

Paper Airplane Lab

(Review of Variables)

Make a paper airplane, and see how far it can fly. Throw it three or four times (without changing anything), just to get a general feel for how well it will do.

What can you change to make the plane fly farther? Pick one thing to change, and go ahead and change it (but do not throw the airplane again just yet!) The thing you changed is called the **Independent Variable**. Using the chart below, record the thing that you changed in the section marked "Independent Variable" for the first experiment.

Remember that the purpose of this experiment is to see how far you can make the plane fly. This is called the **Dependent Variable**. In an experiment, the Dependent Variable will always be the thing that you are monitoring and measuring. Using the chart, write "Flight Distance" in the section marked "Dependent Variable" for the first experiment.

Keep in mind that you only want to change one thing at a time (in other words, you only want one Independent Variable at a time), so that you know exactly what caused any observed change in the plane's flight. All of the things that you did not change are called **Constants**. They must remain constant so that you can be sure that the Independent Variable was the only thing that could possibly cause the observed change in the Dependent Variable. Using the chart, list all of the things that you kept constant in the section marked "Constants" for the first experiment. The more things you list, the better.

Once you think you have thought of everything that needs to remain constant, go ahead and throw the plane again. Throw it a few times (without any further changes), just to be sure of your observations.

	Independent Variable	Dependent Variable	Constants
1 st Experiment			
2 nd Experiment			
3 rd Experiment			

Another basic term used when designing experiments is the Control. The **Control** is the running of the experiment without any changes to the Independent Variable. The purpose of the control is to give you something to compare all other experimental trials to (for measurement purposes). A control can also be run at the same time as your other experiments, in order to determine if there are any unknown variables that might be affecting your results: if the control begins to change (even though you are not doing anything), then you know that something else must be going on.

In this particular experiment, the control was the first few flights of the plane, before you made any changes. Note that not all experiments require a control, but if a control can be used it is probably a necessity.

There is one last thing that can be done to ensure the accuracy of your results, and that is Repeated Trials. The more trials you do (the more times that you do an experiment without changing anything), the more sure you can be that the results you observe are not the product of random chance. That is why you were supposed to give the plane several flights each time.

Try a brand new experiment now, using the same Dependent Variable. In other words, come up with a new Independent Variable- perhaps one of the things from your previous list of Controls. Start over again at the beginning of this paper and follow the same procedure as before, but this time list your information in the row marked for the Second Experiment.

Repeat one more time, listing the variables in the row marked for the Third Experiment.

REVIEW

Variable: Something that is or can be changed in an experiment.

Independent Variable (also called Manipulated Variable): Variable that is changed, or manipulated, to see if there is a response.

Dependent Variable (also called Responding Variable): Variable that responds to (and is therefore dependent upon) the change that you made.

Constants: Variables that are kept from changing (so as not to confuse the results of the experiment).

Ways to make sure that your results are accurate:

Control: A second experiment which mimics the first experiment in every way, except that nothing is changed. It is performed whenever possible, so that you have something to compare to as well as in order to make sure that there weren't any unknown variables which might be affecting your results.

Repeated Trials - The more trials you do (the more times that you do an experiment without changing anything), the more sure you can be that your results are not the product of chance.