

Project or Research Proposals

It is difficult to be involved in scientific work of any kind, either academic research, industrial development, government work, or teaching without writing proposals for research or equipment. These may range from short internal documents describing proposed work to extensive proposals to outside clients for significant support for your research. They may range in length from a few sentences to many pages, although most funding sources do have maximum lengths for proposals. No matter what you do, you will have to convince someone that they want to pay for something that needs doing. This exercise gives you experience in developing such a document.

There are several items that are usually included in a proposal:

1. A statement of the problem to be addressed.
2. A statement of why the problem needs to be addressed.
3. A statement of how you intend to address the problem.
4. The proposed timeline for the research.
5. The resources needed to carry out the research.

The content associated with each of these items will vary significantly depending on the purpose of the proposal and the audience to which the proposal is directed. The format in which they are presented will also vary. For instance, if you are submitting a proposal to a governmental funding agency they may have very specific instructions describing how the proposal is formatted, the length, content, and ordering of each section, and the actual format submitted to the agency (Word document, PDF file, *etc.*). In many cases, failing to follow the prescribed format exactly will result in the proposal being rejected with no consideration.

1.0 A general format

The proposal will usually contain the following sections. They may not be exactly in the stated order since you need to meet the requirements of the client.

Title: This should provide a concise, but adequate, summary of the work. You must find a happy middle-ground between not enough information and too much information. It needs to contain enough information to convey the general purpose of the proposed activity and to differentiate it from other research.

Abstract: The abstract is a *single* paragraph describing the problem to be addressed and why the problem is interesting. The abstract has to be short enough that someone is willing to read it. It also has to contain enough information to get the reader interested in the problem and willing to read more.

In some proposals, the abstract may be either replaced or augmented with an *executive summary*. These tend to be longer and more detailed since they are intended for a manager or research coordinator to read to be able to know who else needs to see the proposal or who will be best suited to evaluating it.

Introduction: This section introduces the problem. It should initially provide background for the problem at a general level. This would be followed by background material specific to the proposed problem. You should include a review of relevant literature on previous work.

The writing style should be concise, clear, and lacking in embellishments. Whoever is reading your proposal doesn't want to wade through lots of exposition to get the important information.

Don't quote your literature sources directly. Summarize what the article includes that is pertinent to your problem and give a citation to the bibliography included as part of the body of your proposal.

It is likely that this section will be the longest one in your proposal.

Research Hypothesis or Research Problem: This is a statement of what you intend to do. What questions are you trying to answer? Based on the current state of the field, what do you hope to show in your research?

This section will also contain some indication that you have evaluated the difficulty of the problem and can state with some certainty that the anticipated effects can actually be measured in some sense. This analysis of the probability of success may include some theoretical background. It may also include some calculations backing up your claims. They can be either carefully done or back-of-the-envelope, depending on the audience for the proposal.

Methods and Resources: Here you will describe your proposed experiment in depth. How are you going to complete the research? What methods are going to be required? What kinds of equipment and supplies will be needed? Be thorough but not excessively descriptive.

Don't forget to include an expected timeline for your work so those reading the proposal know whether it will fit within the constraints for whatever support or resources are being requested.

Conclusion and Justification: Explicitly state how your research will advance knowledge or understanding of the proposed problem or question. Are there any far-reaching effects? Why do you deserve support or resources for this research?

Bibliography: Include all the resources that you consulted in developing this proposal. This will provide evidence to those evaluating the proposal that you have a good understanding of the current state of the field of research and what

has been done previously (important so you don't unnecessarily repeat previous work).

There are several publications that describe the proposal process. For students that are anticipating graduate research, you may want to consult the book [Graduate Research \(Fourth Edition\), A Guide for Students in the Sciences](#) (Robert V. Smith, Llewellyn D. Densmore, Edward F. Lener, Academic Press, 2016, <http://www.sciencedirect.com/science/book/9780128037492>).

2.0 Grading rubric

The points on the rubric add up to 40 points. The score you receive will be scaled appropriately to match the allowed points on the assignment.

Paper part	Point Value	Considerations
Title	2	Adequate summary of the work Not too long
Abstract	3	Problem is stated clearly States why problem is interesting States how problem will be addressed
Introduction	8	Appropriate level Relevant to the problem Relevant literature discussed
Research Hypotheses or Problem	10	Clear statement of what will be done Shows how work is related to goal Theoretical background/calculations to back up claims
Methods and Resources	5	Methods required Evaluation of what control measurements are necessary Evaluation of possible noise Equipment and supplies needed Expected timeline
Conclusions and Justification	4	Statement of how research will advance scientific knowledge Is convincing that support or resources are deserved
Bibliography	3	All resources mentioned Proper citation format
Grammar and Mechanics	5	Good overall grammar Proper use of punctuation Paragraph format Professional in style and tone
Total Score:	40	

The equipment request form can be found on Learning Suite under **Content** ⇒ **Student-Designed Experiments** or [here](#).

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