



Science Fair Handbook:

A Resource for Teachers, Parents, and Students

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1. General Information and Expectations

The Ben Franklin Academy Science Fair is a hands-on learning experience for 3rd and 5th grade students. Students in 3rd grade and 5th grade will complete individual science experiments with some work being done at school (i.e. Science Lab) and *the majority of the work will be done at home*. Students will design and conduct their own experiments and then create a tri-fold poster to present their findings. The BFA Science Fair is a **non-competitive** event.

For the BFA Science Fair, students will present their project with a parent volunteer judge about their project and answer questions. They will be expected to demonstrate a basic understanding of the subject.

This event is a learning opportunity for students; therefore parents are invited to provide guidance and supervision when necessary. Please help your child find a project that is personally interesting to him or her. Help plan a schedule so that the project can be completed by the deadline. Also, please resist the temptation to control their project or do the work for them. Learning happens through the process and through feedback from the presentation!

2. Contacts

Please contact your student's science teacher for questions about projects. Lauren Flint, the Elementary Science Lab Teacher, can also [answer](#) questions about the presentation. The STEM Coordinator, Kyle Nolting, is also a resource and can be [contacted](#).



3. Experimental Projects and Examples

Example of an Experimental Project: **Watching Marigolds Grow**

Purpose/Question	In which type of medium (soil, sand etc.) will marigolds grow best?
Background Information/Research	Several different soils and media are available for growing plants. Some are rich in nutrients, some let water drain quickly through them, and some are light and fluffy.
Hypothesis	If I change the type of media I grow marigolds in, then I hypothesize that marigolds will grow best in store-bought potting soil because that is what is most commonly used.
Experimental Procedure/Methods	We purchased 5 marigold plants as close in size as possible (size is a control variable), rinsed the roots, and repotted in 5 different media: the soil it came in, sand, vermiculite, topsoil from our garden, and store-bought potting soil. Water, sunlight, and temperature were the same for all 5 plants over a 6 week period (these are all control variables). Plant fullness, height, leaf color, and blossoms were measured.
Independent Variable	Planting media.
Dependent Variable	Plant fullness, height, leaf color, and blossoms.
Control Sample	A marigold in the soil it came in.
Experimental Samples	A marigold in the sand. A marigold in vermiculite. A marigold in topsoil from the garden. A marigold in store-bought potting soil.
Results	The marigold in the potting soil was fuller and taller, the leaves were darker green, and it had more blossoms. (The actual measurements and photos should be displayed.)
Conclusion	My hypothesis was correct. The store-bought potting soil was best for growing marigolds. Maybe this is because it contains a mixture of different media that provide nutrients and good drainage. My experiment is important because it will help us to choose good soil for planting flowers this Spring.



4. Rules

Student safety is always a top priority. Anything deemed to pose a danger will be disallowed (e.g., certain lasers or other very bright light sources, anything capable of producing dangerous noise levels, etc.). *Parent judgment needs to be exercised where appropriate.*

- Projects involving live animals, fish, insects, etc. must be pre-approved by a teacher and closely monitored by a parent to ensure that organisms are treated ethically. Your project should not cause them unnecessary stress or harm.
- Projects MAY NOT include the use of dangerous chemicals, extreme temperatures, high voltage, explosives, or open flames.
- Volcanoes are not allowed.
- Students that bring in display items in addition to their board, do so at their own risk.
- BFA and the Science Fair volunteers assume no responsibility for loss or damage to board or display items.



5. Displaying Your Project/The Board

Your display must be free-standing and **your space is limited to 3 feet in width by 2-1/2 feet in depth**. Tables will be provided. Tri-fold presentation boards (size 36 x 48 are preferred) can be purchased at Hobby Lobby, Michaels, Office Max, or Office Depot for \$5-\$10.

Displays should include:

- Title of your project
- Name, grade, and teacher
- Purpose or question you are answering
- Background information (research)
- Sources of information or bibliography
- Hypothesis (what you initially thought the answer might be based on your research)
- Variables (independent, dependent, and control)
- Materials and Procedures (explain how you did the experiment)
- Analysis of your results (your measurements and observations, charts and graphs)
- Conclusion
- Acknowledgments (optional)

Below is an example of how to lay out your board. We recommend using a font size greater than 20.

Question/Purpose	Title	Results Data Table/Graphs/Pictures
	Name, Grade, Teacher	
Background Information	Hypothesis	Conclusion
	Variables	
Sources	Materials	
	Procedure	



6. The Scientific Method

The Scientific Method is a tool scientists use to find answers to questions. The tool involves the following steps:

1. Ask a Question/Identify a Problem
2. Research the Question/Problem
3. Identify the Variables
 - a. Independent Variable
 - b. Dependent Variable
 - c. Control Variable
4. Form a Hypothesis (“I predict if ____, then ____ will happen because ____.”)
5. Test the Hypothesis
6. Record your data or results
7. Make a Conclusion

Still need more information? Go to [Science Buddies](#) for more in depth information on the steps of the scientific methods.



7. Examples of Project Ideas

- Does adding salt to water change the temperature at which it boils?
- The effect of temperature on how long a soap bubble lasts
- The effect of different light intensities on the growth of sunflower plants
- The effect of light on the growth of bread molds
- The effect of acid rain on the growth of plants
- The effect of acid rain on the germination of apple seeds
- Using black walnut juice and marigolds to prevent weeds in your garden
- The effect of sugar water on the survival of cut flower stems
- The effect of salt on the growth of bean plants
- Hummingbird color preferences at feeders
- Bird feed consumption at different colored bird feeders
- Bacterial growth in apple juice and apple cider
- Can magnesium affect seed germination?
- Will acid rain affect the cell structure of spirogyra algae?
- The effect of surface area on burn time
- Does the life of a light bulb depend on its wattage?
- The effect of wire coils on the strength of an electromagnet
- Packaging eggs and shock resistance
- The effect of friction on velocity
- The effect of temperature on golf ball performance
- The effect of temperature on the rate of water absorption in cut carnations
- The effect of the color of light on the growth of sunflowers
- How changes in gravitropic responses affect plants
- A comparison of the heat-conducting abilities of different metals
- The effect of paper airplane design on flight distance and flight time



8. Websites for Additional Information

All Science Fair Projects

With complete instructions

<http://www.all-science-fair-projects.com>

Science Buddies

Topic selection wizard, How-To Guide, many ideas

http://www.sciencebuddies.org/science-fair-projects/project_ideas.shtml

Science Fair Projects and Experiments

Hundreds of topics and ideas

<http://www.juliantrubin.com/fairprojects.html>

CuriOdyssey Science Fair

Idea resources by topic

<https://curiodyssey.org/learn-explore/science-experiments-for-kids/>

Colorado Regional Science Fair

Top Middle School projects will compete at Regionals

<https://csef.natsci.colostate.edu/regional-science-fairs/>

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