Scientific Research Plan

How to…

Purpose/Rational:

- Written as a paragraph.
- Includes reason for conducting the experiment
- Short background on research conducted prior to experimentation
- Includes statement about importance of the research.
- Example: 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 in-take 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.

Question/Problem:

- The "what" you want to find an answer to.
- Example: Does a calcium additive to orange juice change its concentration of Vitamin C?

Hypothesis:

- A single sentence
- States the expected outcome of experimentation
- Typically written in an "If…., then….." statement.

Variables:

- Controlled Variables: Anything that stays constant during the experiment
- Independent Variable: THERE IS ONLY 1. This is what is purposefully changed to determine effect.
- Dependent Variable: What is observed and data collected on.

Background Research:

- Information found from websites, researchers, scientists, journals, etc.
- This is the information that lead you to your purpose, problem, and hypothesis.
- Make a bullet point list of the information that was helpful from reading others results.

Safety Procedures/Precautions:

- List of safety equipment to be used
    - Example: Goggles, Apron, Gloves, Mask, etc.
- List of safety procedures to be followed
    - Example: Secure petri dish lid to base with packing tape to insure no contamination occurs.
- Any precautions that need to be addressed or acknowledged
    - Example: When using a knife remember to cut away from you and be mindful that sharp objects can hurt you.

Materials List:

- A bulleted list
- Extremely detailed…includes anything that will be used to complete the experiment/design during procedures.
- Include amounts/brand/material

Method/Procedures:

- Think of this as a type of recipe to doing your experiment
- Use 3rd Person, Future Tense to describe details
- Written in steps (1..2..3..4..5)
- May use diagrams to explain details
- Use metric measurements. Include concentrations, quantities, and equipment needed.
- Include copy of questionnaire, survey or test if part of study.

Data Collection Procedure

- Explain what data will be collected
- Include how data will be organized, frequency of collection
- Identify qualitative and quantitative data to be collected

Data Analysis Procedure:

- Include procedures to be employed for analysis
- Explain data/results/conclusions that CAN BE DRAWN at conclusion of experimentation.

Bibliography/Works Cited:

- Minimum of 5 RELIABLE references. Attempts should be made to include at least 1 non-internet source.
- Use the APA source generator on the science fair website links
- Alphabetize by authors' last name.

Things to remember:

- Take LOTS of pictures at every step.
- Keep a journal or notebook of everything that happens during your experimentation process.
- If during your experimentation process changes must be made to the procedures, document those in your notes. You will have to explain those in the final documentation process.