

Introduction to the Grant Writing Process

Introductory Worksheet

This worksheet will guide you throughout the workshop. Your answers will evolve into an outline or concept paper, which will feed into your grant writing process.

Who are you? Who are you, as an organization?

What is your idea, problem, or question?

Why is your idea significant, important, or needed?

What directorate or funding source is appropriate for your project?

What is the match between your project and the targeted NSF grant?

Who will benefit from your research?

What is the ultimate purpose or outcome of your project?

Introduction to the Grant Writing Process

How will the goal be achieved?

How will the aims or objectives be achieved?

Who will be the PI and other personnel involved in your project?

What is your evaluation plan?

How will you know the project succeeded?

What is the timeline for your grant?

How will your project results be disseminated?

Collaboration & Networking Worksheet

Being aware of connections and potential networking opportunities can make your grant writing process easier. This worksheet will help you delve into the internal and external politics of your organization. Once you have identified potential allies, you can adjust proposal planning to make the most of this knowledge.

How can you convert your expertise into a grant request and tell the donor that you need external funds?

What internal politics do you need to consider prior to beginning the grant request?

What might be some of the external politics you should consider prior, during and after submission?

Who are some of the people you could recruit for your team or whose expertise would be helpful to seek?

Who else might be writing grants for the same funding as your team, and is it possible to combine teams or collaborate?

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Questions to Generate Project Ideas

Begin the exercise for your research proposal by articulating your thoughts concerning a problem or need you have noticed. Consider the following questions while filling in your responses below: What do you want to do, and how do you see yourself carrying out your ideas? Are your objectives and expectations in line with those of your organization?

What problem or need am I addressing?

What is your hypothesis or problem statement?

What are your research questions?

Why is the problem important and interesting?

What is the ultimate purpose of your research/applied research?

What actions will you take, and how will they lead to a solution for your problem?

What resources will you need to complete the research (equipment, graduate students, facilities, and access to the industry)?

How will your project improve integration of research and education?

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What will you know at the conclusion of the project that we don't know now?

What are some of the priority areas and systems that will be affected by or involved in your project?

How will your project improve demographics and diversity among students within STEM career paths?

How will your project broaden participation, especially for underrepresented groups of people?

What international collaborations, if any, will your project include?

How will your results be measured and evaluated?

How will the results from your evaluations be disseminated?

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Questions to Ask & Answer about Your Idea

The questions below are imperative to gaining both internal and external support for your proposal. Your idea must be able to persuade and compel others to lend their manpower, financial resources, and/or time to your project. Keep this in mind when answering the following questions.

Why is your idea unique?

Why is your idea timely?

Why is your idea urgent?

Why is your idea compelling?

If your idea is funded and the project implemented, how will this project capitalize on your organization's strengths?

If your idea is funded and the project implemented, how will this project help overcome some of your organization's weaknesses?

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Building Intellectual Merit

This worksheet will help you to add intellectual merit to your project. The more detailed your answers, the stronger your project summary will be.

How will the proposed activity advance knowledge and understanding within its own field or across different fields?

How well qualified is the proposer (individual or team) to conduct the project?

To what extent does the proposed activity suggest and explore creative, original, or potentially transformative concepts?

How well conceived and organized is the proposed activity?

Is there sufficient access to resources?

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Considering Broader Impacts

The answers you provide here will ensure that you have thought over the broader impacts of your project. Further, the questions will help you generate alternative and innovative approaches to your project.

Describe how the activity will advance discovery and understanding, while promoting teaching, training, and learning.

Describe how the proposed activity broadens participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.) in your project.

How will your project enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships?

Describe your plan for disseminating results broadly to enhance scientific and technological understanding.

What may be the benefits of the proposed activity to society?

Crafting Your Project Description

You should address the following questions to ensure that your project description is clear, comprehensive, and compelling. The answers you provide will flesh out your project for the review panel.

How will your statement of work convey your message with clarity and concision?

If you are going to include visual materials, how will you incorporate them within the 15-page limit?

Discuss the relationship of your project to longer-term goals of the Primary Investigator.

How will you incorporate your outline for the general plan of work?

How will you include plans for preservation, documentation, and sharing of data, physical collections, curriculum materials, and other related research and educational products within the 15-page limit?

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Hypotheses

Hypotheses require investigators to predict an answer to a research question based on knowledge of the field, logical analysis, and/or anecdotal observations. Not all NSF proposals will require this step; however, you may wish to include a hypothesis to assure the review panel that your project is grounded in the scientific method.

State your initial hypotheses.

List the general relationships implied by your hypotheses.

1. _____ is related to _____

2. _____ is related to _____

3. _____ is related to _____

Identify specific alternative relationships or explanations, which would serve as competing or rival hypotheses, if possible.

1.

2.

3.

Write your revised hypotheses, considering specific competing alternatives to the hypothesized relationships (if applicable).

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Motivating Rationale

The following questions are designed to make you think about why and how your project merits the time and funding of the NSF. Further, the answers will help the *review panels* understand why your project is worth their time and funding.

What makes your project compelling?

What national, international, regional, state, or local problem will your project help overcome?

What evidence will you present to make panels vote yes for your project?

What educational, engineering, or biotechnology need will your project meet or resolve?

How will the reviewers be convinced that your project is reasonable and practical?

Describe the case you will build to demonstrate that the training or research for your project is scarce.

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Search for Related Work

What prior research exists for your topic? Use this worksheet to help organize your thoughts and help build your literature review.

List questions you hope are already answered by previous research, followed by the likely source of information (not necessary with journals).

1.

2.

3.

4.

5.

List relevant theories or models, followed by the likely source of information.

1.

2.

3.

4.

5.

List any other useful background information and the likely source.

1.

2.

3.

4.

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Outcome Objectives

Use this worksheet to verify that your project's outcome objectives will convey the appropriate information to the review panel. If necessary, revise your objectives in the space provided under each question.

Do your outcome objectives describe what will change and when? If not, revise.

Do your outcome objectives demonstrate the direction the changes will take? If not, revise.

Do your outcome objectives tell the reviewer how many changes will occur? If not, revise.

Do your outcome objectives define how changes will be measured? If not, revise.

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Developing Your Methodology

This worksheet will help you flesh out your project design. The more detail you can provide, the better your project description will be.

Describe how you will select the project focus.

Discuss whether you will divide the activities according to the project focus.

Explain what will happen at each phase using a narrative, list, flow chart, or diagram.

Describe how data will be gathered, and by whom.

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Data Collection Forms

Use the space below to sketch forms you will use to record the data of the study. Alternatively, you may list and describe the forms below, and then attach specimens at a later date.

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Reporting of Results

Use the space below to sketch summary data tables and/or graphs which you would expect to use in presenting your results. You may include simulated results of the kind you hope to find.

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Plan of Work

Design and analysis are two sides of the same inferential coin. Always seek competent consultation from a statistician during the analysis phase, or your conclusions may not be usable or interpretable.

List the people whose expertise in statistical analysis may be useful.

List the demographic variables which describe characteristics of subjects such as age, sex, race, previous hospitalizations, etc.

List the variables of the study under the control of the investigator, such as type of instruction given, educational tools, etc., to which the investigator can assign subjects.

List the outcome variables or effects potentially related to or caused by those listed above, such as adherence to instructions, speed of completion, or client satisfaction.

Discussions, Interpretations, or Conclusions

No workbook exercises are included for this phase of your study. Instead we suggest that you maintain a notebook or fieldwork journal to capture anecdotes, remarks of subjects, comments by others involved in the project, or any other facts or ideas which might help to make sense out of the phenomena under study. The serendipity of an alert and curious researcher leads to insightful interpretations and fruitful new hypotheses.

Project Personnel

No workbook exercises are included for this phase of your study. Instead we suggest that you consider the questions below when putting together your team. List the names of persons you might wish to include on your team under each question.

Who are the people most qualified to conduct your study?

What skills do they possess or what research have they conducted that makes them uniquely qualified for your study?

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Developing Your Budget

Your proposal may request any amount in funding, so long as the item and amount are considered necessary, reasonable, allocable, and allowable. Still, keep in mind that a large-budgeted project will receive more scrutiny than others. Be sure to request what you need to conduct the research, and justify every item. This worksheet will help you plan for your budget.

Itemize the following expenditures your project might need, followed by a brief justification of each.

Personnel:

Travel:

Equipment (usually \$5000 or more each, and several years of service):

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Participant support (per diem, stipends, and other costs for trainees, and/or participants):

Cost of educational activities associated with research, where appropriate:

Other direct costs (sub-award, consultant, computer services, publication costs):

Other indirect costs (equipment under the threshold of \$5000, etc.)

Disclosure of Current & Pending Support

The NSF requires that all proposals include a report of **all current and pending funds from any donor for each investigator**. While your project will not be declined due to sufficient funds from other sources, it could be significantly delayed due to insufficient disclosure of the current and pending funds. The following questions will help you track funding.

List the grant awards you and anyone on your team currently receive, followed by the donor and amount.

List the proposals you and anyone on your team have submitted (but are still under review), followed by the donor and the amount.

Collaboration & External Contacts

External support stems from getting others interested in your ideas and your project. Consider contacts outside your organization, as well as coworkers who may already have an existing contact list. Think about the names generated below as contacts for Letters of Collaboration.

With which organizations or individuals can you network?

What contacts have you made, or should you make?

What upcoming meetings or conferences should you attend to meet people and talk about your project?

If your organization does not have the expertise, contacts, or resources to implement your project, what organizations might make a good partner?

Are there specific individuals you should contact in these organizations?

What advantages can your organization or project offer these outside organizations for their collaboration?

Creating Your Data Management Plan

Your Data Management Plan will describe to the panel exactly how you will make your results available to others, store your data, and/or allow for re-distribution. This worksheet will establish the plan outline for your project.

Expected Data

Describe the data, samples, physical collections, software, or other materials that will be produced over the course of your project.

Data Format

List the format in which your data or products will be stored (hard copy notebook, instrument outputs, ASCII, html, jpeg, or other formats).

Explain how your data may be converted to a more accessible format, or otherwise made available to interested parties.

What current or anticipated need do you foresee for interested parties outside of your laboratory to access your primary data?

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Data Access/Sharing Practices & Policies

Describe your plans for providing general access to data, including websites maintained by your research group.

To which public databases or institutions might you contribute your data?

Policies for Re-Use & Re-Distribution

Describe your policies regarding the use of data provided via general access or sharing.

If you plan to provide data and images on your website, will the website contain disclaimers, or conditions regarding the use of the data in other publications or products? If so, describe these disclaimers and/or terms of use.

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Archiving of Data

Describe how data will be archived and how preservation of access will be handled.

How will hardcopy notebooks, instrument outputs, and physical samples be safeguarded against fire or water damage?

Describe your plan to transfer digitized information to new storage media or devices as technological standards or practices change.

How will interested parties gain access to your index of where all archived data are stored?

How long will your data be retained?

Creating Your Postdoctoral Mentoring Plan

Training a new generation of scientists and engineers is central to the mission of the NSF. If your proposal will include funding to support postdoctoral researchers, you must provide a description of the mentoring activities that will be provided to these individuals. Use the questions below to generate an outline for your Postdoctoral Mentoring Plan.

How will you provide career counseling during your project?

How will you allot for training in the preparation of grant proposals?

How will you ensure training in responsible professional practices during your project?

How much autonomy will you allow for developing publications and presentations during your project?

What guidance will you offer on improving teaching techniques and mentoring skills?

How do you plan to provide teaching opportunities?

What counseling will you offer on effectively collaborating with researchers from diverse backgrounds and disciplinary areas?

Timelines & Graphics

Your timeline is a realistic assessment of the time needed to meet your goals. Answering the questions below will help you create yours.

How long do you need to achieve your goals and why?

Outline the time it will take you to achieve your goal.

Why did you decide on the above timeline?

What is the timeline for spending the funds?

If you use graphics to describe the timeline, sketch the form the visual aid will take in your proposal.

The Logic Model

SITUATION:

PRIORITIES:

INPUTS	OUTPUTS		OUTCOMES		
	ACTIVITIES	PARTICIPATION	SHORT	MEDIUM	LONG-TERM
ASSUMPTIONS 1. 2. 3.			EXTERNAL FACTORS 1. 2. 3.		

Evaluation

What do you want to know?

How will you know it?

NOTE: The number of boxes and design will vary depending upon your program and situation. Include arrows to show directional flows.

Evaluation

The NSF is primarily interested in the Broader Impacts, with respect to evaluations. The Evaluation Plan Worksheet on the following page is designed to help you organize your thoughts regarding the assessment process for your project's Broader Impacts. Consider the definitions below when filling in the chart. When you begin writing this section of your proposal, remember that your directorate or program officer will be the audience, so write with him or her in mind.

Evaluation: How the project will be measured and the results given to the directorate or program officer.

Quantitative Evaluation: Hard data, such as: facts, measurements, and statistical analysis.

Qualitative Evaluation: Soft data, such as opinions, individual stories, and surveys.

Evaluation Plan Worksheet

Plan of Work for NSF Researchers

Focus		DATA COLLECTION					
Which program or aspect of a program is being evaluated?	INDICATORS & EVIDENCE How will you know it?	TIMING When should you collect the data?	SOURCES Who has the information?	METHODS How will you gather the information?	SAMPLE Who will you question?	INSTRUMENTS What tools will you use?	
1.	A.						
	B.						
2.	A.						
	B.						
3.	A.						
	B.						
4.	A.						
	B.						
5.	A.						
	B.						

Plan of Work for NSF Researchers

Budgets

Budgets vary according to donor. Be sure that your budget reflects the specifications of the RFP. Please answer the following questions in relationship to your budget.

How much do you need to accomplish your goal & objectives?

What are the budget items? (personnel, fringe benefits, equipment, space, consultants, etc.)

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

What costs will you contribute?

How much does your institution charge (indirect costs)?