Eagle's Landing Middle School

SCIENCE FAIR INFORMATION PACKET GRADES 6-8

TABLE OF CONTENTS

I. Requirements

To successfully complete the requirements for this project, you must conduct an investigation in which you:

- Select a problem that you will attempt to solve
- Collect background information and write a summary of this information
- Form a hypothesis
- Plan and carry out a procedure for testing your hypothesis
- Describe your results by recording data collected and observations made
- Appropriately display your results
- Form valid conclusions
- Discuss possible applications for the information you have earned
- Tell what further research might be done on your topic
- Tell what help you received from consultants, parents, teachers, other students
- Report to the class by way of an exhibit and presentation describing your work

II. Calendar / Critical Dates

The following dates should be considered "on or before" the date listed. No deadline is to be extended beyond this date or late penalties will apply per teacher's late work policy.

Critical Dates	Item/Event Description
	Deadline for students to return their SIGNED parent permission letters
Please look in Appendix I for the exact dates for the current school year.	Deadline for logbook purchase.
	Topic Deadline/Topic Approval. Checkpoint #1 Worksheet Due
	Last day for students to begin background research
	Final day for the construction of a Hypothesis (teacher should approve)
	Deadline for 3 STATE required forms (checklist for adult sponsor, research plan 1A, approval plan 1B)
	Checkpoint #2 Worksheet Due (Required County Grade)
	Final day for the development of the initial experiment plan (teacher should approve)
	Final day for students to begin experiment
	Rough Draft Due (including cover-page, partial abstract (excluding results), table of contents, introduction, background information, hypothesis, procedures, and materials. Students should exclude results from experiment, as they may still be experimenting)
	All Science Fair experimentation should be done
	During this time: Tri-Panel Display, logbook and formal report are due to teachers, all projects should be presented to the class, and graded as well.
	Individual School Science Fairs (schools may decide on December dates, if they wish)
	Projects may be set up at the annex on Friday afternoon before the fair or if students are unable to do it then, they may set up on the morning of the fair
	Set-up, judging and interviews
	Henry County School System Science Fair Award Ceremony and Project Removal
	University of West Georgia Regional Science Fair

III. Getting Started

Before you begin, please note that *research* refers to library research and information gathering. *Experimentation* refers to work done in the field or laboratory after forming a hypothesis.

A. Pick Your Topic.
Get an idea of what you want to study. Ideas might come from hobbies or problems you see that need solutions. Limit your topic, as you have little time and resources. You may want to study only one or two specific events. Choose adult sponsor.

B. Research Your Topic.
Go to the library and read everything you can on your topic. Observe related events. Gather existing information on your topic. Look for unexplained or unexpected results. At the same time, talk to professionals in the field, write to companies for information, and obtain or construct needed equipment. This information should be documented in your introduction.

C. Organize and Theorize.
Organize everything you have learned about your topic. At this point you should narrow down your hypothesis by focusing on a particular idea. Your library research should help you.

D. Make a Timetable.
As you narrow your ideas, remember to choose a topic that not only interests you, but can be done in the amount of time you have. Get out a calendar to mark important dates. Make sure to leave a week to fill out the necessary forms and to review your Research Plan (1A) with your Sponsor. **Certain projects require approval from a Scientific Review Committee (SRC) before they are started, so be sure to allow time to experiment and collect data – even simple experiments do not always go as you expect the first time, or even the second time.** After you have finished your experiments, you will need a few weeks to write a paper and put together an exhibit.

E. Plan Out Your Research.
Once you have a feasible project idea, you should write out a research plan. This plan should explain how you will do your experiment and exactly what it will involve. ***All students participating in the*** Georgia Science & Engineering Fair/International Science & Engineering Fair ***(GSEF/ISEF) and affiliated fairs are required to complete the Research Plan (1A) and Approval Form (1B).***

F. Consult Your Adult Sponsor.
You are ***required*** to discuss your Research Plan (1A) with your Adult Sponsor and get his/her signature of approval. Your Sponsor should review your Research Plan (1A) and determine if you need any additional forms and/or IRB/SRC approval.

G. Conduct Your Experiments.
Give careful thought to designing your experiments. As you conduct your research and experiment, keep detailed notes of each and every experiment, measurement, and observation in your logbook. ***Do not rely on your memory.*** Remember to change only one variable at a time when experimenting, and make sure to include control experiments in which none of the variables are changed. Make sure you include sufficient numbers of test subjects in both control and experimental groups. **Your must have at least five trial for Research to be statistically valid.**

H. Examine Your Results.
When you complete your experiments, examine and organize your findings. Did your experiments give you the expected results? Why or why not? Was your experiment performed with the exact same steps each time? Are there other causes that you had not considered or observed? Were there errors in your observations? Remember that understanding errors and reporting that a suspected variable did not change the results can be valuable information. If possible, statistically analyze your data.

I. Draw Conclusions.

Which variables are important? Did you collect enough data? Do you need to do more experimenting? Keep an open mind – never alter results to fit a theory. Remember, if your results do not support your original hypothesis, you still have accomplished successful scientific research. An experiment is done to prove or disprove a hypothesis.

IV. Science Research and the Scientific Method

Science research tries to solve a problem or answer a question about people and the world in which we live. *When choosing your topic, give careful thought to how your research will enhance the world and its inhabitants.* Good scientists, both young and old, use the scientific method to study what they see in the world for cause and effect. By following the five steps listed below, you can produce a superior scientific experiment:

A. Be curious, identify, or originate/define a problem.
B. Review published materials related to your problem.
C. Evaluate possible solutions and make your educated guess (hypothesis).
D. Challenge and test your hypothesis through experimentation and analysis.
E. Evaluate the results of your experiment and reach conclusions *based on your data.*
F. Prepare your report/research paper and abstract for exhibit.

V. Selecting a Science Fair Project

Selecting a topic can be the most challenging part of your project. You may choose topics in behavioral and social sciences, computer science, engineering, earth and space science, mathematics, chemistry, biological sciences, medicine and health, zoology, physics, etc. Don't underestimate the importance of making observations in selecting a topic. Focus your observations on something that genuinely interests you, including your favorite hobbies (sports, etc.).

A. Sources of Topics

1. Books on science fair projects
2. Science News magazine (weekly journal of current scientific news in all area of science)
3. *Atlanta Journal* (Health & Medicine sections, Food Pharmacy, special editions on Science)
4. Facts on File
5. Scientific American magazine
6. Discover magazine
7. Popular Science magazine
8. World Book Encyclopedia
9. Science Service Abstracts
10. Internet services
11. Science Professionals
12. http://www.sciencebuddies.com
13. http://www.georgiacenter.uga.edu/ppd/courses/academic-special-programs/georgia-science-and-engineering-fair

Check out the Science Topic Wizard on sciencebuddies.com to help you select a topic that truly interests you.

B. Features of a Good Topic

Make sure your project idea is realistic and can be accomplished with available resources. Remember to keep the topic age-appropriate and as original as possible. Above all, choose a topic that interests YOU–you will be working on this project for months to come.

Once you have selected a topic, you must get approval from your science teacher. All ideas should be recorded in your logbook. Warning: some topics require special considerations – vertebrate topics, humans subjects, genetic topics will require special authorization. The next major step will be researching your topic in the media center.

C. Continuation of Projects

Students will be judged only on research completed since the last GSEF/ISEF. Display boards should reflect the current year's work only. However, supporting data books (not research papers) from previous related research may be exhibited with the project. Any continuing research must document substantial expansion of experimentation. Documentation must include the prior year's abstract and forms that were approved by an SRC. Copies with appropriate signatures must be attached, in sequence, behind the current years' research plan and forms. Each page of prior work must be clearly labeled in the upper right hand corner with the year involved (ex: 2002-03).

V. Presenting Your Project

A. Summary

A top-notch project includes four elements:

1. **Project Logbook**
2. **Abstract**
3. **Project Notebook (research report and forms)**
4. **Visual Display**

Project Logbook (***Consult the logbook checklist in the appendices***)

Your most treasured piece of work is your Logbook. It should contain accurate and detailed notes, which make for a logical and winning project. Good notes will not only show your consistency and thoroughness to the judges, but will help when writing a Research Paper. Your Logbook should be written in ink only.

Abstract (***Consult the abstract checklist in the appendices***)

The abstract is a concise summary of the project including the title, problem, hypothesis, procedure, and major conclusions.

Project Notebook

Your project notebook should include the Formal Research Report and ORIGINALS of all required forms (see "D" below for more detail on the formal report and forms)

Visual Display

The visual display will be on a tri-board that displays all of the most important aspects of your project including the title, purpose, procedure, hypothesis, data, conclusions, and discussion. The display should be original, neat, and creative.

B. Science Fair Project Abstract

The following elements should be included in a proper abstract.

1. TITLE: The title should be brief and descriptive.

2. PROBLEM: The statement of the problem tells the reader what specific questions are addressed in the study. The variables and limitations are identified. The intent and objectives of the research effort are made explicit in this statement.

3. PURPOSE: The purpose states the usefulness of the study. It answers the question why the project was undertaken.

4. HYPOTHESIS: The hypothesis is an educated guess that shows the relationship between a set of observed facts and a theory. The hypothesis limits the scope of the investigation and unifies the research design.

5. PROCEDURE: The procedure provides a brief summary of what was done.

6. CONCLUSIONS: The conclusions provide a concise statement of the outcomes of the investigation. They should be written in non-technical language and be related directly to the hypothesis. The conclusions should identify unsolved aspects of the original problem or any new problems identified.

There is no "standard" or required arrangement for the parts of an abstract (suggestion of a format is listed above); its statements may be in whatever sequence enables the most information to be conveyed in the fewest words. Its sequence can be, and frequently is, totally different from that of the paper. A good abstract usually must be drafted and re-drafted – eliminating, adding, and re-arranging the words.

Helpful Hints

- Use past tense and third person in describing completed research, present tense when stating existing facts and what is in the paper.
- Incorrect spelling and sentence structure will discourage interest in your project.
- Assume that the reader has a good general technical vocabulary but try to avoid use of highly-specialized words or abbreviations.
- If reference to procedure is essential, try to restrict it to identification of method or type of process employed.
- State results, conclusions, or findings in clear, concise fashion.

GSEF rules for abstracts are as follows:

1. The abstract must be typed on the GSEF Form (We will not accept abstracts Xeroxed on to the GSEF form).
2. The abstract is limited to the square on the form. Do not include cover sheets, graphics, etc.
3. The abstract must be **250 words or less.**
4. One copy of the abstract must be attached to the GSEF registration form. Original attached to fair exhibit.

C. Science Fair Project Logbook

The logbook is a vital part of your science fair experiment. In competition, judges pay close attention to your logbook. Consult the following information for a complete explanation of how to properly record items in your logbook.

Logbooks are used in every aspect of real research as a means of keeping an honest, chronological account of an investigation. Computers are not used as logbooks because the date can be changed easily if

the date of a discovery is important to the scientific community. Essentially everything you do should be logged. This includes the notes you take from sources at the library. You should begin your brainstorming in your logbook.

A logbook is a diary. It is a dated, written record of how a researcher went about designing a project and then gathering the information to test the hypotheses. It includes everything done, all of the people consulted, their suggestions and ideas, as well as the researcher's own ideas. It describes how the investigator went about finding answers to questions. It includes procedures, data tables, charts, and diagrams. A logbook should be started before anything is done on a project — before the problem has been selected, and before the details have been worked out.

Logbook Requirements

- Use a black ink pen that has the type of ink that will not smear when wet. Write or print neatly!
- Number each page in the logbook before making any entries. Place numbers at the bottom center of each page.
- Be consistent about writing on both sides or just one side of a page.
- Never remove a page from a logbook — no matter what!
- Make entries as you go. Don't wait until later or you may forget the data!
- Entries should be made only on the days the work was done.
- Date each entry and enter the time.
- Initial all pages to the right of the page numbers.
- Never make an entry that states, "Today I did not work on my project."
- Reserve the first four numbered pages for table of contents. On page one you should place the following: name, school, school address, year, and title of project. Save pages 2-4 for Table of Contents. Fill in the table of contents as the work progresses.
- Never erase data. If you make a mistake, draw a neat line through it.
- If insufficient room exists at the bottom of a page to begin the next entry, cross it out and sign across the empty space.
- It is acceptable to write in the margins.
- The front cover of the logbook should be filled in to describe the investigator and the investigation.
- Never recopy a logbook! A logbook should be the investigator's ORIGINAL work.
- Failure to meet these requirements will result in disqualification from the fans, no matter how great the project seems.

Logbook Evaluation

Your logbook will be evaluated by your teachers to insure that it meets the requirements stated above. Below is a checklist for you to go through as you complete your logbook to make sure that your logbook is complete and correct.

___ Name, date, and topic on front cover
___ Table of contents complete
___ Used black ink only
___ Numbered ALL pages in logbook (cover to cover)
___ Pages not torn out
___ Dates and times on each entry
___ Initials at bottom of each page (cover to cover)
___ No invalid entries
___ No erasures
___ Entries appear authentic

___ Data reported to correct number of digits
___ Descriptions seem thorough
___ Brainstorming is present
___ Other (Note here additional items stressed by your teachers)

A more detailed logbook checklist is found in the appendices.

D. Project Notebook
Required Forms (ORIGINAL COPIES ONLY)

✓ Abstract on Official Abstract Form
✓ Form (1) Checklist for Adult Sponsor - completed and signed prior to experimentation
✓ Form (1A) Student Checklist - completed and signed prior to experimentation
✓ Research Plan – written and completed prior to experimentation
✓ Form 1B - Approval Form - completed and signed prior to experimentation
✓ Any additional forms as required by your research subject

E. Formal Research Report Requirements

1. **Title Page:** This should be a short, catchy restatement of the problem. There should be two pages for this section. One title page should bear the title of your project in the center of the page, several inches from the top of the page. Your name, school, your teacher's name, and the course name would be placed in the lower right-hand corer of the page. A second title page should have only the title of your project in the center of the page. Your title should be sufficiently descriptive of your purpose without being too long. Try writing several titles on paper before you come to any decisions.
2. **Acknowledgements:** Give credit in this section to anyone who helped with the project. Be specific, using full names and describing what they did. (For example, parent, teacher, sibling, professor, store clerk)
3. **Abstract:** Abstracts are the chief means by which scientists decide which papers are worth reading and which to bypass. A properly written abstract consists of the title of the project and a brief summary of the entire project.
   a) The abstract should be 200-250 words and limited to one page.
   b) Use past tense and third person ('the researcher') in describing completed research.
   c) Use present tense when stating existing facts and what is in the paper.
   d) You abstract should flow in a logical order.
   e) Restrict the procedures to stating the method or process employed; don't list all the steps.
   f) Make sure the abstract covers what was done, why it was done, how it was done, what was found, and what is means.
   g) See the sample abstract that follows for a good example.
4. **Table of Contents:** The table of contents should list the major headings and appendices. Use Roman numerals.
5. **Problem Question and Purpose:** What are you attempting to answer? Why are you attempting to answer it? Explain benefits. The purpose that you have already composed is the same purpose used here. It should be three sentences or less. If your purpose is well worded, then you should have little difficulty in formulating a title.
6. **Independent Variable and Dependent Variable:** Your project should include controlled experimentation. In other words, if your experiment is done under carefully controlled conditions, what will happen? You, as the experimenter, will change certain conditions and observe how the condition of your subject is affected or changed. This experimentation provides a method for testing your hypotheses. Variables are the factors that could vary or be changed in an experiment.

- The ***independent variable*** is the variable that is purposefully changed by the experimenter, such as the amount of light.
- The ***dependent variable*** is the one that responds to this change.

7. **Controls:** This is the group that is used as a standard for comparison in an experiment. It is often the group that received no treatment, but it can also be a group that is designated by the investigator as a comparison group.
8. **Hypothesis:** Your testable prediction about the relationship between the variables that are to be tested.
9. **Literature Review:** This is your background research. Consult encyclopedias, newspapers, magazines, texts, books, videos, public television, and the internet. A minimum of 5 sources should be used. At least 4 sources should be something other than an encyclopedia. This may be a personal interview with an expert in the field, if appropriate. This could be with one of your teachers. **You should use APA style format for documentation.** See the APA guidelines sheet to follow.
    - **Methods/Procedures:** List the equipment used and the step-by-step procedures you followed to test your hypothesis.
    - **Data Table(s):** This comes from the data in your logbook. Think of the most logical way to present the data.
    - **Analysis of Results:** This section should contain all graphs, figures, and statistical analyses. NO personal opinions. At this point just describe the data. You should also include sources of error that may have altered your results.
    - **Conclusions:** Make specific statements concerning whether or not the analysis supported or failed to support your hypothesis. Leave no doubt in the mind of the reader as to why you feel justified in making these conclusions on the basis of the data that was collected. If possible, tell how the conclusions in your experiment compare with other research.
    - **Recommendations for Future Research:** Give recommendations for improving or expanding the research. When you analyze your data, of what importance will your findings be? Who can use your data? How could your topic be important to society, the scientific community, or to you?
    - **References:** List all references used in alphabetical order by author. **Use APA style.**
    - **Appendices (if any):** For permission forms, field test sheets, etc.

<u>Formal Research Evaluation</u>

Your formal report will be assessed in stages by your teachers according to the timeline in front of this packet. Keep in mind that the report should be written in the third person. You should not use "I" in this paper since it is a research paper. There is not a specific length requirement, but in order to adequately complete all sections of this paper, you will probably have at least 5 pages.

Below is a checklist for you to follow as you prepare your report. These are the same requirements that your teachers will be looking for as they grade your paper.

___ Double-spaced typed report, 1" margins, 12 point Times New Roman
___ Neatness
___ Organization (in order)
___ Completeness
___ Spelling
___ Grammar
___ Punctuation
___ Typographical Errors

___ Sentence Structure
___ Possible Plagiarism
___ Brief appropriate title
___ Acknowledges contributors
___ Contains 200-250 word abstract
___ Table of contents present
___ States problem and purpose
___ Lists variables and control
___ Well-stated hypothesis
___ Literature review included (attention to details outlined below)
___ Introductory paragraph well written
___ Body paragraphs contain details, examples, and explanations
___ Well-written, good transitions between paragraphs
___ Conclusion wraps up presented information
___ Lists equipment used
___ Step-by-step procedure
___ Organized and well-constructed data tables
___ Written summary of data
___ Graphs and figures if applicable
___ States logical conclusions
___ Conclusions stay within data collected
___ Lists possible sources of error
___ Lists possible applications for future research
___ References
___ Appendices
___ Abstract on Official Abstract Form
___ Form (1) Checklist for Adult Sponsor - completed and signed prior to experimentation
___ Form (1A) Student Checklist - completed & signed prior to experiments
___ Research Plan – written and completed prior to experimentation
___ Form 1B - Approval Form - completed and signed prior to experimentation
___ Any additional forms as required by your research subject

F. Visual Display

Tri-Panel Display Suggestions & Requirements

- A logical exhibit of a well-done investigation will help hold attention until the viewer understands what you did and why you did it.
- Maximum size for the tri-panel is 30" deep, 48" wide, and 108" tall.
- Hint: If you do your lettering on separate cards rather than on the tri-panel itself, you can glue the cards to the panel exactly where you want them. Moving them or redoing them becomes a lot easier.
- Be sure your name, grade level, category, and advisor's name is clearly written on the back of the tri-panel display board.

Tri-Panel Display Evaluation

Below is a checklist of items that your teachers will be reviewing as they grade your exhibit. You should go through this checklist yourself to make sure you have all required parts.

___ Exhibit gives a brief, appropriate title
___ States a problem in QUESTION FORM

___ States a hypothesis parallel to the problem
___ Lists the step-by-step procedure
___ Reports observations via tables, chart, graphs, photos, etc.
___ Summarizes the data collected under results
___ States logical conclusions that stay within the data collected
___ Shows adequate time spent on display
___ Shows evidence of a carefully planned investigation
___ Shows originality, attractive use of color and display technique
___ Size of tri-panel-panel within stated guidelines
___ Provides an orderly, complete logbook on the table in front of the display board
___ Includes a project notebook and abstract on the table in front of the display board

Appendices

Appendix A: Parent Letter

Dear Parent/Guardian,

One of the goals of Eagle's Landing Middle School science program is to involve students in quality independent research in an area of their choice. With assistance from several sources, each student will select a topic and conduct an experiment to study some aspect of that topic. All students will need to do most of this work at home, in addition to using libraries to research their topic. Many will actually conduct their experiments at home, although some will need to make arrangements to conduct their experiments at school or at another facility. A schedule of events and a timeline for completing various parts of the project are attached. Please review them with your student.

Each school will enter its top projects in the Henry County District Science Fair, from which first-place winners will move on to the Regional Science Fair. Regional winners are then invited to the Georgia Science & Engineering Fair at the University of Georgia in Athens. Your child will need your support and encouragement in preparing a project for these competitive events.

Below are the answers to some frequently asked questions, which may help your student as he/she begins this project.

Q: *Can my child do the same project he/she did last year?*
A: No. If you would like to do an extension from a previous year, you must (1) notify your sponsor, (2) test NEW variables (not just increase the sample size), and (3) do NEW research on your NEW variables.

Q: *When is my child's project due?*
A: To assist your child in time management, we have provided a timeline and broken up the project into a series of assignments. Please check the dates carefully. We ask your assistance in reminding your child to keep up with assignments.

Q: *To what extent should I be involved in my child's project?*
A: Parent involvement may be necessary to some degree. Your child may need assistance with transportation to the library, lab, or store to purchase materials. You may be asked to serve as an "adult sponsor" for your child's project; however, parents are discouraged from supplying assistance with experimentation.

Please sign below to indicate that you have read the Science Fair Information Packet. Have your student sign below and return this letter to his/her teacher by September 14, 2015

Parent Signature: _____

Parent Name (please print): _____

Student Signature: _____

Appendix B: Eagle's Landing Middle School Science Fair NON ENGINEERING Rubric

Research	Circle the Rating	Total Score
a. Is the topic idea original/innovative?	5 4 3 2 1 0	
b. Is the approach to solving the problem creative?	5 4 3 2 1 0	
c. Did the researcher(s) use the equipment and information services resourcefully?	5 4 3 2 1 0	
d. Is the information included in the display interesting?	5 4 3 2 1 0	
e. Did the research help answer a question in a creative way?	5 4 3 2 1 0	
Note: A creative contribution promotes an efficient and reliable method for solving a problem. When evaluating projects, it is important to distinguish between gadgeteering and ingenuity.		
Notes:		25 Points Possible

Scientific Thought	Circle the Rating	Total Score
a. Is the problem stated clearly?	5 4 3 2 1 0	
b. Is the statement of expectation or hypothesis clear? (Did the researcher(s) explain what he/she thought would happen & why?)	5 4 3 2 1 0	
c. Were the controls and variables clearly recognized and defined?	5 4 3 2 1 0	
d. Was an original procedural plan for obtaining a solution established and clearly communicated?	5 4 3 2 1 0	
e. Was there adequate data to support conclusions and limitations of data stated?	5 4 3 2 1 0	
f. Is a logbook provided with the display? Was scientific literature vs only popular literature (eg. Newspapers & magazines) cited?	5 4 3 2 1 0	
Notes:		30 Points Possible

Thoroughness	Circle the Rating	Total Score
a. Was the purpose carried out to completion within the scope of the original intent? How completely was the problem covered? Are the conclusions based on a single experiment or replication?	5 4 3 2 1 0	
b. How complete are the project notes/logbook? How much time did the researcher(s) spend on the project?	5 4 3 2 1 0	
Notes:		10Points Possible

Skill	Circle the Rating	Total Score
a. Does the project represent the researcher(s) own work being performed in a suitable location (lab, university, home, etc.?)	5 4 3 2 1 0	
b. Is necessary scientific skill demonstrated by using appropriate equipment? Was the testing environment valid?	5 4 3 2 1 0	
Notes:		10 Points Possible

Interview	Circle the Rating	Total Score
a. Do the conclusions make sense based on the results and are they related back to the hypothesis? Does the written material reflect the researcher(s) understanding of the research?	5 4 3 2 1 0	
b. Are the important phases of the project presented in an orderly manner? How clearly are the data/results and project display presented? Are there charts/graphs?	5 4 3 2 1 0	
c. Is the researcher(s) aware of other approaches or theories? Is the researcher(s) familiar with scientific literature in the studied field?	5 4 3 2 1 0	
d. What new information has been acquired as a result of the project? Can the researcher discuss how this project can be revised or expanded in the future?	5 4 3 2 1 0	
e. Is it evident the student completed the majority of the work on the project?	5 4 3 2 1 0	
Notes:		25 Points Possible

	Total Score
	100 Points Possible

Appendix B: Eagle's Landing Middle School Science Fair ENGINEERING Rubric

Creative Ability	Circle the Rating	Total Score
a. Is the topic idea original/innovative?	5 4 3 2 1 0	
b. Is the approach to solving the problem creative?	5 4 3 2 1 0	
c. Did the researcher(s) use the equipment and information services resourcefully?	5 4 3 2 1 0	
d. Is the information included in the display interesting?	5 4 3 2 1 0	
e. Did the research help answer a question in a creative way?	5 4 3 2 1 0	
Note: A creative contribution promotes an efficient and reliable method for solving a problem. When evaluating projects, it is important to distinguish between gadgeteering and ingenuity.		
Notes:		25 Points Possible

Engineering	Circle the Rating	Total Score
a. Does the project have a clear objective?	5 4 3 2 1 0	
b. Is the objective relevant to the potential user's needs?	5 4 3 2 1 0	
c. Is the solution workable? Acceptable to the potential user? Economically feasible?	5 4 3 2 1 0	
d. Could the solution be utilized successfully in design or construction of an end product?	5 4 3 2 1 0	
e. Is the solution a significant improvement over previous alternatives?	5 4 3 2 1 0	
f. Has the solution been tested for performance under the conditions of use?	5 4 3 2 1 0	
Notes:		30 Points Possible

Thoroughness	Circle the Rating	Total Score
a. Was the purpose carried out to completion within the scope of the original intent? How completely was the problem covered? Are the conclusions based on a single experiment or replication?	5 4 3 2 1 0	
b. How complete are the project notes/logbook? How much time did the researcher(s) spend on the project?	5 4 3 2 1 0	
Notes:		10 Points Possible

Skill	Circle the Rating	Total Score
a. Does the project represent the researcher(s) own work being performed in a suitable location (lab, university, home, etc.?)	5 4 3 2 1 0	
b. Is necessary scientific skill demonstrated by using appropriate equipment? Was the testing environment valid?	5 4 3 2 1 0	
Notes:		10 Points Possible

Interview	Circle the Rating	Total Score
a. Do the conclusions make sense based on the results and are they related back to the hypothesis? Does the written material reflect the researcher(s) understanding of the research?	5 4 3 2 1 0	
b. Are the important phases of the project presented in an orderly manner? How clearly are the data/results and project display presented? Are there charts/graphs?	5 4 3 2 1 0	
c. Is the researcher(s) aware of other approaches or theories? Is the researcher(s) familiar with scientific literature in the studied field?	5 4 3 2 1 0	
d. What new information has been acquired as a result of the project? Can the researcher discuss how this project can be revised or expanded in the future?	5 4 3 2 1 0	
e. Is it evident the student completed the majority of the work on the project?	5 4 3 2 1 0	
Notes:		25 Points Possible

	Total Score
	100 Points Possible

Appendix C: Abstract Checklist

FORMAT	YES	NO	COMMENTS/SUGGESTIONS
Typed; 10 or 12pt font			
200-250 words			
Written in past tense and third person("the researcher") in describing completed research			
Uses present tense when stating existing facts and what was in the research paper.			
Includes all aspects of project: title, problem, purpose, hypothesis, procedure, conclusions			
Flows in a logical manner			
Spelling/sentence structure/no highly-specialized words or abbreviations			

CONTENT	YES	NO	COMMENTS/SUGGESTIONS
TITLE: 65 characters and spaces; brief and descriptive; same title on all forms and display			
PROBLEM: states specific question or intent of research; variables and limitations are identified			
PURPOSE: states why project was undertaken; usefulness of study			
HYPOTHESIS: limits scope of investigation; states independent and dependent variable in study; often IF/THEN statement.			
PROCEDURE: brief summary of what was done; restricted to stating method or process; all steps should not be listed			
CONCLUSIONS: states outcomes of investigation, relates directly to hypothesis; states unsolved aspects and new questions			

IF PROJECT IS SELECTED TO CONTINUE TO DISTRICT THE ABSTRACT MUST BE TYPED ON THE OFFICIAL GSEF ABSTRACT FOR

Appendix D: LOG BOOK Checklist

PROJECT LOG BOOK CHECKLIST

The log book should contain accurate and detailed notes on *everything* done on your research project. It is essentially a diary. A dated written record of how you went about designing your project and then gathering the information to test the hypothesis. Good notes will not only show your consistency and thoroughness to the judges, but will help when writing your Research Paper

CHECK	1	2	3	4
DATE				
Log is bound; stitched or glued composition book, no pages have been removed				
Front cover; lists students name and title of project				
Entries written in black ink; no erasures, neat lines drawn through mistakes, original work, not copied				
All pages numbered; bottom center, used or not, student initials appear next to page numbers as completed				
Consistent entries; written on only front or both sides of pages, never both				
Entries are dated with time; made on days when work was done; no entries stating "Today I did not work on my project.",etc.				
Log is sectioned; represents each part of scientific process				
Table of Contents: pages 2-4, filled in as work progresses				
Research notes; includes resources, interviews, bibliographic information; etc.				
Research plan; includes brainstorming, thoughts, problems and direction				
Experimental Procedures; formulation of problem, hypothesis, experiment is evident, modified as experiment progresses				
Raw Data; evidence of experimentation, variables, controls; materials, measurements in metrics				
Conclusions; tables, charts, graphs of results, comments and questions about observations as experiment progresses, outcomes				

Comments/Suggestions

CHECK 1	CHECK 2
CHECK 3	**CHECK 4**

Appendix E: ISEF Science Project Category Descriptions

ANIMAL SCIENCES (Code: AS)
Study of animals and animal life, including the study of the structure, physiology, development, and classification of animals.

Subcategories:
Development
Ecology
Animal Husbandry
Pathology
Physiology
Population Genetics
Systematics
Other

BEHAVIORAL AND SOCIAL SCIENCES (Code: BE)
The science or study of the thought processes and behavior of humans and other animals in their interactions with the environment studied through observational and experimental methods.
Subcategories:
Clinical & Developmental Psychology
Cognitive Psychology
Physiological Psychology
Sociology
Other

BIOCHEMISTRY (Code: BI)
The study of the chemical substances and vital processes occurring in living organisms, the processes by which these substances enter into, or are formed in, the organisms and react with each other and the environment.
Subcategories:
General Biochemistry
Metabolism
Structural Biochemistry
Other

CELLULAR AND MOLECULAR BIOLOGY (Code: CB)
The study of the structure and formation of cells.
Subcategories:
Cellular Biology
Cellular and Molecular Genetics
Immunology
Molecular Biology
Other

CHEMISTRY (Code: CH)
The science of the composition/structure/properties/reactions of matter, especially of atoms/molecules.

Subcategories:
Analytical Chemistry
General Chemistry
Inorganic Chemistry
Organic Chemistry
Physical Chemistry
Other

COMPUTER SCIENCE (Code: CS)
The study of information processes, the structures and procedures that represent processes, and their implementation in information processing systems. It includes systems analysis and design, application and system software design, programming, and datacenter operations.
Subcategories:
Algorithms, Data Bases
Artificial Intelligence
Networking and Communications
Computational Science, Computer Graphics
Software Engineering, Programming Languages
Computer System, Operating System
Other

EARTH AND PLANETARY SCIENCE (Code: EA)
The study of sciences related to the planet Earth (Geology, mineralogy, physiography, oceanography, meteorology, climatology, speleology, seismology, geography, atmospheric sciences, etc.)
Subcategories:
Climatology, Weather
Geochemistry, Mineralogy
Historical Paleontology
Geophysics
Planetary Science
Tectonics
Other

ENGINEERING: Electrical and Mechanical (Code: EE)
The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, processes, and systems.
Subcategories:
Electrical Engineering, Computer Engineering, Controls
Mechanical Engineering
Robotics
Thermodynamics, Solar
Other
ENGINEERING: Materials and Bioengineering Code: EN)
The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical machines and systems.
Subcategories:
Bioengineering
Civil Engineering, Construction Engineering
Chemical Engineering
Industrial Engineering, Processing
Material Science
Other

ENERGY & TRANSPORTATION (Code: ET)
The study of renewable energy sources, energy efficiency, clean transport, and alternative fuels.
Subcategories:
Aerospace and Aeronautical Engineering, Aerodynamics
Alternative Fuels
Fossil Fuel Energy
Vehicle Development
Renewable Energies
Other

ENVIRONMENTAL MANAGEMENT (Code: EM)
The study of managing mans' interaction with the environment.
Subcategories:
Bioremediation
Ecosystems Management
Environmental Engineering
Land Resource Management, Forestry
Recycling, Waste Management
Other

ENVIRONMENTAL SCIENCES (Code: EV)
The analysis of existing conditions of the environment.
Subcategories:
Air Pollution and Air Quality
Soil Contamination and Soil Quality
Water Pollution and Water Quality
Other

MATHEMATICAL SCIENCES (Code: MA)
The study of the measurement, properties, and relationships of quantities and sets, using numbers and symbols. The deductive study of numbers, geometry, and various abstract constructs, or structures. Mathematics is very broadly divided into foundations, algebra, analysis, geometry, and applied mathematics, which includes theoretical computer science.

Subcategories:
Algebra
Analysis
Applied Mathematics
Geometry
Probability and Statistics
Other

MEDICINE & HEALTH SCIENCES (Code: ME)
The science of diagnosing, treating, or preventing disease and other damage to the body or mind.
Subcategories:
Disease Diagnosis and Treatment
Epidemiology
Genetics
Molecular Biology of Diseases
Physiology and Pathophysiology
Other

MICROBIOLOGY (Code: MI)
The study of micro-organisms, including bacteria, viruses, prokaryotes, and simple eukaryotes.
Subcategories:
Antibiotics, Antimicrobials
Bacteriology
Microbial Genetics
Virology
Other

PHYSICS AND ASTRONOMY (Code: PH)
Physics is the science of matter and energy and of interactions between the two. Astronomy is the study of anything in the universe beyond the Earth.
Subcategories:

Atoms, Molecules, Solids
Astronomy
Biological Physics
Instrumentation and Electronics
Magnetics and Electromagnetics
Nuclear and Particle Physics
Optics, Lasers, Masers
Theoretical Physics, Theoretical or Computational Astronomy
Other

PLANT SCIENCES (Code: PS)
Study of plant life. Ecology, agronomy, horticulture, forestry, plant taxonomy, physiology, pathology, plant genetics, hydroponics, algae, etc.

Subcategories:
Agriculture/Agronomy
Development
Ecology
Genetics
Photosynthesis
Plant Physiology (Molecular, Cellular, Organismal)
Plant Systematics, Evolution
Other

Appendix F: Eagle's Landing Middle School Science Fair Check Point #1

Due Date: _____ **Teacher Approval (Initial)**_____

Parent Approval (Initial)_____

1. Briefly describe the topic you have selected.

2. What background information do you already know about your topic?

3. Why is this topic important?

4. What is the biggest difficulty you have encountered so far? How did you solve it?

5. Where do you plan to look for information? (Be specific)

6. What sources will you consult? (Do NOT list encyclopedias)

7. What are your project plans over the next three weeks? (Outline these in a step-by-step fashion.)

8. In which category will your project fit?

	Animal Sciences		Earth & Space Science		Mathematical Sciences
	Behavioral Sciences		Engineering		Medicine & Health
	Biochemistry		Energy & Transportation		Microbiology
	Chemistry		Environmental Management		Physics & Astronomy
	Computer Science		Environmental Sciences		Plant Science

Teacher Comments - Students should leave this portion blank.

	This topic will require university help - do you have access?
	Narrow your topic.
	This topic will require special permission. See me for necessary forms.
	What are you testing?
	See me as soon as possible.

Appendix G: Eagle's Landing Middle School Science Fair Check Point #2

Due Date: _____ **Teacher Approval (Initial)**_____

1. State your title.

2. State the problem you are trying to solve.

3. State your hypothesis.

4. Describe your experimentation procedure so far.

5. How many times will you test and over what period of time?

6. What equipment will you need?

7. Have you consulted anyone on your project? If so, who was it and how have they helped?

8. Describe any unresolved difficulty that is hindering your progress.

9. Outline your project plans over the next three weeks in a step-by-step fashion.

Teacher Comments - Students should leave this portion blank.

_____Title needs work
_____Problem needs work
_____Hypothesis needs work
_____Variables are needed
_____Control is needed
_____Will you be able to get equipment?
_____Equipment not available at this school
_____Need to contact a consultant
_____Begin testing soon
_____More trials needed
_____See me ASAP
_____Other Comments

Appendix H: Eagle's Landing Middle School Science Fair Required Forms Flow Chart

Due Date: _____ Teacher Initials_____Points_____

Please read each question below and check whether or not you need the form.

TITLE OF FORM	DO YOU NEED THE FORM?	
Checklist for Adult Sponsor (1)	Required for ALL projects	
Student Checklist (1A)	Required for ALL projects	
Research Plan	Required for ALL projects	
Approval Form (1B)	Required for ALL projects	
Registered Research Institutional / Industrial Setting Form (1C)	_____ YES	_____ NO
Qualified Scientist Form (2)	_____ YES	_____ NO
Risk Assessment Form (3)	_____ YES	_____ NO
Human Subjects Form (4) (High School Only)	_____ YES	_____ NO
Vertebrate Animal Form (5A)	_____ YES	_____ NO
Vertebrate Animal Form (5B)	_____ YES	_____ NO
Potentially Hazardous Biological Agents Form (6A)	_____ YES	_____ NO
Human and Vertebrate Animal Tissue Form (6B)	_____ YES	_____ NO
Continuation Projects Form (7)	_____ YES	_____ NO
ISEF Official Abstract and Certification Form (Must be typed; Type it online, then print the form.)	Required for ALL projects	

All of the forms listed above (EXCEPT for the "Registered Research Institutional / Industrial Setting Form" and the "ISEF Official Abstract and Certification Form", must be filled out and turned into your advisor PRIOR TO THE START OF ANY EXPERIMENTATION. Failure to do so may result in disqualification from the fair and penalties assessed to your project grades.

Please go to the official website (www.sciserv.org/isef), TYPE the information, and then PRINT the forms. You will be penalized for messy or illegible forms.

Appendix I: Eagle's Landing Middle School Science Fair Timeline

Critical Dates	Item/Event Description
September 14, 2015	Deadline for students to return SIGNED parent permission letters
September 17, 2015	Deadline for logbook purchase.
September 14, 2015	Topic Deadline/Topic Approval. Checkpoint #1 Worksheet Due
September 18, 2015	Last day for students to begin background research
September 30, 2015	Final day for construction of a Hypothesis (teacher should approve)
September 28, 2015	Deadline for 3 required GSEF forms needed at region fair (checklist for adult sponsor, research plan 1A, approval plan 1B) http://student.societyforscience.org/forms
September 29, 2015	Checkpoint #2 Worksheet Due (Required County Grade)
October 03, 2015	Final day for the development of the initial experiment plan (teacher should approve)
October 06, 2015	Final day for students to begin experiment
October 23, 2015	Rough Draft Due (including cover-page, partial abstract (excluding results), table of contents, introduction, background information, hypothesis, procedures, and materials. Students should exclude results from experiment, as they may still be experimenting) Abstract form at http://student.societyforscience.org/forms
November 08, 2015	All Science Fair experimentation should be done
November 11, 2015	During this time: Tri-Panel Display, logbook and formal report due to teachers; projects should be presented to the class, and graded as well.
TBA	Individual School Science Fairs
TBA	Turn in student entries to Central office
TBA	Set-up, judging and interviews
TBA	Henry County School System Science Fair Award Ceremony and Project Removal Project
TBA	University of West Georgia Regional Science Fair