Writing Report -2-

Lect. 3

Scientific Reports

SCIENTIFIC REPORTS

- A scientific report consists of an account of a test or experiment, of its findings, and of its conclusions.

Audience

- Assume that your intended reader has a background similar to yours before you started the project.
- The reader has general understanding of the topic but no specific knowledge of the details.
- The reader should be able to reproduce whatever you did by following your report.

What points should I bear in mind?

Before you can write the report, you must carry out the test or experiment accurately and you must record your results as you proceed.

Here are some points to bear in mind:

♦ Make sure you understand the purpose of the test or experiment.

♦ If you are not familiar with the relevant theory, look it up before you start.

What points should I bear in mind?

- Make sure you select appropriate equipment with reference to its accuracy, sensitivity

- and safety. Ensure you know how the equipment works, and then set it up in the most sensible way for you to make all the required measurements and observations

What points should I bear in mind?

- Carry out the test or experiment, recording every observation as you proceed. Ensure you observe and record accurately.

- Always record the units of measurement. All readings must be consistent, for example to two decimal places.

What points should I bear in mind?

- ♦There is no point in giving a reading of, say, 0.2317mm.If you do not have good reason to believe this, then record the result only to the degree of precision to which you have confidence.
- ♦Record the estimated limits of error. If a spring can measure with an accuracy of plus or minus 0.1mm, you should record this as, say,
- **length of spring = 21.7 ± 0.1mm**

What points should I bear in mind?

- ♦ If you add a mass to the spring and re-measure, the error could be plus or minus 0.1mm on both figures; so record this as, say,
- change of length of spring = 14.9 ± 0.2mm
- ♦ Calculate the results and draw any necessary rough graphs in pencil. If the results are unreasonable or inconsistent (out of line), then make the tests again.

What points should I bear in mind?

- Form a conclusion based on your accumulated evidence.

- Write the report.

This is the usual format for a scientific report:

- **1.Name of class, group or department; experiment number; reference; date and time.**
- The time is relevant only if it is likely to affect results (for example, was barometric pressure a factor?).
- 2. **Title of experiment.**
- 3. **Summary (Abstract)**
- A brief statement about the structure of the report; why the experiment was carried out; what you found, and the significance of what you found.

This is the usual format for a scientific report:

- 4. **Contents page**
- 5. **Introduction**
- – Your purpose and scope.
- 6. **Apparatus**
- – A list of apparatus and details of its arrangements, with diagrams.
- 7. **Circuit theory**
- – Where applicable. A brief account of the theory underlying the experiment.

This is the usual format for a scientific report:

- 8. **Method**

- – A full and clear account of how the experiment was carried out. Write in the passive (A glass stopper was weighed).

- 9. **Results (or Findings)**

- – All your readings neatly tabulated with graphs neatly drawn. Give the estimated

- limits of error. If necessary use appendixes.

This is the usual format for a scientific report:

- 10. **Conclusion (or Discussion)**
- – The inferences drawn from the results obtained (these results show …). Interpret
- results and explain their significance.
- – Could this experiment have been improved in some way? If so, explain why and how.
- 11. **Appendixes**
- – To support section 9, if necessary.

Writing Process

- Start with the data – not the introduction
- Narrow them down to a few figures
- Assemble them into a story board
- Find the trends in the figures. Find the one thing that ties them together
- Tell your readers how to read your figures and what the main point is
- Then map out the story that tells what the main point.

Writing Process

- Start with Methods and Results sections.
- Connect results with how you got them.
- Then connect your interpretation of results (Discussion) to scientific assumptions or principles (Theory).
- Connect what you set out to do (Introduction) to what you found (Conclusion).

Systematic Approach to Writing

Title

- Describe contents clearly and precisely
- Provide key works for indexing
- Avoid wasted words
  - (i.e., “an investigation of”)
- Avoid abbreviations and jargon
- Convey subject seriousness; no “cute” titles.

Systematic Approach to Writing

Abstract

- Convey whole report in miniature, minus specific details.
- State main objectives.
- Describe methods.
- Summarize most important results.
- State major conclusions and their significance.
- Do not include references to figures, tables, or sources.
- Do not include info not in report.

Writing prompts for the introduction

Introduction

- What is the problem?
- Why is it important?
- What solution (or step toward a solution) do you propose?
- Move from general to specific examples.
- Engage your reader / audience.
- Make the information links clear.
- Be selective about your citations.

Student Sample

The purpose of this lab is to observe the conservation of momentum and energy in one dimension in a real life setting. We will study this concept through the motion of carts colliding on a track. The velocity for one or two carts will be determined before and after their collision.

Revised sample

The purpose of this lab **was** to observe the conservation of momentum and energy in one dimension in a real life setting. This concept **was studied** through the motion of carts colliding on a track. The velocity for one or two carts **was determined** before and after their collision.

Statement of purpose (in intro.) should be reflected in conclusion

Overall this lab was a success. The purpose was to observe the conservation of momentum and energy in one dimension in a real life setting. The study of this concept was accomplished through the motion of carts colliding on a track. In addition, the experiment determined the velocity for one or two carts before and after the collision. During the course of the experiment the conservation of both momentum and energy was noted, and the final velocities of the carts was accurately determined.

Writing prompts for theory

Methods

- How did you study the problem?
- What did you use? (materials)
- How did you proceed? (methods/procedures).
- Provide enough detail for study replication.
- Order procedures by type or chronology.
- Use past tense.
- Quantify when possible.
- Do not mix results with procedures.

Writing prompts for methods

- How was the experiment designed?
- On what subjects or materials was the experiment performed?
- How were the subjects/materials prepared?
- What machinery/equipment was used?
- What sequence of events did you follow as you handled the subjects/materials or as you recorded the data?

METHODS SECTION

- Accurate and complete account of what you did in the lab and what materials you used
- Usually a chronological structure
- Past tense

Writing prompts for theory

Results

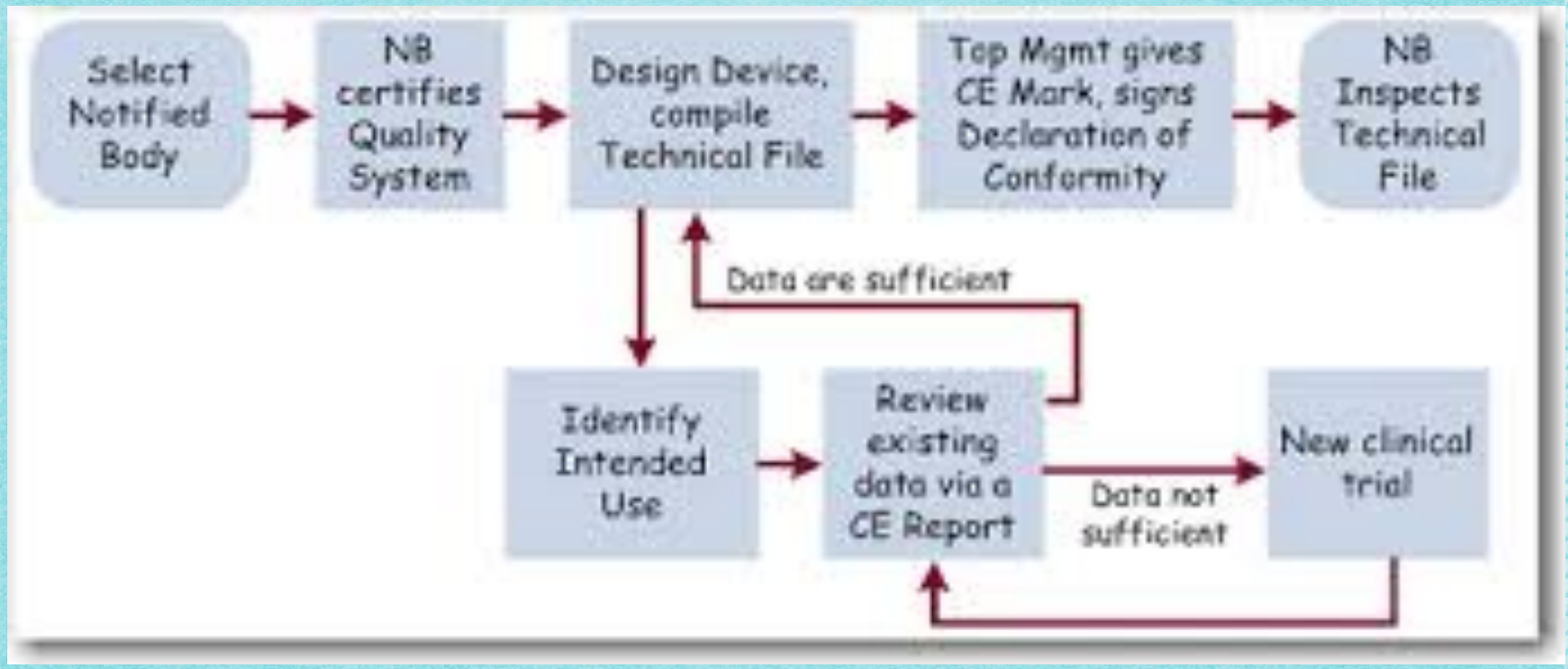
- What did you observe?
- Briefly describe experiment.
- Report main result(s) supported by selected data.
- Order multiple results logically.
- (i.e., “most to least important; simple to complex; etc”.)
- Use past tense.
- Do not simply repeat table data; select key info. .
- Do not interpret results.
- Avoid extra words.

Writing prompts for theory

Discussion or conclusion

- What do your observations mean?
- What conclusions can you draw?
- How do your results fit into a broader context?
- Summarize the most important findings .
- Move from specific discussion to general.
- Do not ignore or bury the major issue.
- Make explanations complete.
- Do not over-generalize.
- Do not ignore deviations in your data.
- Avoid speculation that cannot be tested in future

SYSTEMS EVALUATION REPORTS



SYSTEMS EVALUATION REPORTS

- A systems evaluation report serves one of these purposes:

- 1. To discover which **system** out of several alternatives is most suitable for a particular application.

- 2. To test **an apparatus or system** which it is intended to employ on a large scale, or with multiple applications, if the initial operation is deemed worthwhile.

SYSTEMS EVALUATION REPORTS

- 3. To enquire into **the causes of failures** in an existing operational system.

- The last of these is considered under **Trouble-Shooting Reports.**

What points should I bear in mind?

- **The purpose of the first two types of report is to inform those concerned with selection, implementation and utilization about:**

- ♦ the requirements of the application.
- ♦ the criteria by which the systems should be judged.
- ♦ the features of available systems.
- ♦ data on their performance in the field.
- ♦ and recommendations or conclusions about the best course of action.

What points should I bear in mind?

- These reports are important – mistakes are costly. You must be **independent**; **do not rely on the word of manufacturers or suppliers**. You probably will need to use **supplementary text, footnotes, a glossary and illustrations** (diagrams, flow charts and perhaps photographs).

What would be a suitable format?

- 1. Contents page.
- 2. Preface (personal background: why have you written the report?)
- 3. System Requirements.
- 4. Systems Available.
- 5. Criteria for Selection.
- 6. The Final Choice.
- 7. Appendices (System Data Sheets).

A report on the initial performance of an apparatus or a system could follow this format:

1. Contents page
2. Preface (personal background: why have you written the report?)
3. Apparatus/System Requirements
4. Apparatus/System Performance (use appendices, if necessary)
5. Conclusions
6. Recommendation
7. Appendices (to support section 4, if necessary).