

Research Plan (DUE NOVEMBER 24th 2015)

Research Plan Defined

A Research Plan is written or outlined **BEFORE** the start of an experiment. It states the method or steps that will be used in the experimental research. Thus, the method is written in the **FUTURE TENSE**. It needs approval **PRIOR** to the actual start of the experiment by the Sponsor, SRC, or IRB where applicable. Remember, this is **NOT** the actual science project report. This is only the plan that will be followed.

The research plan should be redefined once definite details have been established.

Remember: This is the Research Plan and NOT the Science Project Report

- Send only what the research plan is asking for (no title page, acknowledgements)
- Should NOT have data, and/or conclusion.
- Should NOT be written in the past tense.

Components of a Research Plan: Follow the format on the Research Plan Attachment, p. 30. by writing. The Research Plan should be typed and not hand-written.

Example:

A. Question or Problem (statement stated as a question leading to the study)

B. Goal/expected outcome/hypothesis (state the purpose, objective, or engineering goal) Hypothesis should follow the problem, purpose, etc. It is a temporary answer, prediction, educated guess. **Stay away** from "I think that..." It should be direct and not wordy and not in first person. It should relate to the problem or the question.

C. Method or Procedure

- ◆ Measurements should be in metric units.
- ◆ Include concentrations, quantities, and instruments or major equipment used.
- ◆ If applicable, include a copy of surveys, questionnaires, or test administered.
- ◆ Mention safety or sterilization procedures when necessary.
- ◆ If working with bacteria or fungi, mention where they will be collected or ordered from, cultured and observed, and how samples will be disposed.
- ◆ Indicate supervision when there should be supervision.
- ◆ If working with Human Subjects, how are their rights, welfare, and identification being protected?
- ◆ Justify the use of nonhuman vertebrate animals.
- ◆ Stay away from personal pronouns: "I will...We will...Next I will...etc."
- ◆ It is best to start with ACTION words, "Measure 3.5 ml of water and..." or "3.5 ml of water will be measured and transferred to a..."

D. Bibliography (List of references or literary resources)

- ◆ Submit at least 5 major references when submitting the plan for approval.
- ◆ Use science journal, books, reliable Internet sites, NOT just Internet sources.
- ◆ Follow a proper bibliography format for journals, books, Internet sites, etc. Select one style and use it consistently. (<http://easybib.com>) may be helpful.
- ◆ One of the 5 resources for vertebrate animals, must include an animal care references

Student Checklist (1A)

This form is required for ALL projects.

1. a. Student/Team Leader: _____ Grade: _____
Email: _____ Phone: _____
b. Team Member: _____ c. Team Member: _____

2. Title of Project:

3. School: _____ School Phone: _____
School Address: _____

4. Adult Sponsor: _____ Phone/Email: _____

5. Is this a continuation/progression from a previous year? Yes No
If Yes:
a) Attach the previous year's Abstract and Research Plan
b) Explain how this project is new and different from previous years on Continuation/Research Progression Form (7)

6. This year's laboratory experiment/data collection: (must be stated (mm/dd/yy))

Start Date: (mm/dd/yy) End Date: (mm/dd/yy)

7. Where will you conduct your experimentation? (check all that apply)
 Research Institution School Field Home Other: _____

8. List name and address of all non-school work site(s):
Name: _____
Address: _____

Phone: _____

9. Complete a Research Plan/Project Summary following the Research Plan instructions and attach to this form.

10. An abstract is required for all projects after experimentation.

Research Plan/Project Summary Instructions

A complete Research Plan/Project Summary is required for ALL projects and must accompany Student Checklist (1A).

The Research Plan/Project Summary is a succinct detailing of the rationale, research question(s), methodology, and risk assessment of your research project and should be completed before the start of your experimentation. Any changes you make to your study should be added to the final document.

The research plan for ALL projects should include the following:

- a. What is the **RATIONALE** for your project? Include a brief synopsis of the background that supports your research problem and explain why this research is important scientifically and if applicable, explain any societal impact of your research.
- b. State your **HYPOTHESIS(ES), RESEARCH QUESTION(S), ENGINEERING GOAL(S), EXPECTED OUTCOMES**. How is this based on the rationale described above?
- c. Describe in detail your **RESEARCH METHODS AND CONCLUSIONS**.
 - **Procedures:** Detail all procedures and experimental design including methods for data collection. Describe only your project. Do not include work done by mentor or others.
 - **Risk and Safety:** Identify any potential risks and safety precautions needed.
 - **Data Analysis:** Describe the procedures you will use to analyze the data/results that answer research questions or hypotheses.
- d. **Bibliography:** List at least five (5) major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

Items 1–4 below are subject-specific guidelines for additional items to be included in your research plan/project summary as applicable.

1. Human participants research:

- **Participants.** Describe who will participate in your study (age range, gender, racial/ethnic composition). Identify any vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
- **Recruitment.** Where will you find your participants? How will they be invited to participate?
- **Methods.** What will participants be asked to do? Will you use any surveys, questionnaires or tests? What is the frequency and length of time involved for each subject?
- **Risk Assessment**
 - ◊ **Risks.** What are the risks or potential discomforts (physical, psychological, time involved, social, legal, etc.) to participants? How will you minimize the risks?
 - ◊ **Benefits.** List any benefits to society or each participant.
- **Protection of Privacy.** Will any identifiable information (e.g., names, telephone numbers, birth dates, email addresses) be collected? Will data be confidential or anonymous? If anonymous, describe how the data will be collected anonymously. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will the data be stored? Who will have access to the data? What will you do with the data at the end of the study?
- **Informed Consent Process.** Describe how you will inform participants about the purpose of the study, what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.

2. Vertebrate animal research:

- Briefly discuss potential **ALTERNATIVES** to vertebrate animal use and present a detailed justification for use of vertebrate animals
- Explain potential impact or contribution this research may have
- Detail all procedures to be used
 - ◊ Include methods used to minimize potential discomfort, distress, pain and injury to the animals during the course of experimentation
 - ◊ Detailed chemical concentrations and drug dosages
- Detail animal numbers, species, strain, sex, age, source, etc.
 - ◊ Include justification of the numbers planned for the research
- Describe housing and oversight of daily care
- Discuss disposition of the animals at the termination of the study

3. Potentially hazardous biological agents research:

- Describe Biosafety Level Assessment process and resultant BSL determination
- Give source of agent, source of specific cell line, etc.
- Detail safety precautions
- Discuss methods of disposal

4. Hazardous chemicals, activities & devices:

- Describe Risk Assessment process and results
- Detail chemical concentrations and drug dosages
- Describe safety precautions and procedures to minimize risk
- Discuss methods of disposal