

OAKWOOD ELEMENTARY

STEM Fair 2019

5th and 6th Grade Guidelines

Preapproval Forms Due: Monday, December 17, 2018

Projects Due: Monday, January 14, 2019

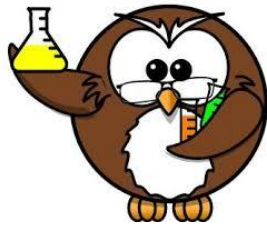
Judging: Tuesday, January 15, 2019

Welcome to the STEM Fair for Oakwood 5th and 6th graders! At this level, your hard work can pay off with a trip to the District or even the Regional STEM Fair. All kinds of Science, Technology, Engineering, and Math projects are eligible to participate in the Fair. We can't wait to see yours!

Because your project may be chosen as an outstanding project that advances to the District Fair, it is important to adhere to specific guidelines outlined by the District STEM Office. This handout summarizes the process of the Fair for 5th and 6th graders, as well as gives guidance about topic selection, safety rules, and laboratory notebooks. **Engineering projects are welcomed, but they do follow different guidelines than other STEM projects.** The Oakwood STEM Fair General Information Handout (also emailed to you from the school) has useful information about differences in a Science project and an Engineering project, The Scientific Method, a recommended timeline, and suggestions about websites with topic ideas. Please use this as a resource as well. If you need a physical copy of the General Information Handout, please check in the main office. **Still have questions? Please ask!**

The regional and district science fairs **REQUIRE that students get pre-approval for their project BEFORE beginning experimentation.** This is a pre-write of your student's project and will require time and signatures (including supervising scientists, in some instances) to complete. This form was given to your student in class. **This form MUST be returned to your teacher by Monday, December 17, 2018.**

The top projects from Oakwood Elementary (up to 15 projects) will be able to submit a VIRTUAL project (i.e. an electronic file of your STEM Fair project) to the Granite School District for consideration for the District Science Fair. **The virtual project will be due at the District (electronically) on January 18, 2019, by 3 p.m.** I encourage students to prepare their display board using the computer (Google Slides is the easiest format) so those files can easily be used for the Virtual Fair. Virtual projects chosen by the District will participate in the District "In Person" STEM Fair on February 1, 2019.



OAKWOOD ELEMENTARY

STEM Fair 2019

5th and 6th Grade Guidelines

At Oakwood, we follow all district and regional fair safety guidelines. Highlights are included on the following pages of this handout. Projects which do not meet safety guidelines will not be eligible for Oakwood judging. **Additional rules need to be followed if you are experimenting on humans or animals.** You *must* have one human consent form per participant, *with appropriate signatures*, where applicable. This form is included in this packet.

The District is encouraging originality in projects – see the extensive list of “What NOT to DO” in this packet. **This is not meant to discourage you, but rather to encourage you to be innovative and scientifically engaged.** If you are interested in a topic on the "What NOT to Do" list, make sure you take a unique angle and have a well-created project with a single variable and many trials.

Included in this packet are the judging guidelines. We will judge the Oakwood projects with the “GSD District In-Person Fair 2018 Rubric”. Review this as you complete your project in order to be sure to address all of the required elements. We are encouraged by Granite School District to only send projects to the Virtual Fair that have a score of 90 or above. I have also included the judging guidelines for the Virtual Projects so you know what to expect from this process.



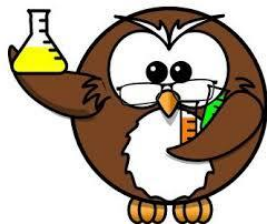
The **ONLY** items which should be brought to school for the Science Fair are the project board (blank boards will be provided to each child by their teacher) and the project log book. Photos and written/verbal descriptions of experiments are terrific! **But NO EXPERIMENTS SHOULD BE BROUGHT TO SCHOOL.** Per the guidelines, experiments brought to school will result in the project being disqualified. This is

for safety reasons. If necessary, a laptop with video of a part of your project will be allowed. The laptop should be brought from home with the battery charged, as there are no power outlets that will be available during judging.

All district information is available on the Granite District Science Fair website: <http://www.graniteschools.org/curriculuminstruction/science-k-12/science-fair/>. Click on the "Granite STEM Fair Handbook 2019" for more complete information. *Subsequent pages in this handout are from the District Handbook.*

Please don't hesitate to contact me with any questions. We hope you have a great experience with your projects and we look forward to seeing them in January!

Michelle Cannon, STEM Fair Chair, michelle.cannon@gmail.com, 385-315-6303



OAKWOOD ELEMENTARY

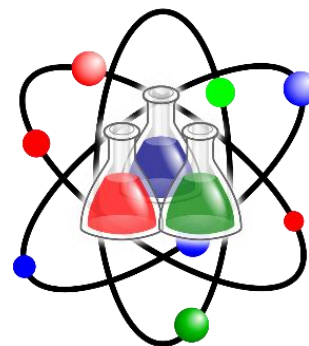
STEM Fair 2019

5th and 6th Grade Guidelines

Projects should be experiments or engineering design projects, **NOT demonstrations or reports** and should reflect the student's own work and ideas. Please refer to the General Information Handout for 3rd-6th grade for a list of resources to help you select project ideas. The following list outlines topics that are **commonly seen at STEM Fairs and are not generally competitive enough to win awards**. **Students should avoid these projects**. Chances are if you got the project in a book, it may not be competitive. **Use caution in finding a project online for inspiration—there is a difference in getting an idea from another project and just copying someone else's work!**

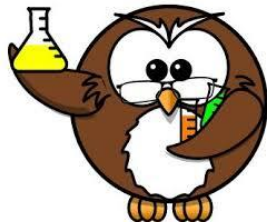
Projects Not Recommended

- Effect of music/talking/colored light/different liquids on plants
- Effect of cola, coffee, etc. on teeth, tooth decay, coloring, etc.
- Effect of running, jumping, music, video games, movies, etc. on blood pressure
- "Which brand is best?" -- (which popcorn pops better; which soap, fertilizer, paper towel, battery, laundry soap, etc.)
- Hovercraft design and Basic maze running
- Simple preference: what do girls/boys/cats/dogs like better
- Effect of color on memory, emotion, mood, how food tastes, etc.
- Optical illusions (including stroop effect)
- Reaction times in general and distractions effecting reaction speed
- Many male/female comparisons, especially if bias shows
- Build a "kit" (solar, robotic, etc.)
- How the amount of music/video games/sleep affects learning
- Taste/color or paw-preferences of cats, dogs, fish, etc.
- Ball bounce tests with poor measurement techniques
- Magnet demonstrations (or hot/cold magnets)
- Fingerprints, heredity, and memory tests
- Growing bacteria from doorknobs, student's hands, places at school, hand sanitizer tests
- Types of Insulation effectiveness
- Coke & Mentos/volcanoes



Projects we DO need more of:

- Computer science
- Mathematical applications
- Engineering



OAKWOOD ELEMENTARY STEM Fair 2019 5th and 6th Grade Guidelines

Is it OK to do a project about...?

For the safety of the students as well as following all the guidelines at the District and Regional Fairs, here is a quick guide to avoiding problems with your projects.

1. I want to have PEOPLE be a part of my project

- No-Skip to #2
- Yes-See page 5. You will also need to have EVERY person fill out an Informed Consent Form (pg. 7) if you have them:
 - Eating/drinking something
 - Asking them survey questions
 - Doing something physical like running, jumping, walking

2. I want to have ANIMALS be a part of my project

- No-Skip to #3
- Yes-To avoid animal cruelty, any project with animals other than observing behaviors of pets needs a vet's signature before beginning. See page 5.



3. I want to have BACTERIA/MICROBES/FUNGUS be part of my project



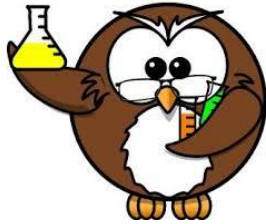
- No-Skip to #4
- Yes-You CANNOT grow bacteria at home or at the elementary school. See page 5. Emily Harward (District STEM Coordinator) can help you find a lab to grow bacteria. eharward@graniteschools.org

4. I want to have WEAPONS/HAZARDOUS CHEMICALS/FIRE be part of my project

- No-Skip to #5
- Yes-You will need to check with your teacher, Michelle Cannon (school STEM Fair coordinator) and Emily Harward (District STEM Fair coordinator) for pre-approval. If you aren't sure if it's a hazardous chemical, contact Emily Harward.

5. My project idea is on the "Not Recommended" list on page 4-is that ok?

Those projects are usually not competitive enough to make it to District or Regional fairs but, yes, you may do one.



OAKWOOD ELEMENTARY STEM Fair 2019 5th and 6th Grade Guidelines

Rules for Experiments Involving Animals

Student projects that use living organisms (excluding plants) must follow these guidelines:

1. Behavior observation studies or supplemental nutritional studies involving pets may be done at home. Any other experiments involving laboratory animals CANNOT be conducted in a student's home. It **MUST** be done in a lab. Proper animal care must be provided daily, including weekends, holidays and vacations. Experimental procedures that cause unnecessary pain or discomfort are prohibited. Experiments designed to kill vertebrate animals are NOT permitted. Experiments with a death rate of 30 percent or higher are NOT permitted.
2. A veterinarian's signature is required of ALL projects with vertebrate animals (except behavior observations of pets).



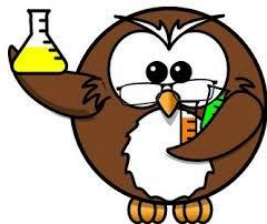
Rules for Experiments Involving People

Experimentation on humans must conform to the same regulations as other animals. Human studies (including surveys, taste testing, and physical exertion) **must have an Informed Consent Form** signed by the participant and the parent/guardian. **One form should be completed for each participant.** This form is on page 6 of this packet or page 23 of the District STEM Fair Handbook. Hard copies are also available in the main office.

Institutional Review Board (IRB) approval is required for projects using Informed Consent Forms. The IRB will be the classroom teacher, the STEM Fair coordinator and, when needed, an administrator. Contact Emily Harward or Megan Black at the District Office with questions.

Rules for Experiments Involving Pathogens (including bacteria cultures)

Culturing Bacteria: Bacteria/Fungus may NOT be grown at home or at an elementary classroom. Pathogenic bacteria experimentation is prohibited. Other bacteria experiments must have sealed Petri dishes. As part of the project, the student should have a plan for disposal, and the experiment must be done in a BioSafety Level (BSL) 1 or 2 lab (the GTI offers its lab as a location for growing bacteria). Projects not following this guideline will be disqualified. If you need help locating a lab, contact Emily Harward, District STEM Coordinator.



OAKWOOD ELEMENTARY

STEM Fair 2019

5th and 6th Grade Guidelines

Hints for Keeping a Project Data Book

A project data book is your most important piece of work. Accurate and detailed notes make a logical and winning project. Good notes show consistency and thoroughness to the judges and will help you when writing your research paper.

Project Notebook Guidelines

- Don't remove any pages. Simply put a line through errors.
- All pages should be numbered before any data is entered.
- All entries should be dated.
- Each new entry should begin on a separate page.
- Use more than one notebook if necessary.
- All entries must be legible if handwritten

Contents of the Project Data Book

- List of potential STEM Fair projects
- Project title
- Experimental design (identification of variables, etc.)
- Data tables (raw and summary data)
- Regular observations (similar to a diary)
- Calculations
- Graphs
- Ah-ha! moments
- Types of error you may have made
- What you might want to try next

Documentation: The proof that the experiment was completed

- Date all entries in the Project Data Book.
- Photograph whenever possible. Photograph the progress in various stages when possible.
- If scientific equipment is used (spectrometer, HPLC, IR, NMR) save all printouts from the machine.
- If the project is to be a continuation from past years you must have all your old notebooks.
- The burden of proof that the project was completed is on the student. To avoid any questions as to the validity of your experiment you should document everything.

Reference Page

- Reading notes from literature pertaining to the project, including references and citations.

Informed Consent Form

Grades 5-12: for projects testing/surveying people

This form must be signed by the parents or guardians of all subjects who are under 18. Form kept by STUDENT scientist in his/her Project Data Book

Student Researcher's Name _____

Title of Project _____

Adult Sponsor _____ Phone _____

Your child has been asked to participate as a subject in a STEM Fair project. The purpose of this form is to notify you of any possible risks and obtain your permission for him/her to participate. The student researcher will be supervised and any surveys or questionnaires should be attached to this page. (This project has been reviewed and approved by an Institutional Review Board. If you have any questions, please contact the Adult Supervisor listed above)

To be completed by the student researcher:

1. What will you ask the subjects to do?

2. Will your subjects be eating or drinking anything? No _____ Yes _____

If yes, what will they eat or drink? _____

3. Will your subjects be doing any kind of exercise? No _____ Yes _____

If yes, what will they do? _____

4. Will your subjects be answering questions or completing a survey? No _____ Yes _____

If yes, please attach a copy of the questions to this page.

To be completed by the subject prior to the experiment:

Subject's Name

Signature

Date

For subjects under 18 years old, a parent/guardian must give permission for participation:

I understand what my child will be doing and am aware of any possible risks.

Subject's Name

Signature

Date

Project's Adult Supervisor (Most likely the classroom teacher)

2019 Granite School **District In-Person** STEM Fair Judging Rubric

This is the form which Oakwood Elementary will use to judge projects.

<p>Interview & Display (up to 15 points) An excellent student will be able to explain in detail their research and experiment designs as well as interpret charts and graphs. Students should be able to explain the significance of their findings, usefulness and new questions/experiments that may arise from their research.</p>	
<p>The Question (up to 10 points) An excellent question will be interesting, creative, worded scientifically and relevant to the world today. You should also include your thought process and preliminary research on why you selected the question.</p>	
<p>Hypothesis (up to 10 points) An excellent hypothesis will lead on from the question, be tightly focused and build on existing knowledge and be testable. A hypothesis should be a concise statement of what they think will happen and explanation of why they think that will happen. It may be in an if/then or because statement. An Engineering/Invention project will have a design goal instead of hypothesis.</p>	
<p>Research (up to 10 points) Excellent students will undertake research to help them shape their question and hypothesis and to put their work into a relevant, real-world context. Engineering/Invention projects show research of how the new product will meet a need better than an existing product. It will detail how the project fills a need.</p>	
<p>Experiment (up to 30 points) Excellent students will demonstrate that they have used good experimental techniques and describe their experiment clearly and in detail. Multiple trials are an expectation in good experimentation. It should include a summary explaining the procedures, variables, materials, and testing/experimental trails. Engineering/Invention projects should show schematics, assembly information, refining of design, and prototyping.</p>	
<p>Data/Observations (up to 20 points) Excellent data will be relevant, sufficient to support a conclusion and should be recorded accurately and precisely, and be presented clearly. Excellent observations will describe patterns or trends supported by the data. Engineering/Invention projects show evidence of testing and the applications of the invention.</p>	
<p>Conclusion (up to 5 points) An excellent conclusion will explain how the experiment answers the question or why it fails to do so and whether or not it supports the hypothesis. Engineering will explain how their design met or did not meet the design goal.</p>	
<p>Total</p>	

2019 GSD Virtual STEM Fair Judging Rubric

<p>The Question/Problem (up to 10 points) An excellent question will be interesting, creative, worded scientifically, and relevant to the world today. You should also include your thought process and preliminary research on why you selected the question. (250 Word max, <u>no pictures on this slide</u>)</p>	
<p>Research (up to 10 points) Excellent students will undertake research to help them shape their question and hypothesis and to put their work into a relevant, real-world context. Engineering/Invention projects show research of how a new product will meet a need better than an existing product. It will demonstrate how the product fills a need. (500 Word max, <u>no pictures on this slide/page</u>)</p>	
<p>Hypothesis/Design Goal (up to 10 points) An excellent hypothesis will lead on from the question, be tightly focused, build on existing knowledge, and be testable. A hypothesis should be a concise sentence or two. An Engineering/Invention project will have a design goal instead of hypothesis. (<u>no pictures on this slide/page</u>).</p>	
<p>Experiment (up to 30 points) Excellent students will demonstrate that they have used good experimental techniques and describe their experiment clearly and in detail. Multiple trials are an expectation of good experimentation. It should include a summary explaining the procedures, variables, materials, and testing/experimental trials. Engineering/Invention project should show schematics, assembly information, refining of design, and prototyping. (Pictures are very appropriate on this slide/page-multiple slides/pages are okay).</p>	
<p>Data/Observations (up to 20 points) Excellent data will be relevant, sufficient to support a conclusion, should be recorded accurately and precisely, and be presented clearly. Excellent observations will describe patterns or trends supported by the data. Engineering/Invention projects show evidence of testing and applications of invention. (Multiple slides/pages are okay to record data. Charts, graphs, and lists are appropriate).</p>	
<p>Conclusion (up to 15 points) An excellent conclusion will explain how the experiment answers the question or why it fails to do so and whether or not it supports the hypothesis. Engineering will explain how their design met or did not meet the design goal. (500 Word Max, <u>no pictures on this slide/page</u>).</p>	
<p>Works Cited (up to 5 points) Excellent students will acknowledge and provide clear references for sources of information that they have consulted, referenced, or received assistance from. Proper citation in APA format. Citationmachine.net (e.g. to find equipment and materials, to stay safe or to use unfamiliar equipment or techniques).</p>	
Total	

Student Explanation to the Virtual Fair Rubric

In addition to the judging criteria, these are suggestions for students to think about or address as they plan and do their project.

The Question/Problem

Find a question that interests you about something that you have observed, noticed or wondered about. What do you want to figure out? If you are engineering a solution, what is the problem you want to solve?

Hypothesis or Design Goal

What is your hypothesis? Try to address something that you believe is challenging which you are able to answer in a single experiment. For engineering, what is the goal/purpose of your project?

Research

Figure out what others have found out about your subject area or question. How has your research helped you to refine your question and ask something that may not be unique, but is relevant and interesting and not already answered?

Experiment/Design Process

Design and execute an experiment that tests your hypothesis. Include descriptions of the materials, equipment, and methods/techniques you used. Explain the variables and how they will be controlled, manipulated and measured. Also detail any key steps to avoid errors, risks and safety. If you are engineering something, what are the components of your design and what will they do, did you build a prototype and then refine it to make it work better?

Data/Observations

Report on all of the data, numbers, outputs or outcomes from your experiment. Show an understanding of what you saw happening during your experiment or design. Describe the patterns and trends you saw emerge as you worked.

Conclusion

How did your experiment support or contradict your original hypothesis? How could you improve your experiment or design? Did everything go as planned or were there unexpected results? Does what you learned lead to a new question to ask or experiment that would answer it? If so, why would it be important, interesting, or useful to do? What new ideas do you have for improving your engineering design?

Works Cited

Use a bibliography generator such as citationmachine.net to document articles you read, people you interviewed etc.