

## Review

## Scientific Method



Has 7 steps

1) Ask a **Question** (It must be **Testable**)

-Include "Which", "Do/Does", "How", "What", "Why"?

-To find an answer you must do a test and the retest

2) Make a **Hypothesis** - Write what you think you will find out, and why you think this.(or what you think the answer will be). Is there a way to test you hypothesis.

-You now have to design an experiment to test your hypothesis

3) **Design an Experiment** - what are you going to do to test your hypothesis. Here you must state the variables. (SEE NEXT PAGE)

4) **List Materials** - list all the materials that you will use in the investigation

5) **Procedure** - Carry out the investigation and make a detailed list of steps in which you followed .

6) **Results/observations** - Record what you observed when you carried out the investigation/procedures

7a) **Conclusion** - From what you observed how would you answer your original question. Was your hypothesis correct? Give reasons of why or why not.

Once you have completed the scientific method you must:

7b) -**Communicate** your results and conclusions with others

- If possible, **relate** what you have learned to the world outside the classroom.

## Variables in Science Experiments

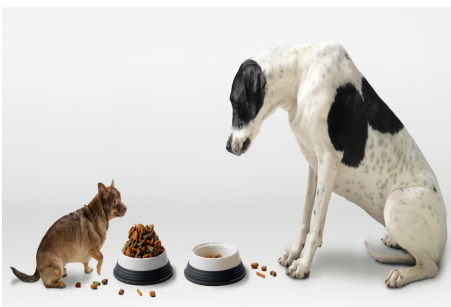
A **variable** is any factor, trait, or condition that can exist in differing amounts or types.

An experiment usually has three kinds of variables:

1) **independent**, 2) **dependent**, and 3) **controlled**.

1) **Independent variable** is the *one* that is changed by the scientist.

Why just one? Well, if you changed more than one variable it would be hard to figure out which change is causing what you observe.



For example, what if our scientific question was: "How does the size of a dog affect how much food it eats?"; then, during your feeding experiments you changed both the size of the dog and the time of day the dogs were fed. The data might get a bit confusing — did the larger dog eat less food than the smaller dog because of his size or because it was the middle of the day and dogs prefer to eat more in the morning? Sometimes it is impossible to just change one variable, and in those cases, scientists rely on more-complicated mathematical analysis and additional experiments to try to figure out what is going on.

2) **Dependent variables** are the things that the scientist focuses his or her observations on to see how they respond to the change made to the independent variable.

In our dog example, the dependent variable is how much the dogs eat. This is what we are observing and measuring. It is called the "dependent" variable because we are trying to figure out whether its value depends on the value of the independent variable. If there is a direct link between the two types of variables (independent and dependent) then you may be uncovering a cause and effect relationship. The number of dependent variables in an experiment varies, but there can be more than one.



3) **Controlled variables** are quantities that a scientist wants to remain constant, and must observe them as carefully as the dependent variables.



For example, in the dog experiment example, you would need to control how hungry the dogs are at the start of the experiment, the type of food you are feeding them, and whether the food was a type that they liked. Why? If you did not, then other explanations could be given for differences you observe in how much they eat. For instance, maybe the little dog eats more because it is hungrier that day, maybe the big dog does not like the dog food offered, or maybe all dogs will eat more wet dog food than dry dog food. So, you should keep all the other variables the same (you control them) so that you can see only the effect of the one variable (the independent variable) that you are trying to test. Similar to our example, most experiments have more than one controlled variable. Some people refer to controlled variables as "constant variables."




In the best experiments, the scientist must be able to measure the values for each variable.


Example) Weight or mass is very easy to measure.

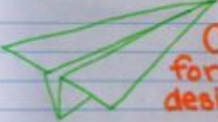
However, love cannot be measured.




# Variables

 Independent:  
size of paper

 Dependent:  
distance the plane flies

 Controlled:  
force of throw,  
design, paper type

Independent	Dependent	Controlled
<ul style="list-style-type: none"><li>· what is being tested</li><li>· the thing in an experiment that is changed</li></ul>	<ul style="list-style-type: none"><li>· result</li><li>· changes based on the independent variable</li></ul>	<ul style="list-style-type: none"><li>· things we keep the same</li></ul>



## Attachments

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Unit 1 Space Test Outline.notebook