Project name

Your name

date

**Abstract:**

Short summary of project. Paragraph form. No longer than 250 words

Abstracts are often the first part of your research that is seen and will often determine whether someone continues to read your report or examines your work further. Because of this, it is critical that your abstract is concise and clear. Abstracts should: 1) describe what was previously known and what your study added (Background), 2. How you carried out your research (Methods), and 3) what your studies found using statistical results when possible (Results). Modified from Andrade, 2011

All abstracts should contain:

**Background:** Why do we care about the problem and the results? What problem is being addressed? Be careful not to use too much jargon. In some cases, it is appropriate to put the problem statement before the motivation, but usually, this only works if most readers already understand why the problem is important. What is the hypothesis?

**Example:** Based on sales numbers from car dealers, red cars have been the most popular car color for the past two decades. However, it remains unknown whether this is due to the consumers’ preference or whether the dealers simply provide more models in the red color, essentially forcing the consumer to buy a red car. We hypothesized that when given the option of any color, red would not be the most popular option.

**Methods:** It should contain enough detail to allow the reader to understand how the work was done, but it should not include every step that was performed.

**Example**: This study surveyed 200 prospective car buyers (age 22-45) and asked, “If all colors were available, which color of car would you buy?”

**Results:** What did you find? Why will this be important? To whom will it be important? Was the hypothesis supported or proven incorrect? When possible, express your results in terms of statistical testing and significance.

**Example:** Interestingly, the most popular choice was silver (35%) with red being second (20%). This difference was statistically significant as tested using Analysis of Variance (p<0.03). These results suggest that car dealers are restricting the consumers’ choice, and furthermore, that the dealers could possibly sell more cars if they had more models in silver.

**Question:**

What is my question?

**Hypothesis:**

How to Write a Hypothesis

The Three-Step Process

Often, it is still quite difficult to isolate a testable hypothesis after all of the research and study. The best way is to adopt a three-step hypothesis; this will help you to narrow things down, and is the most foolproof guide to how to write a hypothesis.

Step one is to think of a general hypothesis, including everything that you have observed and reviewed during the information gathering stage of any research design. This stage is often called developing the research problem.

**An Example of How to Write a Hypothesis**

A worker on a fish-farm notices that his trout seem to have more fish lice in the summer, when the water levels are low, and wants to find out why. His research leads him to believe that the amount of oxygen is the reason - fish that are oxygen stressed tend to be more susceptible to disease and parasites.

He proposes a general hypothesis.

**“Water levels affect the amount of lice suffered by rainbow trout.”**

This is a good general hypothesis, but it gives no guide to how to design the research or experiment. The hypothesis must be refined to give a little direction.

**“Rainbow trout suffer more lice when water levels are low.”**

Now there is some directionality, but the hypothesis is not really testable, so the final stage is to design an experiment around which research can be designed, a testable hypothesis.

**“Rainbow trout suffer more lice in low water conditions because there is less oxygen in the water.”**

This is a testable hypothesis - he has established variables, and by measuring the amount of oxygen in the water, eliminating other controlled variables, such as temperature, he can see if there is a correlation against the number of lice on the fish.

(<https://explorable.com/how-to-write-a-hypothesis>)

**Research:**

Use various forms of resources to gather background information on the topic, the possible variables, the sampling possibilities, the models, the designs, etc. This is the information that will be used in the student’s Oral Presentation to provide Judges with evidence of in-depth knowledge acquired. Use articles from STEM (Science, Technology, Engineering and Mathematics) periodicals, and other reliable and scholarly references. Discuss the topic with Research Librarians at the school or local library. They will provide the name and location of current reference material that will address your topic.

-Designate a note taking system---it’s essential

-Use detailed titles and labels on all of the graphics

-Do not use first or second person pronouns (I, me, my or you) within the paper. If the paper has personal/reflection section I and me are allowed

- Document everything

-Use quotation marks, and correct citations within the paper, as well as, at the end in the list of references.

-All figures, diagrams, tables used in the Research Paper must be mentioned in sentences within the writing.

- All sources cited in parenthesis ( ) in the paper must have a corresponding entry in the Reference Listing.

-Graphics and diagrams should be included within the paper, not just stacked at the end.

-Headings and sub headings are ok!

**Procedure:**

Instructions, but in paragraph form

-anyone should be able to replicate the experiment using the procedures, methods and materials described in the research paper

- Continually write explanations and observations in the Project Data book/Notebook during the entire project. Often these comments become significant and can be used in the Research Report when summarizing and analyzing data.

-Remember to be very specific in procedure-it’s like a cooking recipe for someone who has never cooked. Amounts and materials are important

**Data:**

**This parts just your raw data from your experiment. You can put observations in here but definitely have both a chart and graph.**

**Chart/ include labels**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Temp** | **Trial 1** | **Trial 2** | **Trial 3** |  |  |
| **0⁰C** |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
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**Graph include labels (bar, pie, line, use what is appropriate for your data)**

**Results:**

What does data say about hypothesis? Interpret you results. What does the data tell you, fact not opinion.

**Conclusion:**

Analyze data and results. What were strengths of project, weakness? Sources of Error. How can you expand, change, alter. Relevance to real-world……

**Bibliography:**

Use APA style. Use reference tab to insert works cited and bibliography.

Need help? [www.Perdueowl.com](http://www.Perdueowl.com)

[www.Easybib.com](http://www.Easybib.com)

Use reference tab in word or use add-on in google doc such as easy bib or paperpile

**Appendix**

This is to add extra materials. Copy of survey, etc…..