

Report Template [060907]

The style that we accept for the laboratory reports is the format found in most scientific journals. This format requires that you use and demonstrate your ability to organize ideas logically, think clearly and express yourself accurately and concisely. These instructions apply to all reports which are to be handed in to the subjects Molecular biology, Biomedicine and Ecology at Skövde University. Reports to be handed in to other departments may be expected to follow other instructions and criteria than those given here.

Important:

- DO NOT COPY TEXT AND FIGURES directly from journals, internet or fellow students!!! Read, condense and rewrite based on your own understanding of some phenomenon! The program “Urkund” is used to detect plagiarism.
- Write clearly. There is nothing worse for a reader than having to read a sentence several times to grasp the content.
- If you use abbreviations, e.g. PCR, you must explain each abbreviation at some point in the text, preferably the first time it is used. E.g. Polymerase Chain Reaction (PCR)!
- Reports that do not follow this template will NOT be considered for acceptance and will be returned immediately!

General recommendations worth considering:

- Maintain a log-book during the course of the work to keep a record of your experiences, pitfalls, and the arguments behind various decisions. This will be very valuable when writing your report.
- Write the report in parallel with your work. Otherwise, you may find yourself short of time as the deadline approaches.
- Don't forget that Word has a useful **grammar** and **spelling check**. Always **read through your report** 2 to 3 times to assure yourself that your language is correct and that there are no mistakes which the grammar and spelling checks may have missed or even created due to misinterpretations.
- Do not use possessive pronouns - avoid the extensive use of the words I/we/you/our/us, which means that you should not write **we** did, **we** were given etc.

- Try to write short but concise! To some extent it is true that the shorter something can be said the better (and the more likely that people will listen to what you have to say).
- Often the report has to be commented by another student group and corrected before the final submission. Read and comment each others reports thoroughly and keep in mind that this process takes some time.
- When we check your lab reports we will make a comment in the text only the first time an error appears. The same error might occur elsewhere in your report and you should of course correct all of them even if they are not marked.

Layout:

Title page
Summary/Abstract
Table of Contents
Introduction
Materials & Methods
Results
Discussion
References
Appendices/Supplements

(In your thesis abbreviations should also be included)

Title Page (See last page for example)

The title page should contain the following information:

- Report title
- Course name
- Report number and the time interval during which the work was carried out
- Name and email address
- Department and post address
- The name of your program
- Supervisor

Summary/Abstract

The summary or the abstract is the most important section in your report since it is the first, and often the only part of the report that is read. If the summary is not informative, the rest of the report will almost certainly remain unread. The summary may therefore be regarded as the report's advertisement. The summary should be written in the end, when you know what you want to convey with your report. Write on a separate unnumbered page immediately following the title page and preceding the table of contents.

The summary should contain parts from all sections of the report and can be viewed as a mini-version of the report. First, give a short introduction, state the principal objectives and the scope of the investigation followed by a brief description of what you have done and how. Subsequently, report your most important results and put it into context in a conclusion. If possible, try to point out some interesting implications of your results.

The summary should be written in past tense as a single paragraph. It should not contain references to the literature, figures or tables. Abbreviations other than generally accepted ones should be avoided. The extent of the summary should be 100 - 250 words (maximum half an A4 page).

Table of Contents

1 Chapter

1.1 Subchapter

E.g.

<u>1 Introduction.....</u>	<u>1</u>
<u>1.1 Immunity.....</u>	<u>2</u>
<u>1.2 Resistance to bacterial infections.....</u>	<u>3</u>

Introduction

The purpose of the Introduction is to supply sufficient background information to allow the reader to understand and evaluate the results in the report. Remember to clearly present the nature and scope of the investigated problem, review the relevant literature in the field to orient the reader and state the method used and possibly also the reasons behind the choice of method.

The introduction is where you introduce the reader to the subject, e.g. if you have worked with DNA then you should explain what DNA is and what the purpose of your work was. The introduction must be easy to read so that the reader can follow your train of thought through to the method section. The central ideas behind your work should be presented here, such as your hypothesis and underlying reasoning. It is common to refer to work done in the same or similar fields and to state what novelty value your work may possess. The introduction is often the most difficult section to write because you may be forced to provide and read numerous references. Do not forget to include the most central works within the field in your references.

The introduction is often started in a very broad and general manner. It is then narrowed until you reach the detailed area of your research. It is usually concluded with one or two sentences describing what you will present in the report and why.

Materials & Methods

This section should describe the experimental design of the work or how a particular model was formulated and provide enough details in order to enable the reader to repeat the experiments. If a method is new, you should provide all the details, otherwise cite the literature reference or your laboration manual including all important alterations. Order the methods in a chronological order, however related methods can be described together. Do NOT include results in this section.

You should name the components (key chemicals and enzymes) that were used in your experiment, e.g. the type of antibody used to label a protein, the temperatures of the PCR cycles, or the conditions of bacterial growth. You should describe the methods used (e.g. PCR was used to amplify DNA...). You don't have to describe methods of common laboratory practise, e.g. that the bacterial medium was autoclaved, that the solutions were stored on ice or that the solution was mixed by vortexing. If you have used an experimental setup that is clearly described in the scientific literature you may refer to that work instead of repeating the same information. Examples of what the methods section should contain include descriptions of the chemicals that you have used and why. The supplier of special chemicals or kits should be listed (e.g. not NaCl). Remember to avoid using trade names except where it is required. Animals, plants and microorganisms should be identified by genus, species, and strain. Also list their source and special characteristics. You do not need to repeat all of the chemicals and equipment listed in the lab compendium (e.g. scissors, H₂O, etc.).

If you've created a mathematical model, you should explain your model and the assumptions that have been made. The method section is written so that readers may understand what you have done but also so that they may be able to reproduce your experiment and your results.

Results

In this section your results should be presented clearly and concisely (in past tense). Present the representative data and strive for clarity and remember that this is NOT the place to discuss the results.

Results are often displayed in the form of tables and figures which are *associated with* the text and referred to in the text. This means that it is not allowed to present figures or tables that are NOT pointed to and commented on in the text! On the other hand, it is perfectly OK to present results in the text that is not also presented in a table or in a figure. In general, tables are used to present results that are too complex to describe in the text and figures are used to visualize interesting relationships (or the absence of such). Tables and figures should be simple and easy for the reader to interpret. Do not use unnecessary decimals or add extra formulas that you have not used in your work.

Figures. Figures should be referred to in the text, e.g. “Figure 3 illustrates the results from probe 1”. Note that all figures which are used should be explained in the text as well as in a caption below the figure, e.g. “the dotted line represents the number of cells and the solid represents the number of cell divisions”. The caption should supply all the information necessary to understand the figure while the text may contain a repetition of some of the information along with supplementary information and point out what can be seen in the figure or table. Do not discuss the results in the caption.

Example:

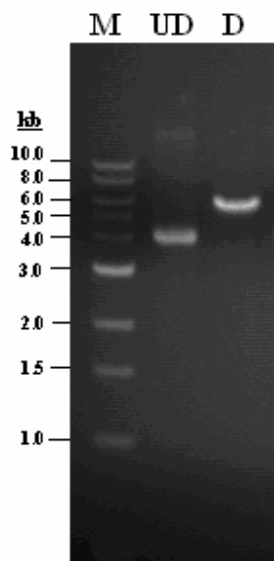


Figure 1. Digestion of pHSK34. The plasmid pHSK34 digested with *Hind*III (D) was analysed by gelelectrophoresis. UD: undigested pHSK34; M: 1 kb DNA Ladder from NEB.

Image editing programs like Photoshop or Paint are preferably used in order to create your figures.

Avoid colour images as long as possible (economy, reproducibility) – use them only when information cannot be conveyed in any other way. **The School of Life Sciences will not pay for the printing of colour images.**

Tables. For clarity, it is better to present large amounts of data in a table (or graph) than in the text. Tables should be referred to in the text, e.g. “Table 2 illustrates the results from sample 1”. A brief description of how to create a common table is given below. Note that tables should have captions just as figures.

- Choose Insert then Table on the Table menu.
- Input the number of columns and rows that you would like.

- Insert your data and label the various columns and rows.
- Choose TableAutoFormat on the Table menu. Note that you must first click on the table to be able to issue this command.
- Choose Simple 1
- Align the leftmost column to the left

Example of accepted table format. Note that only horizontal lines will be printed.

Table 1: Concentrations of CD28 and CD40

Protein	Conc. i solution 1	Conc. i solution 2
CD28	0.3 M	0.2 M
CD40	0.5 M	0.03 M

Under the table (here) is where you will place your caption.

Formulas

Equations are best written in Equation Editor. It may be found in word by choosing Insert, Object, and then Microsoft Equation 3.0. Note that a sentence should never begin with a formula or a mathematical symbol. E.g. instead of “ Φ is the quotient of...”, write “The number Φ is...”. Avoid symbols when simple words will due. Formulas are numbered with digits in parentheses after the formula to facilitate future references to the formula.

Example:

$$\frac{dN}{dt} = a \cdot b - b^2 \quad (1)$$

Discussion

A concise discussion section is the hallmark of a good study. Discuss (do not just repeat) your results and the reasons behind them in this section. The main components of the discussion are (in suggested order). First, present principles, relationships and generalizations shown by the results and point out exceptions, lack of correlation. Second, show how your results and your interpretations agree with previously published works or with the results and interpretations from other groups. Third, discuss any theoretical implications of your work as well as practical applications. If something went wrong and your work didn’t turn out as expected then explain why and how it could have

been avoided. Fourth, state your conclusion as clearly as possible and summarize your evidence for each conclusion. Do not forget to comment on the significance of the results.

If your results are good, you may conclude that you have done everything correctly but if you believe that your results are incorrect then you should discuss possible sources of error here. It is important that you compare your results to other researchers and colleagues. You should emphasize the value of your results and how they may be useful for other researchers. A common mistake is to excessively point out flaws or even classify the work as poor instead of focusing on the knowledge gained from mistakes, which may enable others to avoid the same pitfalls. The discussion should also include possible future work related to yours.

Acknowledgements (not always needed)

Here you can acknowledge significant technical or intellectual help from an individual. You can also thank persons or institutions for supplying material such as a bacteria strain or use of their equipment. You can also acknowledge financial support. A recommendation is to show the acknowledgement to the person to get his/her consent.

References/Bibliography

Many people find it difficult to lay out a reference section correctly as there are nearly as many ways to list references as there are authors. There is no universal template today for how a reference list should be laid out because different scientific journals use very different criteria. The School of Life Sciences at Skövde University uses the Harvard system for listing references.

References in the text

The most common method is to give the author's surname and the year in the current text, e.g. "unlike DNA, RNA is a very unstable molecule (Hedström, 1988)". If there are two authors, use (Magnusson & Söderström, 1994). If there are more than two authors, use (Rye et al., 2004). If the same author has two publications the same year, use (Ahlström, 2003a & Ahlström 2003b). This is not necessary if you are only making a general reference, but it may otherwise simplify matters for the reader. Direct quotations are to be placed "within quotation marks" and followed by the author's surname and year (Holmgren, 1992). You are also allowed to use numbered references.

References

References are arranged in alphabetical order according to the author's surname. Or, when using numbered references, arranged numerically in the order the references appear in the text.

Reports from the Internet

In general, references to information on web pages should be avoided if possible. That is, use the Internet as a tool to search for information but if the information you want to cite is available in a “real publication” (report, scientific paper, book etc) use this instead of citing a page on the web. Reference to publications found on the Internet (not simple web pages) are allowed however. It is important to note which day the web page in question was read or downloaded. **References to texts on the Internet should be treated with great caution** and the type of article must be examined. An article may be an essay written by an American high school student and thus would be inappropriate to use as a source of information. The reference should be to the source of the material, but if that information is unavailable, references may be made as follows:

Fagerlind, M. (1993) *How to survive a venomous snake bite*. Skövde University. Available on the Internet: <http://www.his.se/fagerlind.html> [collected 05.12.24].

In the text do not refer to the internet address instead write (Fagerlind, 2005).

Entire books

You should first refer to the author’s name (surname + first letter of the first name), the year of publication, the name of the book (cursive), the pages in the book, eventually the edition, the district, and the publishing company. The pages need not be given, but this further aids the reader.

Example: Olsson, H. (1996) *Tumour Diseases* (p. 14-21). (2nd edition). Lund: Student literature.

Articles in scientific journals

Refer to the author’s name (surname + first letter of the first name), the year of publication, the name of the article, the name of the journal (italics), the volume number (italics), and the pages of the journal where the article is found.

Example:

Nilsson, P., Olofsson, A., Fagerlind, M. (2001) Kinetics of the AHL regulatory system in a model biofilm system. *J Mol Biol*, 8, 631-40.

Personal communication

Sometimes you may wish to refer to another researcher (or teacher) who has provided information via personal communication. Such a reference should not be included in the reference list because it is not a reference which the reader can follow up. The reference is made in the text as follows:

There is, according to Fagerlind, M (personal communication, Skövde University, July 18, 2001), strong evidence that man can survive a bacterial infection.

Appendices/Supplements

Something which you feel is not part of the report but must be included so that the reader can reproduce your experiment may be added as an appendix/supplement. This could be program code, sequences, additional gel pictures or a list of chemicals used. An appendix section may be introduced with a table of contents separate from the report and unnumbered. Different kind of data should be arranged in separate appendices that are numbered, e.g. appendix I for buffers.

Text format

Font:	TimesNewRoman
Size:	Text 12 pt Figure och table captions 10 pkt, Arial Headings 16 pt (bold) Subheadings 12 pt (bold)
Margins (page setup):	Left (towards the binding) 2.5 cm Right 5.0 cm Above 2.5 cm Below 2.5 cm Page number, centered below
Justification:	The text should be justified to the margins, i.e. the left and right borders of the text should be even and should touch the margins. Note that this does not apply to the title page.
Style:	Bold style should only be used for headings and captions. Cursive style is used for Latin names, e.g. the bacteria <i>E. coli</i> . Underlined text is used to highlight something in the text.

Chapter subdivisions and headlines

- No more than 3 levels.
- Use the same font as the text. Distinguish levels with font size and bold style.
- Insert a blank row (12 pt) between headlines and text, three blank rows (36 pt) before a new headline, and two (24 pt) before a new subdivision.
- Do not begin a new chapter on a new page.
- Begin a new paragraph with a blank row (12 pt).

Text formatting

Choose Styles (and Formatting) on the Format menu and then choose New (Style). Write the name of your text style so that you can easily find it on the text style tab. Next, choose Format and then Font. Set the following:

- Size: 12
- Font: Times New Roman
- Font style: Regular

Choose Format again, choose Paragraph, and select Before 12 pt. This sets the distance between headlines and text.

Heading formatting

Same as above but with the following adjustments:

- Size: 16
- Font: Times New Roman
- Font style: Bold
- Before: 36 (This sets the distance between text and headlines)

Subdivision heading formatting

Same as above but with the following adjustments:

- Size: 12
- Font: Times New Roman
- Font style: Bold
- Before: 24 (This sets the distance between text and subdivision headlines)

Caption text formatting

Same as above but with the following adjustments:

- Size: 10
- Font: Arial
- Font style: Regular
- Before: 6 (This sets the distance between figures/tables and caption text)

Once you have made these adjustments, you simply choose the text format that you need and the rest is automatic.

Common mistakes:

Forgot to check spelling and grammar

Have not indicated any references in the text

Not referred to the laboration manual in Material & Methods

Latin names should be written in italics, e.g. *in vitro*, *Arabidopsis thaliana*

Abbreviations should be explained the first time: Polymerase Chain Reaction (PCR)

Used “,” as a decimal separator instead of “.” when writing in English

Used “.” as a decimal separator instead of “,” when writing in Swedish

Started a sentence with a number

Wrote numbers one-twenty as numbers (1-20) when not followed by a unit, e.g writing “10 mM” is allowed but not “10 samples”.

Forgot to present the results in the summary/abstract

Only presented figures in the results section. Text is necessary although it can be kept rather short.

Using a figure/table without referring to it in the text

Writing references in the wrong way

Discussing the results in the result section

Used ng as the unit for DNA concentration. Remember that mM, U/ μ l and ng/ μ l are units denoting concentration whereas ng and μ l indicates amount and volume, respectively.

Polymerase chain reaction

(Title 26 pt bold)

Immunology 5p

(Course 18 pt bold)

Report 1

(99-01-02 – 99-01-17)

(Report number and time interval pt 18 bold)

Author

Magnus Fagerlind

Magnus.fagerlind@inv.his.se

Computational biology, 2nd year

Supervisor

Patric Nilsson

Patric.nilsson@inv.his.se

School of Life Sciences

Skövde University, Box 408

541 28, Skövde, Sweden