

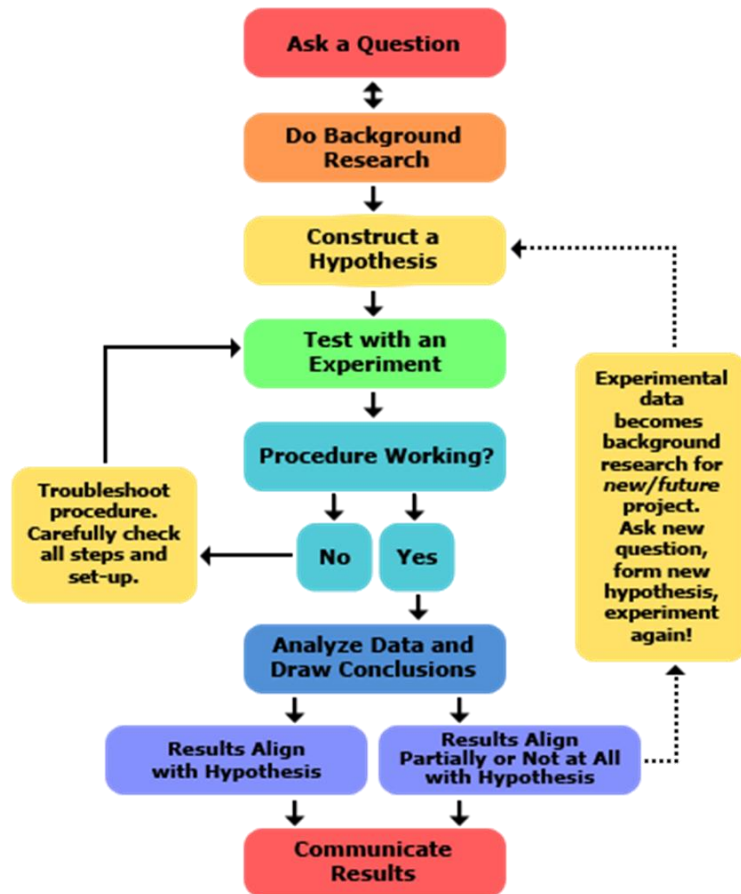
### Abstract:

The purpose of this enrichment opportunity is to give returning students the opportunity to get a head start for next school year's Science Day Exhibition. Science Day is a Fall, semester long project where students are tasked with working in a group or by themselves on a project which utilizes the scientific method. Sometimes, the most challenging part is coming up with a good project idea. This Summer, I am tasking students to brainstorm ideas by using the following guidelines below. Please note, that any work done over Summer is entirely optional, but extremely advantageous, as it is a mandatory project for all Middle School students in Fall.

### Instructions:

1. The flow chart on the next page reflects the process of the scientific method. The first step, is always **asking a good, scientific question**. Use the following guidelines below to develop one.
  - a. **Pick a topic you are interested in!** Science is an incredibly broad field of study and you can turn almost any hobby or passion into a science experiment. This will increase the enjoyment you will get from designing your project.
  - b. **Consider your variables.** A question is not ready to be tested unless you can clearly define your variables. There are three variables to consider listed and defined on the next page.
  - c. Here are some examples of questions from last year's Science Day.
    - i. Does the color of light a plant receives affect that rate at which that plant grows? If so, which color of light allows a plant to grow fastest?
    - ii. Do children fail to determine the difference between medicine and similar looking candies and if so, what age groups fail?
2. **Begin research.** The second step of the scientific method is to do background research. Use evidence from other, similar experiments to support and design your own.
  - a. **Make sure your source is reliable!** We live in a world with an oversaturation of information, some of it inaccurate. To ensure that your research is viable, ask yourself the following questions.
    - i. **Who wrote it?** Who is your author and are they qualified and unbiased enough to be taken for fact? Are they peer reviewed?
    - ii. **What type of website is it (only applicable for web sources)?** Did you get information from a website that is trying to sell something? Do they have a financial or political agenda? Is it a .gov, .edu, .org, .com, etc...?
    - iii. **Is your source education focused?** Is the primary effort of your source to educate people?
  - b. **Build from what other people have discovered.** A goal of science is to continue building from the works of others. Maybe other people have done similar experiments to the one you have in mind. It is worth looking at what other people have done so perhaps you can avoid mistakes that they made or make improvements that they might help suggest.

## Resources:



**Control Variable:** A value that is kept constant throughout the experiment so that your results can be compared back to something.

**Manipulated Variable:** A value that is being tested and changed throughout the experiment. Sometimes called the independent variable.

**Measured Variable:** A value that is measured in order to mark change in the manipulated variable. In other words, what unit of measurement are you using to evaluate your controlled and manipulated variables.

## Websites:

<https://www.sciencebuddies.org/>

<https://sites.google.com/a/kansassciencefair.com/kansas-state-science-and-engineering-fair/>

## Notes:

This enrichment opportunity is solely focused on the first two steps of the Scientific Method. I do not recommend that students work beyond that point as additional instruction will be given once the school year has begun. I will readily be responding to emails over the Summer, so please send any questions to [ksimons@topeka.collegiate.org](mailto:ksimons@topeka.collegiate.org).