

Independent Research Project

Background Research Paper

Chemistry I Honors
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In the Introduction of your final Research Notebook you will present the background research for your experiment. This is often referred to as a “review of the literature” by scientists. In this section, you are expected to provide information about all aspects of the topic on which your experiment is based and include any references to previous research covering questions or problems similar to yours. In your final Research Notebook, this Introduction will be followed by a detailed description of your experimental procedure and a discussion of the results.

Requirements

Title Page

- Include a title (brief problem statement), your name, and your class period.

Documentation

- Follow MLA format for in-text parenthetical citations.

Works Cited

- Follow MLA format.
- Include a minimum of 5 sources (only one pure Internet source).
- Attach as a separate page at the end of your paper.

Length

- 3-5 pages (not including Title Page and Works Cited)

Formatting

- 12-point font, double-spaced, 1-inch margins

Writing Style

- Write in the third person. Avoid using “I,” “my,” or “you” (except in the attention grabber).
- For example, write “The goal of this project...” instead of “My goal...” or write “It is hypothesized...” instead of “I believe...”

Step-by-Step Guide

1. Review the main ideas in your T-Notes and decide on the major points you must cover to explain your topic. Use the sample outline as a guide.
2. Make an outline from these major topics leaving room to fill in sub topics later.
3. Review supporting evidence in your T-Notes and decide on the sub topics you should include. You will probably have at least three major points for each variable.
4. Color code the major sections of your outline.
5. Review your T-Notes once again and underline information according to the color codes you've determined.
6. Begin writing your paper following your outline and putting the color-coded information from your T-Notes into paragraph form. The summaries you wrote main ideas become your topic sentences and the supporting evidence is used to elaborate and flesh out your paragraphs. Keep paragraphs a reasonable length.
7. Once the body of your paper is in good shape, take a rest from it.
8. Go back to your T-Notes to find information that can be used as an attention grabber.
 - EX: Nearly 500 types of bacteria live on our bodies. Imagine how many must live in our kitchens!
 - EX: Look around your kitchen. What do you see? Is it *really* clean? You may be surprised to know that even the cleanest kitchen is teeming with microscopic organisms.

Sample Outline

I. Introduction

- A. Attention grabber (interesting fact, statistic, question, definition)
- B. Introduce the subject
- C. State your problem (thesis statement)

II. Independent Variable

- A. What it is
- B. Its importance
- C. Other background information
- D. Previous research

III. Dependent Variable

- A. What it is
- B. Its importance
- C. Other background information
- D. Previous research

IV. Rationale

- A. State why you chose the problem
- B. State your hypothesis
- C. Explain how your research supports your hypothesis

Example Outline

Title: *Does Formula 409 really kill 99.9% of bacteria found on kitchen counters?*

II. Introduction

- A. Attention grabber – prevalence of bacteria
- B. Problem statement – true effectiveness of Formula 409

III. General information about bacteria [BLUE]

- A. Appearance of bacteria – shape, size, etc.
- B. Structure of bacteria
- C. History of bacteria – when discovered
- D. What bacteria need to survive
- E. How bacteria grow and reproduce
- F. Where bacteria are found

IV. Specific information about bacteria found on kitchen counters [RED]

- A. Names and descriptions of common kitchen bacteria
- B. Risks of exposure to these bacteria – diseases, illnesses
- C. Need for clean kitchen environment

V. Information about Formula 409 [GREEN]

- A. Active ingredient(s)
- B. Advertising claims – supposed effect on bacteria
- C. Other research done to test Formula 409 (if any)

VI. Rationale for Experiment

- A. Reason for experiment – importance of clean kitchen
- B. Hypothesis statement – Formula 409 will kill over 90% of common kitchen bacteria
- C. Support for hypothesis – research shows active ingredient kills bacteria

Problem vs. Hypothesis

Problem

This is a statement of what problem you hope to solve.

- EX: Formula 409 claims to kill 99.9% of such common bacteria as E. coli, Salmonella, Staphylococcus, and Streptococcus. The goal of this experiment is to prove whether or not Formula 409 is as effective as it claims to be at killing common bacteria.

Hypothesis

This is an educated guess about the outcome (results) of your experiment. It should specifically state what you think will happen when you do your experiments. The hypothesis should be supported by the information gathered in your review of the literature.

- NOTE: The success of your project does not depend on whether or not your hypothesis is correct. What is important is that you collect experimental evidence to test your hypothesis and report the results honestly. Sometimes the greatest knowledge comes from an incorrect hypothesis!
- EX: It is hypothesized that Formula 409 will indeed kill over 90% of the bacteria normally found on a kitchen counter because it contains an active ingredient – alkyl dimethyl benzyl ammonium chloride – that has been proven in other scientific studies to kill bacteria.

Library Research Tips

1. Use all the keywords you can think of to help you find possible sources of information. For example, if you are looking for blood pressure information, you should also look under titles such as circulatory system, cholesterol, heart, blood, etc.
2. Primary sources are always preferable to secondary accounts in newspapers and popular magazines. Look for the meaty information in scientific journals and other direct sources.
3. When you find a resource skim the information to see if it will be useful. Remember that you need some very general information and definitions, so don't overlook the simple stuff. If the reference looks promising, the very first thing you should do is complete the bibliographic information on the T-Note. That way, if time runs out, you can easily find the source at a later date.
4. Exhaust all the resources available in the library before you give up – books, science encyclopedias, journals, magazines, Internet resources, etc. When in doubt, ask the librarian for help.
5. Branch out! Go beyond our library and to look for more information. The Public Library is a great resource. University libraries are also good – Trinity, UTSA, Incarnate Word, and UTHSC (great medical information). Call scientists or other professionals for advice. Look up organizations that might relate to your topic in the phone book and give them a call. In other words, use your imagination and ingenuity to dig up everything you can find!

Possible Resources

- Readers' Guide to Periodical Literature (journals, magazines, newspapers)
- books
- science encyclopedias
- Internet
- interviews
- pamphlets
- letters
- videos
- almanac