# Science Fair Information

This section includes teacher information, student information that can be printed as a booklet, and additional pages that may be helpful.

# Science Fair Teacher Resource Packet

## Parts of a Science Fair Project

**Logbook:** The logbook is a record of everything that the student did throughout his project. This includes recording how he chose his topic, how he set up his project, information collected through research, and any data collected during the experiment. It also includes his thoughts, his ideas, any changes made to the project, and the results of the project.

**Written Report:** The written report describes the purpose, procedure, results, conclusions, and reference sources, as well as acknowledging any assistance or donated supplies.

**Display:** The display is a visual presentation of the student's project. It should include the title of the project, the hypothesis, descriptions or illustrations of equipment used in the experiment, the procedure, results, any graphs, charts, or photos, and a Bible application.

## Guiding the Development of a Logbook

Discuss your preferred parameters with the students as they choose their logbook. They will need something that they can continue to use for several months. Bound notebooks, journals, or spiral-bound index cards will work fine. Loose-leaf notebook paper can easily be mixed up, and important pages could be lost.

Each logbook should include the student's name and the project title. You may choose to have the student also include his address, phone number, or other contact information in case the notebook is lost. However, some science fairs require each student to be identified by project number and not by name to help the judges make an impartial evaluation of the project. If this is true for your science fair, then the student would not write his name in his logbook.

Remind the students that, although the logbook should be neat and legible, they should not erase information. If changes need to be made to ideas, variables, or procedures, the information that is no longer pertinent should be neatly crossed out, not erased.

## Guiding Topic Selection

Give the Science Fair Information pages to the students. Discuss their favorite areas of science after they read the section about selecting a topic.

Direct the students to list in their logbooks the areas of science from which they would like to choose their topic. After thinking about possible topics, they should narrow down the list to one or two fields of interest. Provide textbooks, trade books, and periodicals to stimulate their thinking. Refer to www.bjupress.com/resources for websites that list ideas for science fair topics. Many websites also give guidance about how to do a science fair project.

Challenge the students to choose one field of interest to investigate further and to identify a specific topic.

**Notes**

## Developing Good Research Skills

Guide the students in the process of developing a good research question, or problem. This should be the first step in researching their topic. Discuss examples of good and poor questions.

Direct the students to write several possible questions about their topic in their logbooks. Evaluate the questions to see whether they meet the criteria for a good question. You may choose to use the Science Fair Research Question/Problem Rubric to evaluate their questions.

Provide a list of resources for researching topic information, such as local libraries, the Internet, high-school science teachers, science specialists from colleges and universities, or business people. For example, if the topic is on pest control, a technician at a pest-control company or at a chemical company may be willing to provide information. Some stores or businesses may be willing to donate supplies.

## Using the Scientific Method

Refer the students to "Following the Scientific Method" on pages 5–7 in their information. Discuss the information with the students. You may also wish to review scientific method information given in other sources, such as textbooks or websites. The scientific method is taught in *Science 6* Lesson 4.

## Organizing Data

Review how to make graphs and charts as needed. Display and explain several examples of graphs. Each type of graph can be used to show different kinds of information. Both line graphs and bar graphs show comparisons. A bar graph often shows how variables change with certain conditions or how variables change over a period of time, such as months or years. A line graph often shows how variables change over time and can imply a continuous change. A circle graph, or pie chart, shows the parts of a whole.

## Developing a Good Display

Provide examples of good displays. These are often available in reference books. Discuss what makes the examples appealing and helpful. You may choose to use your classroom bulletin boards to illustrate good displays.

Discuss the important elements that need to be included on the display. Provide practice and assistance for students as needed. They will need to decide how they will present their experiments. For some, this may mean displaying pictures, a home video presentation, or the actual results of their experiment if possible.

Remind students that their reports should be part of their displays. They may also need guidance in putting together their report.

## Evaluating the Projects

Explain that the judges' scores may differ from your opinion and the scores that the students received on their rubrics. A sample judging evaluation sheet is included.

Each student should be prepared to explain his project orally to the judges. You may choose to have the student present his project to his classmates to help him practice this. You may want to encourage the student to have a short speech prepared or at least to be able to answer any questions the judges may ask. Each student should be prepared to explain how he came up with his idea, the procedures he followed, and the results of his experiment. Additionally, the student should be prepared to explain to the judges any problems he encountered, any help he received, what he learned, as well as any other aspect of the project.

As part of his training in public speaking, the student should be encouraged to dress nicely and show proper manners while addressing the judges. The student should be encouraged to stand and use good eye contact while speaking to the judges.

# Organizing a Science Fair

If you are organizing a science fair, there are many things that you will need to consider. The following checklist should help your planning.

## About 9 Months Before the Fair:

☐ Recruit volunteers, such as teachers and parents, to form a science fair planning committee. Divide the planning committee into two smaller committees. One committee will coordinate the judging and awards, and the other committee will coordinate the setup and takedown of the science fair.

☐ Determine a date for the science fair. Check school calendars and other organizational calendars as needed. Consider the dates of other regional or national science fairs that students may choose to enter. Saturday is a good day for the event because more parents and friends can visit the fair.

☐ Plan a science fair calendar. Work backwards from the date of the fair and make a timeline of dates for students to complete each step of the process. Set a date for registration, for choosing a topic and developing a procedure, and for making the display and writing the report. You may choose to have younger students bring in their projects a few days early and have a practice fair in their individual classrooms.

☐ Determine a registration fee and budget for the science fair. You may want to charge a small registration fee per exhibit or per family to offset the costs of building rental, printing, awards, and honorariums for the judges.

☐ Choose a location for the science fair. You will need a large room or building that has multiple electrical outlets. The room needs to be large enough for people to walk about and view the displays without worrying about knocking something over. A gymnasium works well if you can provide enough electricity with extension cords.

☐ Decide which grade levels will participate. Consider whether participation will be required or voluntary.

☐ Determine prizes that will be awarded. You may choose to use ribbons, medals, or certificates. You may want to provide participation certificates for all the students. Some stores or businesses may be willing to donate larger prizes. The judging committee coordinates getting the awards.

☐ Determine who will guide students in preparing their science fair projects. You may choose to have the classroom teachers guide their students, or you may choose to have some parent volunteers available to help. Determine how much class time will be spent on the projects. It is not unreasonable to devote one class period per week to project preparation during the most active development phase.

☐ Set guidelines for the types of projects and materials that can be used in the science fair.

☐ Prepare information for the parents regarding the rules, dates, and amount of parental involvement. Include examples of how parents can help the student and what the student is expected to do on his own. You may want to include a cover letter from the school principal. Send this information home at least six to seven months in advance.

☐ Design and make registration forms.

☐ Use a computer spreadsheet program to help you keep track of registration information. Update this file as you collect registrations and fees.

**Notes**

## About 7 Months Before the Fair:

- [ ] Announce and promote the science fair. Provide registration forms. If your school has a website, you may choose to post a registration form or other science fair information on the school website. Make the science fair sound fun and interesting.

- [ ] Collect registration forms and fees. Continue to accept registrations until about one or two weeks before the date of the fair. Assign numbers to student projects as registration forms are turned in.

- [ ] Meet with the science fair volunteers or classroom teachers. Be sure that each teacher or volunteer has a list of the requirements and dates for the science fair. Explain how they can help the student prepare his project. A good project will take the student about three to six months to complete.

- [ ] Contact the judging committee to discuss recruiting judges. Two or three judges may suffice, depending on the size of the fair. Do not require a single judge to evaluate more than 25 projects if student interviews are included. At least two judges should evaluate each project. Each judge should be a professional in an area of science. A good choice would be a doctor, a college science teacher, a chemist or another business person whose job involves science, or a college student majoring in science. If you have a large science fair, you may need to have two or three judges for each science field. The judging committee should prepare a recruiting letter to send to prospective judges. Someone from the judging committee should follow up the letter with a phone call. This committee also needs to prepare information about the science fair guidelines and judging rubrics. A sample judging sheet is included.

- [ ] Meet with the setup committee. This committee should reserve the room or building for the date of the fair. You may wish to reserve it for additional days to allow displays to be set up before the fair day or to be viewed before or after the science fair. The setup committee will also be responsible to secure tables, chairs, extension cords, signs, and other materials needed for the fair. Possible signs could indicate grade levels or science areas or give directions such as "Please do not touch" or "Refreshments available at the concession stand." Signs can also show judges and parents where to go.

**Notes**

## About 5 Months Before the Fair:

☐ Check with the judging committee to discuss the status of judge recruitment. Also, ask them to order or purchase the awards. Review the judging guidelines and rubrics that this committee has prepared. Send that information to the judges. Discuss and determine compensation for the judges.

☐ Create a schedule for the day of the fair.

☐ Meet with the setup committee. Discuss the layout of the fair. Allow adequate space for each student's display. Half of an eight-foot table is usually sufficient to set up a project. Provide chairs so the students can sit while they are waiting for the judges. Make a floor plan for the science fair displays.

☐ Plan an awards program. Remember to provide a time for everyone to view the winning exhibits and their ribbons after the program.

## About 3 Months Before the Fair:

☐ Confirm the judges with the judging committee.

☐ Obtain supplies for the judges: clipboards, pencils, judging rubrics (two for each student), copies of the fair schedule, name tags, and award summary sheets.

☐ Check with the setup committee. Give them an estimate of how many tables and chairs they will need. Check fire-code guidelines for the proper use of extension cords.

**Notes**

## The Month of the Fair:

- ☐ Stop registration one to two weeks before the fair.
- ☐ Pick up awards. Prepare participation certificates.
- ☐ Assign each student project to a display spot on the floor plan.
- ☐ Check with the setup committee. Review the floor plan with the committee. Give them the number of tables and chairs needed. Confirm the availability of the reserved room or building.
- ☐ Ask someone from the judging committee to contact the judges and remind them of the fair.
- ☐ Recruit volunteers to help during the fair. These volunteers could hand out programs, check in contestants, provide refreshments for judges and contestants, or help with the awards ceremony.
- ☐ Make an alphabetical list of participants in grade-level order. You may also choose to arrange the list by science content area.
- ☐ Print programs for the fair. The programs should contain a map showing the location of projects by group.
- ☐ Pick up signs needed for the fair.
- ☐ Make labels for the judges' clipboards and the tables.
- ☐ Obtain supplies for the day of the fair.
- ☐ Obtain a camera to take pictures.
- ☐ Plan and organize refreshments for the judges.
- ☐ Set up tables, chairs, and electrical equipment before the students bring in their projects.

## Notes

## The Day of the Fair:

- ☐ Review judging criteria and assignments with judges.

- ☐ Have volunteers check in participants and assist in setting up projects. Other volunteers can hand out programs or assist with refreshments.

- ☐ Take pictures.

- ☐ Follow the schedule of the day. Make announcements as needed.

- ☐ Begin the awards ceremony when judges have finished judging and have tallied the scores.

- ☐ Keep a record of any finalists who may move on to another science fair.

- ☐ After the awards ceremony, have volunteers and parents help clean up. Keep student projects on display if possible.

## After the Fair:

- ☐ Send thank-you notes and/or compensation to judges and volunteers.

- ☐ Tabulate the financial report and fair attendance.

- ☐ Discuss ways to improve next year's fair.

**Notes**

# Science Fair Research Question/Problem Rubric

Name _____

_____
Title

| Category | Possible points | Points earned |
|---|---|---|
| Problem is written as a question | | |
| Question is specific | | |
| Question indicates the subjects to be studied | | |
| Question includes the variables to be tested or observed | | |
| Question stimulates curiosity | | |
| Problem reflects proper use of grammar and spelling | | |
| | | |
| **Total** | | | **Grade** |

**Comments:**

# Science Fair Display Rubric

Name _____

_____
Title

| Category | Possible points | Points earned |
|---|---|---|
| **Materials**<br>Display uses sturdy construction material | | |
| **Appearance**<br>Display is attractive, organized, and understandable<br>Color is used appropriately<br>Display demonstrates an appropriate amount of work done by the student | | |
| **Presentation**<br>Title, problem, hypothesis, data, and conclusions are clearly displayed<br>Display presents information that is sequential and complete<br>Display includes charts, graphs, or other illustrations | | |
| **Logbook**<br>Display includes a detailed logbook | | |
| **Written Report**<br>Display includes a well-written report | | |
| **Biblical Application**<br>Display includes an appropriate biblical principle, truth, or application to the project | | |
| **Grammar & Spelling**<br>Display reflects proper use of grammar and spelling | | |
| | | |
| **Total** | | | **Grade** |

## Comments:

# Scientific Method Rubric

Name _____

_____
Title

| Category | Possible points | Points earned | |
|---|---|---|---|
| **Problem**<br>Problem is clearly stated | | | |
| **Variables**<br>Chosen variables are logical and appropriate | | | |
| **Hypothesis**<br>Hypothesis is a testable statement | | | |
| **Procedure**<br>Procedure is described in a logical sequence<br>Procedure includes explanation of how variables are controlled<br>Data is collected and recorded in a consistent and orderly fashion | | | |
| **Conclusions**<br>Conclusions are logical and are based on the results of the experiment | | | |
| **Grammar & Spelling**<br>Presentation reflects proper use of grammar and spelling | | | |
| | | | |
| **Total** | | | **Grade** |

## Comments:

# Science Fair Judging Form

Project number _____

_____
Project Title/Subject

| | Incomplete | Unsatisfactory | Acceptable | Commendable | Outstanding | Comments |
|---|---|---|---|---|---|---|
| **Display** | | | | | | |
| **Scientific Merit (32 points)** | | | | | | |
| Problem or purpose is clearly stated. | 0 | 1 | 2 | 3 | 4 | |
| Hypothesis is stated. | 0 | 1 | 2 | 3 | 4 | |
| Procedure is explained clearly. | 0 | 1 | 2 | 3 | 4 | |
| Materials are displayed. | 0 | 1 | 2 | 3 | 4 | |
| Variables are properly communicated. | 0 | 1 | 2 | 3 | 4 | |
| Repetitions were performed to verify the experiment results. | 0 | 1 | 2 | 3 | 4 | |
| Results are shown. | 0 | 1 | 2 | 3 | 4 | |
| Conclusions are stated. | 0 | 1 | 2 | 3 | 4 | |
| **Records and Research (15 points)** | | | | | | |
| Logbook record is thorough, including a step-by-step description of the plans and procedures used to accomplish the project. | 0 | 4 | 6 | 8 | 10 | |
| Written report is included with the project. | 0 | 2 | 3 | 4 | 5 | |
| **Biblical Application (5 points)** | | | | | | |
| Biblical references, truths, and applications are related to the scientific study. | 0 | 2 | 3 | 4 | 5 | |
| **Layout (20 points)** | | | | | | |
| Display is well constructed, neat, well laid out, and attractive with an appropriate amount of work done by the student. | 2 | 4 | 6 | 8 | 10 | |
| Presentation of information is sequential and complete. | 0 | 2 | 3 | 4 | 5 | |
| Good spelling and grammar are evident. | 1 | 2 | 3 | 4 | 5 | |
| **Interview (28 points)** | | | | | | |
| Knowledge and understanding of concepts are evident. | 0 | 3 | 6 | 9 | 12 | |
| Conclusions and applications from findings are logical. | 0 | 2 | 4 | 6 | 8 | |
| Discussion of the topic is communicated with confidence, clarity, and enthusiasm. | 0 | 2 | 4 | 6 | 8 | |
| **Overall Rating** | | | | | | |