

Project Content (Scientific Method)

TITLE

A project needs a title. It lets people know what you have worked on. The title should be in the form of a statement, unless you use the problem statement as your title. Then it should be in the form of a question.

Poor Title: Soap Powder (does not say enough)

Better General Title: Cleaning Power of Soap Powder

Problem Statement as Title: Which Soap Powder Works Best in Removing Ketchup Stains?

PURPOSE/PROBLEM

The purpose or problem is always written in the form of a question, even if it is used as the title. The question tells people what you are trying to find out.

Poor Problem Statement: How Does Soap Work?

Better Problem Statement: Which Soap Powder Removes Ketchup Stains The Best?

RESEARCH

This is where you will learn as much about your topic before you start. You must have a minimum of two sources of information. You must use at least one print material as research; **you may not only use internet sources.** You should research other experiments that have been completed that are similar to yours. You can also research information about your particular topic. Your research must be written in your own words for the display, or you will not get any credit for this portion of your project. You will cite your sources on the bibliography page in your journal.

HYPOTHESIS

After getting information about your topic, you should make an educated guess about what you think the answer to your question may be.

Example:

Soap X will work best in removing ketchup stains.

MATERIALS

This is a list of all the materials that you used to complete your experiment or demonstration.

PROCEDURE

This is a list of the steps you followed to complete the experiment, or produce the model/demonstration. Each step should be numbered and should be in the correct order. This section should also include how you did repeated trials. **Every experimental procedure should be completed three times or have a large number of subjects participating in order to check for accuracy of results.**

Example:

1. Five pieces of cotton from a white shirt were placed on a table.
2. One drop of ketchup was placed on each piece of cotton.

VARIABLES/CONTROLS (This applies to grades 3-6 only)

You need to identify the controls and variables of your experiment.

CONTROLS: There should always be a control with which results can be compared. A control is the part of your experiment that is kept the same (variable held constant). For our soap experiment, how much of the ketchup stain is removed with plain water or NO soap is the control.

VARIABLES:

These are all factors that affect your investigation. A manipulated variable is what you change on purpose to see its effect (what are you testing). A responding variable is what changed or did not change in response to what you have manipulated. This is what you are observing or measuring in order to get your results.

Example:

In an experiment to test which brand of detergent would be the best at removing ketchup stains, the **controls** would be the ketchup stains, the cloth the ketchup stains are placed on, the amount of time the detergent is left on the cloth, and the water the cloth is rinsed in. The **dependent (or manipulated) variable** would be the brand of detergent used. The **independent (or responding) variable** would be the amount of time it takes to remove the stain.

DATA:

This section contains the information or observations that were collected during the experiment. This is where measurements are recorded. If you used quantitative data, be exact with your numbers or counts (use metric units) and include the labels. If you used qualitative data, describe what you observed in words like hot and cold, bright and dim, using the most exact words you know. Make graphs or tables to display your data, or take pictures. If you take pictures, be sure that no faces show. REMEMBER TO PERFORM YOUR EXPERIMENT AT LEAST THREE TIMES. If you are growing plants, start out with at least 8 seeds or seedlings. If you are conducting a survey, interview at least 25 people.

RESULTS:

Interpret the data. Think about what you are learning. State the findings of the experiment based upon the data you observed and analyzed. Discuss connections between variables or point out any patterns in the data.

Example:

Soap X worked in 20 minutes while it took soap Y 40 minutes

CONCLUSION

Your conclusion should begin with a statement on whether or not the results supported your hypothesis. You should add specific data that supported the hypothesis. Include a description of problems that might have affected the results and why. Also include any discoveries you have made in addition to the results of the experiment. Add any new questions that may lead to new experiments.

Example:

Soap X worked in 20 minutes while soap Y took 40 minutes. Soap X works best in removing ketchup stains because it worked twice as fast as soap Y. The hardness of the water may have affected the results because

