

FCPS Middle School Science - Investigation Report Format

Fundamental to the scientific enterprise is the belief that the natural world is understandable through the careful collection and critical analyses of empirical evidence (National Research Council, 1996). Sharing scientific ideas and explanations is a critical component of every scientific experience. Scientific investigations can be categorized as experimental or observational. Whereas a physicist might conduct a controlled experiment, an astronomer would make careful observations over time. Sharing of scientific information can occur by publishing an article in a science journal (e.g., *Nature*), presenting a paper or workshop at a conference, or posting an item to the Internet.

The purpose of these guidelines is to establish a **Science Investigation Report Format** you can use to share the results of your scientific investigations with your peers. Generally, a Science Investigation Report has several critical elements that are discussed below. Use these guidelines to help you formulate effective and informative syntheses of your science investigations

General Components of a Science Investigation Report

1. **Title** – A good title should give the reader an idea of the nature of the scientific investigation. Students may elect to use the “Effect of the (IV) on the (DV)” format but should note that this format is rarely used by practicing scientists. Titles referring to a formal experiment should clearly identify the independent and dependent variables. Observational investigations must have a title that clearly reflects the concepts being examined. Scanning the titles that appear in your lab booklet show that the subtitle generally provides this information. For example, the activity *Stayin’ Alive: Observing Natural Selection*, focuses on the adaptations of organisms and their relationship to Darwin’s theory of evolution through natural selection.
2. **Introduction** – Like an English composition or a book, a science report also has an Introduction. In a science investigation report, the Introduction includes three main components:
 - Question – Establishes why you are investigating the topic.
 - Purpose – States what you should know and be able to do as a result of the investigation.
 - Prediction or hypothesis – Predicts the outcome of the investigation. For experimental investigations, the hypothesis should be a concise statement that predicts the effect of the independent variable on the dependent variable. Initially, you may present the hypothesis as an “if..., then...” statement. Although this format is an easy way to get started when developing a hypothesis, it is not a required format.
3. **Procedure or Plan** – This section specifically describes the investigation and gives specific details that would allow someone to repeat the experiment and validate your results.
 - Investigations from the MS Science lab booklet: In most cases, you will be writing a report for investigations that appear in your lab book. In those cases, it will not be necessary for you to repeat information that appears there (i.e., EDD, procedure). When this occurs, refer in writing to the title of the lab booklet containing the activity (i.e., Observing Living Things) and the specific page numbers where the procedure can be found. Note any changes your group made to the pre-written lab procedure and why the change(s) occurred. For example, if your group used pea seeds instead of corn seeds for

the Corny Genes laboratory investigation, note that in this section and why the substitution occurred (i.e., corn seeds were not available).

- Investigations not from the MS Science lab booklet: In some cases, you may be designing an original laboratory investigation. Begin by listing the materials needed for the investigation. Then, enumerate the steps you followed in performing the investigation. If you designed an investigation as an experimental design activity, you should include the experimental design diagram (EDD) with your procedure.
4. **Results** – Data that are collected while performing the investigation should be displayed in a table that is appropriate for the data.
 - Investigations from the MS Science lab booklet: In most cases, a data table has already been provided as part of the laboratory investigation. When this occurs, you need not repeat it. Instead, refer to the lab book from which the activity was taken (i.e., Investigating Matter and Energy) and the specific page number where the data table can be found. If you modified the data table, explain the change and why it was necessary.
 - Investigations not from the MS Science lab booklet: If you are performing an original investigation, you will need to design a table for recording and displaying the data you collected. For tips on constructing data tables see pages 56-59 of *Students and Research* (Cothron, Giese & Rezba, 2006).
 5. **Summary** - Present the data in a graphic format that is appropriate for the data you collected. In most cases you will need to construct a graph. Use the FCPS Graphing Decision Foldable as a guide. Your summary should describe general patterns and trends in the data. It is a good idea to include measures of central tendency (i.e., mean, median, and mode) as well.
 6. **Conclusion** – Like the Introduction section, the Conclusion is a structured presentation of what the experiment was about, a summary of findings, and discussion of suggested improvements in its design. It should include the following elements:
 - A restatement of the purpose for the investigation.
 - An summary of the major findings (paraphrase from the Summary section).
 - A statement as to whether the data supports or does not support the hypothesis or prediction. Point out specific trends in the data or measures of central tendency to support this statement.
 - Analysis of experimental errors and reasonable suggestions for improving the investigation.
 - Recommendations for further study.
 7. **Applications** – An explanation of how the concepts investigated relate to everyday life and/or the Nature of Science (Peterson, 2009).
 8. **References** – If you used any published sources (print or electronic) while completing your investigation, list them here using the format required in your language arts class.

References

Cothron, J. H., Geise, R. N., & Rezba, R. J. (2006). *Students and Research* (Fourth ed.). Dubuque, IA: Kendall/Hunt Publishing Company.

National Research Council. (1996). *National science education standards*. Washington, D.C.

Peterson, L. (2009). *The Nature of Science*. NOS synthesis paper written for Fairfax County Public Schools.