



BHEA Science Fair Guide

Purpose

The purpose of the BHEA Science Fair is to promote a positive, competitive environment in which participants demonstrate their understanding of the Scientific Method through written and verbal presentation of their projects.

So What is the Scientific Method?

The Scientific Method is a specific approach used for asking and answering questions to science problems. Students participating in the BHEA Science Fair are expected to follow the Scientific Method while conducting their experiments. The steps for the Scientific Method are explained below and each step should be recorded in a notebook.

Ask a question: The first step is to ask a question that can be answered through research, observation and testing. When posing your question keep it as specific as possible.

Do background research: Collect information, experience, and data related to your topic. Use reliable resources. These include books, magazines, professional journals, newspapers, interviews with professionals in the field, and the Internet (but confirm the source). Properly quote and cite all sources.

Construct a hypothesis: Based on the information that you've collected and observations you've made on your own, come up with a solution or an educated guess for the answer to your question. Pose this statement in an "If/then" form.

Design and perform your experiment: Design an experiment to test your hypothesis. The design should include how the experiment will be performed, what variables are involved, which variables will change, and what materials will be needed to conduct the experiment. When the design is complete, gather your materials and perform the experiment.

Collect data: Record the results of the experiment. These are observations, measurements, or results of any kind that you've gathered during your experiment. Put them in a readable format for easier interpretation (i.e., charts, graphs, diagrams, pictures, tables, etc.).

Interpret the results: Determine whether or not the experiment supported your hypothesis.

Draw a conclusion: Draw a conclusion from the data about the success of the experiment.

Getting Started - Things to Keep in Mind

The First Step

The first step to participating in the Science Fair is to choose a topic. Here are a few suggestions to get started.

Consider one of your hobbies or an area of science that interests you and ask yourself the following questions:

- What do you wonder about that particular hobby or area of science?
- What would you like to know more about?
- Have you ever thought “It would be interesting if ...” or “What would happen if ...” ?
- What do you already know about this topic?

Look in books with science experiments for ideas.

Research science fair project ideas on the Internet. There are several websites that are devoted to providing ideas for science fair projects.

Investigations vs. Demonstrations

Please keep in mind that you must present an investigation in order to be considered for judging at the BHEA Science Fair. Demonstrations will be accepted at the science fair, but will not be judged.

- An **investigation** is a project that uses the Scientific Method to answer a question.
- A **demonstration** does not answer a question but merely shows a scientific principle (i.e., Bernoulli’s Law). With a little thought, a demonstration can be modified to become an investigation.

Prohibited

When choosing a topic for the BHEA Science Fair, please use common sense. Above all, safety is our number one concern for all involved. Therefore the following topics will **NOT** be allowed at the BHEA Science Fair:

- Projects causing harm of any kind (physical, psychological, emotional) to humans or animals. Behavioral studies in which the subject is observed in their natural environment will be accepted as long as it is an investigation (i.e., changing a light source, heat source, food source, etc.). Pictures and explanations only will be allowed at the fair.
- Projects involving explosive, toxic, poisonous or hazardous chemicals or substances. Please keep in mind that even mild household chemicals can be harmful if combined. Read all labels

and operate under adult supervision.

- Projects involving explosive or hazardous devices. Rocketry experiments are the exception but only under strict adult supervision. Pictures and explanations only will be allowed at the fair.
- Projects involving poisonous or toxic plants of any sort.

Conducting Your Work - Who's Responsible for What?

Part of the purpose for hosting the BHEA Science Fair is for students to “demonstrate their understanding of the Scientific Method.” To this end, it is important that the student have primary responsibility for conducting and completing their projects. Therefore, please observe the following guidelines while working with your student.

Student Responsibilities

- Decide on the topic and develop the hypothesis.
- Conduct the research and properly cite all sources.
- Design and conduct the experiment.
- Gather data and report conclusions.
- Present the information on a display board.
- Keep a notebook with dates and notes on your progress.

Teacher/Parent Responsibilities

- Keep your student informed of deadlines and help them meet them.
- Ask questions to help the student further refine or develop their topic.
- Provide information on how to write reports and bibliographies (grade dependent).
- Act as a resource, but do not do the work.
- Assist in getting supplies and materials needed by the student to complete their project.
- Ensure student safety.

Presenting Your Work - Student Guidelines

Your Display Area

At a minimum, your display area should contain a display board and a notebook. Middle School and High School students' display areas should also contain their report. If possible, all display sections should be typed. Parents may provide typing assistance for students that are unable to type for themselves. Please minimize “corrections” so that the student's original work is preserved.

Your Display Board

Please use a free standing tri-fold display board to display your work. Table space will be limited so we recommend that you ***use a standard size tri-fold display board (roughly 35.5" x 46")***. Your display, when standing, should not exceed 48 inches wide by 18 inches deep. Wall space will ***not*** be available for hanging posters or pictures of any sort. Please make sure that all your work is presented in such a way that it fits on your display board or on the table in front of your display without spilling into another student's display space or off the table.

All Students: All students' display boards should include the following elements: title, purpose/question, hypothesis, research and bibliography, procedures, materials, data, results and conclusion. Your notebook needs to be on the table in front of your display. Students' names should not be visible anywhere on the display.

Middle School and High School Students: In addition to the above elements, Middle and High School students' display boards should include an abstract and either a future considerations or an application section. Notebooks and written reports should also be included on the table in front of their display. Students' names should not be visible anywhere on the display.

The example layout below shows the elements that need to be included on the display board. This should serve only as a guideline of what needs to be on the board, not as a directive for how it should be laid out. Please use creativity and imagination. Remember that you are competing against other students, so you'll want your work to stand out.

Purpose	Title	Results
Hypothesis	Procedure & Materials	Conclusion
Research & Bibliography	Data	Future Considerations or Application (if required)
Abstract (if required)		

Please see the "Student Checklist" for a listing of items that need to be included with your display.

Your Notebook

All students are required to maintain a notebook recording their progress. All students that can record their own work should. Younger students may require some assistance. This is acceptable as long as the narration and intention of the student is preserved.

Your Report

If you are in Middle School or High School, you will need to include a report with your display. Middle School and High School students' reports should include the student's name, title, posed question, hypothesis, research and bibliography, description of the experiment and materials used, the data, an analysis of the results, and a conclusion. The report should be clearly written and within the student's ability level.

What Can and Cannot Come to the Fair? - Exhibit Guidelines

Display Boards and Areas

The following display guidelines should be observed by each participant:

- All displays should be free standing so please test your display before bringing it to the fair.
- Space is limited. We recommend a standard size tri-fold board (roughly 35.5" x 46") be used. The display board cannot exceed 48 inches wide by 18 inches deep when set up. Please measure it before you bring it.
- All posters, charts, data presentation methods, etc. must be attached to the display board.
- No part of the display should be attached to the wall, table, floor, etc. Again, please put your display to the test before bringing it to the fair.
- Pictures taken by the participant are acceptable but should not show any faces. Copyrighted pictures are not acceptable unless written permission has been obtained.
- Students' names should not be visible anywhere on the display board, data logbook, or final report.

Safety Guidelines - PROHIBITED at the Fair

Once again, safety of all involved is our utmost concern. Anything which could be hazardous is PROHIBITED at the fair.

- No live creatures - plants, animals or other living organisms. Please take pictures and display these instead.
- No preserved vertebrate animals or parts (including embryos and teeth).
- No food of any sort. Again, pictures and explanations are acceptable.
- No liquids or chemicals of any sort.
- No hazardous, toxic, explosive or poisonous substances or devices.
- No sharp items.
- No flames or anything highly flammable.
- No glass or glass objects.
- No open soil samples.

What CAN Come to the Fair

We want all participants to have a positive experience at the BHEA Science Fair. After observing the above rules, you are more than welcome to bring anything that will enhance your display. Please remember that it must fit in your display area though.

Entry Categories and Prizes

Entry categories and prizes are based on grade level and whether the project is submitted by an individual or a team. Below are the entry categories and corresponding prize assignments. Please note that we are in the process of assessing the feasibility of giving prizes similar to those given by Tate's School of Discovery.

Entry Category	Grade Level	Prize
Individual	K - 2 nd early elementary non-competitive	Participation Bag
Individual	3 rd - 5 th late elementary competitive	1 st place - TBA, medal 2 nd place - TBA, medal 3 rd place - TBA, medal All others - Certificate of Participation
Individual	6 th - 8 th middle school competitive	1 st place - TBA, medal 2 nd place - TBA, medal 3 rd place - TBA, medal All others - Certificate of Participation
Individual	9 th - 12 th high school competitive	1 st place - TBA, medal 2 nd place - TBA, medal 3 rd place - TBA, medal All others - Certificate of Participation
Team	Maximum of three members Members can be from any grade level	Not eligible for prizes Will receive Certificates of Participation

Advancement

Winners from the elementary division will be eligible to advance to Tate's School Regional Science Fair. For more information, please visit their website at: <http://www.tatesschool.com/ScienceFair>. Winners from the Middle School and High School divisions will be eligible for advancement to the Southern Appalachian Science and Engineering Fair. For more information, please visit their website at: <http://www.sasef.com>.

Deadlines and Important Dates

Prior Approval

All BHEA Science Fair projects must have prior approval by the Science Fair Committee. Please fill out and submit the “Project Approval Form” before beginning work. “Project Approval Forms” can be sent to BHEA Science Fair Committee, 5811 Hutton Ridge Rd., Maryville, TN 37801. The “Project Approval Form” is due no later than November 1, 2011 but can be submitted earlier. Changes cannot be made once a project has been approved.

There is a \$12.00 participation fee for BHEA members and a \$15.00 participation fee for non-BHEA members. These fees will cover facility rental costs, supplies, and awards. This should be submitted with your “Project Approval Form”. The fee will guarantee your spot at the Science Fair. The fee is refundable through December 1, 2011 and non-refundable after that.

General Timeline

The following is a general timeline for successfully completing projects if you are not participating in one of the Monday Fun Science Fair classes. If you are participating in a Monday Fun Science Fair class, please see the respective teacher for project deadlines.

Remaining of October	Decide on a Science Fair Topic and submit your “Project Approval Form”
Nov. 1 st	Final date to submit your “Project Approval Form”
Nov. 1 st - Nov. 8 th	Committee Review and approval
Nov. 9 th - Nov. 22 nd	Research your topic, write the Bibliography, and develop a Hypothesis
Nov. 23 rd - Dec. 7 th	Design your experiment or procedure and gather materials
Dec. 7 th - Jan. 8 th	Conduct your experiment, record your results and draw conclusions
Jan. 9 th - Jan. 21 st	Write your results, finalize your notebook, design and set up your display board
Jan. 22 nd - Jan. 27 th	Review “Student Checklist” to make sure you have everything you need for the fair
January 28 th	SCIENCE FAIR HAS ARRIVED!!



BHEA Science Fair Student Checklist

Required Elements for your Display Board

- _____ Title
- _____ Purpose or Problem Statement (the original question)
- _____ Hypothesis
- _____ Research and Bibliography
- _____ Procedure
- _____ Materials List (The “Materials List” section can be combined with the “Procedure” section but should be clearly labeled, ie “Procedure and Materials List” or something similar.)
- _____ Data (include charts, graphs, tables, pictures)
- _____ Results (The “Data” and “Results” sections can be combined but should be clearly labeled.)
- _____ Conclusion
- _____ Future Considerations or Applications (Middle School and High School Students Only)
- _____ Abstract (High School Students Only)

Required Elements for your Display Table

- _____ Notebook
- _____ Report (Middle School and High School Students Only)

NOTE: Please see the BHEA Science Fair Guidelines for what can and cannot be displayed at the fair.

The example layout below shows the elements that need to be included on the display board. This should serve only as a guideline of what needs to be on the board, not as a directive for how it should be laid out. Please use creativity and imagination. Remember that you are competing against other students, so you’ll want your work to stand out.

Purpose	Title	Results
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Research & Bibliography	Data	Future Considerations or Application (if required)
Abstract (if required)		

Number: _____ Color: _____



BHEA Science Fair Project Approval Form

Name: _____ Date: _____ Grade: _____

Address/City/State/Zip: _____

Project Title: _____

Hypothesis: _____

Will you require electricity? yes _____ no _____

Committee Use Only

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Comments/Questions: _____

Approved By: _____

Date: _____