

STEMIST SCIENCE FAIR

HOW TO SET UP YOUR PROJECT



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Introduction

Do you have what it takes to win the STEMist science fair? We want to help you succeed! In order to have a successful science project, you must understand the scientific method. The scientific method is a process for experimentation that is used by scientists to explore observation and answer questions. For more information, watch the instructional video before beginning:

<https://youtu.be/CuV71MIOiZ4>

Scientific Method:

- Make an Observation
- Identify a Problem
- Form a Hypothesis
- Experiment
- Gather Data
- Come to a Conclusion
- Communicate Results

Let's Get Started!

For the STEMist science fair, you are going to dig a little deeper into each of the categories of the scientific method. Follow the project checklist on page 2 as a reference while you complete your project!

Tip!

Keep a journal throughout the process of your project to take notes of your observations, data, thoughts and more! This will come in handy when its time to write your report!

Need a Topic?

Coming up with a topic for your science fair project can be the hardest part of the entire process! Think of a subject that interest you and research projects that you can do. Some examples of good science fair projects include, but are not limited to:

- Shiny Pennies
 - Which substance cleans pennies the best?
- Egg Drop
 - What material can save an egg from breaking when dropped.
- Paper Towels
 - Which paper towel brand is most absorbant?
- Paper Airplanes
 - Which method of folding a paper airplane makes it fly the furthest?
- Fruit Battery
 - What kind of fruit could be used to power a battery?



Want Some More Help?

If you want to learn more about the scientific method, check out these videos by NASA! <https://tinyurl.com/NASA-VIDEOS-SM>

If you have additional questions, you can submit them on the Microsoft Form linked to the right or email ok4hsteam@okstate.edu

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Project Checklist:

- ◇ **Make Initial Observation**
 - Find an interesting topic that you want to investigate in more detail.
- ◇ **Identify a Problem and Write Problem Statement**
 - Come up with a question about the topic you want answered.
 - The question should be testable, meaning it should lead to an experiment where something is changed and the result is measured.
- ◇ **Research**
 - Use the internet, library, knowledgeable friends/family to conduct research on your topic.
 - Keep track of all the sources of information you gather.
- ◇ **Give the Project a Title**
 - Find a title that describes what you are investigating
 - Be creative and ensure the title summarizes the project.
- ◇ **Form a Hypothesis**
 - The hypothesis should be an educated guess or prediction for the answer to your problem statement.
 - The statement should be worded so it can be tested by an experiment.
 - The hypothesis should be written in a "if-then-because" format.
- ◇ **Identify the Variables**
 - Every experiment should have the following variables/groups. If you are unable to identify all the variables for your experiment, you need to reevaluate your plan for the experiment.
 - Independent Variable: the factor you will change on purpose during the experiment to find out what effect it has on something else.
 - Dependent Variable: the factor that will be observed and measured to see if it is affected by the change made by the independent variable.
 - Constant Variables: the factors in an experiment that must be kept the exact same to ensure they are not having any effect on the dependent variable. (there should be multiple constant variables)
 - Control Group: the group in the experiment that undergoes zero changes. This allows a benchmark to measure the changes other groups experience.
- ◇ **Create Materials List**
 - Be specific, give amounts and sizes, use proper measurements.
- ◇ **Form Procedure List**
 - Create a detailed, step-by-step set of directions for how to conduct the experiment.
 - Explain exact amounts, time it will take, etc.
 - It is important to be detailed so that anyone can conduct the experiment based off of your project and can follow the exact same steps as you.
- ◇ **Perform the Experiment**
 - Conduct the experiment and record all data as you go.
- ◇ **Final Observations**
 - Record observations as you go by writing them down and taking pictures as possible.
 - Observations will be valuable when drawing conclusions.
- ◇ **Perform Calculations**
 - If your data requires it, perform calculations to turn your raw data into numbers that can be placed on a graph/chart.
 - Pick the best graph/chart to best represent your data.
- ◇ **Summarize Results**
 - The purpose of the results is to explain the data you obtained. Your results summary should be at least a paragraph and can include pictures and diagrams.
- ◇ **Come to Conclusion**
 - Use the trends in your experimental data and observations to answer your original problem statement. Pull together what happened and assess the experiment you conducted.
 - The conclusion should start with a single statement that directly parallels the hypothesis.
- ◇ **Prepare Presentation**
 - Complete your report and presentation board
 - Practice, practice, practice!

