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 <u>adult supervision</u> and use <u>good safety practices</u>).
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

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
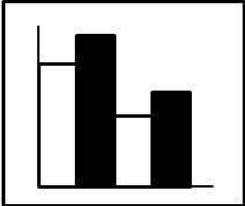http://school.discoveryeducation.com/sciencefaircentral/

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

Sample Science Experiment Display Board

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

Portola Hills Elementary

PTA

every child. one voice.®

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

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/

Engineering Projects

	TITLE		
MATERIALS	PROBLEM	PROPOSED SOLUTION	RESULTS & INTERPRETATION
PICTURES	PICTURES		GRAPHS
DATA/LOG BOOK	BACKGROUND RESEARCH	DESIGN	CONCLUSION