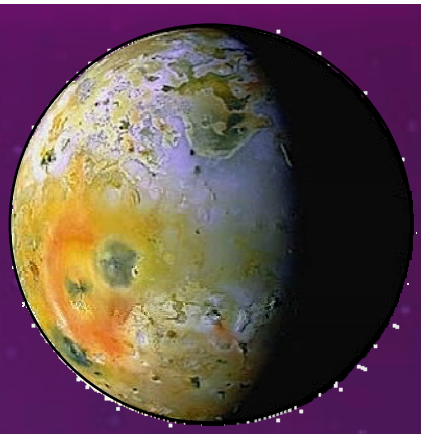

NORTHERN DIVISION Science Fair Handbook - Elementary

Dr. Brian T. Binggeli, Superintendent
Brevard Public Schools
2012-2013

SCHOOL BOARD OF BREVARD COUNTY

Educational Services Facility
2700 Judge Fran Jamieson Way
Viera, FL 32940-6601

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Superintendent
Brevard Public Schools

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Associate Superintendent,
Division of Curriculum
and Instruction,
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School Board of Brevard County
2700 Judge Fran Jamieson Way
Viera, Florida 32940-6601
(321) 633-1000

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Viera, Florida 32940-6601
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TABLE OF CONTENTS

INTRODUCTION

The purpose of this document is to provide direction and assistance for students, teachers, and parents involved in the elementary science fair process. The design is intended to alleviate some of the mystery and frustration that can be associated with science projects/fairs.

In 2010-11 new forms were introduced to help schools, teachers, parents and students ensure that projects are done safely, ethically, and in a manner that is humane to animals that might be part of testing.

The booklet is divided into two sections: Part I, the **School/Teacher Handbook**, will be useful for teachers and administrators desiring detailed school information including guidelines, requirements, judging criteria, updated schedules, important rules changes, school responsibilities, registration forms, and science project help; Part II, the **Student Handbook**, is a condensed version of the School/Teacher Handbook containing materials appropriate to students. The Student Handbook can be modified for school fair use by adding material from the teacher version.

Electronic copies of the handbooks are on the Elementary Science Resources 2.0 site: http://goo.gl/gddyd.

Appreciation is expressed to all individuals whose contributions have assisted in the development of this document.

IMPORTANT DATES/TIMES

Date	Event	School
Monday September 17, 2012	School Contact Committee Meeting 12:00-3:00 p.m.	Saturn Elementary
Friday January 14, 2013	Fair Committee Meeting 12:00-3:00 p.m.	Enterprise Elementary
Thursday January 31, 2013	Deadline for School Application Forms to be emailed to: Lori Cantaloupe, Enterprise Elementary	
Thursday and Friday March 7 & 8, 2013	Northern Division Science and Art Fair	Space Coast Jr./Sr. High
Thursday March 7, 2013	Science Fair Registration and Setup 12:00 noon to 4:00 p.m.	Space Coast Jr./Sr. High Gym
Friday March 8, 2013	Project Judging/Student Interviews/ Judges' Breakfast/Luncheon 7:00 a.m.-1:00 p.m.	Gym Multi-Purpose Room
Friday March 8, 2013	Displays Open to Public 5:30 – 7:15 p.m. Discovery Division Science and Art Fair Awards Ceremony 6:00 – 6:45 p.m. Columbia Division Science and Art Fair Awards Ceremony 7:15 – 8:00 p.m. Fair Closes 8:00 p.m.	Gym Space Coast Jr./Sr. High Cafeteria Space Coast Jr./Sr. High Cafeteria Space Coast Jr./Sr. High Cafeteria

NOTE: * Projects can be viewed only between 5:30 – 7:15 p.m.
* Columbia Division projects should be viewed before their Awards ceremony since projects can be removed starting at 7:15 p.m.
* Students & school personnel may remove their projects beginning at 7:15 p.m.

NORTHERN DIVISION SCIENCE FAIR GUIDELINES AND REQUIREMENTS FOR TEACHERS

The following guidelines will be used in the process of selecting and exhibiting projects for the Northern Division Science Fair. For the sake of compatibility, it is suggested that School Fairs follow Northern Division Fair guidelines.

Project/Display Eligibility

1. **Students' projects, research plans, and testing procedures must be reviewed and approved by their teacher.**
   - **A. Each school should have a Science Fair Committee in place that can support the classroom teacher with advice and guidance.**
   - **B. Students designing their own experiments for science projects will need guidance to conduct safe and ethical science. An "Elementary Science Project Research Plan and Approval Form" template is provided in this Science Fair Handbook to assist. This approval form indicates what additional forms may need to be used.**
   - **C. Teachers, students and parents should work together to review and complete this form, so that everyone has a complete understanding of the intended project and is aware of any potentially dangerous or unethical situations *before* the student begins any testing so that the appropriate changes can be made.**
   - **D. Students should always follow approved procedures and never perform unauthorized experiments.**
   - **E. The Intel International Science and Engineering Fair (Intel ISEF) website provides additional resources and guidelines that can be a valuable resource for students, teachers, and parents. Visit http://www.societyforscience.org/isef/rulesandguidelines**
2. First place winners from Elementary School Fairs are eligible to enter the Division Fairs. For students served in a home school situation, home schools are to submit their entries to the public school where the child would have attended according to that school's guidelines and timelines. The home school entry should then be judged along with all the other entries from the public school. If selected, that home school entry would attend the Division Fair as part of the public school science team.
3. An additional **"School Choice"** entrant can be designated (optional) by the School Fair Director. (1 total per school) **Because of space limitations this entrant must be an individual project, not a team project. It can be from any grade level (3-6).**
4. Exhibits will be limited to those projects, which can be classified under **Biological, Physical**, or **Environmental** sciences in grades 3 through 6. Projects in non-science fields are ineligible.

   Projects that relate to more than one category should be entered in the category of major emphasis.
5. In the **Team Project** category, each school will be permitted to enter **two team projects – (2-3 students).** The school's selection of the competing team projects **must** be from grades 3, 4, 5 or 6.

   The above categories are defined as follows:

   BIOLOGICAL: Projects that focus on the vital processes of living organisms, plants, microorganisms, and animals (including humans), and how these processes are affected as a result of controlling a variable. Processes may include but not be limited to such functions as growth, maintenance, breathing rate, pulse, learning, memory, vision, etc. Animals/insects must be treated humanely.

   PHYSICAL: Projects related to the natural sciences such as physics, chemistry, as well as earth and space sciences, which focus primarily on non-living materials. Topics may include but are not be limited to: properties of matter, physical and chemical changes, various forms of energy, forces, motion, processes that shape the Earth, weather, etc.

ENVIRONMENTAL: Projects that focus on human relationships with their natural surroundings. Projects may include the relationships of energy, population, pollution, resource allocation and depletion, conservation, transportation, and technology to the total human environment. Topics may include but are not limited to: ways that humans protect or improve the quality of life by wisely using, reusing, recycling, or reducing use of our natural resources; ways that technology impacts our resources; ways that humans negatively impact the quality of life by pollution, etc.

TEAM PROJECT: A study conducted by two or three students (grades, 3, 4, 5 or 6 only) in any scientific discipline.

NOTE: Any project that results in microbes (including mold) being collected, isolated, and/or cultured – even if inadvertent/unintentional – will require copies of the appropriate forms (Qualified Scientist, Designated Supervisor and BSL-1 Checklist) to be a part of student's project display, or daily log, for judges' review. This is to ensure student and other's safety. The original forms should be kept at the school.

6. **Microbial experimentation (involving microscopic organisms such as bacteria, fungi, etc.) done by elementary students is potentially dangerous and should only be done with expert and careful supervision. Samples/organisms cannot be collected, isolated and/or cultured from the environment as they are potentially pathogenic. This includes, but is not limited to, projects involving blood, growing mold and culturing swabs from the environment. Instead, all microbial samples/organisms should be obtained from a science supplier/company and are limited to Biosafety Level 1 (BSL-1). The BSL-1 Checklist must be used to guide safe practices such as sealing Petri dishes, proper disposal, etc. A Qualified Scientist Form and a Designated Supervisor Form are required to ensure student's and others' safety. Forms will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges.**

Microbiology projects are potentially dangerous and should be discouraged in most cases. Directors ask that schools be accountable in this area and exclude projects where proper safety procedures and forms were not followed.
A project that is not "judgable" should not be submitted to the Division Fair.

7. **Projects involving invertebrates (e.g. worms, daphnia, fruit flies, snails, insects, etc.) must have a clear purpose that has scientific significance. Invertebrates should be treated humanely, and intentionally harming them without a scientific purpose should not occur.**

8. **Projects involving non-human vertebrates (including embryos, eggs, tadpoles, and other early life cycle stages of vertebrates) are held to a higher standard than projects testing invertebrates. Vertebrates must be treated humanely, and if a project could cause pain or distress to the vertebrate the student will need to design a new question and procedure. When non-human vertebrate animals are tested and their environment is changed, a Qualified Scientist Form and Designated Supervisor Form are required to ensure humane treatment. Forms will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges. A project with a mortality rate of 30% or greater in any vertebrate group or subgroup is not permitted to be entered into the Science Fair even if the deaths were unintentional or accidental.**

9. **In some cases, students may choose to use human subjects for their experiments. However, when an experiment could cause more than minimal risks to the human subject, the subjects (and their parents, when a minor) must be informed of, and consent to, the testing procedures before any experimentation begins. In these cases, use of the Qualified Scientist Form, Designated Supervisor**

Form, and Informed Consent Form is required to ensure the safety of the human subjects. Forms will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges. For more details, see the online Risk Assessment Guide at www.societyforscience.org/isef/rulesandguidelines

10. **Students are never allowed to do projects that are clearly dangerous.**
    a. Testing involving firearms, knives or other items that could be considered weapons (E.G. a paintball gun) is not permitted.
    b. Testing involving fireworks or other explosives is not permitted.
    c. Testing involving controlled substances, prescription drugs, alcohol, and tobacco is not allowed.
    d. The use of any potentially hazardous chemicals, devices, and activities require direct supervision by a Designated Supervisor.
    e. Microbial experimentation (involving microscopic organisms such as bacteria, mold, fungi, etc.) is potentially dangerous and should only be done with expert and careful supervision.
11. Each project will be classified by grade level in one of the first three categories listed above. Team projects are **not** categorized by discipline or by grade level.
12. Entered projects must be prepared during the present school year.
13. Exhibits should be constructed and developed by the students entering them. Help **must** be limited to supervision and guidance.
14. To be eligible for awards, students are required to meet all grade level requirements:
    - **Grades 3-4 Grade Level Requirements: Daily Log, Backboard and one-page Summary.**
    - **Grades 5-6 and Team Grade Level Requirements: Daily Log, Backboard, Summary, and Bibliography.** (Daily Log should be handwritten. Summary and Bibliography can be hand-written or typed.)

Registration Requirements

1. Schools should email School Application Forms no later than **January 31, 2013** to Lori Cantaloupe, **Enterprise Elementary.**
2. Displays must be registered by students, teachers, or parents at Space Coast Jr./Sr. High School between the hours of 12:00 noon and 4:00 P.M. on **March 7, 2013.**

Display Requirements

1. Displays must meet all size requirements. Exhibits will be confined to table space which must not exceed **3 feet (91 cm) from side to side, 5 feet (152 cm) high, and 30 inches (76 cm) front to back.** Headers may be used if they fit within these size requirements. Projects larger than size limitations will be disqualified until changes are completed.
2. No display items in front of exhibit/backboard. Only Research and/or Daily Logs. Display items cannot be brought in for judging either. Photos, charts, graphs and student knowledge will suffice in communicating the project to others.
    - **Backboards must be able to fold flat. Only "2 dimensional" paper, photos, pictures, lettering, designs, and borders should be on the backboard. No 3D materials should be on the backboard other than scrapbook-type foam lettering.**
    - The following may **not** be exhibited **on** the exhibit/backboard.
        * Live animals, preserved animal bones, feathers or other parts.
        * Live or dead plants (flowers, fruits/vegetables)
        * Soil, sand, rocks, seashells, chemicals, liquids, tobacco products

* Sharp objects (metal cans, nails, screws, pins, glass, etc.)
* Any other potentially dangerous substance or item that may be hazardous in a public display.

3. Research involving live specimens should be displayed through the use of drawings, charts, photographs, graphs, or original models.
4. Electricity will not be provided.
5. The Committee reserves the right to:
    a. refuse an exhibit that is considered unsafe
    b. disqualify an exhibit which may bring discredit to the Fair
    c. refuse a project that did not treat invertebrates or vertebrates humanely
    d. refuse a project did not involve the proper protocol and/or completed forms
    e. refuse a project with a mortality rate of 30% or greater in any vertebrate group or subgroup. A project with these results is not permitted to be entered into the Science Fair, even if the deaths were unintentional/accidental.
    f. **Projects not following proper procedures may be excluded from the fair and may not be eligible for awards.**
6. Students **may** use photographs that include their faces.
7. Student's last names or school names must **not** be visible on either side of the display or on the Daily Log. Project numbers will identify participants.
8. Students' last names or school names must **not** be visible on shirts or other clothing during judging.

Display Setup

1. After project registration is completed, the Fair Committee will set up projects in assigned spaces. Teachers and/or parents may register for students. Due to the time constraints and influx of people, this is not the time for public viewing of the projects. Only complete projects will be accepted. School personnel should not leave until they have been told officially that all projects are checked in.
2. The Fair Committee will affix a **Setup Checklist** to the back of each display. Items on the checklist, which will be reviewed by the Fair Committee, include the following information:

    - Completed grade level requirements
    - Display meets size requirements
    - Display meets safety requirements
    - School or student name not visible on front or back of display or on Daily Log
    - Project number and area number attached to front of display (on color-coded dots)
    - Completed Qualified Scientist, Designated Supervisor, and other forms are on file at the school for projects that require them. **Copies must be included with certain projects to be viewed at check-in and by judges.**
3. The Fair Committee reserves the right to move projects in order to accommodate participants in regards to space and safety.
4. Entrants should make every effort to secure his/her/their exhibit. The Fair Committee will safeguard all projects, but the responsibility for the security of displays rests on the participants.

Judging Process

1. Students will arrive for project judging at assigned times.

2. Immediately prior to entering the judging area, the students will receive a judging orientation.

3. The judging process will include an interview with judges for each entrant at his or her displays. The judging process must be a **positive** experience for all students. Judges will be reminded that all work has worth and value.

4. Other than the team division, projects are compared only to others in the same category and same grade level.

5. Science projects should involve experimental testing of a hypothesis (not just gadgeteering or "cookbook" science experiments).

6. Elementary students' work should be appropriate to their grade level.

7. **Parents and teachers will not be permitted in the judging area (gym floor) while interviews and judging are in progress. Schools should limit the number of adults transporting – due to parking and distraction issues. Siblings and additional family members should not attend judging.**

8. The judges will dismiss students individually from the judging area after completion of judging process.

9. The decision of the judge is final.

10. Students should be advised that all judges' information regarding decisions, notes, point awards, etc. is strictly confidential, however, students **will** receive judging feedback forms.

11. Schools will be given a schedule of interview times.

12. Teachers should make students aware of criteria (below) used for judging.

Judging Criteria

The student's use and understanding of the scientific method as well as knowledge gained through their research are the key factors in determining the quality of science projects. The physical display is secondary. Each project should involve experimentation (not just gadgets or model building). Creative ability, thoroughness, skill, and clarity of presentation should also be considered. An elementary child's work should be appropriate for his/her grade level. Judges are reminded to make the interview process a positive experience and to reinforce the notion that all work has worth/value. The following may be helpful as suggested criteria for judging:

Scientific Thought

Is the problem clearly stated?
Is the problem limited so that it was possible to attack it?
Was there a detailed procedure for the solution?
Were the results measurable?
Were the variables recognized and defined?
Was the number of trials or the number of subjects tested sufficient?
Was there adequate data to support the conclusions?

Knowledge Gained

What knowledge has the student learned as a result of doing this project?
Does the student understand the basic science related to his/her project?
How would the student change the project if starting over?
What were the most interesting and exciting things about the project?
How can this project be applied to a "real life" situation?
What is the practical application?

Creative Ability

Does the project show creative ability and originality in:
The question asked?
The approach to solving the problem?
The analysis of the data?
The use of equipment?
The construction/design?

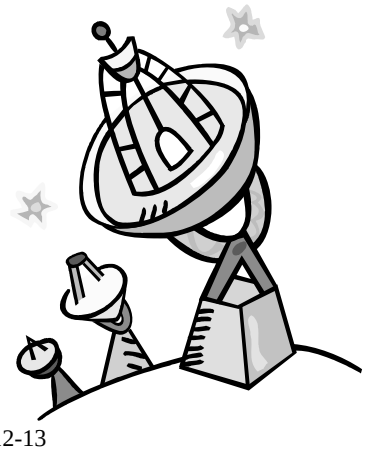
Obviously the elementary child would not incorporate all of the above in his/her project, nor to any depth. Try to ascertain the kind of assistance received by the child. Don't penalize for taking help from others, but try to determine what the student has contributed. EXAMPLE: Did (s)he get the idea from a book or did (s)he develop the idea as a result of reading. The child's idea is considered more creative. Collections are not creative unless they are used to support an investigation and help to answer a question in a creative way. Engineering should not be limited to gadgets, but a genuine contribution to ways of solving problems.

Thoroughness

Was the project carried to completion?
How complete are notes and entries in the Daily Log?
How much time was spent on the project?

Skill

Does the student have all the skills to do the work?
What kind of assistance was given?



Clarity

Is (s)he able to explain the purpose, procedure, and conclusion clearly?
Has the child expressed him/herself well in written material and interview?
Are ideas clearly presented in the display?
Is (s)he able to present findings clearly so that others can easily understand?

IMPORTANT: ALL JUDGES' INFORMATION REGARDING DECISIONS, NOTES, POINT AWARDS IS STRICTLY CONFIDENTIAL. PLEASE ADVISE STUDENTS THAT THE ELEMENTARY JUDGING PROCESS **NOW** INCLUDES FEEDBACK FROM THE JUDGING TEAM MEMBERS. ALL JUDGES' DECISIONS ARE FINAL.

Awards

1. To be eligible for awards, entrants must have an approved Setup Checklist.
2. Entrants must meet all grade level and safety requirements to be eligible for awards.
3. Discovery and Columbia Divisions will receive **separate** awards for their area.
4. Awards will be given for first place through fifth place in each of the four divisions by grade level (teams projects will not receive awards by grade level).
5. A **"Harris Best of Show**" and a **"Best of Show Runner-Up"** award will be given to the outstanding projects in physical, biological, environmental and team projects in the Discovery and Columbia Divisions.
6. The judges may give one optional "Honorable Mention" award in their divisions, as they deem appropriate.
7. All entrants will receive a "**Certificate of Merit**" and a "**Participation"** ribbon**.**
8. Every attempt is made to notify schools of winners before afternoon dismissal. Unfortunately, there is a short turnaround time after judging is completed and to avoid errors the process can't be rushed.

Display Removal

- Schools are responsible for communicating to students and parents who will be responsible for removal of projects after the awards program.
- The Fair Committee will not be responsible for any displays remaining after the fair closes.

Summary Of School Responsibilities For Northern Division Fair

Each school is responsible to:

1. **Teach and model scientific methods of problem solving in the classroom before science projects are assigned.**
2. Assign science projects in a timely manner to allow sufficient time for completion.
3. **Provide adequate supervisory and instructional support to participating students.**
4. Designate person(s) to attend Division Science Fair Committee meetings and to remove projects at the designated time at the conclusion of the fair.
5. Provide student handbooks to participating students.
6. Complete school fair as early as possible.
7. **Review every project before it is sent to the Northern Division Science Fair to ensure it is within the guidelines established for size, project safety, humane treatment of animals/insects and proper use and display of all necessary forms when applicable (Qualified Scientist, Designated Supervisor, etc.).**
8. **Schools must be accountable in this area and exclude projects where proper safety procedures and forms were not followed. A project that is not "judgable" should not be submitted to the Division Fair.**
9. Insure that each project satisfies all grade level requirements.
10. Email School Application Form to appropriate Division Fair contact person before **January 31, 2013**. The School Application Form includes a list of first place winners in each category by grade level. Each school may include one school choice entrant if desired (1 total) and/or two team entries (also optional). School forms should be emailed **to Lori Cantaloupe, Enterprise Elementary.**
11. Attach color-coded project numbers (to be assigned and provided by Fair Committee to each school) to designated place on the **front** of student display boards.
12. Deliver projects to Space Coast Jr./Sr. High School between the hours of 12:00 noon to 4:00 P.M. on **March 7, 2013**, for registration and setup.
13. Set up projects in assigned space according to size and safety guidelines.
14. Insure that students arrive on time for project judging and interviews. Limit the number of adults transporting students to judging. It is not appropriate for siblings and other family members to attend judging. Attendees, noise, cameras, etc. are very distracting to students.
15. Type its own certificates of participation for the Division Fair.
16. **Provide each student with a nametag that designates student's first name only to be worn during judging.** (The school is responsible for providing this)
17. Each school is responsible for keeping on file completed Qualified Scientist, Designated Supervisor and other forms from students who did projects involving microbes, animal/insect testing, etc.

SCHOOL APPLICATION FORM *

List of School Participants for Northern Division Science Fair
This form will be emailed to schools by Lori Cantaloupe.

Please type and spell names correctly – this is how they will appear in the program.

School Name_____ Division _____

BIOLOGICAL DIVISION WINNERS:

Grade 3_____ Project Number_____ Title _____

Grade 4_____ Project Number_____ Title _____

Grade 5_____ Project Number_____ Title _____

Grade 6_____ Project Number_____ Title _____

PHYSICAL DIVISION WINNERS:

Grade 3_____ Project Number_____ Title _____

Grade 4_____ Project Number_____ Title _____

Grade 5_____ Project Number_____ Title _____

Grade 6_____ Project Number_____ Title _____

ENVIRONMENTAL DIVISION WINNERS:

Grade 3_____ Project Number_____ Title _____

Grade 4_____ Project Number_____ Title _____

Grade 5_____ Project Number_____ Title _____

Grade 6_____ Project Number_____ Title _____

SCHOOL CHOICE SELECTION (OPTIONAL-cannot be a <u>team</u> project)

Name_____ Grade_____ Division_____

Project Number_____ Title _____

TEAM SELECTION (OPTIONAL)

Names_____

Project Number_____ Title _____

Names_____

Project Number_____ Title _____

* Please type names of students and email form no later than <u>January 31, 2013</u>, to: **Lori Cantaloupe, Enterprise Elementary**.

<u>REMINDER</u>: Schools are responsible for keeping on file completed Qualified Scientist, Designated Supervisor, and other forms from students who did microbiology, animal testing, or other potentially dangerous projects. **Copies must be included with projects to be viewed at check-in and by judges.** Your Administrator name below verifies the above and that any animals/insects used were treated humanely.

_____
Name of Administrator Who Verified This Form

Teacher Notes

Northern Division Science Fair Student Handbook - Elementary 2012-2013

Northern Division

2012-13 ELEMENTARY SCIENCE FAIR

Student Handbook

IMPORTANT DATES FOR STUDENTS

Date	Event	Where
Thursday and Friday March 7 & 8, 2013	Northern Division Science and Art Fair	Space Coast Jr./Sr. High
Thursday March 7, 2013	Science Fair Registration and Setup 12:00 noon to 4:00 p.m.	Space Coast Jr./Sr. High Gym
Friday March 8, 2013	Project Judging/Student Interviews Schools will be given assigned times between 8:00 a.m. and 1:00 p.m.	Gym Multi-Purpose Room
Friday March 8, 2013	Displays Open to Public 5:30 – 7:15 p.m. Discovery Division Science and Art Fair Awards Ceremony 6:00 – 6:45 p.m. Columbia Division Science and Art Fair Awards Ceremony 7:15 – 8:00 p.m. Fair Closes 8:00 p.m.	Gym Space Coast Jr./Sr. High Cafeteria Space Coast Jr./Sr. High Cafeteria Space Coast Jr./Sr. High Cafeteria

NOTE: * Projects can be viewed **only** between 5:30 – 7:15 p.m.
* Columbia Division projects should be viewed before their Awards ceremony since projects can be removed starting at 7:15 p.m.
* Students and school personnel may remove their projects beginning at 7:15 p.m. Please do not remove them before that time.
* **Schools are responsible for communicating with students and parents who will be responsible for removal of projects.**

Dr. Brian T. Binggeli
Superintendent
Brevard Public Schools

HOW TO DO A SCIENCE PROJECT

Step-by-Step <u>Suggestions</u> and Help for
Elementary Students, Teachers, and Parents
Brevard Public Schools

1. Get an Idea for Your Project

Researching your favorite science topics can help you find a question that interests you. You might want to look at a list of science fair categories to help decide. Talk over ideas with your family, teacher, or friends. Use TV commercials, magazines, newspapers, hobbies, sports, or books to get more ideas. Think about problems around the house that you would like to solve. You can even test household items.

2. Start a Daily Log

A detailed Daily Log with accurate records allows scientists to describe their investigation so others can repeat it and try to replicate the results. **Divide it into two sections: *"Daily Work"* and *"Data."*** A bound notebook (such as a "composition notebook") is the best for a Daily Log because it is a "legal document". Don't tear pages out even if you make mistakes.

- In the ***Daily Work*** section write down all the things you do or think about concerning your project each day - like a diary. Write a **<u>date for each entry</u>** to show the day to day record of your progress while doing your project. Give details. Include your procedure, research, diagrams, changes to the experiment, bibliography, etc.
- In the ***Data*** section make charts **<u>before</u>** you start your testing. Record all measurements, readings, etc. in these charts **<u>in ink as you measure them</u>** during your testing. If you make a mistake draw a line through it and rewrite it. Do not erase or "white out." Data should not be recorded by typing. Record any and all other observations you make while testing also. A good scientist keeps careful, detailed records of findings and test results. Sometimes it's the unexpected observation that leads to a new discovery.

3. Do a Search for Background Information

Every scientist spends time getting background information. Use the library; write or call experts; write to companies and organizations; use the Internet*. Start keeping a bibliography with complete information on every source you used or tried to get. Good research will help you **<u>become an expert</u>** on your topic and refine your question. As an expert, you will be able to make better hypotheses, plan better testing, and draw better conclusions. You'll also impress others with your knowledge when you share the results of your project with them.

4. State the Problem in a Question Form

This part (often used as a title) asks what you are trying to find or show in your investigation. Make sure your question or problem is one that can be **<u>solved by testing</u>**. It must involve more than a demonstration, survey, or a collection. Don't confuse the use of "affect" (a verb) with "effect" (a noun).

5. State Your Hypothesis

The hypothesis is **a prediction** of what you think will happen during your experimentation. Use background information to help you prepare this prediction and to explain it. Be sure to write your hypothesis **before** you start your experiment. Word it as an ***"If…, then…"*** statement. The results of the test you do later do not have to support the hypothesis in order for the experiment to be a success. It is important to note that your hypothesis will NOT be "proved" or "disproved." The words to use are that it is "supported" or it is "not supported."

6. Design the Experiment

Determine the **procedure that you will follow to test your hypothesis** and record it in your Daily Log. The procedure should explain the steps to be followed in order to find the answer to your question or problem. Think about necessary safety precautions that will be taken. Make a complete list in your Daily Log of all the materials you will need.

- Identify the conditions (also called **Constants**, **Controls,** or **Control Variables**) that will be kept the same during the experiment. These will help you run a fair, scientific test that will give you valid results.
- Identify the one factor you will change (on purpose) to get a result. This is called the **Independent variable**.
- Identify how your results will be measured. This is called the **Dependent variable**. It's important to have results that can be measured. Use measuring tools with metric units whenever possible.
- It is very important to have a **Control Group**. This is the group of subjects that is treated in the "normal" way so you can compare them to the Experimental Group (the group of subjects that have the one factor changed.)

A good procedure is very detailed – like a good recipe. This makes it easy for other scientists to duplicate your experiment so they can verify your results.

7. Conduct the Experiment

Follow your procedure carefully to ensure fair, scientific testing. While testing, **record all data, in ink**, directly into your Daily Log. Don't write measurements on a piece of paper and then copy them into your log – this can lead to errors. Be accurate and exact as you observe, measure, describe, count, or photograph. **Work safely.** If necessary, make changes in your procedure and document them in your Daily Log.

8. Repeat the Procedure

The results will be more valid, and convincing, if you **repeat the experiment as many times as possible**. For example, an experiment that uses ten plants will give more valid results than one that tested only one or two plants. Testing and measuring the distance a car rolled down a ramp twenty times would be much more valid than testing it only three times. Understand that an experiment must be repeated many times and yield consistent results before the results can be accepted. Repeat at least ten (10) times.

9. Analyze the Data (Results)

Look at the measurements you recorded in your Daily Log closely. Think about the data and decide what the results mean. Try to find explanations for your observations. If possible, examine your results mathematically using percentages, mean, median, range, and modes. Be sure to know the meanings of these words if you use them. Construct graphs or tables that will go on your backboard to show the results more clearly. Charts and graphs can help us understand patterns of change. The data will help you decide

whether your hypothesis is supported or should be rejected. Identify data that is contradictory or unusual and try to explain it in your conclusions.

10. Make Conclusions

Conclusions are statements telling what you found out or learned during your investigation. This is a very important part of your project since you probably learned a lot. They are based on the results of your experiment and your hypothesis. Explain how the data you collected "supports your hypothesis" if it does. Remember that you won't prove your hypothesis. A hypothesis isn't proven until many scientists repeat the same experiment many times and get similar results. If the data doesn't support your hypothesis, explain why you "reject your hypothesis." Explain what further testing might be done to better answer your original question. Through the use of science processes and knowledge, people can solve problems, make decisions, and form new ideas. Tell how people might apply your findings to everyday life. Can you explain any unusual findings from your testing?

11. Communicate Your Results in a Summary or Abstract

Scientists share their findings with other scientists. Write a **short, one-page, five-paragraph** Summary (it is also called an Abstract) that explains the most important parts of your project. An easy format to use is to **write one paragraph that summarizes each** of the following:

- **Problem or Question.** State it and explain why you chose it.
- **Hypothesis.** Tell your prediction and explain why you thought it would happen.
- **Testing.** Give a general overview of your procedure telling how you used fair and scientific testing. Tell about your variables, how you had repeated trials or multiple subjects, testing time, and if you had a control group.
- **Results.** Summarize your data by telling your final measurements, totals, or averages. Share a few of the most important observations you made. Compare your control group to your experimental group – did one do better than the other?
- **Conclusions.** State whether your hypothesis was supported by the data you collected or not. Tell the most important thing you learned. If the project was to be repeated what changes would you make and why?

*Practice an oral presentation also. **Be an expert** on all parts of your project so you'll be prepared to answer an interviewer's or a classmate's questions.*

12. Construct a Display that Explains Your Project

Even though science does not always follow a rigidly defined method ("the scientific method"), it does involve important processes such as observation and gathering of empirical evidence. Including the parts below is an effective way to organize your presentation and to communicate information about your project to others:

- **PROBLEM or QUESTION** - Statement of problem in question form.
- **HYPOTHESIS** - Your prediction of what will happen and your reasoning.
- **MATERIALS** -A complete list of materials and equipment you used.
- **PROCEDURE** -Step-by-step explanation of how you tested.
- **DATA or RESULTS** - Shows the measurements you collected while testing. Include measurements **graphs,** tables, or charts. Diagrams or photographs can also be displayed.
- **CONCLUSION** - Statements relating your data to your hypotheses to tell what you learned by your testing.

Display your Daily Log, Summary or Abstract, and Bibliography on the table in front of your backboard.

13. Be ready to answer question that judges often ask.

Below are sample questions that judges often ask students during judging interviews. It is a good idea to practice answering the following questions before meeting the judges:

- Can you explain or describe your project?
- What procedures did you follow that made sure it was a fair and scientific test? Did you repeat your testing – at least ten (10) times?
- Tell me what happened in your control group.
- Where, or how, did you get the idea for your project?
- What kind of help did you receive while working on your project?
- What are the most important things you have learned by doing your project?
- If you had more time, what things would you do to change or improve your project?
- How much time did you spend working on your project?
- How can you apply what you have learned to "real life" situations?

Enter your project in the school science fair. Be sure to follow the rules. Set up your backboard, Daily Log, Summary or Abstract, and Bibliography at the fair. Have fun showing others what you have learned!

* Use Internet sites for more information about science projects - go to: Brevard's Elementary Science Resources 2.0 site: http://goo.gl/gddyd.

Wording of Science Project Problems

A science project "Problem" should be written in a question form that can be solved by testing.

Two common formats used are:

- *"Will salt affect the boiling temperature of liquids?"*
- *"What are the effects of water pollution on the growth of sea grass?"*

Be careful when using the words "affect" and "effect" because they are often confused and misused.

- "Affect" is a verb that means, "to influence." In the example above the student is asking if salt will "influence" or "affect" the boiling temperature.
- "Effect" is usually used as a noun that means "a result, or something brought about by a cause." In the second example above the student is asking what the "results" or "effects" will be when she tests water pollution on sea grass.
- "Effective" is an adjective meaning "producing an expected result." It is sometimes misused also. A correct example would be. *"Which of the tested air filtering systems is the most effective?"*

Some other formats that can be used are:

- *"What happens to the drag and stability of a boat when the pontoon design is changed?"*
- *"Is there a relationship between light color and the growth of bean plants?"*
- *"Which of the tested materials provides the best insulation?"*

The way the question is worded should be chosen carefully so it expresses clearly what you are trying to find out.
For example:

"Is there a relationship between the cost of different brands of disposable diapers and how absorbent they are?" is a better question than *"How does the cost of diapers affect their absorbency?"*

The second question indicates that **the cost** is what makes one diaper more absorbent than another. We know the absorbency is actually related to the materials the diapers are made from, not whether the store has marked the price of them high or low.

NORTHERN DIVISION SCIENCE FAIR
GUIDELINES AND REQUIREMENTS FOR STUDENTS

The following guidelines will be used in the process of selecting and exhibiting projects for the Northern Division Science Fair.

Project/Display Eligibility

1. **Students' projects, research plans, and testing procedures must be reviewed and approved by their teacher with support from the school's Science Fair Committee when needed.**
   A. Students designing their own experiments for science projects will sometimes need guidance in order to conduct safe and ethical science.
   B. Teachers, students and parents should work together to review student research plans and testing procedures, so that everyone has a complete understanding of the intended project and is aware of any potentially dangerous or unethical situations *before* the student begins any testing so that appropriate changes can be made.
   C. Students should always follow approved procedures and never perform unauthorized experiments.
   D. This Science Fair Handbook includes forms to support and assist schools with science project processes.
   E. The Intel International Science and Engineering Fair (Intel ISEF) website provides additional resources and guidelines that can be a valuable resource for students, teachers, and parents. Visit **http://www.societyforscience.org/isef/rulesandguidelines**

2. First place winners from Elementary School Fairs are eligible to enter the Division Fairs. For students served in a home school situation, home schools are to submit their entries to the public school where the child would have attended according to that school's guidelines and timelines. The home school entry should then be judged along with all the other entries from the public school. If selected, that home school entry would attend the Division Fair as part of the public school science team.

3. An additional **"School Choice"** entrant can be designated (optional) by the School Fair Director. (1 total per school) **Because of space limitations this entrant must be an individual project, not a team project. It can be from any grade level (3-6).**

4. Exhibits will be limited to those projects, which can be classified under **Biological, Physical**, or **Environmental** sciences in grades 3 through 6. Projects in non-science fields are ineligible.

   Projects that relate to more than one category should be entered in the category of major emphasis.

5. In the **Team Project** category, each school will be permitted to enter **two team projects – (2-3 students).** The school's selection of the competing team projects **must** be from grades 3, 4, 5 or 6.

   The above categories are defined as follows:

   BIOLOGICAL: Projects that focus on the vital processes of living organisms, plants, microorganisms, and animals (including humans), and how these processes are affected as a result of controlling a variable. Processes may include but not be limited to such functions as growth, maintenance, breathing rate, pulse, learning, memory, vision, etc. Animals/insects must be treated humanely.

PHYSICAL: Projects related to the natural sciences such as physics, chemistry, as well as earth and space sciences, which focus primarily on non-living materials. Topics may include but are not be limited to: properties of matter, physical and chemical changes, various forms of energy, forces, motion, processes that shape the Earth, weather, etc.

ENVIRONMENTAL: Projects that focus on human relationships with their natural surroundings. Projects may include the relationships of energy, population, pollution, resource allocation and depletion, conservation, transportation, and technology to the total human environment. Topics may include but are not limited to: ways that humans protect or improve the quality of life by wisely using, reusing, recycling, or reducing use of our natural resources; ways that technology impacts our resources; ways that humans negatively impact the quality of life by pollution, etc.

TEAM PROJECT: A study conducted by two or three students (grades, 3, 4, 5 or 6 only) in any scientific discipline.

NOTE: Any project that results in microbes (including mold) being collected, isolated, and/or cultured – even if inadvertent/unintentional – will require copies of the appropriate forms (Qualified Scientist, Designated Supervisor and BSL-1 Checklist) to be a part of student's project display, or daily log, for judges' review. This is to ensure student and other's safety. The original forms should be kept at the school.

6. **Microbial experimentation (involving microscopic organisms such as bacteria, fungi, etc.) done by elementary students is potentially dangerous and should only be done with expert and careful supervision. Samples/organisms cannot be collected, isolated and/or cultured from the environment as they are potentially pathogenic. This includes, but is not limited to, projects involving blood, growing mold and culturing swabs from the environment. Instead, all microbial samples/organisms should be obtained from a science supplier/company and are limited to Biosafety Level 1 (BSL-1). The BSL-1 Checklist must be used to guide safe practices such as sealing Petri dishes, proper disposal, etc. A Qualified Scientist Form and a Designated Supervisor Form are required to ensure student's and others' safety. Forms will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges.**

Microbiology projects are potentially dangerous and should be discouraged in most cases. Directors ask that schools be accountable in this area and exclude projects where proper safety procedures and forms were not followed.
A project that is not "judgable" should not be submitted to the Division Fair.

7. **Projects involving invertebrates (e.g. worms, daphnia, fruit flies, snails, insects, etc.) must have a clear purpose that has scientific significance.** Invertebrates should be treated humanely, and intentionally harming them without a scientific purpose cannot occur.

8. **Projects involving non-human vertebrates (including embryos, eggs, tadpoles, and other early life cycle stages of vertebrates) are held to a higher standard than projects testing invertebrates.** Vertebrates must be treated humanely, and if a project could cause undue pain or distress to the vertebrate the student will need to design a new question and

procedure. When non-human vertebrate animals are tested and their environment is changed, a Qualified Scientist Form and Designated Supervisor Form are required to ensure humane treatment. **Forms will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges. A project with a mortality rate of 30% or greater in any vertebrate group or subgroup is not permitted to be entered into the Science Fair even if the deaths were unintentional or accidental.**

9. **In some cases, students may choose to use human subjects for their experiments. However, when an experiment could cause more than minimal risks to the human subject, the subjects (and their parents, when a minor) must be informed of, and consent to, the testing procedures before any experimentation begins.** In these cases, use of the Qualified Scientist Form, Designated Supervisor Form, and Informed Consent Form is required to ensure the safety of the human subjects. **Forms will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges.** For more details, see the online Risk Assessment Guide at www.societyforscience.org/isef/rulesandguidelines

10. **Students are never allowed to do projects that are clearly dangerous.**
    a. Testing involving firearms, knives or other items that could be considered weapons (E.G. a paintball gun) is not permitted.
    b. Testing involving fireworks or other explosives is not permitted.
    c. Testing involving controlled substances, prescription drugs, alcohol, and tobacco is not allowed.
    d. The use of any potentially hazardous chemicals, devices, and activities require direct supervision by a Designated Supervisor.
    e. **Microbial experimentation (involving microscopic organisms such as bacteria, mold, fungi, etc.) is potentially dangerous and should only be done with expert and careful supervision.**

11. Each project will be classified by grade level in one of the first three categories listed above. Team projects are **not** categorized by discipline or by grade level.

12. Entered projects must be prepared during the present school year.

13. Exhibits should be constructed and developed by the students entering them. Help **must** be limited to supervision and guidance.

14. To be eligible for awards, students are required to meet all grade level requirements:
    - **Grades 3-4 Grade Level Requirements: Daily Log, Backboard and one-page Summary.**
    - **Grades 5-6 and Team Grade Level Requirements: Daily Log, Backboard, Summary, and Bibliography.** (Daily Log should be handwritten. Summary and Bibliography can be hand-written or typed.)

Registration Requirements

1. Schools should email **School Application Forms** no later than **January 31, 2013** to **Lori Cantaloupe, Enterprise Elementary.**
2. Displays must be registered by students, teachers, or parents at Space Coast Jr./Sr. High School between the hours of 12:00 noon and 4:00 P.M. on **March 7, 2013.**

Display Requirements

1. Displays must meet all size requirements. Exhibits will be confined to table space which must not exceed **3 feet (91 cm) from side to side, 5 feet (152 cm) high, and 30 inches (76 cm) front to back.** Headers may be used if they fit within these size requirements. Projects larger than size limitations will be disqualified until changes are completed.

2. No display items in front of exhibit/backboard. Only Research and/or Daily Logs. Display items cannot be brought in for judging either. Photos, charts, graphs and student knowledge will suffice in communicating the project to others.
   - **Backboards must be able to fold flat. Only "2 dimensional" paper, photos, pictures, lettering, designs, and borders should be on the backboard. No 3D materials should be on the backboard other than scrapbook-type foam lettering.**
   - The following may **not** be exhibited **on** the exhibit/backboard.
     * Live animals, preserved animal bones, feathers or other parts.
     * Live or dead plants (flowers, fruits/vegetables)
     * Soil, sand, rocks, seashells, chemicals, liquids, tobacco products
     * Sharp objects (metal cans, nails, screws, pins, glass, etc.)
     * Any other potentially dangerous substance or item that may be hazardous in a public display.

3. Research involving live specimens should be displayed through the use of drawings, charts, photographs, graphs, or original models.

4. Electricity will not be provided.

5. The Committee reserves the right to:
   a. refuse an exhibit that is considered unsafe
   b. disqualify an exhibit which may bring discredit to the Fair
   c. refuse a project that did not treat invertebrates or vertebrates humanely
   d. refuse a project did not involve the proper protocol and/or completed forms
   e. refuse a project with a mortality rate of 30% or greater in any vertebrate group or subgroup. A project with these results is not permitted to be entered into the Science Fair, even if the deaths were unintentional/accidental.
   f. **Projects not following proper procedures may be excluded from the fair and may not be eligible for awards.**

6. Students **may** use photographs that include their faces.

7. Student's last names or school names must **not** be visible on either side of the display or on the Daily Log. Project numbers will identify participants.

8. Students' last names or school names must **not** be visible on shirts or other clothing during judging.

Display Setup

1. After project registration is completed, the Fair Committee will set up projects in assigned spaces. Teachers and/or parents may register for students. Due to the time constraints and influx of people, this is not the time for public viewing of the projects. Only complete projects will be accepted.

2. The Fair Committee will attach a **Setup Checklist** to back of each display. Items on the checklist, which will be reviewed by the Fair Committee, include the following information:
   - completed grade level requirements
   - display meets size requirements
   - display meets safety requirements
   - school or student name not visible on front or back of display or on Daily Log
   - project number and area number attached to front of display (on color coded dots)
   - **completed Qualified Scientist, Designated Supervisor, and other Forms that are required for certain projects will be retained at the school level but copies must be included with the project to be viewed at check-in and by judges.**

3. The Fair Committee reserves the right to move projects in order to accommodate participants in regards to space and safety.

4. Each entrant should make every effort to secure his/her exhibit. The Fair Committee will safeguard all projects, but the responsibility for the security of displays rests on individual participants.

Judging Process

1. Students will arrive for project judging at **assigned** times. **Schools will limit the number of adults providing transportation due to parking and distraction issues. Siblings and additional family members should not attend judging.**
2. Immediately prior to entering the judging area, the students will receive a judging orientation.
3. The judging process will include an interview with judges for each entrant.
4. Team Projects will be compared to other team projects at the other grade levels.
5. All other projects will be compared only to others in the same category and same grade level.
6. Science projects should involve experimental testing of the hypothesis (not just "cookbook" science experiments).
7. Parents and teachers will **not** be permitted in the judging area (gym floor) while interviews and judging are in progress.
8. The judges will dismiss students individually from the judging area after completion of judging process.
9. The decision of the judge is final.

Awards

1. To be eligible for awards, entrants must have an approved Setup Checklist.
2. Entrants will meet all grade level and safety requirements to be eligible for awards.
3. Discovery and Columbia Divisions will receive **separate** awards for their area.
4. Awards will be given for first place through fifth place in each of the four divisions by grade level (teams projects will not receive awards by grade level).
5. A **"Harris Best of Show**" and a **"Best of Show Runner-Up"** award will be given to the outstanding projects in physical, biological, environmental and team projects in the Discovery and Columbia Divisions.
6. The judges may give one optional "Honorable Mention" award in their divisions, as they deem appropriate.
7. All entrants will receive a "**Certificate of Merit**" and a "**Participation"** ribbon**.**
8. Every attempt is made to notify schools of winners before afternoon dismissal. Unfortunately, there is a short turnaround time after judging is completed and to avoid errors the process can't be rushed.

Display Removal

- Schools are responsible for communicating to students and parents who will be responsible for removal of projects after the awards program.
- The Fair Committee will not be responsible for any displays remaining after the fair closes.

Summary of Student Responsibilities for Area Fair

Each eligible student is responsible to:

- Meet all grade level and safety requirements, including humane treatment of animals/insects.
- Meet all size and safety requirements
- **Use the Qualified Scientist, Designated Supervisor, and other required forms if doing animal/insect testing, a microbiology project, etc. Completed forms must be kept on file at the student's school and copies must be included with the project to be viewed at check-in and by judges.**
- Make arrangements with teacher and/or parents for project registration and setup.
- Report to judging interview at **assigned** time.
- Make every effort to secure his/her exhibit. The Fair Committee will make every effort to safeguard all projects.
- Remove his/her project not before, but beginning at the designated time – 7:15 p.m.
- Not wear clothing showing last name or school name during judging.

Tips for Constructing the Project Display

DISPLAY:

- Meets grade level requirements: Daily Log, Summary, Bibliography (Team and grades 5-6 only) should be displayed in front of the backboard. **Daily Log** – refers to a notebook detailing the student's daily work and data. **Summary** – one page briefly explaining the most important parts of the project. (also called an Abstract) **Bibliography** – is a listing of all resources used to obtain research information.
- Backboard meets size requirements, no poster board, self-supporting.
- Does not include student's name or school name. Not visible on front or back of backboard
- May include photographs of students, testing, materials, etc.

PRESENTING INFORMATION:

- Use appropriate titles
- Label neatly, spell correctly, explain clearly, print or type all words on display
- Use computer for lettering
- Use unlined paper
- Use ink or markers,
- Use colored paper for background behind information sheets

SUGGESTED TITLES TO BE SHOWN ON DISPLAY BOARD:

(Placement of these materials and selection of other items are optional)

- Question
- Hypothesis
- Materials
- Procedure
- Data / Results
- Conclusion

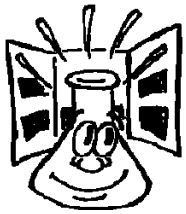
NO EQUIPMENT OR MODELS WILL BE DISPLAYED:

No display items in front of exhibit or backboard.

No display items in front of exhibit/backboard. Only Research and/or Daily Logs. Display items cannot be brought in for judging either. Photos, charts, graphs and student knowledge will suffice in communicating the project to others.

- **Backboards must be able to fold flat. Only "2 dimensional" paper, photos, pictures, lettering, designs, and borders should be on the backboard. No 3D materials should be on the backboard other than scrapbook-type foam lettering.**
- The following may **not** be exhibited **on** the exhibit/backboard.
    * Live animals, preserved animal bones, feathers or other parts.
    * Live or dead plants (flowers, fruits/vegetables)
    * Soil, sand, rocks, seashells, chemicals, liquids, tobacco products
    * Sharp objects (metal cans, nails, screws, pins, glass, etc.)
    * Any other potentially dangerous substance or item that may be hazardous in a public display.

* Use Internet sites for more information about science projects - go to: Brevard's Elementary Science Resources 2.0 site: http://goo.gl/gddyd



Student Notes

QUALIFIED SCIENTIST FORM

To ensure that safe and ethical science is conducted, this form is required for research involving microbial experimentation. It is also required when non-human vertebrate animals are tested and their environment is changed, and when human subjects are tested and there is more than minimal risk involved for the subjects.

A Qualified Scientist is a medical doctor, veterinarian or individual with relevant science credentials. A science teacher, without these specific credentials, cannot be a "qualified scientist". This form must be signed prior to the start of the student's experimentation. Copy of form MUST be part of the student's project documentation available at the Fair.

Student's Name _____

Title of Project _____

To be completed by the Qualified Scientist:

Scientist Name _____
Advanced Degree _____
Degree Specialty _____
Position _____
Address _____
Phone _____

- Students must provide a copy of their Science Project Research Plan and Approval Form to the Qualified Scientist.
- Students should always follow approved procedures and never perform unauthorized experiments.

1. Will microbial samples/organisms be used? **Yes** **No**

Microbial experimentation (involving microscopic organisms such as bacteria, fungi, etc.) done by elementary students is potentially dangerous and should only be done with expert and careful supervision. Samples/organisms should **not** be collected, isolated and/or cultured from the environment as they are potentially pathogenic. This includes, but is not limited to, projects involving blood, growing mold and culturing swabs from the environment**.** Instead, all microbial samples/organisms should be obtained from a science supplier/company and are limited to Biosafety Level 1 (BSL-1). The BSL-1 Checklist must be used to guide safe practices such as sealing Petri dishes, proper disposal, etc.

2. Will non-human vertebrates be used? **Yes** **No**

Projects involving non-human vertebrates (including embryos, eggs, tadpoles, and other early life cycle stages of vertebrates) are held to a higher standard than projects testing invertebrates. Vertebrates must be treated humanely, and if a project could cause pain or distress to the vertebrate, the student will need to design a new procedure. This form is required when changes are made to an organism's environment. A project with a mortality rate of 30% or greater in any vertebrate group or subgroup is not permitted to be entered into the Science Fair even if the deaths were unintentional or accidental.

3. Will human subjects be used? **Yes** **No**

When an experiment could cause more than minimal risks to a human subject, the subjects (and their parents, when a minor) must be informed of, and consent to, the testing procedures before any experimentation begins.

I certify that I have reviewed and approved the Research Plan prior to the start of experimentation. If the student or Designated Supervisor is not trained in the necessary procedures, I will ensure his/her training. I will provide advice and supervision during the research. I have a working knowledge of the techniques to be used by the student in the Research Plan. I understand that a Designated Supervisor is required when the student is not conducting experimentation under my direct supervision.

_____ _____
Qualified Scientist's Printed Name Signature of School Person Approving

_____ _____
Signature Date of Approval

The Intel International Science and Engineering Fair (Intel ISEF) website provides additional resources and guidelines that can be a valuable resource for students, teachers, and parents. Visit http://www.societyforscience.org/isef/rulesandguidelines

Brevard Public Schools – Elementary Science

DESIGNATED SUPERVISOR FORM

To ensure that safe and ethical science is conducted, this form is required when a Qualified Scientist has been identified but may not be available to supervise experimentation. A "Designated Supervisor" is someone who agrees to oversee the experiment in the event the Qualified Scientist is not available to supervise. The Designated Supervisor must be trained by the Qualified Scientist to ensure the safety of the student and others. All animals must be treated in a humane manner. A project with a mortality rate of 30% or greater in any vertebrate group or subgroup is not permitted to be entered into the Science Fair even if the deaths are unintentional/accidental. Copy of form MUST be part of the student's project documentation available at the Fair.

Student's Name _____

Title of Project _____

To be completed by the Designated Supervisor:

Qualified Scientist Name _____
Advanced Degree _____
Degree Specialty _____
Position _____
Address _____
Phone _____

List or describe your responsibilities in supervising the student. Include all hazardous substances and devices used in the research and safety precautions to be employed: (Use back or attachments if necessary).

_____
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I certify that I have been trained in the techniques to be used by this student prior to the start of experimentation and that I will provide direct supervision.

_____ _____
Designated Supervisor's Printed Name Signature of School Person Approving

_____ _____
Signature Date of Approval

The Intel International Science and Engineering Fair (Intel ISEF) website provides additional resources and guidelines that can be a valuable resource for students, teachers, and parents. Visit http://www.societyforscience.org/isef/rulesandguidelines

Brevard Public Schools – Elementary Science

**The recommended procedure for using the approval process is for the teacher to send home a copy of this form with each student to complete with parent guidance then carefully review the form before approving the project.*

Elementary Science Project Research Plan and Approval Form

Elementary students designing their own experiments for science projects will need guidance to conduct safe and ethical science. **Teachers**, **students** and **parents** should work together to review and complete this form, so that everyone has a complete understanding of the intended project and is aware of any potentially dangerous or unethical situations *before* the student begins any testing. Each school should have a Science Fair Committee in place. Questions concerning this form and other science project concerns should be referred to the school Science Fair Committee.

Name of Student _____ **Project Title** _____

Guidelines for practicing safe and responsible science for students, parents and teachers

- Students are **not** allowed to do projects that are clearly dangerous. Testing involving firearms, knives and other items that could be considered weapons is not permitted. Testing involving fireworks or other explosives is not allowed. Testing involving controlled substances, prescription drugs, alcohol, and tobacco is not allowed. The use of any potentially hazardous chemicals, devices, and activities require direct supervision by a Designated Supervisor.
- Microbial experimentation (involving microscopic organisms such as bacteria, fungi, etc.) done by elementary students is potentially dangerous and should only be done with expert and careful supervision. Samples/organisms should **not** be collected, isolated and/or cultured from the environment as they are potentially pathogenic. This includes, but is not limited to, projects involving blood, growing mold and culturing swabs from the environment**.** Instead, all microbial samples/organisms should be obtained from a science supplier/company and are limited to Biosafety Level 1 (BSL-1). The BSL-1 Checklist must be used to guide safe practices such as sealing Petri dishes, proper disposal, etc.
- Projects involving invertebrates (e.g. worms, daphnia, fruit flies, snails, insects, etc.) must have a clear purpose that has scientific significance. Invertebrates should be treated humanely and intentionally harming them without a scientific purpose should not occur.
- Projects involving non-human vertebrates (including embryos, eggs, tadpoles, and other early life cycle stages of vertebrates) are held to a higher standard than projects testing invertebrates. Vertebrates must be treated humanely, and if a project could cause pain or distress to the vertebrate the student will need to design a new question and procedure. A project with a mortality rate of 30% or greater in any vertebrate group or subgroup is not permitted to be entered into the Science Fair even if the deaths were unintentional or accidental.
- In some cases, students may choose to use human subjects for their experiments. However, when an experiment could cause more than minimal risks to the human subject, the subjects (and their parents, when a minor) must be informed of, and consent to, the testing procedures before any experimentation begins.
- Students should always follow approved procedures and never perform unauthorized experiments.

Note: These guidelines are adapted from the *Brevard County Secondary Science Research Guide* and the *Intel International Science and Engineering Fair Guidelines.*

Research Plan

What question will you be testing? _____

_____

Describe your plan and procedure(s) to test this question. Be sure to include enough detail to ensure that safe and responsible guidelines are being followed. _____

_____

_____

_____

_____

Does your project involve?

Microbial Experimentation?	Non-Human Vertebrates whose environment is being changed?	Human Subjects where there is more than minimal risk involved?
Check: No ☐ Yes ☐ If yes, you must obtain teacher approval and complete a *Qualified Scientist Form* and a *Designated Supervisor Form* before any testing begins. *BSL-1 Checklist* must be used. Copy of forms MUST be part of the student's project documentation available at the Fair.	Check: No ☐ Yes ☐ If yes, you must obtain teacher approval and complete a *Qualified Scientist Form* and a *Designated Supervisor Form* before any testing begins. Copy of forms MUST be part of the student's project documentation available at the Fair.	Check: No ☐ Yes ☐ If yes, before any testing begins you must obtain teacher approval and complete a *Qualified Scientist Form*, a *Designated Supervisor Form* and *Informed Consent Forms* when more than minimal risks are involved. Visit www.societyforscience.org/isef/rulesandguidelines Copy of forms MUST be part of the student's project documentation available at the Fair.

NOTE: A qualified scientist is a medical doctor, veterinarian or individual with relevant science credentials. A science teacher, without these specific credentials, cannot be a "qualified scientist". All forms can be found in the Science Fair Handbook (see school Science Fair Contact) and on the BPS Elementary Programs Science Website. http://elementarypgms.brevardschools.org/science_fairs.htm

Does your project involve invertebrates (e.g. worms, daphnia, fruit flies, snails, insects, etc.)? Check: No ☐ Yes ☐

If yes, describe the purpose and scientific significance of your project: _____

_____

_____

Circle the category of this project: Biological Physical Environmental

Detailed descriptions of each category are in the Science Fair Handbook and on http://elementarypgms.brevardschools.org/science_fairs.htm

Teacher and/or Parent notes or concerns to be addressed: _____

_____

_____

I have read the guidelines and agree to follow the procedures of this Research Plan and Approval Form.

Student signature _____ **Date** _____

Parent signature _____ **Date** _____

Teacher Approval: _____

☐ **I do not approve this project, as currently planned.**

Notes and/or Suggestions: _____

_____

☐ **I approve this project.**

I will encourage the student to adhere to the guidelines and procedures of this Research Plan and Approval Form.

Teacher signature _____ **Date** _____

****It is recommended that teachers make a copy of this signed form for their own records and send the original home with the student. If a Qualified Scientist will be used the student must provide him/her with a copy of the Research Plan and Approval Form.**

The Intel International Science and Engineering Fair (Intel ISEF) website provides additional resources and guidelines that can be a valuable resource for students, teachers, and parents. Visit http://www.societyforscience.org/isef/rulesandguidelines

INFORMED CONSENT FORM

To ensure that safe and ethical science is conducted, this form is required when an experiment could cause more than minimal risks to the human subject. The subjects (and their parents, when a minor) must be informed of, and consent to, the testing procedures before any experimentation begins. Use a separate form for each test subject. Copy of form MUST be part of the student's project documentation available at the Fair.

For more details, see the online Risk Assessment Guide at www.societyforscience.org/isef/rulesandguidelines

Student Researcher's Name _____
Grade _____
School _____
Title of Project _____

To be completed by the Student Researcher:

1) What are the research procedures in which the subject will be involved? _____

2) What are the possible discomforts that may reasonably be expected by participating in this research? _____

3) What procedures will be used to minimize risks? _____

Adult Sponsor's Printed Name	**Signature**	**Phone**
Qualified Scientist's Printed Name	**Signature**	**Date Signed**
Title	**Institution**	**Phone**

To be completed by human subject prior to experimentation:

☐ I have read and understand the conditions stated above, and I consent to participate in this research procedure. I realize I am free to withdraw my consent and to withdraw from this activity at any time.

☐ I consent to the use of visual images (e.g. photographs, video) involving my participation in this research project (optional).

Participant's Printed Name	**Signature**	**Date Signed**

If participant is under 18 years old, a parent/guardian signature is required. If the subject of this experiment or parent/guardian has any questions about this experiment, the Adult Sponsor should be contacted.

I have received and reviewed a copy of any test, survey or questionnaire used in the research. ☐ **Yes** ☐ **No**

Parent's/Guardian's Printed Name	**Signature**	**Date Signed**

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BSL-1 Checklist – for Pathogenic Hazardous Biological Agents

Student Name: _____ **School:** _____

Copy of form MUST be part of the student's project documentation available at the Fair.

Pathogenic Hazardous Biological Agents BSL-1 (Biosafety Level 1)**:**

1. Agents not known to consistently cause disease in healthy adults, and of minimal potential hazard to lab workers and the environment.

Aseptic Technique Practice:

1. Specific training in procedures being performed.
2. Supervision by a qualified teacher.
3. Limited access when experimentation is taking place. (may not be done at home)
4. After plates are cultured and sealed with masking tape or Petri-Seal along the outside edge of the Petri dish, they are not to be reopened.
5. Hand washing before and after handling cultures and before leaving lab.
6. Eating, drinking, applying makeup or contacts is prohibited in the lab.
7. Work surfaces can be decontaminated after spills and at end of day with a 70% isopropyl alcohol.
8. Approved disposal policy. (ISEF rules p. 13: www.societyforscience.org/isef)

Safety Equipment Requirements:

1. Work can be performed on an "open bench" (laboratory area) or in a fume hood.
2. Lab coats or aprons are to be worn.
3. Appropriate gloves will be worn.
4. Protective eyewear should be worn.
5. Eyewash must be available.
6. Bench tops impervious to spills and resistant to moderate heat, solvents, acids, alkalis, or chemicals used to decontaminate surfaces.
7. Designed to be easily cleaned. Carpets and rugs are not appropriate.
8. Windows securable and fitted with screens.

_____ _____

Student Signature Date

_____ _____

Teacher Signature Date

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Brevard Public Schools – Elementary Science