



Creating a Successful Science Project Using the Scientific Method



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The Scientific Method

QUESTION

RESEARCH

HYPOTHESIZE

PREPARE

EXPERIMENT

COLLECT DATA

CONCLUDE

celebrate !

Step 1 ~ Ask a Question

You like to garden, and notice that some tomatoes are bigger than others and wonder why. Because of this personal experience and an interest in the problem, you decide to learn more about what makes plants grow.

Example of a “Question” ~ *Does the amount of sunlight a tomato plant receives effect the size of the tomatoes?*

Step 2 – Conduct Background Research

- Conduct research on the problem/question you have chosen using:
 - Internet, books, your own experiences, etc.
 - Important to use as many sources as you can find

Example: *Photosynthesis is the process in which plants utilize sunlight to make their own food.*

Step 3 – Construct a “Hypothesis”

- Defined as *“a possible solution to the problem”*
- A simple statement that defines what you think the outcome of your experiment will be
- Does not have to be correct!

Example of a “Hypothesis”:

I believe that the more sunlight a tomato plant receives, the larger the tomatoes will grow because plants use sunlight for the process of photosynthesis, which makes food. The more food they can make, the larger the tomatoes.

Step 4 – Experiment/Procedure

- How will you test your hypothesis to see if it is true or false?
- The experiment that you design is done to test the hypothesis
- Important! Once you develop a hypothesis and experiment, you shouldn't change it, even if the results of your experiment show that you are wrong!
- The “Experiment” is the most important part of the scientific method
- You must list the steps you took in conducting your experiment
- Remember to conduct at least three trials to be sure your results are accurate and not skewed due to an unforeseen variable (i.e. multiple tomato plants should be set up in various locations)
- Also, remember to take pictures throughout the experiment phase of your project

Materials

- 6 Tomato Plants
- Water
- Sunlight
- Ruler
- Scale

Constants & Variables

- The constant is the part of the experiment that never changes (stays the same) throughout the experiment
- The variable is what changes (what is experimented on)

Example:

One tomato plant will be left in partial sun (constant).

The other plant will be placed in a location where it receives full sun (variable). Any different action to one of the plants from the original would be considered the variable.

Step 5 ~ Analyze Your Data and Form a Conclusion

- This is a written summary of the experiment's results, and how those results match up to your hypothesis
- If your results support your hypothesis, then be sure to indicate that. If they do not, then don't change the hypothesis. Instead, try to explain why your hypothesis might have been show to be false

Example: What information did you not have prior to the experiment that caused your hypothesis to be incorrect? What are the reasons the hypothesis and experimental results didn't match up?

Final Thoughts/Tips

- A cardboard project board is sturdy, stands on it's own and provides enough space to display all of the pertinent information
- Be colorful and creative
- Include charts, photographs, etc.
- Be sure to “guide” your child and be careful not to do “too much”
- Have fun!