Frederick Douglass Middle School

Science Fair
EVERYTHING UNDER THE SUN

Science Fair
Information Packet

This packet belongs to: __________

TABLE OF CONTENTS
• Introductory Letter and Contract
  • Timeline and Checklist
• Written Report Guidelines and Checklist
  • Lab Report Rubric
• Display Board Guidelines
• Student Planning Packet
December 16th, 2009

Dear Parent(s) or Guardian:

The science fair project is an activity that draws upon basic and advanced skills that have been taught and emphasized in the Frederick Douglass Academy Middle School science program. The grade on this project will be based on whether or not students display a firm grasp of these skills. Other criteria, such as neatness, creativity, and adherence to the guidelines, will also be part of the science project grade. Science Fair projects are a mandatory requirement for all science classes at FDAMS and will significantly impact students' overall grades. Your child will have an opportunity to enter his or her science project in the FDAMS Science Fair in March. The emphasis of our project is not on winning, but on having positive learning experiences and having fun with science.

The science fair project involves the solution of a problem selected by student and submitted for approval by the science teacher. To solve the problem the student must use the scientific method. It is the proper use of the scientific method that involves many of the skills mentioned earlier in this letter. The students will complete a written report that follows the steps of the scientific method. A sheet showing the report format can be found in the 2009-2010 Science Fair Information Packet. Students will also be required to create a project display board (please see included Display Board Guidelines sheet).

The written report must be in a report folder. The report must be assembled inside the folder according to the Written Report Guidelines and Checklist sheet, which you will find in this Science Fair Information Packet. The report will be graded for content, adherence to the guidelines, grammar, and spelling (please see the Lab Report Rubric). Students should have the report proofread by someone they trust before handing it in.

Those students who have a project approved should begin conducting preliminary research, gathering materials for their displays, and/or performing their experiments as soon as possible. Your student should be spending a minimum of 1-2 hours per week working on his/her science project.

When you receive the Science Fair Information Packet, please go over it with your student. Some of the details not in the packet will be discussed in class. Please contact your student's science teacher if you have concerns or questions. Thank you for your help and support.

Sincerely,
The FDAMS Science Department
SCIENCE FAIR STUDENT CONTRACT

Please read this over with your child, sign the appropriate line, and return to your student’s science teacher by January 4th, 2010.

By signing below: (please check each box)
- I affirm that I will adhere to the Science Fair Timeline and Guidelines.
- I will spend at least 1-2 hours per week working on my science project.
- I will not plagiarize and take credit for other people’s hard work.
- I understand that if the project is not turned in by the due date, I will receive a 0.

Student Name: __________________________________ Period __________

Student Signature: ______________________________________________

By signing below: (please check each box)
- I affirm that my student will adhere to the Science Project timeline and guidelines.
- I will support my student by monitoring their progress regularly.
- I understand that if my student does not turn in the science project by the due date, he/she will receive a 0.

Parent Name: ___________________________________________________

Parent Signature: ________________________________________________

Phone #: _________________________________
e-mail: ______________________________________________________

Comments:
### SCIENCE FAIR TIMELINE

**Project Guidelines and Checklist**

<table>
<thead>
<tr>
<th>TASK</th>
<th>Date</th>
<th>Teacher</th>
<th>Parent</th>
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</thead>
<tbody>
<tr>
<td>Introduce Science Fair Project (Science Fair Introductory Letter/Packet)</td>
<td>Dec. 16-18th</td>
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<tr>
<td>1. Choose and submit a problem to investigate for teacher approval.</td>
<td>Jan. 4th</td>
<td></td>
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<tr>
<td>2. Conduct preliminary research.</td>
<td>Jan. 4th</td>
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<td>3. Develop a hypothesis based on your preliminary research.</td>
<td>Jan. 7th-8th</td>
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<td>4. Write a final draft of the research portion of the project.</td>
<td>Jan. 11th</td>
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<tr>
<td>5. Decide on the procedure that you will use to test your hypothesis.</td>
<td>Jan. 14th-15th</td>
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<tr>
<td>7. Conduct your experiment. Collect and record data.</td>
<td>Feb. 16th</td>
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<td>8. Organize your data and results.</td>
<td>Feb. 18-19th</td>
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<tr>
<td>9. Write your conclusion based on the results of your experiment.</td>
<td>Feb. 22nd</td>
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<tr>
<td>10. Write a draft of your science fair report.</td>
<td>Feb. 22nd</td>
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<td>11. Proofread your draft. Type or write a final copy of your report.</td>
<td>March 1st</td>
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<tr>
<td>12. Complete your science fair backboard and model.</td>
<td>March 8th</td>
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<tr>
<td>13. Turn in your science fair project (report, model, and backboard).</td>
<td>March 8th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Take backboard and model home.</td>
<td>TBD</td>
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</tbody>
</table>
WRITTEN REPORT GUIDELINES

Scientists always report the results of their research and experimentation so that others may benefit from this new knowledge. Some work is reported through published papers and other scientists present their work at conventions, on TV, or through the Internet. Your research will be presented through your written report, a project display, and an oral presentation.

☐ **ABSTRACT**
  The abstract is a concise, one-half to one page summary or overview of your whole project. Others can read your abstract if they do not have time to read your paper. You must write the abstract **AFTER** your report is complete.

☐ **TITLE PAGE**
  Put the project title in the center of the page.

  In the lower right corner, have:
  Last Name, First Name
  Grade ___
  Period ___
  Teacher Name
  School Name
  Date (include year)

  **NOTE:** This same, exact information will also go in the upper right corner on the back of the display board.

☐ **PURPOSE**
  In one short paragraph, tell why you did your project on the topic you chose. Please be detailed and specific in your explanation. What exactly sparked your interest?

☐ **ACKNOWLEDGEMENTS**
  This is a “Thank You” to all the people who helped you with your project. Include family members, teachers, or experts who provided you with assistance or participated in some way in your project.

☐ **TABLE OF CONTENTS**
  Divide your Table of Contents into sections. **Type in the actual page numbers** **AFTER** you have finished the final copy of your report.

☐ **PROBLEM**
  State the problem in the form of a question. (Example: “Can plants grow upside down?”) **NOTE:** Your page numbering begins here.

☐ **PRELIMINARY RESEARCH**
  This section includes the history and general background needed by the reader to understand your project. Also include any previous research on your topic. Use notes from books, journals, the Internet, magazines, and interviews to write this section of your report. You will conduct research mainly at city and college libraries. If you have the opportunity to conduct an interview with an expert in the field—it is highly recommended! You should **keep a log** of libraries visited, dates visited, and sources researched. Information received via the computer must also be documented.

  The minimum number of typed, double-spaced pages in the research section will be 2 pages.
Standards-sized letters and margins must be used (1 inch, 12 point font Times New Roman). Type on only one side of the paper and do not use subtitles in this portion of the project.

The ability to take a large amount of information, organize, summarize, blend it together, and then write it out in a coherent manner is certainly a skill needed during the research phase of the report. This portion of the project should be a well-structured essay with an introduction, coherent body, and a concluding paragraph.

- **HYPOTHESIS**
  This is an educated guess (based on preliminary research) which answers the problem. The hypothesis is a statement that is generally one sentence long.

- **EXPERIMENTAL DESIGN**
  - **MATERIALS**: List the materials you used during your experiment. Be very specific. If someone wanted to duplicate your experiment, he or she would have to know exactly what to use and how much is needed.
  
  - **PROCEDURE**: The procedure is a detailed list of steps needed to conduct your experiment. The procedure you design should demonstrate an understanding of a controlled experiment and should clearly identify the independent and dependent variables.
  
  - **DATA**: Raw data or observations collected during your experiment should be recorded in a log. This section should be long, detailed, and stated in the present tense. Dates, times, names, responses, measurements, locations, and problems you had need to be recorded and presented in an organized manner. The data should be compiled and presented into colorful readable data tables. All tables must be labeled and titled. Check with your teacher about the number of trials you should perform. In most cases, multiple trials will be necessary. Diagrams and/or photographs are encouraged in this section.
  
  - **DATA ANALYSIS**: This section is a summary of your raw data. The data should be compiled and presented into colorful readable graphs since some data are measurable. Graphing is a means of taking large amounts of data and summarizing the data in a visual manner. All graphs must be labeled and titled.
  
  - **RESULTS**: In addition, write your results in essay form. Summarize all data including the qualitative observations which could not be put in a data table or graph. Analyze why you think you got the results you did. Discuss any errors that may have occurred and how they affected your results.
  
  - **CONCLUSION**: Your conclusion should follow the following essay format closely.

First Paragraph:
1. Topic sentence: The purpose of this experiment was to ______________
2. Explanation of terms
3. Why did you select this topic?

Second Paragraph:
1. Summary of procedure
2. Summary of results (include data)

Third paragraph:
1. Analysis of results
2. Answer to original questions

Fourth Paragraph:
1. What was your hypothesis?
2. Should your hypothesis be accepted or rejected?
3. Why was your hypothesis accurate or inaccurate? (use research for support)

Fifth Paragraph:
1. What could you have done to make your experiment better?
2. What suggestions do you have for future research?

☐ DISCUSSION/APPLICATION
   Explain how your project findings apply to you personally or to society, in general.

☐ SOURCES
   List all books, articles, and other communications or sources that you used for writing your preliminary research section. You must have at least 2-3 sources. This should be presented in MLA format.

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**POINTS TO REMEMBER!**

☐ Type on one side of the paper only.

☐ Use only **12 point font Times New Roman**.

☐ Center the page numbers of your report at the bottom of each page.

☐ Have someone proofread your report before you make the final copy.

☐ Carefully review your lab report with the rubric before turning it in for a final grade.

☐ Put report in a report cover.
<table>
<thead>
<tr>
<th>Section</th>
<th>Unacceptable (0-1.9)</th>
<th>Needs Improvement (2.0-3.9)</th>
<th>Excellent (4.0-5.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABSTRACT</td>
<td>Student does not include an abstract OR it is poorly written with significant</td>
<td>Student includes abstract, however, it may contain a few grammatical/spelling errors.</td>
<td>Student includes a well-written abstract that effectively summarizes the project. Minimal errors.</td>
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<td></td>
<td>grammatical errors.</td>
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<tr>
<td>TITLE PAGE</td>
<td>Student does not include a title page.</td>
<td>Title Page is missing information and/or is messy.</td>
<td>Title Page is complete and is neat/organized.</td>
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<tr>
<td>PURPOSE</td>
<td>Student does not include a purpose OR it is poorly written with significant</td>
<td>Student includes purpose, however, it may contain a few grammatical/spelling errors.</td>
<td>Student includes a well-written purpose that effectively explains choice for project and reason for completing the experiment. Minimal errors.</td>
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<tr>
<td></td>
<td>grammatical errors.</td>
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<tr>
<td>TABLE OF CONTENTS</td>
<td>Student does not include a Table of Contents.</td>
<td>Table of Contents is missing information and/or has inaccurate page numbers.</td>
<td>Table of Contents is complete and is neat/organized.</td>
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<tr>
<td>PROBLEM</td>
<td>Student does not include this portion of the project OR student includes a question</td>
<td>Student includes problem in the form of a question; however, it may contain a few</td>
<td>Student includes a well-written and TESTABLE problem.</td>
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<td>that is NOT TESTABLE OR it is poorly written with significant grammatical errors.</td>
<td>grammatical/spelling errors.</td>
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<tr>
<td>PRELIMINARY RESEARCH</td>
<td>Student does not include this portion of the project OR student includes a paper that</td>
<td>Student includes a research paper, however, he or she fails to adequately cite resources</td>
<td>Student includes a well-written, well-researched, and correctly formatted research</td>
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<td></td>
<td>is poorly written and/or poorly researched and/or fails to include citations.</td>
<td>and/or has grammatical/spelling errors and/or fails to structure essay properly.</td>
<td>paper. Minimal errors.</td>
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<tr>
<td>HYPOTHESIS</td>
<td>Student does not include this portion of the project.</td>
<td>Student has a hypothesis, however, it is not written correctly.</td>
<td>Student has a hypothesis that is written correctly in an if-then format.</td>
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<td>MATERIALS</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes a materials section, however, it is not detailed/specific with regards</td>
<td>Student has a detailed, specific materials list that would allow someone to</td>
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<td>to specific quantities/brands/types.</td>
<td>duplicate his/her experiment EXACTLY.</td>
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<tr>
<td>PROCEDURE</td>
<td>Student includes a procedure section, however, it is not detailed/specific with regards to steps. AND/OR Student’s experimental design is flawed (does not allow for a CONTROLLED experiment)</td>
<td>Student includes a detailed procedure for a CONTROLLED experiment.</td>
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<td>DATA</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes a data section, however, it may not be detailed/thorough.</td>
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<tr>
<td>DATA ANALYSIS</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes this section, however, the analysis is incorrect/inaccurate.</td>
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</tr>
<tr>
<td>RESULTS</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes a results section, however, it may not be detailed/thorough AND/OR is messy/disorganized.</td>
<td></td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes a conclusion section that is based on student’s own results. It has minimal errors in spelling/grammar.</td>
<td></td>
</tr>
<tr>
<td>APPLICATION</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes an application section that is thoughtful and well written.</td>
<td></td>
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<tr>
<td>SOURCES</td>
<td>Student does not include this portion of the project.</td>
<td>Student includes this section, however, it is not formatted correctly AND/OR is missing information.</td>
<td></td>
</tr>
<tr>
<td>FORMATTING</td>
<td>Paper is not typed.</td>
<td>Paper is typed, however, it is not formatted correctly.</td>
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</table>

- **PROCEDURE**: A detailed, numbered list of steps needed to conduct the experiment. Clearly identifies the independent and dependent variables as well as controlled variables.
- **DATA**: Raw data/observations collected during the experiment. This section should be long, detailed, and stated in the present tense. Dates, times, names, responses, measurements, locations, and problems you had to be recorded. Student has included labeled, colorful, and neat data tables.
- **DATA ANALYSIS**: The data should be presented in readable graphs that are clearly LABELED with a descriptive title and units of measurement.
- **RESULTS**: All data is summarized in essay form: Analyze why you think you got the results you did. Discuss any errors that may have occurred and how they affected your results.
- **CONCLUSION**: Student follows directions outlined in the Student Information Packet for Paragraphs 1-5.
- **APPLICATION**: Student explains how project findings apply to student personally or to society, in general.
- **SOURCES**: Student lists all books, articles, and other communications or sources used for writing preliminary research section. Entries are formatted correctly in MLA format.
- **FORMATTING**: Paper is typed, written in 12pt. font Times New Roman, and has 1-inch margins.
DISPLAY BOARD GUIDELINES

DISPLAY BOARD MATERIALS
The display board must be sturdy and stand by itself on a table. Foam coreboard and cardboard are the best materials.

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

COLORS
If you need to paint your display board, enamel paint works best. Do not use water-based paint. Contact paper may also be used. Use contrasting colors on your board as backing and a neat border for all typed material.

LETTERING
Your title and subtitles may be computer-generated or cut from construction paper. DO NOT freehand the letters. The title letters should be 3 to 4 inches high. The subtitle letters should be 1 to 2 inches high. The subtitles (which are mandatory) on the display board are: Purpose, Research, Hypothesis, Materials, Procedure, Data, Data Analysis, Results, Conclusion, and Application/Discussion. All items on the display must be glued to the board. Do not use pins or tacks.

DRAWINGS, PHOTOS, TABLES, AND GRAPHS
Drawings and photos are most useful on the display. Drawings should be drawn in pencil first and then retraced. Drawings should be in color and outlined in thin black felt tip pen. They may also be scanned from the computer. Tables must be displayed in a clear, organized form. Several tables or graphs may be included on one page, as long as the format is clear and easy to read. Tables and graphs must be used in the Data and Data Analysis sections. Tables and graphs should be computer-generated. All tables and graphs must have explanatory titles. Graph axes must be labeled with a description of what each axis represents and the units being represented. Intervals between numbers should be even.

SCIENCE FAIR PROJECT CHECKLIST
□ There are no tacks or pins on the display board--only strong glue or strong tape that is NOT VISIBLE. Make sure everything is secure.
□ The student’s name and other required information are on the back of the display board in the upper right hand corner. (See instructions for Title Page of report.)
□ The report is in a report cover with 3-hole fasteners with the student’s name and other required information on the title page.
□ Any display items other than the display board and the report are in a paper bag with the student’s name and other required information on the outside of the bag.
□ Display items with many pieces (i.e. crystals) are not loose. They are in a display case or other “holder.” No harmful materials or substances are part of the project display.
□ The project is completed BEFORE bringing it to school the day of your presentation.
If you have a camera, you should photograph your experiment’s progress. A photo of you with your experimental set up is encouraged. All photos must be titled.

DISPLAY ITEMS
Something that represents the project should be placed in front of the board. Examples include:
- equipment or materials used
- models
- artistic representations
- samples or specimens
- simulated items

There are endless possibilities - be creative!

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