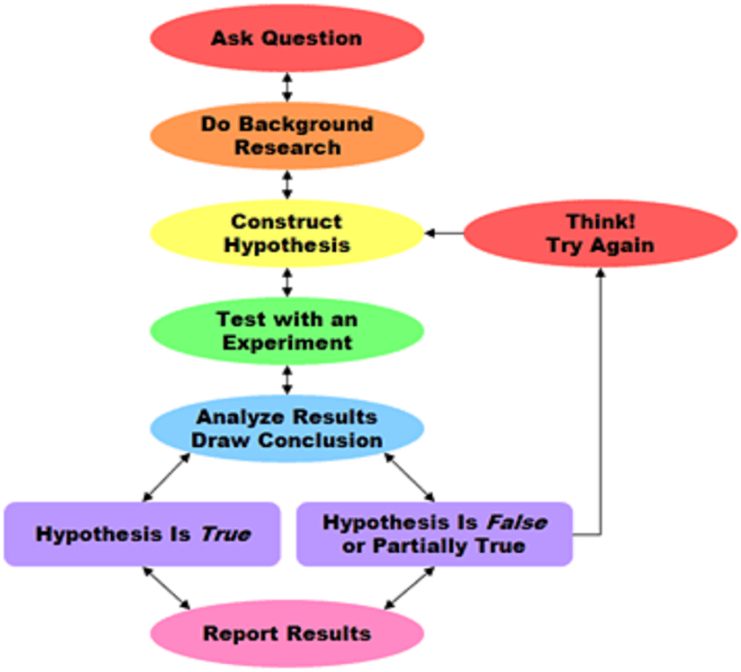
Conduct an experiment using the

Scientific Method



Grades 5 & 6
Standard: Supplementary

The scientific method is a formula used to answer questions about **phenomena** that happen in our world. Most often, when we talk about the scientific method, we talk about how it is used to conduct scientific experiments. However, we often don't realize that we almost constantly use the scientific method in our daily lives. Anytime we ask a question and try to form the answer to it, we are using the scientific method, or we are at least using stages of it.
Let's practice using it with a personalized activity. Create your own question, hypothesis, and experiment to learn about the scientific method and how it helps us understand our world.

1) Brainstorm a few **questions** you don't have answers to. They can be almost anything. For example: "Where do colors come from?" This is the first stage of the scientific method, known as **observation.** *Note: some questions may be easier to perform experiments on than others, so make sure to come up with several questions in case one doesn't work so well.*
2) Examine your questions and choose one that you think you are able to experiment with given the **resources** (materials, people, access to information) you have available to you.

3) Conduct background **research** on the subject of your question. This can be on the internet, in books, or even from observing the subject of your question. This stage involves finding facts. For example: "We don't see colors when there is no light."
4) Once you have conducted research, come up with a possible explanation for your question. In other words, form a **hypothesis**. Hypotheses are statements that can be tested. They are also not proven to be true. For example, I hypothesize that "color is affected by light," but I don't know if that's true yet, because I haven't done my experiment.
5) Test your hypothesis with an **experiment**. Following the color example, I might color some squares of paper with markers, bring them next to a window, and take pictures of the colored squares in that light. Then I will do the same thing with the same camera on the same settings, but I will put the squares in a corner of the room that appears darker and has no windows. *Note: Experiments need to have a dependent variable and an independent variable. Only the independent variable changes. Everything else must remain the same.*
    a. **Dependent variable**: something that is being affected by the experiment. In my example, the dependent variable is the colored squares.
    b. **Independent variable**: something that the experimenter controls and changes to get different outcomes from the dependent variable. My example's independent variable is the amount of light on my colored squares.
6) Once you've finished your experiment, **analyze** or study your results. Does your experiment explain your hypothesis?
    a. If so, then there is reason to believe your hypothesis is correct. In my experiment, I compare the photos and notice that the squares look more vibrant in the brighter light next to the window than they do in the darker corner of the room with no windows. This would indicate that my hypothesis is probably correct—Color is affected by light.
    b. If your experiment turned up the opposite or different results than you expected, your hypothesis is probably incorrect. You can either move on to step 7, or you can continue to rethink your hypothesis and try a new experiment.
7) Write a report on your experiment. Describe every part of the process. What was your question? What facts did you find about your subject? What was your experiment, and how did you run it? What are your conclusions?

Important:

You have probably heard the word theory before. A scientific **theory** is a hypothesis that has been scientifically accepted. We do not know that theories are true for certain, but we can say that they are very likely to be true. Why? Because theories come from experimentation performed many times by many different people. Hypotheses must be tested numerous times in the same or very similar ways in order for a theory to be acceptable. It is also important that many different scientists test the hypotheses because one scientist may have knowledge or experiences that another does not. By gaining "the wisdom of the crowd," a hypothesis can be

considered even more likely to be true. Therefore, our experiments have not created theories. We have merely tested hypotheses and found them to be likely true or likely not true.