2015 - 2016

Science Fair Handbook

Buffalo Academy of Science Charter School
2015-2016

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CALENDAR OF EVENTS

SEPTEMBER 2015

Monday, September 14th	Students receive their Science Fair Handbooks
Friday, September 18th	The Release and Safety Forms are due

OCTOBER 2015

Friday, October 2nd	The Project Entry Form is due
Friday, October 16th	**Last day to change project subject and\or title**
Friday, October 30th	Research Plan Attachment is due

DECEMBER 2015

Friday, December 4th	Completed Data Table is due. **Must complete experiment by this time.**
Friday, December 18th	Rough Draft of Research Paper is due

JANUARY 2016

Friday, January 8th	Deadline: All students will have their rough draft of the research paper returned to them.
Friday, January 15th	Finalized Research Paper OR PowerPoint Presentations are due

FEBRUARY 2016

Wednesday, February 3rd	Display Boards are due
Wednesday, February 10th	**Pre-eliminations**
Thursday, February 25th	Revised Display Boards are due
Saturday, February 27th	***Annual BASCS School-Wide Science Fair!***

LETTER TO PARENTS

Dear Parents and Guardians,

Your child will take part in the Annual Science Fair at Buffalo Academy of Science Charter School! This is an exciting event that encourages students to think like young scientists. During the next few months, your child will design a science project that uses the process of scientific inquiry to solve a problem. We hope you agree that the educational benefits are numerous, as students develop skills in creative thinking, problem solving, writing, and oral presentation.

For suggestions on helping your child through this process and choosing a topic for his/her Science Fair project, there are various websites that can help. These sites include but are not limited to:

- www.all-science-fair-projects.com
- http://school.discoveryeducation.com/sciencefaircentral/
- http://www.sciencebuddies.org/
- http://www.education.com/science-fair/

We ask that you encourage your child and monitor his or her progress along the way. Your support is the key to a successful project, but please do not allow your involvement to extend any further than support in order to assure equity and promote student learning! Guide your child whenever and wherever you can, but let the final project reflect your child's individual effort and design.

Please read the Science Fair Guidelines with your child and sign the necessary forms. Let us know if you'd like more information on creating a successful science fair project. If you have any questions, do not hesitate to contact us at 854-2490.

Due to limited display space, the Science Fair Committee will hold a pre-elimination phase on Wednesday February 10th, 2016. The qualified projects will be displayed on **Saturday, February 27th, 2016** and evaluated by the Science Fair Judge Panel.

The qualified projects will be eligible for First, Second, or Third Place in the all-category, school-wide judging. First Place will receive an Apple iPad, 2nd Place will receive a Kindle Fire, and 3rd Place will receive an Apple iPod! First, Second and Third place winners at each grade level will receive a medal!

Sincerely,

The Science Fair Committee:
Mucahit Polat, Jacki Tothill, Erin Brown, Michael Schlifke, Jennifer Livergood & Andrew Notaro

SCIENCE FAIR GOALS

Here at BASCS, we believe that the Science Fair is a valuable experience for our students. Listed below are some of our top reasons, as well as goals, that we hope the students are able to achieve through participating in the BASCS Annual Science Fair:

- Create a stimulated interest, curiosity, and desire to explore the mysteries of the world.
- Students will learn, understand, apply and master the process of scientific inquiry.
- Provide the students with real scientific experiences, allowing them to apply their scientific knowledge.
- Students will develop the necessary skills in communicating scientifically; both verbal and written.
- Students will expand their skills of interpretation and analysis of data.
- Students will learn how to manage and complete long range projects.
- Acquire skills of research using a variety of resources such as the Internet, interviews, books, magazines, etc.
- Demonstrate a connection between what is learned in the classroom and real-life experiences.
- Promote unique opportunities for the teachers to work individually with the students in an interdisciplinary project.
- Foster independence in students by providing the opportunity to take initiative and responsibility in studying a topic of their choice.

FOUR MAJOR COMPONENTS

The science fair project can be divided into four major components:

1. The Experiment
    a. Choose a topic
    b. Perform an experiment related to that topic
2. The Research Paper
    a. Review and research literature for the chosen topic and closely related topics
    b. Summarize the experiment and draw conclusions from the experiment
    c. Write a properly formatted and cited research paper
3. The Visual Display
    a. Prepare a display board that illustrates the complete science project from start to finish
    b. Display equipment and materials needed to complete the project
4. The Oral Presentation
    a. Present an oral summary of the project to your teachers, classmates, parents and judges
    b. Share and explain all phases of the project in an open setting

BASCS SCIENCE FAIR RULES AND REGULATIONS

Buffalo Academy of Science organizes an annual school-wide science fair. Due to the high expectations we have for our students in science, math and technology, each student is required to complete an individual or group research project in one of these areas. Failure to do so will result in failing the science class.

1. All students in 7th through 11th grade attending BASCS **MUST** complete and submit a research project.
2. All students need to have their projects approved by the Science Fair Committee in order to be eligible for participation in the Science Fair.
3. Students will receive project grades for their projects which will contribute to their 2nd and 3rd quarter grades in Science class.
4. All projects will be turned in on the due date. (See the calendar of events.) **No late projects will be accepted!**
5. All projects should be taken home within two days after the school-wide science fair. Projects not taken home will be discarded. Buffalo Academy of Science Charter School does not take the responsibility for loss or damage to any of the projects.
6. **If your project needs electrical power, please request it **one month** in advance of the due date. This will ensure the proper arrangements are made for your project.
7. If a student wins a trophy or medal in the city-wide or state-wide science fair, or in any other competition/contest in which he/she represents the school, the school owns the trophy or medal and displays it.

SAFETY GUIDELINES

Buffalo Academy of Science follows all rules and requirements specified by most of the national science and engineering fair competition organizations. **Students should obtain approval for their projects!** All students should return the Science Fair Safety Form.

The exhibits **MUST NOT** include any of the following:

1. Microbial cultures or fungi, alive, dead, rotted or moldy specimens! (Use photographs of your experiment instead!)
2. Displays of live animals.
3. Preserved vertebrate animals, whether whole or their parts (this includes humans). Teeth, hair, nails, and histological sections are permissible if properly acquired and form is filed.
4. Photographs showing vertebrate animals in any non-normal condition.
5. Open or concealed flames, matches, or lighters.
6. Dangerous chemicals, including caustics, acids, and many household chemicals.
7. Highly combustible solids, fluids, or gases. (No rocket engines!)
8. Controlled substances.
9. Radioactive materials.
10. Operating lasers.
11. Anything potentially hazardous to the public.

Special care must be given to the following:

1. High temperature.
2. Batteries. (Open top cells are not permitted.)
3. High voltage equipment must be shielded with a grounded metal box or cage to prevent accidental contact. Wiring, switches, and metal parts must be located out of reach.
4. Electric circuits for 110 volts AC must have an Underwriters Laboratories (UL) approved card equipped with a grounded (3 pronged) plug. **Exhibits are limited to 300 watts.**
5. All wiring must be properly insulated.
6. Bare wire and exposed knife switches are permissible only in low voltage, low current circuits of 12 volts or less.
7. Electrical connections in 110 volt circuits must be soldered or fixed with approved connectors.
8. Devices emitting ultraviolet light must be equipped with the proper filters for eye protection.

CATEGORIES

Environmental Science, Life Science, Physical Science, Earth Science and Technology and Engineering

Please note: Subcategories/Topics for the five main categories are not limited to what is listed below. Remember to get your topic/project approved by the Science Fair Committee.

Environmental Sciences

- Environmental Management
- Biodiversity
- Global Warming
- Pollution
- Waste Disposal
- Agriculture

Life Sciences

- Behavioral and Social Sciences
- Psychology
- Botany
- Anatomy
- Cellular and Molecular Biology
- Medicine and Health Sciences
- Microbiology
- Animal Sciences and Zoology

Physical Sciences

- Chemistry (Inorganic and Organic)
- Biochemistry
- Electricity and Magnetism
- Physics
- Thermodynamics

Earth Sciences

- Astronomy and Astrophysics
- Meteorology
- Geology and Geography
- Oceanography
- Seismology

Technology and Engineering

- Computer Sciences
- Mathematical Sciences
- Energy and Transportation Engineering
- Electronics
- Bioengineering

STEPS FOR AN EXPERIMENTAL SCIENCE PROJECT

The steps in the experimental scientific method (process of scientific inquiry) are presented in the following order: Ask a question, perform background research, create a hypothesis, test your hypothesis by conducting an experiment, report your results, analyze your data and draw a conclusion.

A scientific investigation should have the following components:

Initial Observation and\or Question

You notice something, and wonder why it happens. You see something and wonder what causes it. You want to know how or why something works. You ask questions about what you have observed. You want to investigate. The first step is to clearly write down exactly what you have observed and what you want to find out.

Information Gathering

Find out about exactly what you want to investigate. Read books, magazines, scientific articles or ask professionals who might know about the topic in order to learn about the question at hand or area of study. Keep track of from where you got your information!

Give the Project a Title

Choose a title that describes the effect or thing you are investigating. The title should be short and summarize what the investigation examines.

State the Purpose of the Project

What do you want to find out? Write a statement that describes what you want to do. Use your initial observations and questions to write the statement.

Identify Variables

Identifying variables is necessary before you can make a hypothesis. When you think you know what variables may be involved, think about ways to change one at a time. If you change more than one at a time, you will not know what variable is causing your results. Sometimes variables are linked and work together to cause something. At first, try to choose variables that you think act independently of each other. At this point, you are ready to translate your question into a hypothesis.

Make Hypothesis

A hypothesis is a question which has been reworded into a form that can be tested by an experiment.
Based on your gathered information, make an educated guess about what types of things affect the system you have chosen.

Design Experiments to Test Your Hypothesis

Design an experiment to test your hypothesis. Make a step-by-step list of what you will do to answer your question. This list is called an experimental procedure. For an experiment to give answers you can trust, it must have a "control." A control is an additional experimental trial or run. It is a separate experiment, done exactly like the others. The only difference is that no experimental variables are changed. A control is a neutral "reference point" for comparison that allows you to see what changes a variable does by comparing it to not changing anything. Without a control you cannot be sure that changing the variable causes your observations. A series of experiments that includes a control is called a "controlled experiment."

Experiments are often done many times to guarantee that what you observe is reproducible, or to obtain an average result. The ability to reproduce an experiment is a crucial requirement; without it you cannot trust your results. Reproducible experiments reduce the chance that you have made an experimental error, or observed a random effect during one particular experimental run.

Some Guidelines for Experimental Procedures

- Select only one thing to change in each experiment. Things that can be changed are called variables.
- Change something that will help you answer your questions.
- The procedure must tell how you will change this one thing.
- The procedure must explain how you will measure the amount of change.
- Each experiment should have a "control" for comparison so that you can see what the change actually did.

Obtain Materials and Equipment

Make a list of the things you need in order to perform the experiment, and prepare them.

Conduct the Experiments and Record Data

Experiments are often done in series. A series of experiments can be done by changing one variable a different amount each time. A series of experiments is made up of separate experimental trials. During each trial you make a measurement of how much the variable affected the system under observation. For each trial, a different amount of change in the variable is used. This produces a different amount of response in the system. You measure this response and record the data in a table or chart, depending on the data. This is considered "raw data" since it has not been processed or interpreted yet. When raw data gets processed mathematically, for example, it becomes results.

As you do experiments, record all numerical measurements made. Data can be amounts of chemicals used, how long something is, the time something took, etc. If you are not making any measurements, you probably are not doing an experimental science project.

Record Your Observations

Observations can be written descriptions of what you noticed during an experiment or problems encountered. Keep careful notes of everything you do and everything that happens. Observations are valuable when drawing conclusions and useful for locating experimental errors.

Perform Calculations

Do any calculations needed from your raw data to obtain the numbers you need to draw your conclusions. For example, you weighed a container. This weight is recorded in your raw data table as "wt. of container." You then added some soil to the container and weighed it again. This would be entered as "wt. of container + soil." In the calculation section, do the calculation to find out how much soil was used in this experimental run:

(wt. of container + soil) - (wt. of container) = wt. of soil used

Each calculated answer is entered into a table in the Results section of your project.

Not all experiments need a calculation section. However, if you do not have any calculations, you may not be using the experimental scientific method. If you have calculations to make, you are probably using the experimental scientific method.

Summarize Results

Summarize what happened. This can be in the form of a table with processed numerical data or graphs. It could also be a written statement of what occurred during the experimental trials. The results from calculations using recorded data helps to create the tables and graphs that are made. By studying tables and graphs we can see trends that tell us how different variables cause our observations. Based on these trends, we can draw conclusions about the system under study. The conclusion(s) we make from our experimental results help us support or refute our original hypothesis. Often, mathematical equations can be made from graphs. These equations allow us to predict how a change will affect the system without the need to do additional experiments. Advanced levels of experimental science rely heavily on graphical and mathematical analysis of data. At this level, science becomes even more interesting and powerful.

Draw Conclusions

Using the trends in your experimental data and your experimental observations will assist you in answering your original question(s). Is your hypothesis supported by the data or refuted by the data? Now is the time to pull together what happened, and assess the experiments you did.

Other Things You Can Mention in the Conclusion

- If your hypothesis is not supported by the data, what could be the answer to your question?
- Summarize any difficulties or problems you had while performing the experiment.
- Do you need to change the procedure and repeat your experiment? Why?
- What would you do different next time?
- List other things you learned.

A SAMPLE PROJECT

The Effect of Salt on the Boiling Temperature of Water

INITIAL OBSERVATION
Cooking instructions tell you to add salt to water before boiling it.

PROJECT TITLE
The Effect of Salt on the Boiling Temperature of Water

PURPOSE OF THE PROJECT
To find out how table salt affects the boiling temperature of water.

HYPOTHESIS
If table salt is added to boiling water, then it will cause the water to boil at a higher temperature.

MATERIALS AND EQUIPMENT

- Table Salt
- Distilled Water
- 2 Quart Cooking Pot
- Pint measuring cup
- Teaspoon and tablespoon measuring spoons
- Thermometer
- Stirring spoon

EXPERIMENTAL PROCEDURE

1. Boil one quart of distilled water on a stove.
2. Measure the temperature of the boiling water. Record the highest temperature reading. This is the control to compare with.
3. Measure out table salt using a kitchen measuring spoon. Level the spoonful.
4. Add the measured salt to the boiling water and stir.
5. Measure the temperature of the boiling water with the salt in it. Record the highest temperature reading.
6. Repeat for other amounts of salt.

DATA

Data Obtained: 2/25/95, Mankato, MN	
Amount of boiling water	2 Cups
Temperature of boiling water (Control)	212.9° F
Amount of table salt added to boiling water: Run #1	1 Tbl.
Temperature of boiling water after adding salt: Run #1	215.6° F

Additional amount of table salt added to boiling water: Run #2	1 Tbl.
Temperature of boiling water after adding salt: Run #2	218.3° F

EXPERIMENTAL OBSERVATIONS

When the salt was added to boiling water it bubbled up more and then stopped boiling. Shortly afterward, it boiled again.

If the thermometer extends beyond the outside of the pot it reads a higher temperature. Heat from the stove burner makes the thermometer read higher. Keep the thermometer over the pot when making temperature measurements.

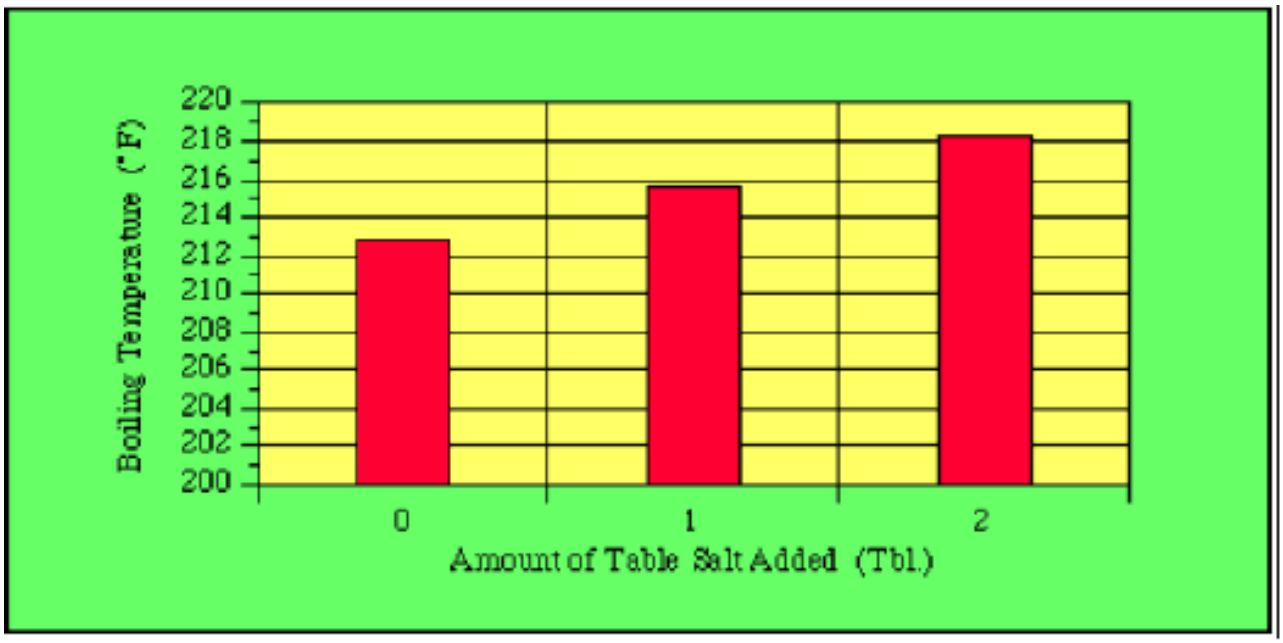
CALCULATIONS

- Total amount of table salt added for Run #1: 0 + 1 = 1 Tbl.
- Total amount of table salt added for Run #2: 1 + 1 = 2 Tbl.

RESULTS

Temperature of boiling water (Control)	212.9° F
Amount of table salt added to boiling water: Run #1	1 Tbl.
Temperature of boiling water after adding salt: Run #1	215.6° F
Total amount of table salt added to boiling water: Run #2	2 Tbl.
Temperature of boiling water after adding salt: Run #2	218.3° F

Amount of Table Salt Added Versus Water Boiling Temperature



CONCLUSIONS

- Is the hypothesis supported by the data collected during the experiment?

  Yes. Adding table salt to water causes the water to boil at a higher temperature.

- Problems with doing the experiments.

  The temperature readings were hard to make. Gloves had to be worn to keep my hands from getting too hot. Also, had to be careful that the stove heat was not hitting the thermometer.

- Other things learned.

  Be careful when adding salt to boiling water. It makes the water boil vigorously for a second or two.

RELATED QUESTIONS

- Why do you think cooking instructions tell you to add salt when boiling water?

  When the water is hotter, you can cook food faster. Salt also makes the food taste better.

REQUIRED PARTS OF THE RESEARCH PAPER & POWERPOINT PRESENTATION

Each student is required to submit a research paper for their research project. Students will prepare a PowerPoint presentation in their computer classes which will help them prepare their display boards. The following sections should be in the research paper:

1. TITLE PAGE – Include the Title of your project, your name, your partner's name if applicable, school's name, grade and class, sponsor, city, state, and zip code. (The title page should be a page of its own.)

2. TABLE OF CONTENTS – List the parts of your paper in the order they appear and indicate page numbers where each section begins.

3. ABSTRACT – After finishing research and experimentation, you need to write a (maximum) 250-word, one-page abstract. An abstract should include the (a) purpose of the experiment, (b) procedures used, (c) data and (d) conclusions. It also may include any possible research applications. Only minimal reference to previous work may be included. The abstract must focus on work done since the last fair and should not include: a) acknowledgements or b) work or procedures done by the mentor.

4. ACKNOWLEDGEMENTS- You can acknowledge someone for helping you with your project.

5. INTRODUCTION – Explain your topic. What is it about? Include any research or background information that you have gathered.

6. PURPOSE/PROBLEM – A statement of what you intend to do. What is your goal? What idea are you trying to test? What is the scientific question you are trying to answer?

7. HYPOTHESIS – Explain how you think your project demonstrates your purpose. Make a prediction regarding the outcome of your experiment. State the results you are predicting in measurable terms. Try and sum up your hypothesis in a short statement.

8. VARIABLES – Independent, dependent, constants and control group. Be clear about the variables (elements of the experiment that change to test your hypothesis) versus your controls (elements of the experiment that do not change).

9. MATERIALS – List all materials and equipment that were used, including ingredients if applicable.

10. PROCEDURE – Should be listed in steps with pictures, not in paragraphs. Give a detailed explanation of how you will conduct the experiment to test your hypothesis. Be very specific about how you will measure results to support or refute your hypothesis. You should include a regular timetable for measuring results or observing the projects (for example, every hour, every day and every week). Your procedure should be specific enough to enable another person to repeat your experiment exactly. Test this with a friend or parent to be sure you have not forgotten anything.

11. **PICTURES – Include any pictures taken throughout your experiment. Pictures can document steps of the procedure, turning points in your experiment, and/or checkpoints.**

12. DATA – All of your data should be represented in an organized chart or table.

13. GRAPHS – Use your data and create a visual representation of your data to be viewed by the reader.

14. ANALYSIS – Explain your observations, data and results. This is a summary of what your data has shown you. List the main points that you have learned. Why did the results occur? What concepts does your experiment seem to prove? Did the data support or refute your hypothesis? This should be explained thoroughly.

15. CONCLUSION – Answer your problem or purpose statement. How does it all add up? What is the value of your project? Was your hypothesis supported by the data? Why or why not?

16. APPLICATIONS & FURTHER RESEARCH – What is the application of your project in daily life or the economy? What further study do you recommend given the results of your experiment? What would be the next question to ask? If you repeated this project, what would you change?

17. BIBLIOGRAPHY – List the books, magazines or other communications you used to research your topic. Write in complete sentences. Add titles, units and labels where necessary. (Google, Wikipedia, etc. are not considered sources for your bibliography.)

    Please refer to the examples and websites below to help you write your bibliography properly:

    a. http://www.sciencebuddies.org/science-fair-projects/project_mla_format_examples.shtml
    b. http://chemistry.about.com/od/sciencefairprojects/ht/bibliography.htm

        Examples from the above website:

        i. For a book or magazine -- Jones, Jenny R., "Science Experiments to Try" *Science Time*, New York: Sterling Pub. Co., May 2004, Vol. 3:12-15.
        ii. For a Web site -- Helmenstine, Anne, About Chemistry Website, http://chemistry.about.com, Oct. 4, 2005.
        iii. An example for a conversation -- Smith, John, Telephone Conversation, Mar. 5, 1993.

    c. http://intranet.dalton.org/MSLIB/citation.html

THE ORAL PRESENTATION

Along with the backboard, the presentation is very important within the scientific community. Using the backboard as your prop, you will present your project from an objective and scientific perspective. The following topics should be addressed while presenting:

1. INTRODUCTION - Give the project **title**, **your name and grade level**. Explain the topic to be discussed and why you became interested in this topic.

2. ACKNOWLEDGMENTS – Thank the people who helped you and those who you contacted for interviews or research information.

3. PURPOSE AND HYPOTHESIS – State clearly the purpose and hypothesis. A short explanation of the reasoning behind the hypothesis is appropriate. Explain the difference between the dependent and independent variables.

4. BACKGROUND INFORMATION – The background section is like a short review of literature. Give some of the information from the review but just enough to familiarize the audience.

5. PROCEDURE – Give a detailed and complete explanation of how you completed the experiment. Use the step by step method just as you wrote for the paper. Start with the first step and proceed, including explanations of designs and techniques used while experimenting. Explain what the control group is and why it is used.

6. RESULTS – Use the charts and graphs on the backboard to explain the results and numbers that were produced from the experiment.

7. CONCLUSION – State clearly the conclusion and make sure your data supports it. Explain whether the hypothesis was supported by the data (accepted) or not supported by the data (rejected). Admit any deficiencies or errors that may have occurred during the experiment and may affect the conclusion. All scientists respect the fact that all experiments have some deficiencies.

8. FUTURE PLANS – Discuss any possible future investigations that can be done to continue with your project.

9. QUESTIONS – At the end, ask if anyone has questions for you. Take your time and think about the answer, then answer slowly. If you do not know the answer, admit it! Offer to look for the answer and then ask for more questions. It is better to admit to not knowing than to be wrong! If questions are not related to your topic, try to clarify the question. If the question is still unrelated then redirect the conversation back to your topic.

10. THANK THE AUDIENCE AND JUDGES FOR LISTENING!

HELPFUL HINTS:

- Use note cards and the backboard to make sure that you hit all points.
- Do NOT read the backboard or note cards.
- Speak slowly and face the audience.
- Practice! Practice! Practice in front of parents, friends, teachers, mirrors, etc.

Buffalo Academy of Science Charter School
Science Fair Judging Rubric for ORAL PRESENTATION

Project #
_____

Project Title: _____

Point Total
_____

	Impressive		Adequate		Minimal	
Part I – Oral Presentation **The Student will:**						
1. State the title of the project, their name, grade and why they became interested in the project.	5	4	3	2	1	0
2. Acknowledge those who helped	5	4	3	2	1	0
3. Explain the purpose and hypothesis	5	4	3	2	1	0
4. Explain the difference between the dependent variable and independent variable	5	4	3	2	1	0
5. Explain background information	5	4	3	2	1	0
6. Summarizes procedure in an understandable manner and can explain what the control group is and why it is used	5	4	3	2	1	0
7. Explain results (uses tables, graphs and photos on display board as visual aids)	5	4	3	2	1	0
8. Provide conclusion supported by data and relevant to hypothesis. Explain experiment's deficiencies.	5	4	3	2	1	0
9. Offer suggestions for follow up experiments.	5	4	3	2	1	0
10. Answer judges' questions accurately	5	4	3	2	1	0

DISPLAY BOARD

Your science fair display board represents all the work that you have done. It should consist of a backboard, the project report and anything that represents your project such as models made, items studied, photographs, surveys, etc. It must tell the story of the project in such a way that it attracts and holds the interest of the viewer. This needs to be thorough, not too crowded and simple.

Your board should be approximately 48 inches (122 cm) wide, 30 inches (76 cm) deep and 108 inches (274 cm) high (including the table it stands on). These are **maximum** measurements, so your display may be smaller than this. A three-sided backboard is usually the best way to display your work. Sturdy cardboard or other heavy material is easier to work with and is less likely to be damaged during transportation to the fair. Some office supply stores - such as Hobby Lobby, Office Depot and Staples, just to name a few - sell inexpensive premade backboards. Purchased backboards generally come in three colors: black, blue and white. You may use any one of these colors. The title and other headings should be neat and large enough to be read at a distance of about 6 feet (2 m). A short title is often eye-catching. Self-sticking letters, of various sizes and colors, for the title and headings can be purchased at office supply stores and stuck to the backboard. You can cut your own letters out of construction paper or stencil the letters for all the titles directly onto the backboard. You can also use a word processor or computer to print the title and other headings.

Please see the example below as well at the Sample Science Fair Board Design on the school website. **The following headings should be included on the board: TITLE, Problem/Purpose, Hypothesis, Experiment (procedure), Data (includes data table, graph & pictures), Results, Conclusion and Next Time. The project title should go at the top of the center panel, and the remaining material needs to be placed neatly in order according to scientific method.**

You want a display that the judges will remember positively. So before you glue everything down, lay the board on a flat surface and arrange the materials a few different ways. This will help you decide on the most suitable and attractive presentation. The figure below shows what a good display might look like.

Buffalo Academy of Science Charter School
Science Fair Judging Rubric for DISPLAY BOARD

Project # _____

Point Total _____

Project Title: _____

	Impressive		Adequate		Minimal	
Part II – Display Board						
1. Title of Project (includes student name and grade)	5	4	3	2	1	0
2. Purpose/Problem (stated as a question)	5	4	3	2	1	0
3. Hypothesis (If/then statement and uses D.V. and I.V.)	5	4	3	2	1	0
4. Procedure/Experiment (thorough and understandable)	5	4	3	2	1	0
5. Data (tables, graphs, original photos)	5	4	3	2	1	0
6. Results/Data Analysis (verbal summary)	5	4	3	2	1	0
7. Conclusion (supported by data and relevant to hypothesis)	5	4	3	2	1	0
8. Next Time (Ideas for further research)	5	4	3	2	1	0
9. Components in correct order on board	5	4	3	2	1	0
10. Aesthetic (font can be read 6 ft away, use of color and contrast, eye catching, creative)	5	4	3	2	1	0

BASCS SCIENCE FAIR RESEARCH PLAN ATTACHMENT

The Research Plan must be completed before the student begins project work. Fill out date information accurately. The student must remember to obtain approval for their project before any research is started. This is an outline of your experiment. It will help you get organized!

A. Problem/Purpose/Question Being Addressed

- The students should present the ideas behind the research.
- Why is the research to be done?
- There should be a reason for wanting to do the research.
- Some explanation should be given regarding what the research is expected to show and what is to be learned.
- The last statements of this section should include a specific purpose of the research and an applicable hypothesis.
- The purpose should reflect a very close relationship with the title.
- Use additional sheets if needed.

B. Hypothesis/Engineering Goals

- A specific statement of the Hypothesis(es) or Engineering Goal(s) must be included.
- Explain how you think your project can demonstrate your purpose.
- Make a prediction regarding the outcome of your experiment.
- State the results you are predicting in measurable terms.

C. Methods or Procedures

- Give a detailed explanation of how you will conduct the experiment to test your hypothesis.
- Be clear about the variables (elements of the experiment that change to test your hypothesis) versus your controls (elements of the experiment that do not change).
- Be very specific about how you will measure results to prove or disprove your hypothesis. You should include a regular timetable for measuring results or observing the projects (for example, every hour, every day and/or every week).
- Your procedure should be like a recipe. Another person should be able to perform your experiment following your procedure. Test this with a friend or parent to be sure you have not forgotten anything.
- For projects involving human research, include survey or questionnaire if used, and critically evaluate the risks.
- For vertebrate animal research, you must briefly discuss potential alternatives and present reasons why alternatives are not suitable.
- MAJOR DEVIATIONS FROM THE APPROVED PLAN MAY ONLY BE IMPLEMENTED WITH THE WRITTEN APPROVAL OF THE QUALIFIED SCIENTIST OR THE TEACHER-SUPERVISOR.

D. Bibliography/Works Cited

- List the books, articles and papers that were read in preparation of the Research Plan.
- Each reference should contain the author, title of the book or paper, publisher, date of publication, and pages used. (Remember to use MLA format.)
- Research involving animals must have appropriate references on animal care.

Research Plan Attachment

(This form is necessary for all students)

DUE: Friday, October 30, 2015

TITLE : _____

BY : _____

CLASS PERIOD : _____

A. Problem/Purpose/Question Being Addressed*

B. Hypothesis I Engineering Goals*

C. Methods or Procedures*

D. Bibliography*

*Use more sheets if needed! (May use lined paper if preferred.)

BASCS SCIENCE FAIR PROJECT ENTRY FORM

(This form is necessary for all students)

DUE: Friday, October 2, 2015

TITLE _____

(**Maximum** of 50 letters/characters)

EXHIBITOR(S) **CLASS PERIOD:**

1. Exhibitor's Last Name _____ First Name _____ MI_____ Grade_____

2. Exhibitor's Last Name _____ First Name _____ MI_____ Grade_____

CATEGORY (please circle ONE of the following)

Environmental Sciences Life Sciences Physical Sciences

Earth Sciences Technology and Engineering

If this project involves vertebrate animals, human subjects (including surveys), recombinant DNA, tissues, cell cultures, microorganisms, environmental sampling, or potentially dangerous chemicals or equipment, were the safety forms approved/signed by the BASCS Science Fair Committee?

Yes No

Will the project require access to 110-120V electricity?_____

If yes, the student must provide a 9 ft. UL-listed, good quality grounded extension cord.

NAME OF TEACHER: _____
(Either your Science Teacher or the Teacher giving the most assistance.)

ENTRY AGREEMENT: I enter this project at my own risk and will not hold anybody responsible for loss or damage to the exhibit or harm to myself. I agree to submit display board on Tuesday, January 21, 2014 and to remove my exhibit AFTER the close of the Awards Ceremony on Saturday, January 25, 2014.

_____ _____
Exhibitor's Signature Parent or Guardian Signature

_____ _____
Exhibitor's Signature Parent or Guardian Signature

Certification for entry by Science Fair Committee

_____ _____
Name/Title Signature

SCIENCE PROJECT SAFETY FORM

(This form is necessary for all students)

DUE: Friday, September 18, 2015

Student's Name: _____

Grade & Class Section: _____

Parent/Guardian Name: _____

Phone Number and/or Email Address: _____

- If a science project involves vertebrate animals, human subjects (including surveys), controlled substances and pathogens, recombinant DNA, tissues including blood, cell cultures, microorganisms, environmental sampling, or potentially dangerous chemicals or equipment, you need approval from the Science Fair Board.
- All bacteria, fungi, etc. should be considered potentially pathogenic.
- Air, water, mud and soil samples may contain pathogens or hazardous materials.
- Learn about animal safety measures if working with animals. Pet store animals may not be used for any type of research.
- Surveys should not involve violation of privacy act or potential risk.
- If using equipment that has voltage greater than 220 volts, firearms, radioactive substances and radiation, you need to review the proper safety standards before experimentation.
- **The starting date of project is when it is approved. No student can begin until they receive approval from their parents and teachers.**

- -

Student Acknowledgement:

I understand the risks and possible dangers related to the project on which I will be working. I will adhere to all BASCS Science Fair rules when conducting my research and project.

_____ _____ _____

(Student's Printed Name) (Signature) (Date)

Parent/Guardian Approval:

I have read and understand the risks and possible dangers involved in my child's science fair project. I consent to my child participating in this research project.

_____ _____ _____

(Parent/Guardian's Printed Name) (Signature) (Date)

BASCS SCIENCE FAIR HANDBOOK RELEASE FORM

(This form is necessary for all students)

DUE: Friday, September 18, 2015

My signature below indicates that I have read and understand BASCS Science Fair Handbook Guidelines and have been given a copy of my own to keep.

Student Name	Date	CLASS PERIOD

Student Signature	Date

Parent Signature	Date

Email Address	Phone Number