

Experimental Design
Due Friday, September 22

**Must be
Typed!!!!**

Problem:

Make sure this ends in a question mark (?)

Hypothesis:

An educated guess, based on research; the proposed answer to the problem question. "If ..., then...because..."

Use bullet points.

Materials:

- *If it's used in the procedure it must be listed here.*
- *List measuring instruments.*
- *Give exact amounts of materials.*
- *List the size, brand, and types of equipment used.*

Variables:

Independent Variable:

(what is being changed on purpose).

Dependent Variable:

(what is being measured).

Constants:

(what stays the same throughout the experiment).

Control:

(the control does not have the independent variable applied; not all projects have a control. If your project does not have a control, state: "There was no control for this project.")

Procedure:

1. *Number each step of the procedure.*
2. *List each step of the procedure stating exactly what you did it and how you did it.*
3. *Most steps should begin with a verb (subject is you understood).*
4. *Do not use any personal pronouns.*
5. *Include directions for at least 5 trials or 10 test subjects.*
6. *Include directions for finding an average for the data collected.*
7. *Make sure someone else can repeat the experiment following the steps exactly as given.*

Experimental Design Example

Problem:

Which brand of popcorn pops the best?

Hypothesis:

If I pop Orville Redenbacher's, Pop-Secret, and Great Value popcorn, then the Orville Redenbacher's will create the most cornels because it is the most expensive brand.

Materials:

- Stove
- 18 Tablespoons of Cooking Oil
- 300 Kernels of Orville Redenbacher's Popcorn
- 300 Kernels of Pop-Secret Popcorn
- 300 Kernels of Great Value Popcorn
- Measuring Spoons
- 3-Quart Pot with a Lid
- Timer
- Thermometer

Variables:

Independent Variable:

Brand of Popcorn

Dependent Variable:

The number of popped kernels

Constants:

Type of pot, number of kernels you start with, brand and amount of oil, temperature you heat the kernels

Control:

There was no control for this project.

Procedure:

1. Count out 100 kernels of the Orville Redenbacher's brand of popcorn.
2. Put 30 ml (2 tablespoons) of oil in a room temperature pot.
3. Heat the pot to 237°C.
4. Add the 100 kernels of Orville Redenbacher's Popcorn and cover with a lid.
5. Take the pot off the heat for 30 seconds so all the kernels can be brought to a near-temperature.
6. Return to heat for 60 seconds.
7. Remove the popcorn from the heat.
8. Let the popcorn cool a little then count the number of popped and the unpopped kernels. Record this data in the data table.
9. Do five trials for the Orville Redenbacher's popcorn.
10. Repeat steps 1-8 for the other two brands of popcorn (Pop Secret and Great Value). Do five trials for each brand of popcorn and record the number of kernels popped and unpopped each time.
11. Find the average number of popped kernels for each brand of popcorn by adding up the five trials and dividing by five

