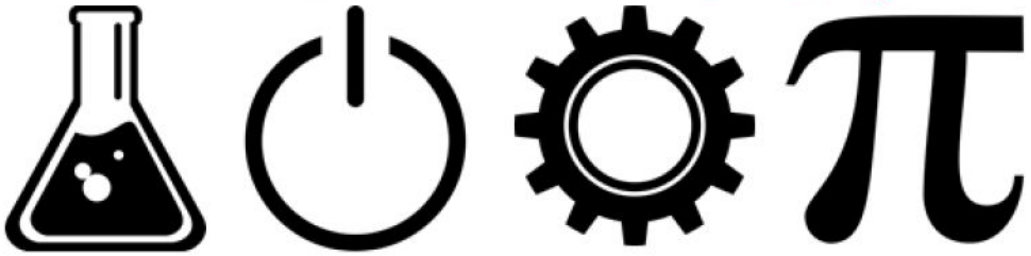
FOREST HEIGHTS

STEM

ACADEMY



STEM Fair Packet

6th-8th Grade

2018-2019

Check Point Dates

Date	Activity Description
September 5	Parent Information Night 5:30-6:30 Cafeteria
September 18	Student Help Session #1 2:45-3:45 Room 428
September 27	Research Checkpoint
October 9	Student Help Session #2 2:45-3:45 Room 428
October 11	Experimental Procedure or Plan Checkpoint
October 18	Log Book Checkpoint
October 23	Student Help Session #3 2:45-3:45 Room 428
October 25	Logbook/Progress Checkpoint #2
November 6	Student Help Session #4 2:45-3:45 Room 428
November 8	Experiment/Plan Checkpoint
November 13	Student Help Session #5 2:45-3:45 Room 428
November 15	Rough Draft Checkpoint
November 29	Final Report Due
January 10	Display Board Due
January 15-18	Science Fair Judging*
January 24	Science Fair Award*

*Please note the dates are subject to change based on the weather

Guidelines and Parental involvement

Science Fair Project Guidelines

These guidelines are designed to ensure the safety of our science fair participants and the viewing public. Science fair project proposals will be reviewed for compliance with these guides.

1. Science fair projects many not include inhumane treatment of people or animals.
2. No living organisms except plants will be exhibited at the fair. Display of foods, mood, bacteria, microorganisms or any other type of cultured growth is not permitted, so pictures on the display board are required.
3. Anything that could be harmful to the public or that is prohibited on school property cannot be exhibited at the fair. This includes harmful chemicals, caustics, acids, poisons, explosives, open flames, combustible materials, and sharp items (knives, pins, hypodermic needles).
4. Models or photographs can be used instead of things that are restricted from display.
5. There will be space for each exhibitor to have a display board and a small amount of table space in front of the display board. No running water or electricity will be available. If you are interested in developing a project that involves electricity, you may choose to use batteries.
6. Projects should be developed, carried out, and exhibited by students with minimal help from parents.

Helping your children with their science fair projects

Things you may do:

1. Give encouragement, support, and guidance. (Be positive)
2. Make sure your child feels it is his or her project. Make sure the project is primarily the work of the child.
3. Realize that the main purpose if the science fair project is to help your child use and strengthen the basic skills he/she has learned and to develop higher level skills.
4. Realize your child will need help understanding, acquiring, and using the major science process skills.
5. Help your child design a safe project that is not hazardous in any way.
6. Provide transportation to places such as libraries, nature centers, universities, etc. that can help find project information.
7. Help your child write letters to people who can help on the science project and be sure the letter is mailed.
8. Help your child develop the necessary technical skills and /or help the child do the technical work such as building the exhibit and do they photography.
9. Look over the project to check for grammar, neatness, spelling, and accuracy.
10. Buy or help find necessary material to complete the project.
11. Help your child keep a record (science fair log) of all he/she does and a list of references used.
12. Explain to your child that he/she must consult with you or the teacher when problems arise. Set aside time for help sessions. Make them short and constructive.
13. Have your child present his/her science project to you before they take it to school

14. Be positive and supportive if your child does not win a prize at the science fair. The skills the child has gained are worth the effort!

Feel a sense of pride and satisfaction when the project and the science fair is finished.

Cut below and return

I have read the STEM fair packet with my child and we understand and agree that checkpoints must be turned in on time for full participation credit. Please make changes to your project as you get feedback from your teacher about these checkpoints. The checkpoints are designed to help you have a quality final project.

I agree that my child will seek the teacher for guidance and I agree that my child will do his or her own work. I also agree that if there are any issues with my STEM project I will let my teacher know before the due date to keep from receiving a deduction of points.

Parent Signature_____ Date_____

Student Signature_____ Date_____

Experimental Outline Due October 11, 2018

Name:
Date:
Period:

Grade:____/20

Project Title (1 point):	
Category (1 point):	
Question (2 points):	

Hypothesis (3 points):	
Variables (3 points): Write in complete sentences. Include how the variable is measured.	
Independent	
Dependent	
Control(s)	

Materials (5 points):	**Experimental Procedure (5 points)**:

Name:
Date:
Period:

Grade:____/20

Logbook Check #1 (6th, 7th, & 8th)

I. When purchasing a log book, look for:

- A bound logbook, such as a "Composition Book" (NOT: spiral, 3-ring, loose leaf)

II. These are things you must keep in mind when doing entries and/or research:

- **All entries in BLUE or BLACK INK (colored pencil may ONLY be used to color-code graphs).**
- **You MUST put the correct *chronological date on each entry.***
- **All your entries should be meaningful; i.e.: you should not have a page stating "today I did nothing". If you ran out of things to say on one page and went to the top of the next page, *draw a diagonal* on the blank area and *sign your initials* across the diagonal line.**
- **If you made an incorrect entry that is more than 1 line in length, draw a *diagonal* line across the incorrect statement or information and *sign your initials* across the diagonal line**
- **No printed material should be taped or stapled into the logbook (i.e.: *no background from the internet that you printed out*) with the exception of: PHOTOS and computer generated GRAPHS.**

III. Specific items to be included (20 points):

- ***Number each and every page* (front and back) from beginning to end of logbook IN PEN at the bottom outside corner. Start with the very first page!**
- Page 1 is the ***Title Page.*** Print your project title, your name, teacher's name, date you started project.
- Make sure you date and record all activity that has anything to do with your project.

Logbook Check #2 (6th Grade Only)

Grade:____/25

I. **Data:** All of your data should be collected by this date and present in your log book.
II. **Pictures:** Include pictures in your log book that show the progression of your project. A logical place for your pictures in the dated entries section.
III. **Data Analysis:** Write a rough draft of your discussion after the data section of your log book. Use the guide below.
IV. **Graphs:** Complete all graphs or other analysis of your data. Refer to these in your discussion.
V. **Conclusion**

How to Write a Final Report
(CARSEF refers to as a research paper)

A paper describing your research should consist of the following sections, which are well-written and to the point.

Does your final report include:

- Title page.
- Abstract.
- Table of contents.
- Question, variables, and hypothesis.
- Background research (**your Research Paper)**.
- Materials list.
- Experimental procedure.
- Data analysis and discussion (including data table and graph(s)).
- Conclusions.
- Ideas for future research (for some fairs only).
- Acknowledgments.
- Bibliography

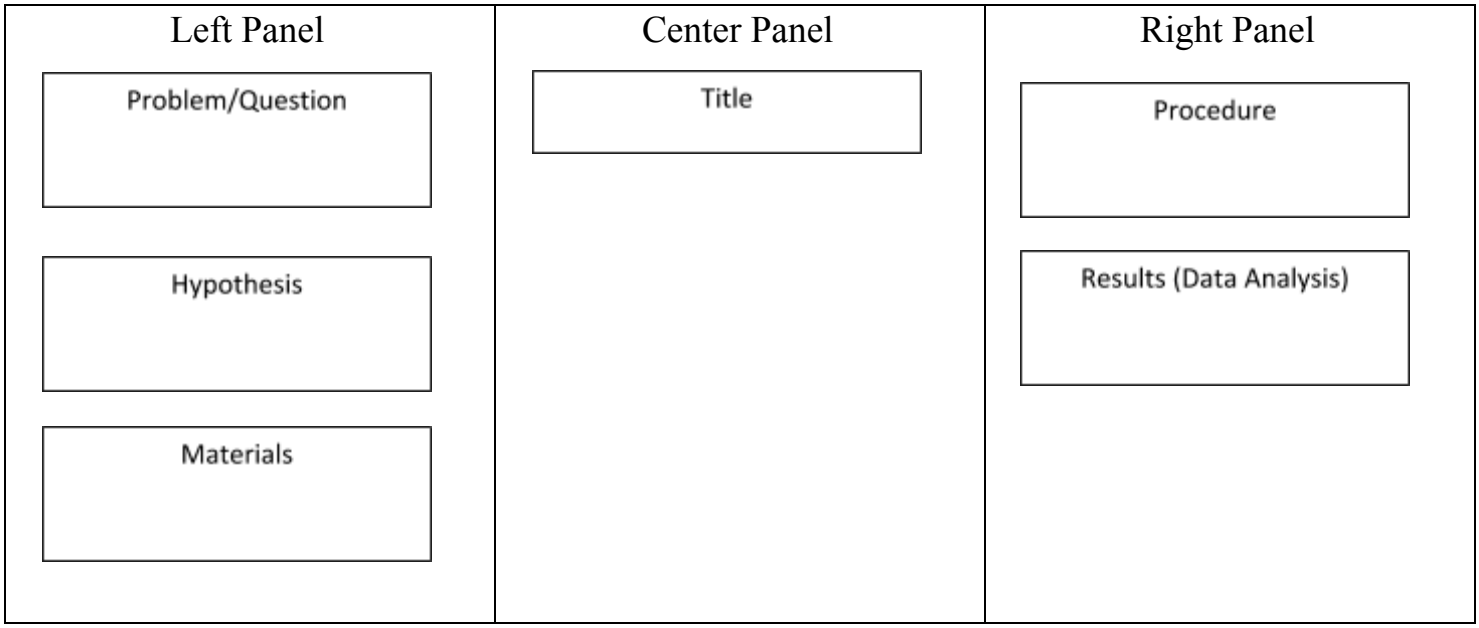
Your teacher will provide you with a digital outline that you may use.

WARNING: Points will be deducted if your project does not include the following.

- If items are taped or inserted into logbook other than: photos, receipts, and *the forms that are required* for CARSEF
- If English instead of the required Metric units are used
- Notes of a personnel nature, opinions of a non-scientific nature (I didn't enjoy this; etc.)
- Student who does a project not approved on the originally-submitted checkpoint, student must also re-submit a paper on the approved topic
- If you did not make the improvements suggested on the check points
- Turning in a project late

Display Board

The science fair display is a visual way to communicate to others what you have learned from the investigation. The display should be neat, attractive, easy-to-read, colorful, and arranged in an orderly manner.



- ✓ **Each section needs to be included on the display board in the designated location as shown above.**
- ✓ **Use headings to label each section.**
- ✓ **Use a legible font. NO SCRIPT (Science, science, science, science)**
- ✓ **Font should be large enough to read from a distance of 6 feet.**
- ✓ **All sections of the board must be typed.**
- ✓ **Add border or colored paper behind the printed information.**
- ✓ **Do not put your name, teacher's name, or grade level on the board. Students will be given a sticker with this information.**
- ✓ **Any photographs showing faces of students must be covered. This can be done with a simple sticker.**

Science Fair Board Rubric		
Exceeding-25 points	Ready-20 points	Close-15 points
Science fair board is very neat and attractive. All	Science fair board is somewhat neat. All required components are viable.	Science fair board is not neat. Or student is missing required components.

required components are present in the correct location.		

Defining the Terms

Planning Sheet	○ Used to help organize the entire experiment.
Ask a Question	○ Ask a question to begin your experiment. ○ The best questions make a comparison that will allow the scientist (you) to control changes and observe the result of those changes. ○ How does _____ (independent variable) affect _____ (dependent variable)? ○ Example: Does mass affect how fast a marble will travel down an inclined plane?
Research	○ **Research your topic and write a paper about your findings. This should be done to help you better understand your topic and to see if this topic fit your interest.** ○ **You must put information in your own words.** ○ **Plagiarism is a serious offense. It is defined as use or publication of someone's work with the intent to claim it is your own work. Give credit to the authors of the research found and paraphrase or use your own words based on the idea.** ○ **6th grade will be responsible for 2 pages of background research plus a bibliography** ○ **7th and 8th grade will be responsible for 2-3 of background research pages plus a bibliography** ○ **6th grade must have at least 3-5 sources** ○ **7th and 8th must have 4-5 sources** ○ **WIKI anything is not acceptable because it can be revised at any time.**
Hypothesis with Reason	○ The hypothesis is what you think will happen in your experiment. ○ Your experiment is testing your hypothesis. ○ The reason is why you think your hypothesis is going to occur.
Materials	○ A ***list*** of what you need to complete this experiment ○ List all necessary materials in sufficient detail ○ List exact quantities for items where more than one is needed
Procedures	○ The ***step by step method*** you will use to do your experiment. ○ Make sure someone else can follow your procedures. They should be listed in logical order, like a recipe ○ Have a description of the procedure to change the independent variable and how to measure that change. ○ Have an explanation of how to measure the resulting change in the dependent variable or variables ○ Have a procedure for how the controlled variables will be maintained at the constant value ○ Don't forget to ***repeat and record data*** for your experiment in your procedures. ○ A good experiment has ***at least 3 trials***.
Results with Data tables & Graphs	○ ***Record*** your ***results*** in a ***data table***. ***Label*** and title your data table. ○ ***Average*** your data for the 3 trials. ○ ***Graph*** your results using your data table.

	○ ***Label*** and title your graph. ● Has the appropriate graph type been selected? ● Is the independent variable on the x-axis and the dependent variable on the y-axis? ● Is the data plotted correctly and clearly on the graph? ● Does the graph have a proper scale (the correct high and low values on the axes)?
Conclusion	○ Answer the investigative question. ○ State whether you proved or disproved your hypothesis ○ Summarize and evaluate the experimental procedure, making comments about its success and effectiveness ○ Include supporting data from your data table. ○ Explain how the data supports your conclusion. ○ Suggest changes in the experimental procedure and/or possibilities for further study.
Bibliography	○ Give credit to the books, Internet sites, journals, and people who helped you in your investigation by ***citing sources properly in format***. **MLA or APA** ○ See your Science Fair Packet for examples on how to write a bibliography.
Display Board	○ The goal of a display board is to attract and inform spectators and judges. ○ Display needs to reflect current years' work only. ○ A good title that grabs spectators and judge's attention. ○ Photographs of the experiment. ○ Logical organization. A judge wants to be able to find the title, experiment, results, and conclusion ○ Visual stimulation- use colorful headings, charts, graphs, etc. Stick to the size limitations and safety rules.
Project Log Book	○ A project book is accurate and detailed notes of your experiment from beginning to end. ○ These notes will help you when you write your report. Detail, detail, detail. ○ **Composition-type notebook is required.**
Abstract	○ A (maximum) 250 word, one-page abstract. This is done after research and experimentation. ○ Abstract needs to include: 1) purpose of the experiment 2) procedures used, 3) data (results) and 4) conclusions.
Final Report	○ You have basically already done everything for the report. Now it has to be put it together into a report format. ○ Report needs to include: 1) ***Title Page*** and ***Table of Contents*** 2) ***Abstract***- The abstract is a brief overview of the project. It should not be more than one page. Maximum of 250 words 3) ***Introduction***-Problem or engineering goals, hypothesis, variables, an explanation of your research, and what you hoped to achieve. 4) ***Background Research*** ***5) Materials List*** 6) ***Procedure***-describe in detail the procedures you used to collect all the data, make observations, design apparatuses, etc. Your report needs to be detailed enough that someone can repeat your experiment from the information in your paper. Include detailed photographs or drawings of self-designed equipment.

	7) ***Results***- should flow smoothly and logically from your data. 8) ***Conclusion***-Briefly summarize your results. Be specific, do not generalize. Never introduce anything in the conclusion that has not already been discussed. 9) ***Acknowledgments***-You should always credit those who assisted you, including, businesses, and educational and research institutions. o ***References/Bibliography***-Your reference list should include and documentation that is not your own (i.e. books, journal articles). See an appropriate reference in you discipline format.

Topics to Avoid

Topics to Avoid	Why
Any topic that boils down to a simple preference or taste comparison. For example, "Which tastes better: Coke or Pepsi?"	Such experiments don't involve the kinds of numerical measurements we want in a science fair project. They are more of a survey.
Most consumer product testing of the "Which is best?" type. This includes comparisons of popcorn, bubble gum, make-up, detergents, and paper towels.	These projects only have scientific validity if the investigator fully understands the science behind why the product works and applies that understanding to the experiment.
Any topic that requires people to recall things they did in the past.	The data tends to be unreliable.
Effect of colored light on plants.	Several people do this project at almost every science fair. You can be more creative!
Effect of running, music, video games, or almost anything on blood pressure.	The result is either obvious or difficult to measure with proper controls.
Effect of color on memory, emotion, mood, taste, strength, etc.	Highly subjective and difficult to measure.
Any topic that requires dangerous, hard to find, expensive, or illegal materials.	We care about your safety and your parents' pocketbook.
Any topic that requires measurements that will be extremely difficult to make or repeat, given your equipment.	Without measurement, you can't do science.
Graphology or handwriting analysis	Questionable scientific validity.
Astrology or ESP	No scientific validity.

Judging Criteria for Science Projects/Math

I. Research Question (10)

___ clear and focused purpose

___ identifies contribution to field of study

___ testable using scientific methods

II. Design and Methodology (15)

___ well designed plan and data collection methods

___ variables and controls defined, appropriate and complete

III. Execution: Data Collection, Analysis and Interpretation(20 pts)

___ systematic data collection and analysis

___ reproducibility of results

___ appropriate application of mathematical and statistical methods

___ sufficient data collected to support interpretation and conclusions

IV. Creativity (20)

___ project demonstrates significant creativity in one or more of the above criteria

V. Presentation (35)

a. <u>Board</u>

___ logical organization of material

___ clarity of graphics and legends

___ supporting documentation displayed

b. <u>Interview</u>

___ clear, concise, thoughtful responses to questions

___ understanding of basic science relevant to project

___ understanding interpretation and limitations of results and conclusions

_ degree of independence in conducting project

___ recognition of potential impact in science, society and/or economics

___ quality of ideas for further research

___ for team projects, contributions to and understanding of project by all members

Judging Criteria for Engineering Projects

I. Research Problem (10 pts)

___ description of a practical need or problem to be solved

___ definition of criteria for proposed solution

___ explanation of constraints

II. Design and Methodology (15 pts)

___ exploration of alternatives to answer need or problem

___ identification of a solution

___ development of a prototype/model

III. Execution: Construction and Testing (20 pts)

___ prototype demonstrates intended design

___ prototype has been tested in multiple conditions/trials

___ prototype demonstrates engineering skill and completeness

IV. Creativity (20 pts)

___ project demonstrates significant creativity in one or more of the above criteria

V. Presentation (35 pts)

a. <u>Poster (10 pts)</u>

___logical organization of material

___clarity of graphics and legends

___ supporting documentation displayed

b. <u>Interview (25 pts)</u>

___ clear, concise, thoughtful responses to questions

___ understanding of basic science relevant to project

___ understanding interpretation and limitations of results and conclusions

___ degree of independence in conducting project

___ recognition of potential impact in science, society and/or economics

___ quality of ideas for further research

___ for team projects, contributions to and understanding of project by all members

RESOURCES

http://www.societyforscience.org/ISEF/primer/index.asp

The Kids' Guide to Science Projects: www.ipl.org/div/projectguide/

Thinking Fountain: http://www.sci.mus.mn.us/sln/tf/nav/thinkingfoutatin.html

NCES Kids' Zone Graph Maker: http://nces.ed.gov/nceskids/

http://scienceclub.org/scifair.html

http://www.accessexcellence.org/RC/scifair.php

http://www.sciencebuddies.org/science-fair-projects/project_finding_information.shtml - Research Paper

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

Science Fair Central: http://school.discoveryeducation.com/sciencefaircentral/

Bibliography: http://www.bibme.org/

Environmental Protection Agency (Environmental ideas/Research)
http://www.epa.gov/students/waste.htm

Contacts

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