ASE Science Fair Information Night

**When:**
Thursday, March 26th

**Who can participate:**
K - 5th
What is a science fair?

- A journey of the scientific process
  - Students answer a scientific question by conducting an experiment.
  - The process ends with a showcase event that shows students that their work matters to the school community.
Others have said it best…

- “Happy is he [or she] who gets to know the reasons for things.”
  – Virgil, Roman poet

- “[Science is] a great game. It is inspiring and refreshing. The playing field is the universe itself.”
  – Isador Isaac Rabbi, U.S. physicist, Nobel Prize winner, 1944
Student Benefits 1

- Catered to what the students are interested in
  - This is their own learning adventure.
  - They might explore topics such as:
    - Timing ocean tides
    - How gears work
    - How Beyblades work
    - Chemistry of baking ingredients
    - How Many Numbers Can You Remember?

The possibilities are endless

For more ideas visit www.sciencebuddies.org
Student Benefits 2

- Integrates skills they’ve learned in other classes:
  - Math skills
  - Computer skills
  - Research skills
  - Writing and presentation skills
Student Benefits, continued

- Furthers students’ interest in science by utilizing hands-on learning
  - Serves as a starting point for future science fairs, which present opportunities for scholarships, awards, and prestige
  - Promotes interest in a STEAM careers – science, technology, engineering, arts, & math
2 Types of Projects - Experimental Projects or Exploration Projects

- Traditional Fairs have always favored scientific experiments or engineering style projects.

- Exploration projects such as research projects, demonstrations, and models add another way for students to show their knowledge of the subject to cater to all styles of learning.
Project Planning

- Our planning involves breaking the science project into small, manageable assignments that are spread out over time.
  - Students think of an idea or question they would like to know more about
  - Students research that idea
  - Students plan the experiment
  - Students do the experiment
  - Students get the data
  - Students make a conclusion
  - Students presents information
Partnership

Students
- Work
- Responsibility

Science Fair Success

If students don’t create their own learning experience, it defeats the purpose of the active inquiry.

Parents
- Encourage
- Answer questions
- Supervise safety
- Come to the fair!

Letting your child explore, observe, make mistakes, ask questions—and seek the answers—is at the heart of the science fair process.

Although most of the work is done at home, teachers are there to help as needed. There will be several science fair nights student may take advantage of to research ideas, print, and get help working on boards.

Teachers
- Encourage
- Answer questions
- Provide space & time to research ideas

Appropriate parent involvement can be found HERE
Overview of what the students needs to do

- **6 Science Fair Project Steps**
  1. Ask a question.
  2. Do research.
  3. Form a hypothesis.
  4. Test the hypothesis by doing an experiment.
  5. Analyze the data and draw a conclusion.
  6. Communicate the results.
Ask a question.

- This is the foundation.
- If your child identifies a question that is safe and can be answered through experimentation, the rest of the project will follow.

For lots of ideas visit www.sciencebuddies.org
Ask a question, continued

- **Safety**
  - Some tools and techniques that might be considered very safe can become unsafe without supervision and a careful experimental procedure.
  - Some potentially dangerous materials can be perfectly safe with the right supervision and right experimental procedure.
  - As a parent, if you have any expertise in supervising certain tools or techniques, then by all means, help your child. With your supervision, the child will then likely be able to do the project.
Ask a question, continued

How to Pick a Good Question

- The question should be interesting enough for your child to read about and then work on for the next couple months.
- There should be at least three sources of written information on the subject.
- Make sure the experiment is safe to perform.
- Ensure there is enough time to do the experiment before the science fair. For example, most plants take weeks to grow. If your child is doing a project on plants, he or she will need to start early.
Here’s a helpful resource to find a great project idea. Visit the Science Buddies website at www.sciencebuddies.org to utilize these tools:

- **The Topic Selection Wizard** This brief online survey recommends project ideas that are best for your child, based on his or her interests.

- **Project Ideas** Pick from a huge selection of project ideas, organized by difficulty level, and featuring safety guidelines, materials lists, and required time for each project.
Do background research.

- Collect information.
  - Define what to look for.
  - Look in a variety of sources.
  - **Key Goal:** Obtain enough information to make a prediction of what will happen in the experiment.
Do background research, continued

- Organize research.
  - With organized research that is based on questions, the writing will flow.
  - Use multiple sources, no copying.
  - Writing should be focused on the project.
Construct a hypothesis.

- **What is a hypothesis?** An educated guess about the answer to a question.

- **If/then:** If I do [this], then [this] will happen.
  - “If I increase the temperature of water in a cup, then the more sugar will dissolve.”
Test the hypothesis by doing an experiment.

- **Process**
  - **Part 1**: Design an experimental procedure.
    - Steps and materials should be spelled out.
  - **Part 2**: Do an experiment.
    - Actual testing of hypothesis occurs, answering the question.

Guides can be found at www.sciencebuddies.org
Do an experiment.

- **Expectations**
  - It’s ok if the first experiment goes wrong and your child has to modify the procedure.
  - It’s ok if the experiment disproves the hypothesis.
  - Safety, safety, safety!
  - It takes time. Most scientific experiments are done multiple times.
Analyze the data and draw a conclusion.

Example of a graph that draws a conclusion:

Do some colors of M&M's melt faster than others?

<table>
<thead>
<tr>
<th>Color of Candy</th>
<th>Number of Cracked Candies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 Sec</td>
</tr>
<tr>
<td>White</td>
<td>0</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>0</td>
</tr>
<tr>
<td>Observations</td>
<td></td>
</tr>
<tr>
<td>Brown</td>
<td>0</td>
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<tr>
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</table>
Communicate results.

- The display board tells a story from left to right, generally on three panels. It mimics the steps in the scientific method and is a combination of written material, as well as photos, charts, diagrams, and graphs.
# Experimental Projects Rubric

Experimental Science Project Score Sheet:

<table>
<thead>
<tr>
<th>Exhibit Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Judges Initials:</td>
<td></td>
</tr>
<tr>
<td>Exhibit Number:</td>
<td></td>
</tr>
<tr>
<td>Grade</td>
<td>Team ID</td>
</tr>
</tbody>
</table>

Assign a maximum score of 10 points in each category.

1. Creativity and originality of Objective.
2. Clear statement of objectives.

## Project Objectives

3. Creativity and originality of Design.
4. Adequacy of scientific and engineering approach used (the Scientific Method).
5. Knowledge and understanding of the scientific principles relevant to the project.

## Project Design

6. Thoroughness of experimentation or development used to reach objectives (repetitions). Recording of data in a laboratory notebook.
7. Level of skills and effort used by student to carry out the project. Amount of work done by the student compared to others. Understanding of equipment and techniques used to obtain the data.

## Project Execution

8. Conclusions are consistent with the data obtained and with the relevant principles of science or engineering.

## Project Conclusions

9. Quality and coherence of the oral presentation.
10. Quality and clarity of the display, including the organization and presentation of data.

## Project Presentation

<table>
<thead>
<tr>
<th>TOTAL SCORE (maximum = 100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain normalized score by ranking the projects according to the unadjusted score and assigning a normalized score of 1 to the highest unadjusted score, 2 to the next, etc.</td>
</tr>
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| NORMALIZED SCORE |
Experimental Projects Rubric

### Exploration Project Score Sheet

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<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td><strong>Journal</strong></td>
<td>1. Quality of the journal</td>
<td></td>
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<tr>
<td><strong>Research</strong></td>
<td>2. Research thoroughness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Research Accuracy</td>
<td></td>
</tr>
<tr>
<td><strong>Research Paper</strong></td>
<td>4. Research paper quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Research paper thoroughness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. Research paper completeness</td>
<td></td>
</tr>
<tr>
<td><strong>Presentation</strong></td>
<td>7. Accuracy of the presentation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8. Quality of the presentation</td>
<td></td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>9. Accuracy of the display</td>
<td></td>
</tr>
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**NORMALIZED SCORE**