



# TRY THIS OUT!



## DESIGN YOUR OWN EXPERIMENT

Time: variable  
Difficulty: medium

If you have a question about how the world works, you need to test it to find out the truth! Discover answers to your questions like a professional scientist.

### WHAT YOU NEED

- Pen and paper
- Online access or a library
- A question

### MAKE IT

1. Start by thinking of a question about how the world works. What are you curious about?
2. Do a little bit of research on the question you've picked. See what other scientists have found out about it before you! Make sure to keep track of all the sources you used.
3. Think about an experiment you could do to test your question. Write down your *procedure*, which is the steps needed to do your experiment. Make a materials list as well. Somebody should be able to read your material list and procedure and be able to do the experiment exactly like you.
4. Write down your *independent* and *dependent* variables. The independent variable is whatever you are changing. The dependent variable is what you are measuring or observing, and is something that depends on the independent variable. For example, if you're measuring the effect that different sunlight levels have on plant growth, the sunlight levels would be your independent variable and the height of the plants would be your dependent variable.
5. Identify your *control* variables. Controls are anything that you are going to keep consistent throughout the whole experiment, as to not interfere with the data. For example, you would keep the type of plant, the age of the plant, the soil type, and the amount of water you give them consistent.
6. Using the information you've researched, develop and write a *hypothesis*. A hypothesis is a type of specific prediction as to what is going to happen. What results are you expecting from your experiment? Why?

### TEST IT

Perform your experiment and record your results. Ask yourself what your results mean. This step is called *analysis*. After your analysis, write down your conclusion as to whether or not your hypothesis was right. How did the results you collected support or disprove it? How do you know?

### EXPLAIN IT

The scientific method is what makes science, science! All good scientists follow this standardized method because it makes your experiment more objective. It's easy for anyone—even the best scientists—to bring their own bias and beliefs into an experiment, and not get the right results because of it. This standardized method minimizes the chance of this happening.





# TRY THIS OUT!



## DESIGN YOUR OWN EXPERIMENT

### OBSERVE IT

Professional scientists use this exact process when designing their own experiments. Although it becomes much more complex as the question becomes more challenging to measure, every scientific breakthrough was made using this method.

### GO FURTHER

One of the most crucial steps in the scientific process for professional science is *peer review*, which happens before the scientist is allowed to publish their results. When a scientist writes up a report on an experiment they performed, it's required that other scientists read their work to make sure that their experiment was fair and that the results are valid.

Have a friend read over your report. Do they see anything wrong with your experiment that you may have missed? If so, you should repeat your experiment. Did the results change?