



Conducting a Science Experiment

Key Info

- If you haven't already, obtain a notebook to record all of your observations during your experiment.
- Before starting your experiment, prepare a **data table** so you can quickly write down your measurements as you observe them.
- Follow your experimental procedure exactly. If you need to make changes in the procedure (which often happens), write down the changes exactly as you made them.
- Be consistent, careful, and accurate when you take your measurements. Numerical measurements are best.
- Take pictures of your experiment for use on your display board if you can.

Preparations

With your detailed experimental procedure in hand, you are almost ready to start your science experiment. But before you begin there are still a few more things to do:

- **Know what to do.** Read and understand your experimental procedure. Are all of the necessary steps written down? Do you have any questions about how to do any of the steps?
- **Get a laboratory notebook** for taking notes and collecting data (see Data Table below).
- **Be prepared.** Collect and organize all materials, supplies and equipment you will need to do the experiment. Do you have all of the materials you need? Are they handy and within reach of your workspace?
- **Think ahead about safety!** Are there any safety precautions you should take? Will you need adult supervision? Will you need to wear gloves or protective eye gear? Do you have long hair that needs to be pulled back out of your face? Will you need to be near a fire extinguisher?

Data Table

Prepare a **data table** in your laboratory notebook to help you collect your data. A data table will ensure that you are consistent in recording your data and will make it easier to analyze your results once you have finished your experiment.

Sample Data Table

Trial	Faucet Opening (the Independent Variable)	Water Flow (the Dependent Variable)
#1	1/4 open	[Write your data in this column as you make measurements during your experiment.]
#2	1/4 open	
#3	1/4 open	
#4	1/2 open	
#5	1/2 open	
#6	1/2 open	
#7	3/4 open	
#8	3/4 open	
#9	3/4 open	
#10	Fully open	
#11	Fully open	
#12	Fully open	

Note: Some experiments will require additional columns for two or more dependent variables.

During the Experiment

It is very important to take very detailed notes as you conduct your experiments. In addition to your data, record your **observations** as you perform the experiment. Write down any problems that occur, anything you do that is different than planned, ideas that come to mind, or interesting occurrences. Be on the lookout for the unexpected. Your observations will be useful when you analyze your data and draw conclusions.

We suggest that you keep a laboratory notebook so that all your information is kept in one place (don't use loose-leaf notebooks, you want to make sure all your information stays together). The data that you record now will be the basis for your science fair project final report and your conclusions so capture everything in your **laboratory notebook**, including successes, failures, and accidents.

If possible, take **pictures** of your experiment along the way, these will later help you explain what you did and enhance your display for the science fair.

Remember to use numerical measurements as much as possible. If your experiment also has qualitative data (not numerical), then take a photo or draw a picture of what happens.

Be as exact as possible about the way you conduct your experiment, especially in following your experimental procedure, taking your measurements, and note taking. Failures and mistakes are part of the learning process, so don't get discouraged if things do not go as planned the first time. You should have built enough time in your schedule to allow you to repeat your test a couple of times.

In fact, it's a good idea to do a quick **preliminary run** of your experiment. Show your preliminary data to your mentor or teacher, and make revisions to your experimental procedure if necessary. Often there are glitches in the procedure that are not obvious until you actually perform your experiment--this is normal. If you need to make changes in the procedure (which often happens), write down exactly the changes you made.

Stay organized and be safe! Keep your workspace clean and organized as you conduct your experiment. Keep your supplies within reach. Use protective gear and adult supervision as needed. Keep any chemicals away from pets and younger brothers or sisters.

Sample

You can see a sample from a laboratory notebook on the Project Guide's page at www.sciencebuddies.org.

Checklist for Conducting a Science Experiment

What Makes a Good Science Experiment?	For a Good Science Experiment, You Should Answer "Yes" to Every Question
Did you take detailed notes about your observations and record them in your laboratory notebook?	Yes / No
Did you collect your data using a data table?	Yes / No
Were you consistent, careful, and accurate when you made your measurements?	Yes / No
Were you careful to insure that your controlled variables remained constant so as not to affect your results?	Yes / No
If you ran into any unexpected problems, did you adjust your experimental procedure accordingly?	Yes / No
If you are doing an engineering or programming project, have you involved some of your targeted users in the testing of your prototype?	Yes / No