# Science Fair Project 2009-2010

Grades 3rd - 8th can either do an experimental or non-experimental project (however, the non-experimental project will not be able to continue on to the ACS1 Science Fair Competition).

Grades 9th - 12th can do an experimental, or an engineering project, or a non-experimental (however, the non-experimental project will not be able to continue on to the ACS1 Science Fair Competition).

**PLEASE BE AWARE THAT ONLY EXPERIMENTAL PROJECTS (3RD & 12TH) AND ENGINEERING PROJECTS (9TH – 12TH) CAN QUALIFY FOR ACSI COMPETITION**

- A project is experimental if a hypothesis is posed (a statement not a question), and the student's experiment was conducted by using the scientific method. Data/records were collected and analyzed. The solution to a problem was sought. Scientific Method is identifying the problem, forming a hypothesis (a tentative assumption made for the purpose of testing), doing background research (books, periodicals, magazines, pamphlets, etc.), conducting an experiment (observation, analyzing the procedure, recording data, and formulating a conclusion concerning the hypothesis.) When analyzing the procedure, you tell how it was done and what materials were used. ***All data should be recorded in a log book. A log book is a chronological record of the project's development; it should include the who, what, when, where, why, and how of each day's work. A log book must be a part of the project.*** The conclusion should be included as a statement as to whether the hypothesis was verified or nullified. It should also include statements of what further experimentation could be done to broaden the scope of the problem considered, or why results are inconclusive.

- A project is non-experimental if it does not meet the criteria listed under "experimental", in which case it may be a model, collection or demonstration. A model shows how various parts work together to accomplish the purpose for which they were designed. It includes a project, which explains how a manufactured item such as the internal combustion engine works, and how a created item, such as the leaf of a plant, functions. A collection is a project that classifies and displays items gathered from nature. It includes fossil, flower, rock collections, etc. A demonstration is an explanation of a principle or law found in physical creation or in mathematical realms, such as why objects appear to lose weight when placed under water.

- A project is an engineering project that identifies a need and/or problem; it conducts an investigation to meet the need and/or solve the problem. Data records are collected, analyzed, and reported. ***All data should be recorded in a log book. A log book is a chronological record of the project's development; it should include the who, what, when, where, why, and how of each day's work. A log book must be a part of the project.*** The student presents the model used to meet the need or solve the problem.

- See attached "Project Requirements", "Sample Project Plans", and "Project Checklist" for additional information.

C. Display/Project Information

1. Title/Topic

a) Topic

(1) A good project is one that is chosen to fit your interests and abilities, so the time you spend selecting a topic is very important for your future success. *You will be working with this project for a long time.*

(2) Do not choose a topic that you will be unable to do, or a topic that requires equipment that is too costly to obtain. Stay within your abilities and means. Sometimes, equipment can be borrowed from a teacher or a friend, but you should check before choosing your topic.

(3) Be sure that topics encompassing sensitive issues are dealt with from an appropriate Christian perspective, and avoid any topic that may be offensive.

(4) Consider the following suggestions:

(a) Look through the project topic ideas listed in this handbook.

(b) Examine scientific magazines and textbooks for labs and problems.

(c) Read current-affairs magazines for possible ideas.

b) Title

(1) Use a question format.

(2) Make it short, yet descriptive, conveying specific information about your project.

2. Abstract

An abstract is a summary and description of what was done and what happened as a result (250 words or fewer).

Example: "Three brands of tennis balls were tested to determine which one retained its bounce over the longest period of time. The balls were regularly bounced over a five-week period. Of the three brands tested—Brand A, Brand B, and Brand C—Brand B retained its bounce best."

3. Background information, including research

a) Include a problem and a hypothesis, presented separately.

(1) State the problem in one sentence. It is the question you set out to answer.

(2) The hypothesis predicts what you believe will happen.

4. Experimental design/Engineering design and hypothesis

Include a drawing or diagram of the project.

5. Results including tables and graphs of data

Include a graph, table, or picture with an explanation, pointing out comparisons or trends.

6. Conclusions

a) Specifically state whether the hypothesis is correct and if not, state the changes that are needed to attain desired results.

b) State what further experimentation could be done to broaden the scope of the problem.

## 7. This section does not apply to Texas Christian School projects.

8. Logbook

The logbook is the history and the record of progression of your science project. It begins the first day you receive the assignment and ends the day you turn it in. It is a diary for your science project. Every time you work on your project, you need to record your work in your logbook. When your experimentation begins, you will refine your procedure in detail and write it out in your logbook, step-by-step, drawing and labeling any apparatus you use and explaining how all the variables are controlled.

If you complete an experimental or engineering project, you must include the ACSI Project Approval Form in your logbook, as well as any other necessary ISEF forms.

Consent forms are required for photographs of individuals as well as for behavioral studies. These signed consent forms must be placed in the logbook.

Your data is first taken in your logbook. Your results are first formulated in your logbook. Resulting data will be summarized in your written report.

Everything you do on your project is in your logbook!

*Remember: From start to finish, everything must be in your logbook. Keep the book neat and clean. It will be displayed with your project at any fair you attend.*

9. Examples and Equipment (adhere to safety standards)

Adhere to safety standards regarding the equipment, samples, and other items from your experiment.

10. Biblical Application/Illustration

Each project must include a related biblical application/illustration, and it must be included on the visual display. The student should demonstrate an understanding of this application/illustration in the written and oral presentations.

11. Photographs and/or Diagrams

Photographs and/or diagrams should be included in the logbook or on the display to demonstrate the experimental process.

12. Project Forms

The ACSI Science Fair follows the guidelines and rules of the International Science and Engineering Fair (ISEF) to ensure safe, approved projects.

a) The ACSI Project Approval Form, required for all entrants, replaces ISEF Forms 1–3.

b) The following ISEF forms may be necessary:
- Human Subjects Form (4)
- Vertebrate Animal Form (5)
- Human and Vertebrate Animal Tissue Form (6)
- Continuation Projects Form (7)

c) The ISEF Forms can be accessed at www.societyforscience.org/isef/.

13. Engineering

Engineering projects are investigative in nature and design and use a modified scientific method. An engineering project often answers the question, "What are the effects of A on B?" Engineering projects generally seek broad answers to problems involving physical or engineered systems. Because they do not lead to yes/no answers, it is often difficult to formulate a hypothesis for an engineering project. The project often involves the use of constructed equipment, instruments, or tools in the investigation. The results of the inquiry are the goal, rather than proving or disproving a hypothesis.

a) Define a need or a problem.

b) Develop design criteria. Equipment, instruments, or tools are devised to assist in the investigation.

c) Search literature to see what has already been done to meet this need.

d) Prepare preliminary designs. A plan of investigation should be developed, including provision for data taken at the null condition to serve as a control.

e) Build and test a prototype. The equipment is used to conduct the investigation according to the plan.

f) Record data, and make observations.

g) Analyze data (statistical methods can often be to determine the results).

h) Draw conclusions from the results to provide answers to the problem.

i) Retest and redesign as needed and desired.