**Research Plan Instructions**

This plan needs to be submitted and approved prior to experimentation. This should be updated if there are any changes to the experiment while completing this project.

**Problem Question or Topic:** What is the question or problem being addressed?

**Purpose and Rationale:** 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**. High-quality projects will have widespread impact (will affect more than only a few people) and will be scientifically relevant.

**Goals and Expected Outcomes:** What do you hope to achieve by completing this project? What do you expect to happen in your experiment? What do you expect to prove? How are these goals based on your rationale?

**Hypothesis(es):** “If\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then\_\_\_\_\_\_\_\_\_\_\_\_ because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” statement. Remember to avoid using pronouns. This experiment needs to be replicable.

**Research Methods and Questions:** How are you conducting your research? What are the guiding questions that are leading your research?

**Experimental Design:** Be sure to list all 4 required components of an experiment. You need a control unless you are conducting an investigation.

**Materials:** List all materials required for the experiment.

**Procedures:** These need to be listed step-by-step. They need to be very specific- every single step needs to be written down. Do NOT forget to include safety steps, such as put on gloves, use potholder to take pan out the oven, get parent to supervise opening the oven, etc. All safety precautions must be mentioned here. Include what you will do to set up and clean up. You also need to include repeated trials and/or sample size in your steps. Include methods for data collection and describe only your project. Do not include work done by mentor or others.

**Risk Assessment and Safety Precautions:** Identify any potential risks and safety precautions needed. This includes any work with chemicals, equipment and tools. Include sources of safety information in your bibliography.

**Data Analysis:** Describe the procedures you will use to analyze the data/results that answer research questions or hypotheses. Also include the units you will be using for any measurements and list any qualitative or quantitative data that will be observed or measured.

**Bibliography:** List at least five (5) major references (e.g. science journal articles, books, Internet sites) from your literature review. If you are doing a special project (humans, animals, hazardous chemicals), you need to include those additional required references as noted in the Intel ISEF Rules and Guidelines. You must cite the correct online MSDS sheets for any chemicals you will be using in your experiment. The Guidebook is a required reference for all projects, as cited below:

Society for Science & the Public-Intel ISEF. (2015). *International rules for pre-college science*

 *Research: Guidelines for science and engineering fairs 2014-2015*. Washington, DC. Retrieved

 from https://member.societyforscience.org/document.doc?id=398

**Special Projects Information:** These components only need to be included if the project is a special project (humans, animals, hazardous chemicals) that requires pre-approval.

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