Kingswood Science Fair

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Thanks for your interest in participating in the Kingswood 3rd-5th grade science fair!

Here are some steps to help you complete a successful project. If you have any questions please don't hesitate to contact:

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1. Turn in your Project Selection form

2. Take a look at the Kingswood Science Fair Rules **(Appendix I)**.

3. If you think your project may make it to Regionals (February), take a look at their rules as well. This site is also a great source of general information: http://www.ncsciencefair.org/index.php/guidelines

4. After you have determined that your project idea will fit within the rules, you need to do the following:

    - Make sure you have a testable question. (For example, How much water does a plant need to grow?)

    - Form a hypothesis. (I think that plants need 200 milliliters of water per day to grow)

    - Test your hypothesis. (Pick a type of plant, put several individual plants in different pots and give them different amounts of water. Make observations about their growth. Record your results. Make sure you repeat your experiment!)

    - Analyze the results and come to a conclusion (Frequently, results are reported using a graph)

**NOTE that inventions should follow the engineering design process. If you are doing an invention and have questions, please let us know!

5. Here are some criteria by which your projects will be judged:

   a. Experimental rubric **(Appendix II)**
   b. Engineering and Invention rubric **(Appendix III)**

6. You will then need to work on your report and your poster.

   a. Sample reports **(Appendix IV and V)**
   b. Poster information **(Appendix VI, VII, VIII)**

Appendix 1

Kingswood Science Fair Rules

Safety Rules

1. Make sure you have an adult to help you.

2. Never eat or drink during an experiment. Keep your work area clean.

3. Wear protective safety goggles when doing any experiment that could lead to eye injury.

4. Do not touch, taste, or inhale chemicals or chemical solutions.

5. Respect all life forms. Do not perform an experiment that will harm an animal.

6. All experiments should be supervised by an adult!

7. Always wash your hands after an experiment, especially if you have been handling chemicals or animals.

8. Dispose of waste properly.

9. Any project that involves drugs, firearms, or explosives are not permitted.

10. Any project that breaks district policy, and/or local, state or federal laws are not permitted.

11. Use safety on the internet! Never write to anyone without an adult knowing about it. Be sure to let an adult know about the websites you will be visiting, or have them help you search.

12. If there are dangerous aspects of your experiment, like using sharp tools, please have an adult help you or have them do the dangerous parts.

Science Fair Rules

1. Projects can be individual or team-based. For team-based projects, maximum is three students per project entry.

2. Adults can help, in fact we want them to get involved. They can help gather materials, supervise your experiment and even help build the display. They cannot complete the major part of your project such as writing your report, building your invention, collecting your data, or conducting your experiment.

3. If you are doing an experimental project, you must use the Scientific Method. If you are doing an invention project, you must use the Engineering Design Process. You will not receive high scores unless you follow these steps.

4. You will only be judged on your display board and report. You will not be doing a live experiment or invention demonstration.

5. Do not buy a science kit to build an invention or conduct an experiment.

6. No part of your display may pose a safety hazard. Do not include harmful chemicals, bacterial cultures, sharp objects, or any source of heat or flames. No live or preserved animals are allowed.

7. Displays must be on display boards or can be made with cardboard. They must stand alone. See the display making page if you need a diagram.

8. Respect all adults involved in the fair... especially the judges!

9. All decisions of the judges and science fair committee are final.

Appendix II
Experiment Rubric

Score	Problem/Question	Research	Hypothesis	Procedures	Material/Equipment
4 Outstanding	Above expectations - detailed, well-written in question form. Demonstrates critical thinking skills, learning opportunity, and creativity. Comes from personal interests or experiences.	Well researched using at least five different types of sources. Bibliography included. Student clearly connects research to their problem in their own words.	Hypothesis is above expectations - detailed, well-written, testable, scientific reasoning, clearly addresses the stated problem, shows a direct connection to research.	Well-written, detailed plan, step-by-step. Included at least three trials (repetitions) and specific measurements of materials used in the experiment. Clearly addresses the hypothesis.	Materials specifically identified in column form and metric units used properly.
3 Proficient	Complete well-written problem statement in the question form. Represents a learning opportunity for the student.	Well-written but does not address all aspects of the project. Uses at least three sources. Student connects research to their problem in their own words.	Hypothesis is well-written and testable with some scientific thought. Addresses stated problem and shows connection to research.	Well-written plan, step-by-step. Included at least two trials (repetitions). Is linked to their hypothesis.	Materials specifically identified in column form and used properly.
2 Developing	Poorly written or not in a question form. No evidence of connection to a specific interest or experience.	Limited material used in research, with at least two sources. Student generally connects the research to their problem in their own words.	Complete hypothesis but not completely testable. Addresses stated problem and shows some connection to research.	Sufficient procedural plan to confirm hypothesis. Includes no trial (repetition) but listed as step-by-step.	Materials specifically identified but used improperly.
1 Beginner	Incomplete problem statement or addresses an issue that the student already knows the answer	Limited materials used in research. Research itself is limited. Has little or no connection to the problem. Is not written in the student's own words.	Incomplete hypothesis. Not testable, does not connect to stated problem, no connection to the research	Partial procedural plan to confirm hypothesis. Not listed as step-by-step.	Materials not specifically identified and/or used properly.
0 Did not attempt	No problem statement	No documentation of research.	No hypothesis	No overall procedural plan to confirm hypothesis.	No materials identified or used.

Score	Results	Conclusion/Application	Visual Display	Skill	Creativity
4 Outstanding	Comprehensive and significant interpretation of data/results above expectations. Has clear colorful pictures, data tables, and graphs, which support the explanation of the results of the research.	Well-written conclusion/ interpretation of data support for hypothesis with major findings and possible explanations for them. Significant well-written recommendations, applications, or new question recognized.	Display is exceptionally well developed and visually appealing. Has significant attention to detail. Spelling and grammar are correct.	Exceptional project which appears to be completely student's own work.	Demonstrated original or innovative approach and design.
3 Proficient	Comprehensive narrative interpretation of data/results with thoughtful inclusion of pictures, tables, and graphs.	Well-written conclusion/ interpretation of data support for hypothesis. States if hypothesis was supported or rejected with possible explanations. recommendations, applications, or new question clearly recognized.	Display is neat and easy to read. Pictures, graphs, or charts enhance the display. Has major details with few spelling and grammar errors.	Complete understanding of the project. Appears to be mostly student work.	Demonstrated ingenuity in the idea and design.
2 Developing	Correct written narrative interpretation of data/results with minimal pictures, tables, and graphs.	Correct/complete conclusion/interpretation of data support for hypothesis. Apparent recommendations, applications, or new question recognized.	Display is organized and relatively easy to understand. Has minor attention to detail with several spelling and grammar errors.	Adequate understanding of the project. Appears to be mostly student work.	A relatively unique idea with a standard design.
1 Beginner	Partial written narrative interpretation of data/results. Poor or no use of pictures, graphs, or tables.	Incomplete problem statement or interpretation of data support for hypothesis identified. Incomplete or vague recommendations, applications, or new question recognized.	Display is messy and disorganized. Has no attention to detail with many spelling and grammar errors.	Partial understanding of project and/or significant help is obvious	A commonly used project idea with some new ideas.
0 Did not attempt	No written narrative interpretation of data/results.	No problem statement or interpretation of data support for hypothesis identified. No recommendations, applications, or new question recognized.	No display or very confusing display	Incomplete project. Significant help is obvious.	Lacking creativity. A commonly used project with no variation.

Appendix III

Engineering and Invention Rubric

Score	Problem/Question	Experimental Design	Experimental Procedures	Materials/Equipment	Scientific Process
4 Outstanding	Original, unique project/ invention, that addresses or solves a real problem that some people have.	Exemplary quality, very functional, practical design. Is effective in addressing or solving the problem.	Steps in the design of the invention are clear, complete, and easy to follow.	Materials are carefully identified. They are used above expectations. Costs are evaluated or kept down.	Well researched using at least five different types of sources. Bibliography included. Student clearly shows that no similar project/invention exists.
3 Proficient	Shows insight and addresses a problem or need that some people have.	Sufficient quality, functional, practical design. Is able to address or solve the problem.	Steps in the design of the invention are clear and complete.	Materials are carefully identified and used above expectations.	Well-written but does not address all aspects of the project. Used at least three different sources of material. Student shows that no similar project or invention exists.
2 Developing	Unoriginal invention. It may not address a problem or need that some people have.	Average quality design, functional, but not practical in addressing or solving the problem.	Steps in the design of the invention are clear but hard to follow.	Materials appropriately identified and used safely.	Limited material used in research, but research is much more extensive. Has at least two sources. Student shows that there may be a similar project/invention but lists how this project/invention has different results.
1 Beginner	Poor invention. There is little need for it because it does not address a problem or need that some people have.	Poor quality design, not functional, not practical in addressing or solving the problem.	Steps in the design of the invention are listed but are incomplete or are vague.	Materials not appropriately identified and or used in an unsafe manner.	Limited materials used in research. Research itself is limited. Student is unclear whether there are similar invention/projects.
0 Did not attempt	No problem to solve. No practical need for the invention because there is already a common solution.	No design or model to address or solve the problem.	Steps in the design of the invention are not listed or are not clear.	No materials/equipment identified and used.	No documentation of research. Student shows no evidence that the invention/project is unlike other products.

Score	Data Analysis	Outcomes	Design/Construction	Visual Display	Skill
4 Outstanding	Excellent improvements or additions to the invention were made during the engineering design process.	The function of the invention is exemplary and the need is completely met.	Well designed and constructed, Shows attention to detail	Display is exceptionally well developed and visually appealing. Has significant attention to detail. Spelling and grammar are correct. Exemplarily labeled diagram(s) or data tables.	Exceptional project which is completely student's own work.
3 Proficient	Very good improvements or additions to the invention were made during the engineering design process.	The function of the invention is very good and the need is met.	Good design and construction	Display is neat and easy to read. Pictures, graphs, or charts enhance the display. Has major details with few spelling and grammar errors. Sufficiently labeled diagram(s) or data tables.	Complete understanding of the project. Mostly student work.
2 Developing	Some improvements or additions to the invention were attempted to solve problems in the engineering design process.	The function of the invention can be identified and the need is partially met.	Adequate design and construction	Display is organized and relatively easy to understand. Has minor attention to detail with several spelling and grammar errors. Unclear or messy labeled diagram(s) or data tables.	Adequate understanding of the project. Mostly student work.
1 Beginner	Limited improvements or additions to the invention were attempted to solve problems in the engineering design process.	The function of the invention can be identified, but the need is not met.	Poorly designed or poorly constructed	Display is messy and disorganized. Has no attention to detail with many spelling and grammar errors. Partially labeled diagrams or data tables.	Partial understanding of project and/or significant help is obvious
0 Did not attempt	No improvements or additions to the invention were attempted to solve problems in the engineering design process.	The function of the invention is not easily identified & it does not meet the need for which it created.	Poorly designed and constructed	No display or very confusing display. No labeled diagrams or data tables.	Incomplete project. Significant help is obvious.

Appendix IV
Sample Experiment Report

Science Fair Report

Title

Student Name

Grade

Life Science/Earth Science/Physical Science

Experiment/Demonstration-Research

Section 1: Purpose (Use three complete sentences or less.)

- ☐ Why did you want to do this science project?

Section 2: Problem

- ☐ State the science question you were trying to answer. Use a long, specific, and complete sentence.

Section 3: Hypothesis

- ☐ State your hypothesis (best guess answer before doing your experiment). Use one complete sentence.

Section 4: Description of Experiment

- ☐ State everything you can to describe your experiment.
- ☐ List all materials used
- ☐ Procedure: List the steps of your experiment. Do not use the words “I” or “you.”
- ☐ Include any drawings, photographs, graphs, computer printouts, and/or whatever helps explain how you tested your hypothesis.
- ☐ Pretend you’re telling another person how to do your experiments. In fact, another person should be able to take this section and use it as instructions to do their own experiments.

Section 5: Results

- ☐ State the results obtained. Include observations, present data collected, and data visualization (tables, graphs, charts, pictures) to help show your results.

Section 6: Conclusion (Use two or three complete sentences.)

- ☐ Explain fully what you learned from the project. Was your hypothesis correct? Why or why not?
- ☐ Describe any problems you had with the experiment. Tell what you had to do to correct them or what you would do if you did this over.
- ☐ What other investigations (if any) would you like to do as a result of this project.

Section 7: Bibliography

- ☐ List any books, experts, websites, or other sources you used to do this project

Appendix V

Sample Engineering or Invention report
Kingswood Science Fair Invention Project (3rd - 5th graders)

The Engineering Design Process

Nearly everything we use, work with, or wear is engineered. Someone had to think of how to design that object to solve a particular problem. Anyone can be an engineer! An engineer is someone who uses knowledge of science and math, and their own creativity to design objects or processes {inventions) to solve problems.

I. PROBLEM

Ask a question about an everyday problem you would like to solve. Inventions can be almost anything created to solve a problem or meet a need. Examples include pencils, cups, cell phones, processes to clean water or move heavy objects, etc.

II. RESEARCH

Research products/processes already available to meet a need or serve a similar function. To do your research, look online, visit stores, and interview experts as well as potential invention users.

III. POSSIBLE SOLUTIONS

Brainstorm possible solutions. Imagine a few different set-ups or designs. Compare and talk about the.positive and negative points of each idea. Do not just try your first idea, but choose the best one. Reach consensus on which idea is the best possible solution.

IV. PLAN & CREATE

A. **Draft Plan**: Make a plan and explain it. Draw a diagram and label the parts of your diagram. Use symbols to label the parts.
B. **Materials:** Make a list of the materials you would like to use for your invention and the amounts you will need. Collect the materials you will need for your invention. It is best to borrow, make, or use inexpensive materials.
C. **Build:** Build your invention according to your plan.
D. **Obstacles:** Keep a log of difficulties you run into and how you address them.

V. TEST & IMPROVE

A. **Test**: See if it works! Keep a data log of when and how you tested. Evaluate the results.
B. **Improve**: Gather information from the "test" of your first design to help find problems that need improvement. Improve your first design to make it better!
C. **Re-Test**: See if it works better! Add the new data to your data log to show the change.

VI. CONCLUSION & APPLICATIONS

Review how well your invention worked and how it might be useful to others.

Appendix VI
Poster Information
Kingswood Science Fair Display Information

DISPLAY BOARD MATERIALS: The display board must be sturdy and stand by itself on a table. Foam core-board and cardboard are the best materials. COLORS: If you need to paint your display board, enamel paint works best.

LETTERING: Your title and subtitles may be computer-generated or cut from construction paper. The title letters should be 3 to 4 inches high. The subtitle letters should be 1 to 2 inches high. All items on the display must be glued to the board. Do not use pins, tacks, staples, or tape.

DRAWINGS, PHOTOS, TABLES, AND GRAPHS: Drawings and photos are most useful on the display. Drawings should be drawn in pencil first and then retraced. Drawings should be in color and outlined in thin black felt tip pen. They may also be scanned from the computer. Tables must be displayed in a clear, organized form. Several tables or graphs may be included on one page, as long as the format is clear and easy to read. Tables and graphs must be used in the results section. Tables and graphs should be computer-generated. All tables and graphs must have explanatory titles. Graph axes must be labeled with a description of what each axis represents and the units being represented. If you have a camera, you should photograph your experiment's progress. A photo of you with your experimental set up is encouraged. All photos must be titled.

DISPLAY DIMENSIONS:

1. When the display board is laid open and flat, it should be no more than 48 inches wide.
2. Side panels should be 12 to 18 inches.
3. Height should be no more than 48 inches.

REPORT POCKET: There must be a "pocket" on the front of the display to hold your report.

DISPLAY ITEMS: Something that represents the project should be placed in front of the board. Examples include: equipment or materials used, models, artistic representations, samples, etc. There are endless possibilities - be creative!

SCIENCE FAIR PROJECT CHECKLIST

There are no tacks, pins, tape, or staples on the display board--- only strong glue. Make sure everything is secure. The student's *name and other required information* are on the back of the display board in the upper right hand corner. (See instructions for Title Page of report.)
The report is in a report cover with 3-hole fasteners. The report is in a "pocket" on the front of the display board with the student's *name and other required information* in the upper right hand corner on the outside of the cover. The student has the original report in the report cover and a *copy* at home. Any display items other than the display board and the report are in a paper bag with the student's *name and other required information* on the outside of the bag. Bring a UL approved extension cord for displays requiring electricity. Display items with many pieces (i.e. crystals) are not loose. They are in a display case or other "holder." No harmful materials or substances are part of the project display. The project is completed before bringing it to school.

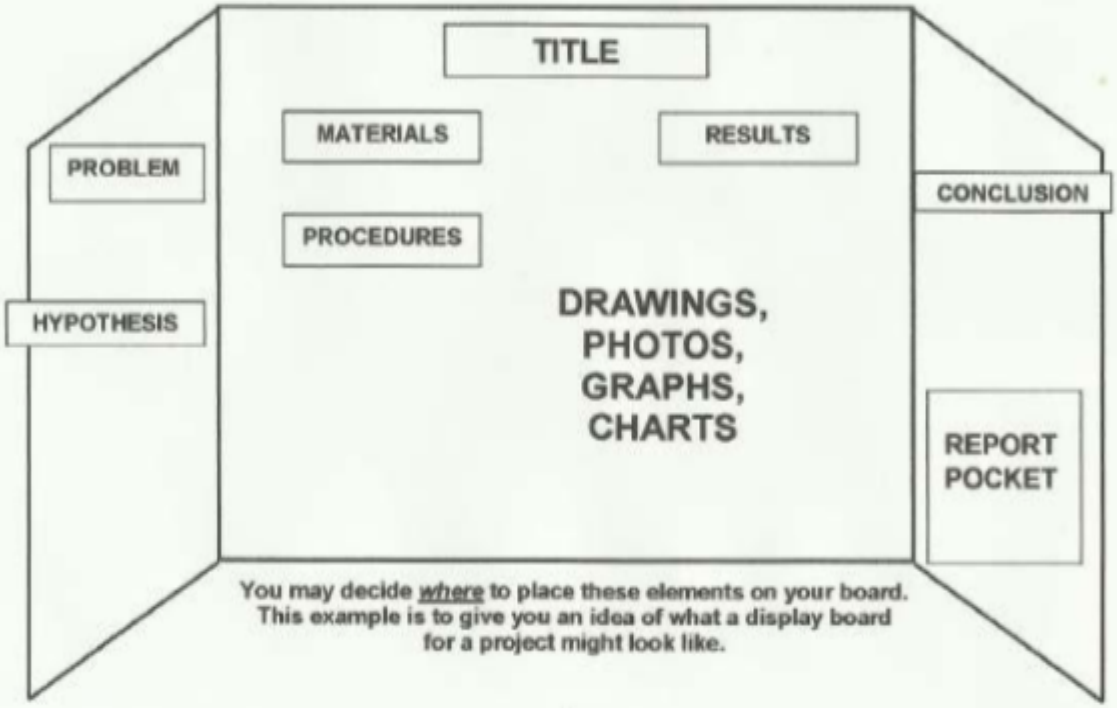
Appendix VII

Poster Information

DISPLAY SIZE & SET-UP

This page is also included in Student Information Packets.

FOR SCHOOL SITE AND LBUSD SCIENCE FAIRS



You may decide where to place these elements on your board. This example is to give you an idea of what a display board for a project might look like.

Appendix VIII

Poster Information