The Intel International Science and Engineering Fair website, explains thoroughly why a Science Fair is worth all the time students and teachers put forth. Our Science Fair:

1. integrates, into one functional activity, virtually all of the skills and arts that are usually taught separately. When brought to completion, the project is an amalgamation of reading, writing, spelling, grammar, math, statistics, ethics, logic, critical thinking, computer science, graphic arts, scientific methodology, self-learning of one or more technical or specialty fields, and public speaking and defense in front of expert judges.
2. allows students to teach themselves, to take from the established information what they need to discover something exciting and new, and to identify and choose the tools that they need to conduct and conclude their project.
3. yields mature, self-confident, skilled, and competitive young leaders who have career goals and the preparation, discipline, and drive to attain them.

**Due Dates**

- Proposal - 9/12/08
- Proposals returned - 9/22/08
- Late Proposals - 9/29/08
- Forms - 9/29/08
- SRC/IRB Committee Meeting - 9/30/08
- Earliest Start Date- 10/1/08
- Funding requests - 10/8/08
- Introduction - 10/24/08
- Extensions - 11/17/08
- Record Book - 11/17/08
- Results and Conclusions - 12/5/08
- Abstract - 1/7/09
- Display Board, draft - 1/12/09
- Final Display Board - 1/16/09
- Sayre Science Fair - 1/21/09
- Fayette County Fair - Saturday 2/7/09
Science Fair: Independent Research

**Getting Started**
Many students feel overwhelmed by the idea phase of the Science Fair Project. The most important questions to ask yourself are: “What do I like to do?” or “What are my hobbies?” These questions can help you focus on a project that you enjoy. There are many webpages that may help you determine a project, but we recommend a few specific sites:

*Science Buddies.* Take this [quiz](##) to learn about topics that might interest you.

*MiniScience.* Read about the basics of [What Makes a Good Project](##).

*Cyber Fair.* Read about different types of [scientific studies](##) and experimental errors.

*KidSpace:* Read [Start to Finish:](##) taking you through all the steps

*Vernier:* Read about [innovative uses](##) of probes and check the [list of probes](##) Sayre has.

Your experiment must fall into one of the following categories:

- Animal Sciences
- Behavioral and Social Science
- Biochemistry
- Cellular and Molecular Science
- Chemistry
- Computer Science
- Earth and Planetary Science
- Engineering
- Energy and Transportation
- Environmental Management
- [Environmental Science](##)
- Mathematical Sciences
- Medicine and Health
- Microbiology
- Physics and Astronomy
- Plant Sciences.

Take a look at the [Intel webpage](##) to determine what these categories encompass. You may not begin experimentation until October 1 after the Committee approves your project.
Project Advice:

Please Do:
- Think about activities you enjoy or hobbies that you are involved in.
- Attend one Tuesday Help Session to talk with a science teacher about an appropriate project.
- Consider finding a solution to something that bugs you. Check out the Louisville Center.
- Conduct research on your topic. You will need at least five sources for the introduction.
- Be aware that working with humans and other vertebrate animals is often more difficult than you would think. Maintaining appropriate constants during the experiment and determining a control group can be challenging. These projects also have their own set of rules and guidelines.
- Read the appropriate sections of the International Science Fair rule book (see page 4)
- Be aware that culturing bacteria is one of the most expensive projects, even if you request funding from the Science Department it will require a significant financial investment on your part. These projects also have their own set of rules and guidelines.

Please Don’t:
- Please do not take a project directly from the Internet.
- Please do not choose a project that is below your grade level. We know what will happen in experiments dealing with heart rate and music, Sprite on plants, amounts of fertilizer on plants, different types of learners, distance golf ball flies, height of a ball bounce, etc. We know you are capable of a better project and will help you design one.
INTERNATIONAL SCIENCE AND ENGINEERING FAIR (ISEF) RULES AND GUIDELINES

Read the International Science Fair rules for all projects, and adhere to the ethics statement. “Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include plagiarism, forgery, use or presentation of other researcher’s work as one’s own and fabrication of data. Fraudulent projects will fail to qualify for competition in affiliated fairs or the Intel ISEF.”

Before experimentation begins on October 1, a Scientific Review Committee (SRC) will review and approve your project. This Committee composed of a teacher, administrator, veterinarian, nurse, and psychologist will review your project to ensure that you abide by the ISEF guidelines and your project will not endanger the life or well-being of you, another human, or a vertebrate animal. Look at the appropriate sections of the Rules Book.

- If your project involves the use of humans read the following guidelines.
- If your project includes testing non human vertebrate animals (such as fish, mice, rabbits, etc) read the following guidelines.
- If your project includes testing potentially hazardous biological agents (such as bacteria, mold, organisms in pond water) read the following guidelines.
- If your project includes testing hazardous chemicals, activities, or devices (such as flammable substances, racing cars, projectiles, etc.) read the following guidelines.
- If this year’s project uses any of the information from last year’s project, read the Continuation of Project on page 10 of the rule book.
GROUP WORK

• You may choose your own partner. Select carefully, as you will be working with this person for a significant amount of time. You want to be certain that this individual will devote his/her share of effort to the project.
• If you choose to work with a partner, when you submit your proposal, you are committing to working with that person throughout the project. You may not switch partners or may not choose to work on your own after the proposal has been approved.
• As a team, you only need to submit one copy of each assignment. Be certain that both names are included. If you are working with a student who has a different science teacher, let both teachers know, so the teachers can decide who will grade the project. All work must be turned into the same teacher.
• Each partner will receive the same grade for their work. Be sure that you are both satisfied with the quality of your efforts.
• During the science fair, both partners will participate in the judging and interview.

TIME LINE

A successful science fair project need not be expensive or even time-consuming. However, it does require some planning and careful thought. Projects become frustrating to students, parents and teachers when they are left to the last minute, preventing you from developing them as fully had you expended sufficient time on the project. You cannot rush good science, so start early. Take a look at Intel’s Science Fair Checklist to know why you need to begin as soon as possible.
**Science Fair: Independent Research**

**Proposal: Due September 12, 2008**

You need to complete a proposal and determine if you will be working in a group or alone (see page 5). If you need help with the proposal you can ask a scientist at Science Buddies (be sure to read the dos and don’ts) or read the Intel Website for explanation of variables. Make sure your project is not a brand study by taking this quiz.

- **Title:** Come up with an interesting, specific and informative title.
- **Independent Variable (IV):** Select one measurable independent variable to manipulate.
- **Dependent Variable (DV):** Result of the manipulation of the IV. Must be measurable.
- **Hypothesis:** A statement that follows this format: If I change the independent variable, then the dependent variable will change in this way.
- **Control:** Identifies the one setup of the experiment that is the standard for comparison.
- **Constant:** Identifies all conditions maintained throughout the experiment.
- **Timeline:** A dated list which outlines a plan for completing the project (See page 5).
- **Methods & Materials:** The methods section is written in complete sentences and tells the reader exactly how you will set up and perform the experiment. Be sure to explain the procedure for collecting all the data. For a science fair, it is appropriate to list the steps to be followed during the experiment, including all safety requirements. This list is not written in past tense until you have completed the project. The materials section is a listing of all materials to be used in the experiment. An experiment requires multiple trials to be acceptable. Fill out this proposal form and use the Scoring Guide to make sure that you have fully completed the proposal.
**Unapproved Proposal**

If your proposal is not approved by the September 12 deadline, the four science teachers will be in their rooms from 2:30 until 3:00 Tuesday September 23 to help you with your idea. Your teacher will not give you a science fair project, you must come prepared with topics that interest you, and your teacher will help you create a project that will interest you. You must have an approved proposal by September 29.

Failure to meet this deadline will result in a zero for this component of the science fair process. Students must have an approved proposal before any future component of the science fair can be evaluated. Each time you turn in a proposal after September 12, your teacher will reduce the grade you receive on this assignment. Exceptions will be evaluated on a case-by-case basis.
FORMS: DUE SEPTEMBER 29, 2008
The National Science Fair requires that you fill out a set of forms to make sure that you are not going to hurt yourself, another person, or any vertebrate animals. Once you have an approved Science Fair Proposal, you must complete the required International Science Fair forms and deliver them to your teacher by September 29, 2008. Your teacher will keep these forms on file until the Regional Fair. If you are chosen to present at the Regional Fair, you must take these forms with you.

All projects require the following forms attached to the original and a corrected proposal.
- Approval form (1B)
- Risk Assessment form (3)
- Checklist for adult sponsor (1)
- Student checklist (1A)

The Scientific Review Committee will meet on September 30 to review your forms and proposal. You must have the required signatures on these forms before the committee meets. Since the members of this group are not Sayre employees, the committee will only meet once. If you do not have your forms completed by September 30, you will not be able to compete in the County, Regional, State, or International Fair. Please begin filling out these forms early, so that you have time to get all the appropriate signatures. You, your parent, and supervising scientist must read the roles and responsibility section of the rule book.
FUNDING: DUE OCTOBER 8, 2008

As you plan your project, you must consider the materials that will be necessary for you to collect data. Please realize that the science department has a considerable amount of equipment that you may use throughout your experiment. The science department has limited funding available to students to help them purchase equipment or supplies that may be expensive or that may not be readily available.

The funds are available on a first come, first awarded basis. The earlier you submit your request, the more likely it is that your project will be funded. When your proposal has been approved, and you have identified which materials you will need, you may fill out this funding form. The science department will meet to discuss funding requests. This list of science supply companies’ websites will help determine price of materials.

You should work to limit your request to less than $50.00 per project. If the materials that you need cost more than $50.00, you have two options: you may cover the price above $50.00, or you may volunteer your time serving in the science classrooms. In recognition of your efforts, you may earn $10.00 of credit for every hour that you serve, up to an additional $50.00 for your project. These hours may not be counted for your service learning projects.
**Introduction (Background Research): Due October 24, 2008**

The Introduction of a scientific paper is organized to move from general information about your topic to specific information about your project. The International Science Fair requires at least five sources for background research. Be sure to summarize the sources succinctly, and take care not to go too far afield in providing background information; limit the introduction to studies that relate directly to your experiment and will help you perform your experiment. The last sentences of the introduction should be a statement of objectives and a statement of your hypotheses.

You should write three to five paragraphs or about a page typed. You must cite at least five sources in the introduction section of your paper. Here is an example of an Introduction.

Fill out the Introduction form, and use the scoring guide to make sure that you have fully completed the introduction.
**Record Book with Data: Due November 17, 2008**

Dated record books outlining the purpose of the project, procedures used, source of data & information should be available for examination during the Science Fair. Keep a detailed journal of observations, data, and results. Your journal should contain data measurements and written notes about what you are observing about your experiment.

**Photograph your project results or phases of the project to help explain your experiment on your display board.**

Take a look at Science Buddies examples of lab notebooks for additional information. Use the scoring guide to make sure that you have completed the entire Record Book phase.

**Extensions**

This process is NOT intended to give students who have not started their project additional time. Even though you have started early, some of you may find that your long term project will not be completed by this record book deadline. If you need extra time, you must file an extension to your teacher by November 17. To file an extension, turn in your record book (to show your teacher that you have started) and fill out this form. If your teacher approves your extension, you must turn in your completed record book and the results and conclusions on December 5. Projects requiring additional time past December 5 will be looked at on a case by case basis.
Results and Conclusions: Due December 5, 2008

The results tell the reader what occurred during the experiment. This statement might seem obvious, but it is important that the reader understand the outcome of the investigation. Include data tables and graphs in this section when appropriate. If you need to use Microsoft Excel to graph your results, use this graphing tutorial to help you. Your results section verbally tells the reader what is shown in the data figures. Any calculations performed should also appear; however it is sufficient to show one example of each calculation. The results section must be in paragraph form.

The conclusion is the most important section and should be the most developed. Be sure to carefully think and analyze the data which you observed.

- Compare the hypothesis to the results; do the data support or reject the hypothesis?
- What could you revise in the methods to improve the experiment?
- What might cause the relationship between the dependent variable and the independent variable?
- What questions were raised; are there more scientific tests that could be performed?
- If any statistical tests were performed, be sure to include a discussion about them.

Fill out this form and use the scoring guide to make sure that you have completed the entire results and conclusion phase of the science fair.
Abstract: Due January 7, 2009

Scientific reports begin with an abstract, a summary of the entire article. You will need to place an abstract on your display board in a prominent location. An abstract is the perfect paragraph in science and should be no more than 75 words or 8 sentences. Begin with approximately 2 sentences on the introduction, 2 sentences on the methods, 2 sentences on the results (no graphs) and 2 sentences on the conclusion.

- **Introduction**: Give background information to a reader who may not be familiar with the topics of your experiment. You should begin with the general pertinent information about the subjects in the investigation, and then move into more specific information such as the hypothesis.
- **Methods**: give an abbreviated version of your methods.
- **Results**: give the overall picture of the outcome.
- **Conclusion**: explain whether your hypothesis was supported and explain what might cause the relationship between the dependent variable and the independent variable.

Fill out the Abstract form , and use the scoring guide to make sure that you have fully completed the abstract.
Display Board: Due January 12, 2009.

Your science fair project must be displayed on a tri-paneled board. The board must include an abstract for your experiment (see page 13). Your board must follow the guidelines set out by the International Science Fair.

Displays are important. Think about neatness, size, ease of reading, and graphics. Make both your name and the hypothesis prominent on the board. Do not place the entire results and conclusion sections on the board, these sections belong in the journal. Summarize your results in graphical form, and summarize the conclusion. Science Buddies has examples of what makes a great display board.

- Make sure that you read the section on appropriate fonts for your board. You may not hand write your board.
- Be sure to spell check and think about appropriate use of words like trail vs trial, affect vs effect.
- All resources and photographs must have a bibliographical citation. If you took your own photographs you must indicate as such on the board.
- Your board will be peer reviewed during class and the corrected final board is due January 16, 2009.

ShowBoard sells an electrostatic board (designed by a student who entered it in the International Science Fair). This board allows you to place paper and photographs on the board without tape or glue, and you can rearrange the sections with ease. These boards are $40 and can be reused for each of the three science fair projects you will conduct while in the Upper School.
Science Fair: January 21, 2009

All entries will be displayed during Sayre’s Science Fair on January 21, 2009. Projects will be evaluated and awards given to exceptional projects.

A committee of judges will evaluate the projects on three criteria – originality, complexity, and presentation. This committee will determine the award winners for the categories represented by the Fayette County Science Fair. Additionally, an award will be given to the best project in each grade level. And from these category and grade level winners, a Best-in-Show award will be given. Science department faculty will select the projects eligible for entry in the Fayette County.

Use the scoring guide to know how the judges will score your project. Go to ScienceBuddies to learn how to prepare for the science fair and what scholarship opportunities await the winners.

If your outstanding project is chosen to move on to the State Science Fair and you choose to compete, you will be given two dress down days and a pizza party. If your project advances to the International Science Fair, you will not be required to take your science final exam. There are monetary awards given out by the County, Regional, and State Fair.