

Regional Science and Engineering Fair Research Plan / Idea Format:

- A complete Research Plan/Project Summary is required for ALL projects.
- Students should develop or create an experiment that demonstrates their thinking specifically the scientific method.

The Research Plan/Project Summary should include the following:

- **RATIONALE:** a brief synopsis of the backgrounds that supports your research problem and explains why this research is important and if applicable, explains any societal impact of your research.
- **Problem:** What do you want to find out? What is your question?
- **Hypothesis:** What do you think will happen? Hypothesis is educated guess or logical explanation that could be tested and forecasts how one variable (independent) can affect a second variable (dependent).
- **Procedure:** How will you conduct your investigation? Detail all procedures and experimental design including methods for data Collection.
- **Risk and Safety:** Identify any potential risks and safety precautions needed.
- **Data Analysis:** Describe the procedures you will use to analyze the data/results.
- **Bibliography:** List major references (e.g., science journal articles, books, internet sites) from your literature Review.

Research Plan (Sample)

A. Rational: The food industry has been adding additives to food such as vitamins and minerals to enhance the food nutritional value and to help individuals who have a low intake of them. The importance of this research is to see if what labels claim on the content of Vitamin C in orange juice is true and not less with the addition of a calcium additive since some literary research has shown that calcium reduces Vitamin C in the body. The impact of such a study would have on society is a greater awareness of the validity of nutritional labels.

B. Question: Does a calcium additive to orange juice change its concentration of Vitamin C?
Problem: To determine if added calcium decreases the concentration of Vitamin C in orange juice.

C. Hypothesis: If calcium is added to orange juice, then the concentration of Vitamin C will decrease.

D. Procedures: (Use FUTURE TENSE to describe the details of the method or procedure.)

- May be written stepwise, in sections, or in phases. Must be in the FUTURE TENSE.
- Detail the procedure and experimental design that WILL BE used very clearly!
- May use diagrams or flow charts, etc.
- STAY AWAY from personal pronouns: “I will... We will... Next I will... etc.”
- Use metric measurements. Include concentrations, quantities and major equipment.
- Include a copy of a questionnaire, survey, or test if part of the study.

E. Data Analysis: State the procedures that WILL BE USED to analyze the data that WILL BE collected to answer the question or hypothesis. USE the FUTURE TENSE. DO NOT give results. DO NOT give a conclusion. The research plan states WHAT WILL BE DONE.

- Discussion of Results and Conclusion: Discuss the data/results and conclusion that CAN BE drawn (future tense).

F. Bibliography: List at least 5 major RELIABLE references from literature review that are applicable to the experiment. The more resources, the better it is for your study.

- Do not rely only on Internet resources. Internet resources should be reliable. But also use science journals, books, magazines, newspapers, etc.
- Use a proper bibliography format (MLA or AP style or other format) for journals, books, magazines, newspapers and Internet resources

Example from a journal article: Meise CJ, Johnson DL, Stehlik LL, Manderson J, Shaheen P. 2003. Growth rates of juvenile Winter Flounder under varying environmental conditions. *Trans Am Fish Soc* 132(2):225-345.

Example from a book chapter: McDaniel TK, Valdivia RH. 2005. New tools for virulence gene discovery. In: Cossart P, Boquet P, Normark S, Rappuoli R, editors. *Cellular microbiology*. 2nd ed. Washington (DC): ASM Press. p. 473-488.

Example from an electronic article:

Hong P, Wong W. 2005. Gene Notes: a novel information management software for biologists. *BMC Bioinformatics* [Internet]. [Cited 2007 July 24]; 6:20. Available from: HYPERLINK

["http://www.biomedcentral.com/1471-2105/6/20"](http://www.biomedcentral.com/1471-2105/6/20)

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