

The Popcorn Lab And Science Fair

General Experiment Outline Guide

I. Title: This should tell what the experiment is investigating. It is the name of the experiment and may be in the form of a question. Be specific.

II. Statement of the Problem: Identify the problem that exists

III. Purpose: Identify the purpose. Why are you doing the experiment? "To see if...."

IV. Hypothesis: Before you do the experiment, what do you predict will happen? This should be based on Observations and Preliminary Research. "If..., then..., because..." Make this quantitative (ie: it needs a number value)

V. Variables & Controls:

Variable to be changed: What is the one condition that you changed? What are you comparing or testing?

Variable to be measured: What results are you going to measure & record?

You may want to include a test where you do nothing to your sample to see what would happen if it were "left alone."

This is called the "Control."

Controls: List the things that you plan to keep the same during your experiment, so that they will not affect your results. (List at least 6.) If there will be a "control group" be sure to state what makes this group the "control"

VI. Procedure: List in a step by step way how to do the experiment. If you do a good job, someone reading your procedure will be able to repeat it accurately. You should include at least TEN trials or samples. Try to do your tests in a random (changing) order.

Analyze results and discard any that show a major error.

VII. Materials: List the equipment you need to do the experiment. Be specific; list the kinds and amounts.

VIII. Experimentation Observations & Results: Use charts, graphs, photographs to record your data and observations. All calculations should be clearly labeled. MAKE NO CONCLUSIONS, simply present the results that occurred. Be sure to keep a journal of all information gathered while doing your investigation. For the actual science fair project you will record ALL results in a composition book which will be kept and placed in the back pocket for the science fair judging.

IX. Conclusion: be sure to answer ALL of these questions as best as you can.

A. What was proven? Analyze what your results meant. What were the differences between the factors or products you tested? Check the ingredients or makeup of your variable. (Be careful not to confuse close results with a major difference. Is it close enough to be considered of "no significant difference" due to possible experimental error?

B. What conditions may have affected your results causing an experimental error?

C. How would you change the design of the experiment to eliminate the problems and make it a better test?

D. What were some of the conditions that were impossible to control?

E. What did you learn from your experiment that you did not expect?

F. If your results are accurate, what recommendations would you make as a result of your experiment?

X: Recommendations: If you were to do this experiment again, what would you do different ?

Popcorn Experiment Sample: (this is an example. You may title/write the sections as you wish)

For this classroom experiment, each group of students should pop a bag of microwave popcorn and count the popped and unpopped kernels.

I. Title :

Which brand of microwave popcorn produces the most popped kernels.

II. Statement of the Problem:

Microwave popcorn is sold by many different brands, and many different prices. But, do all popcorn's produce an equal amount of popcorn, even if they are less expensive?

III. Purpose:

To see if the most expensive brands of microwave popcorn are really worth the extra money by producing more popcorn and less unpopped kernels.

IV. Hypothesis

If both expensive and inexpensive brands of microwave popcorn are popped it is believed that a higher number of popped kernels will result in the more expensive brands.

V. Variables & Controls

Variables to be changed: A. 17 different brands of microwave popcorn

Variables to be measured: A. The number of popped and unpopped popcorn from each of the 17 brands

Controls: 1. microwave 2. time 3. counting methods...etc

VI. Procedure (do this as a step by step as shown below)

- A. Prepare the 17 samples microwave popcorn
- B. Pop all bags of popcorn for 3min 40 sec with the same microwave.
- C. Count all popcorn pieces/ popped popcorn and unpopped kernals

VII. Materials

- A. 17 + bags of different microwave popcorn
- B. microwave

VIII. Experimental Results & Observations

Develop a chart for recording the collected data. Also keep a record of everything observed as anecdotal information to help in making conclusions.

Results: Popped and Unpopped Microwave

| Popcorns Brand | Popped kernals | Unpopped Kernals |
|-----------------|-----------------|------------------|
| brand 1: _____ | brand 1: _____ | brand 1: _____ |
| brand 2: _____ | brand 2: _____ | brand 2: _____ |
| brand 3: _____ | brand 3: _____ | brand 3: _____ |
| brand 4: _____ | brand 4: _____ | brand 4: _____ |
| brand 5: _____ | brand 5: _____ | brand 5: _____ |
| brand 6: _____ | brand 6: _____ | brand 6: _____ |
| brand 7: _____ | brand 7: _____ | brand 7: _____ |
| brand 8: _____ | brand 8: _____ | brand 8: _____ |
| brand 9: _____ | brand 9: _____ | brand 9: _____ |
| brand 10: _____ | brand 10: _____ | brand 10: _____ |
| brand 11: _____ | brand 11: _____ | brand 11: _____ |
| brand 12: _____ | brand 12: _____ | brand 12: _____ |
| brand 13: _____ | brand 13: _____ | brand 13: _____ |
| brand 14: _____ | brand 14: _____ | brand 14: _____ |
| brand 15: _____ | brand 15: _____ | brand 15: _____ |
| brand 16: _____ | brand 16: _____ | brand 16: _____ |
| brand 17: _____ | brand 17: _____ | brand 17: _____ |

from this data make a graph

IX. Conclusion (answer these questions in the conclusion to produce a quality conclusion)

- A. What was proved? Analyze what your results meant. What were the differences between the factors or products you tested? Check the ingredients or makeup of your variable. (Be careful not to confuse close results with a major difference. Is it close enough to be considered of "no significant difference" due to possible experimental error?
- B. What conditions may have affected your results causing an experimental error?
- C. How would you change the design of the experiment to eliminate the problems and make it a better test?
- D. What were some of the conditions that were impossible to control?
- E. What did you learn from your experiment that you did not expect?
- F. If your results are accurate, what recommendations would you make as a result of your experiment? Comparing the Number of

Additional questions for consideration:

- 1.If there is a difference between the initial mass of the corn and the popped corn, what happened to account for this change?
- 2.How much variability is there in the samples of each kind of corn? Why do you think this is true?
- 3.What happens to the reliability of the results as the sample size is increased?
- 4.What practical problems are there in the unpopped kernels and the popped corn? How can you limit these?

X: Recommendations:

If you were to do this experiment again. what would you do different ?