What is the Science & Engineering Fair?
The Science & Engineering Fair is an opportunity for students to conduct a scientific experiment or an engineering design to share with their peers and community. Students will conduct a scientific experiment or develop a design and then prepare a display board to showcase at the Science & Engineering Fair event, in the Portola Hills Elementary MPR.

Who may participate?
All Portola Hills students in the 2nd thru 6th grades are invited to participate in the Science Fair as either an individual, siblings, or group. Students in 2nd & 3rd grades will participate at a Beginner Level, by conducting a simple age-appropriate experiment or engineering design and creating a basic display board. Students in 4th thru 6th grade will participate at an Intermediate Level, by creating a hypothesis and conducting an experiment, or by defining a problem and designing a solution. These students will then create a more detailed display board using charts and graphs.

Science & Engineering Fair T-shirts
Participants will have an option to purchase a PHE Science & Engineering Fair T-shirt HERE.

Steps to participate:
1. Consider a topic and develop a scientific question to study ("Does _____ affect _____?"). Alternatively, **identify a problem to be solved by an engineering design**. See attached online resources for further ideas and approaches.
2. Return the participant entry form by Friday, December 20, 2024.
Note: All participants must receive safety approval for their Science Fair project. Do not begin a project until your project has been approved. Email Science Fair committee with questions.
3. Conduct a Scientific Experiment / Develop an Engineering Design. Remember to have adult supervision and good safety practices.

- Adult supervision and safety practices are a must. For safety reasons, experiments involving fire, mold, or other types of bacteria will not be approved.

4. Prepare a Display Board. Project Boards will be distributed on January 6th and January 9th 2025 after school hours. Separate communication will be sent closer to the dates.
5. Display Board Drop off instructions will be provided separately.
6. Attend the Science & Engineering Fair during the school day and the evening program on Thursday, January 16, 2025. Student scientists and engineers will have the opportunity to showcase their projects and explain their findings to their
7. Participants must take projects home the evening of January 16, 2025.

** *Projects for 5th & 6th graders will be evaluated on a non-competitive, informal basis.* Some 6th grade projects may be recommended for the Orange County Science & Engineering Fair in March 2025!

Portola Hills Elementary PTA
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Contact the PHE PTA Science & Engineering Fair Committee with any questions:
sciencefair@portolahillspta.org

Science Experiment Project Help Guide

Scientific Process:

1. Choose a **Question** to investigate. ("Does _____ affect _____?")
2. Conduct **Background Research** and get advice on your topic.
3. Develop a **Hypothesis** (I think _____ because _____) based upon your background research.
4. Decide on **Procedures** you will use to test your hypothesis. Be sure to run at least 3 trials.
5. Make a list of **Materials** you will need. Gather your materials.
6. Conduct your **Investigation**. Collect **Data**. (Be sure to have adult supervision and use good safety practices).
7. Organize your data. Summarize your **Results**. Use charts and graphs.
8. Write the **Conclusion** based upon the results of the investigation. Compare to hypothesis.
9. Consider any **Future Investigations** to answer other questions or extend your experiment.

Selecting a Scientific Inquiry Topic:

When considering a project topic, ask yourself:

- What are your interests?
- Are there any questions you have asked or pondered?
- Do you prefer Earth, Life or Physical Science? Do you prefer Engineering or Math?
- What sparks your curiosity?
- Consider: Does _____ affect _____?
- Visit www.sciencebuddies.org or try other science resource links at www.portolahillspta.org.

Elements to Include on Display Board:

- Experiment/Project Title
- Scientific Inquiry Question
- Student Name, Grade, Teacher
- Hypothesis (I think _____ because _____)
- Background Research
- Materials
- Procedure
- Data (use a chart to show data collected during the 3 trials of your experiment)
- Results (present in a graph by totaling or averaging the data collected)
- Conclusions (summarize results and compare to hypothesis)
- Future Experiments
- Photos or Drawings

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Online Science Fair Resources

100 Extremely Useful Search Engines for Science
http://www.onlinecollegecourses.com/2009/11/08/100-extremely-useful-search-engines-for-science/

American Psychological Association Guide to Psychological Research
http://www.apa.org/education/k12/science-fair.aspx

Archimedes Initiative
http://www.archimedesinitiative.org/

Education.com
http://www.education.com/science-fair/elementary-school/

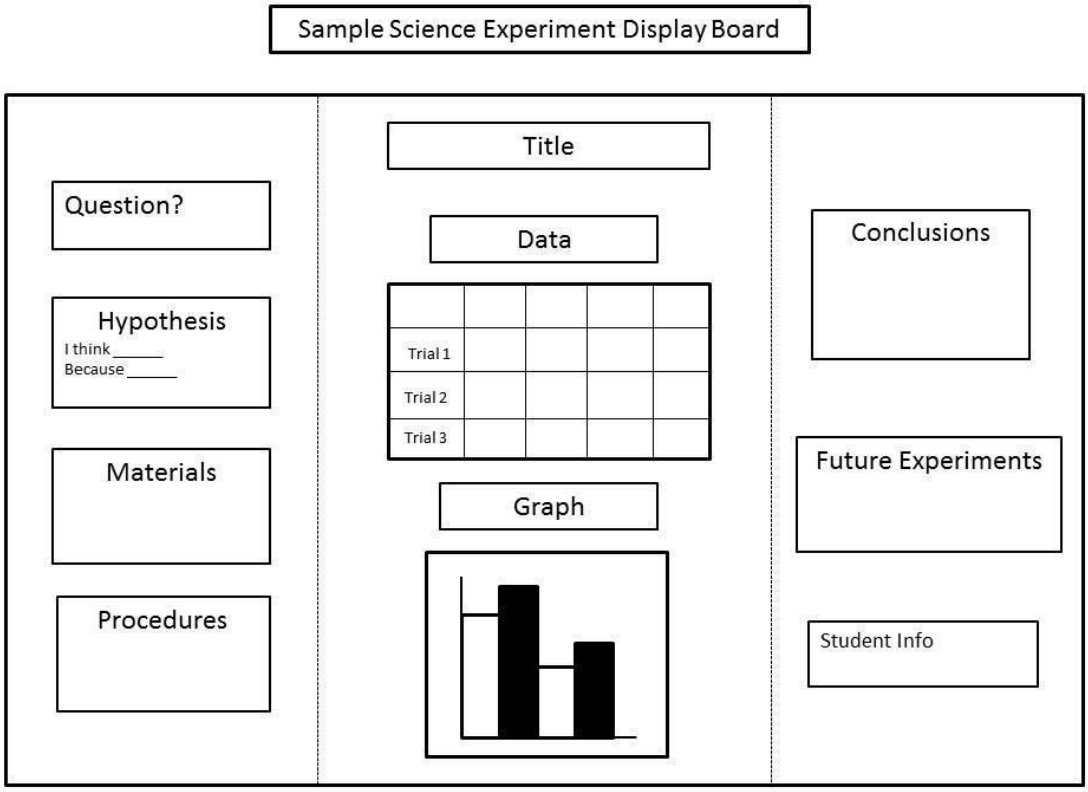
Energy Quest
http://www.energyquest.ca.gov/projects/index.html

Internet Public Library's Science Fair Project Resource Guide
http://www.ipl.org/div/projectguide/

Science Buddies:
http://www.sciencebuddies.org/science-fair-projects/project_guide_index.shtml?From=body

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

Science Fair Projects @ Nasa
http://www.hq.nasa.gov/office/hqlibrary/pathfinders/fairs.htm



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Engineering Design Project Help Guide

Engineering Design Process:

1. **Define a Need**; express as a goal or a problem statement
2. Establish **Design Criteria** and constraints (challenges or design limits)
3. Evaluate **Alternative Designs**
4. **Build a Prototype** of best design
5. **Test and Evaluate** the prototype using the design criteria
6. **Analyze** test results, make design changes, and retest
7. **Communicate** the design and its ability to satisfy the goal or solve the problem (Success is NOT a requirement!)

Selecting a Problem to Solve:

When considering a project topic, ask yourself:

- Is there a need or problem that needs to be addressed?
- What ideas can be used to accomplish a goal or solve a problem?
- Can those ideas be made with available materials?
- Can different design options be selected with available materials?
- How can I test a design to see if it helps meet a goal or solve a problem?
- Can I communicate the design so that someone else can make it or learn from it?
- Try other engineering resource links at www.portolahillspta.org.

Elements to Include on Display Board:

- Engineering Project Title
- Student Name, Grade, Teacher
- Problem Statement
- Proposed Solution
- Background Research
- Materials
- Data (use a chart to show data collected during the 3 trials of your experiment)
- Results (present in a graph by totaling or averaging the data collected)
- Conclusions (summarize results and compare to hypothesis)
- Photos or Drawings
- Future Designs or Modifications

Online Engineering Fair Resources

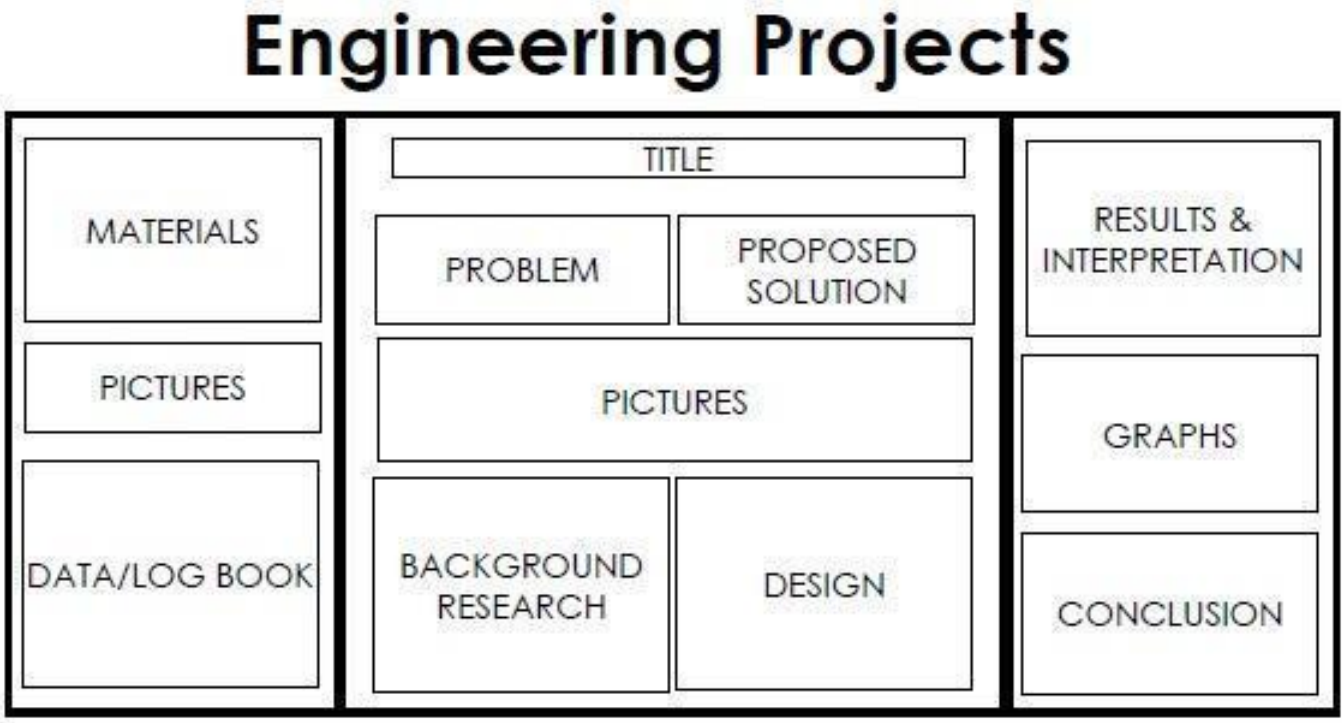
How to do Engineering Projects
https://science-fair.org/students-parents/winning-engineering-projects/

Engineering Science Fair Projects
http://www.education.com/science-fair/engineering/

100 Engineering Projects for Kids
http://thehomeschoolscientist.com/100-engineering-projects-kids/

Project-Based Engineering for Kids
http://www.instructables.com/id/Project-Based-Engineering-for-Kids/

Orange County Science & Engineering Fair
http://www.ocsef.org/



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