taken from 48 informed and consenting patients… the subjects ranged in age from 6 months to 22 years.” (Pediatr. Res. 6:26, 1972)

- Do not underestimate
  - quantity of time you need
  - quality of work your supervisor expects
Run Spell-Check

• Two options and are uncertain, use both.
• Later, see if you selected the right word from the theatrical (theoretical?) options.

We rely on theatrical calculations to give the lifetime of a star on the main sequence. (Annu. Rev. Astron. Astrophys. 1:1000, 1963)
Clarity

1. Subjects name the characters.
2. Verbs name actions of those characters.
3. Avoid turning verbs and adjectives into nouns.
4. Replace the weak *is, was, are, has been* with action
5. Avoid compounding nouns and adjectives.

Print this list and tape it over your computer
And watch *it.*
Cohesion

• **Keep the topic visible**
• **Begin** with the familiar, ideas already mentioned
• **End** with the new, most significant information:
  – a new term
  – information to **stress**
  – information to expand on
• **Connect topics** by predicting what’s next
  – Transition between topic sentence and preceding paragraph
  – Find a key word/concept at the end (last few words)
  – Use it as a bridge to the next topic
Be concise

• Cut unnecessary windups
  – that make sentences wordy or complex
  – It depends on the context

As already mentioned… Needless to say…

• Omit
  – meaningless modifiers (kind of, really, basically)
  – redundant words (future plans)

• Compress wordiness (is able to – can)

• Do not belabor the obvious

Farmers who are poor often do not have money or secured income, which explains why developing countries are typically unlike developed countries.
Be precise

- Replace the abstract with specifics
- Avoid breezy, casual tone
- Do not introduce unnecessary doubt
- Do not use contractions: don’t, it’s, who’s
Challenges

1. Manage your time
   – Procrastinate
   – Binge writing
2. Think critically
   – Original idea
   – Logic
3. Apply principles
   – Outline
   – Rewrite for
     • Clarity
     • Cohesion
     • Concision
Failure = Carelessness

Papers fail that care less about being

• Clear
• Cohesive
• Concrete
• Concise