Scientific Method Projects:

Research Plan Instructions (**Attach to Form 1A**)

*A written outline of your project PLAN (NOTE- you cannot begin experimenting until this plan is approved)*

Heading: Name Title of Project Category

1. Question (or Problem)- Overview of the topic investigated
2. Hypothesis- “If” (reference a general idea to be supported)... then a specific statement of what you think the result will be of the experiment you will do.
3. Materials-

List materials to be used Give model name or number appropriately for tools

In column format Use ® for any brand names used

Do not number the list Note: Human participants are not “materials” nor are

List equipment vertebrate animals

Itemize consumables Refer to questionnaires used in the materials list

List any questionnaires or tests Attach all items to be shown to human participants

List any music, video games by name (questionnaires, tests, photos, reading material, etc)

Method- ***(Set Up, Execution, Data Collection)***

1. Number the steps to be followed
2. Use 3rd Person, Passive Voice, Future Tense for text of Research Plan Method(“length will be measured”)

Set Up

1. Describe how the materials listed above will be used to arrange the experimental and control set up
2. Feel free to draw a line diagram to fully identify experimental set up

Execution

1. Be specific about every step.
2. Explain in detail what is to be done for one level of independent variable.
3. Identify how many trials will be run for each level of Independent Variable.
4. May say “repeat steps #5-8” for each level of independent variable (identify each one)
5. Be sure that another scientist reading this would be able to exactly imitate your experiment, and therefore be able to support your findings.

Data Collection -

1. Identify what is to be recorded (dependent variable) with the units to be used.
2. If a self identified “Scale of Color” or “Scale of Health”, etc is to be used, specify the range of numbers to be used (e.g. 0-3 or 0-5) and explain what each numeric value in your scale represents.
3. Prepare Data Collection Tables complete with Title (Dep Variable with units), First Column listing Levels of Ind Variable and Control, all other Column Headings showing Trial #. The last column can be used for the form of Analysis to be used (e.g. “Average” for quantitative data, or “Mode” for qualitative data).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Title: Dependent Variable (units) | | |  |  |  |  |  |
|  | Trial #1 | Trial #2 | Trial #3 | Trial #4 | Trial #5 | Trial #6 | Form of Data Analysis (e.g. Average or Mode) |
| Level #1 of Ind Variable |  |  |  |  |  |  |  |
| Level #2 of Ind Variable |  |  |  |  |  |  |  |
| Level #3 of Ind Variable |  |  |  |  |  |  |  |
| Control |  |  |  |  |  |  |  |

Data Analysis -

Identify Form of Analysis to be used. Describe what you will do to the data collected to arrive at a proper conclusion regarding your hypothesis. For quantitative data (values on a standard scale) such as “time (min)” or “temp (oC)” mathematical analyses such as average, square, total, difference, or proportional equations can be performed. On the other hand, for non-standard scales (“Scale of Plant Health (0-5)”) the mode can be used for analysis. Maximum values, minimum values, and ranges can be reported.

Describe your future graph. Say “The Average ........ (gm) will be plotted on the y axis of a graph with ...... plotted on the x axis.

1. Bibliography-

Use proper MLA format. Do not number entries, but put entries in alphabetical order by author’s last name. Have at least five entries (At least 2 sources must be NON-Internet sources).

1. Special Conditions: (Note: Forms will have to be completed to address any of the following Experiments)
   1. Human Participants-
      1. Identify expected number of participants.
      2. List age group and gender.
      3. Mention how and where recruitment of participants will be done.
      4. Explain what they will be expected to do.
      5. Estimate how much time each participant should expect to spend participating in your project.
      6. Describe privacy protection procedures.
   2. Vertebrate Animals-
      1. Identify animal species
      2. explain how many animals you plan to use
      3. Describe the source of these animals (personal ownership / neighbor’s pets / veterinarian clinic.
      4. Explain how the animals will be cared for during and after your experiment.
      5. Explain why it is important for your experiment to use live animals instead of an experimental model.
   3. Risk Assessment-
      1. Any tools, chemicals, potentially dangerous equipment or activities that are part of the planned project.
      2. Outline safety precautions that will be taken
      3. Explain why these activities, etc are necessary to your project.
      4. Describe any adult supervision that is planned
   4. Potentially Hazardous Biological Agents-
      1. Describe any microbiology projects and projects that involve body tissues or fluids.
      2. Identify the Biosafety Level of the Laboratory in which the experiment will be conducted.
      3. State that a Qualified Scientist will supervise your project.
      4. Explain that proper handling and disposal of bacterial cultures or body fluids will be supervised by a qualified scientist. (See instructions with Forms for *Potentially Hazardous Biological Agents*.)