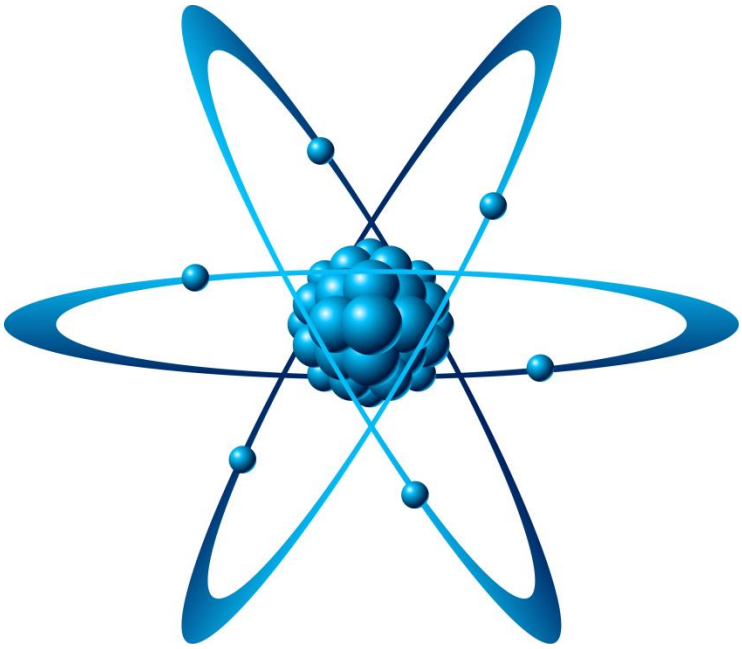


ELEMENTARY SCIENCE FAIR GUIDELINES
SARASOTA REGIONAL
SCIENCE, ENGINEERING, AND TECHNOLOGY FAIR

Sarasota Regional Science, Engineering, and Technology Fair

Date and Location: The annual Elementary Sarasota Regional Science, Engineering, and Technology Fair will be held on **Tuesday, January 26, 2016** at Robarts Arena. Set up will be on Monday, January 25, 2016.

Eligibility: Students grades 3-5 enrolled in any of the district's elementary schools are eligible in this year's Elementary Science Fair.

Selection: Each school will be able to enter a total of 18 projects (6 projects per grade level). These entries can be in any combination from the following categories: Engineering, Earth/Space, Life, and Physical Science. Students are to be selected through a campus selection process. The campus selection process will be at the discretion of the school. It is highly recommended that the students go through a process similar to the Elementary Science Fair.

Group Projects: No more than three students can compete in a group project.

Required Forms: Each Elementary School that wants to participate in the Elementary Sarasota Regional Science, Engineering, and Technology Fair will need to submit a **Science Fair School Registration Form** no later than 4:30 PM on **October 9, 2015**. Each project must have the **Exhibit Entry Form**, the **Elementary Safety Assessment Form, and Signature Form** submitted no later than 4:30 PM on **December 11, 2015.**

****To ensure that your forms arrive on time, please remember that PONY picks up every other day.**

NOTE: Deadlines will be strictly enforced. Project changes after the deadline will not be accepted.

Guidelines for Awarding Ribbons

Two independent judges will judge each project. If there is a large disparity between scores, a third judge will review the project. Scores from the two judges will be added together to arrive at the total score. Of the possible 200 points (100 pts. per judge), 56 points (28 pts. per judge) are determined by the student's responses to specific questions. If a student is not present during the judging, he/she will receive a zero for all questions that specifically require a student response. Judging sheets and students' scores will not be released.

Ribbons will be awarded based on the following point scale.
180 - 200 (90%) Superior (Blue Ribbon)
150 - 179 (75%) Excellent (Red Ribbon)
125 - 149 (63%) Outstanding (Yellow Ribbon)
0 – 124 (less than 63%) Merit (White Ribbon)

Judging Criteria for Science Projects

I. Purpose/Hypothesis (10 pts)
___ clear and focused purpose with a creative approach used to answer the question
___ contributes to field of study and is testable using scientific methods

II. Design and Methodology (15 pts)
___ procedure is clear, including specific directions and metric units
___ well designed plan and data collection methods with complete material list
___ variables and controls are defined, appropriate and complete

III. Execution: Data Collection, Analysis and Interpretation (30 pts)
___ systematic data collection and analysis done quantitatively, precisely and related directly to the hypothesis
___ results are reproducible
___ appropriate application of mathematical and statistical methods
___ sufficient data collected to support interpretation and conclusions (evidence of at least three trials and an overall average of those trials)
___data displayed graphically and correctly labeled
___clear statement that shows support of the hypothesis

IV. Creativity (10 pts)
___ project demonstrates significant creativity in one or more of the above criteria
___ project demonstrates imagination and inventiveness that offer different perspectives to new possibilities or new alternatives

V. Presentation (35 pts)
a. Poster (10 pts)
___ logical organization of material with supporting documentation displayed
___ clarity of graphics and legends

b. Interview (25 pts)
___ clear, concise, thoughtful responses to questions
___ understanding of basic science relevant to project
___ understanding interpretation and limitations of results and conclusions
___ degree of independence in conducting project
___ recognition of potential impact in science, society and/or economics and quality of ideas for further research

Judging Criteria for Engineering Projects

I. Research Problem (10 pts)
___ description of a practical need or problem to be solved
___ definition of process for proposed solution

II. Design and Methodology (20 pts)
___ exploration of alternatives to answer need or problem
___identification of a solution
___ background research is diverse with multiple sources
___ procedure is sequential and describes the investigation clearly
III. Execution: Construction, Testing, and Results (25 pts)
___ prototype demonstrates intended design
___ prototype has been tested in multiple conditions/trials
___ prototype demonstrates engineering skill and completeness
___quantitative, metric data collected and displayed appropriately
___conclusion based on success in regards to the problem being solved and suggestions for further efforts or practical applications

IV. Creativity (10 pts)
___ project demonstrates significant creativity in one or more of the above criteria
___ project demonstrates imagination and inventiveness that offer different perspectives to new possibilities or new alternatives

V. Presentation (35 pts)
a. Poster (10 pts)
___logical organization of material with supporting documentation displayed
___clarity of graphics and legends

b. Interview (25 pts)
___ clear, concise, thoughtful responses to questions
___ understanding of basic science relevant to project
___ understanding interpretation and limitations of results and conclusions
___degree of independence in conducting project
___ recognition of potential impact in science, society and/or economics and quality of ideas for further research

Scoring Rubrics

Judges use the scoring rubrics below when evaluating projects. All questions assessing the project itself are scored using the Project Display Rubric. All questions requiring a student response are scored using the Student Response Rubric.

	Project Display Rubric	**Student Response Rubric**
0	No evidence or incorrect	Student has no understanding or is unable to respond or section is missing.
1	A weak attempt made/ many errors or major flaws	Student has little knowledge or flawed understanding.
2	Partial evidence/ some flaws or omissions	Student has some knowledge but lacks complete understanding.
3	Missing some evidence/few minor flaws or omissions	Student has good knowledge but lacks complete understanding.
4	Clear evidence/minor flaws or omissions	Student is able to articulate an adequate understanding.
5	Clear evidence/no flaws	Student able to articulate a clear understanding.

RULES AND GUIDELINES

Entries

1. Each student who enters the Elementary Science Fair must be selected by his/her school. It is the school's responsibility to verify that the project is the work of the student and satisfied all science fair guidelines.
2. All projects must be registered, signed in and set up in accordance with all deadlines to be eligible for judging.
3. It is the teacher's responsibility to inform and provide copies of these rules and guidelines to the entrants. It is the student's responsibility to be knowledgeable of these rules and guidelines.

Projects

1. An investigation should clearly demonstrate the components of a science experiment as outlined in this Handbook.
2. Students in grades 3-5 should complete a scientific experiment, maintain a log/journal on the progress of the experiment and construct a display. A research paper is not required. However, an abstract is required for all projects.

Display

1. Display must be self-standing of reinforced cardboard, plywood, or other materials. The project cannot lean on the table, wall, or other projects. Nail, glue or tape cannot be placed onto tables.
2. Maximum area for display is 76cm deep, 122cm wide, and 274cm high.
3. The display board and log book are the only items to be displayed at the fair. **(Engineering projects may have a model on display that should be brought the day of the judging and should leave with the student at the end of the fair.)** The display board must not display actual materials used in the project; i.e., food, seeds, teeth, crystals, etc.
4. **IMPORTANT: Only paper and pictures should be on the display board. There should not be any other items attached to the board, such as 3-dimensional objects, vines, foam board backing, aluminum foil, fabric, lights, etc. Items other than paper and pictures will be removed. Corrugated border or paper border is acceptable. Please, no headers that attach to the top of the display board.**
5. Students will remain with their display during the judging to answer questions.
6. Student and school names should be placed in the center on the backside of the display board. Students should place their name on inside back cover of their logbook.
7. The Elementary Science Fair Directors will not take responsibility for any loss of materials from the project displays.
8. The Elementary Science Fair Directors reserve the right to reject projects they deem inappropriate and remove items not in compliance.

Important!!

While it is expected that projects be neat and legible, a Science Fair project is not an art project. Rather than spending time on the appearance of the display, students should be encouraged to improve their project by conducting more research for their abstract, performing more trials, adding more details to their procedures, etc. The emphasis should be on understanding and applying the scientific process.

Please note that no items should be attached to the display board except for paper and photographs. Please do not attach any 3-dimensional items, lights, aluminum foil, fabric, etc. to the display board. School science contacts are required to screen all display boards for such items before they come to the District Science Fair. If in doubt, please remove it.

COMPONENTS OF A PROJECT

I. TOPICS

Good science projects are based on topics. These topics should be grade appropriate so that students can investigate on their own. A good way for students to start developing topics is by asking themselves questions that can be answered through measurable experimentation.

- Brainstorm for topic ideas as a class. Don't discard any ideas for now. List topics or questions just the way that the students suggest them.
- Discuss the qualities that make a topic good or poor. Product comparisons (which brand of batteries last longest) are not eligible to compete at the district level. It is the school's decision whether or not to allow product comparisons at the school level.
- Use a bulletin board to motivate students to select their science project topics. As students turn in a written copy of their ideas, write their topic titles and names on a strip of construction paper and display on the board. Caption the board "Our Science Project Topics." The ideas displayed on the board may spark ideas in other students.
- Have students list all the science projects that they have seen or done in the past. Encourage them to come up with a new "twist" on an old idea and not to do a project for which they know the outcome - regardless of whether they have seen or done it before. They should be learning something new.

II. PURPOSE

This component of a science investigation explains in one statement why you are doing the experiment. The purpose can best be stated in the form of wonderment or a cause and effect statement.

III. HYPOTHESIS

The hypothesis is a statement that explains what you think might happen based on general understanding of the topic. It is not a wild guess or theory.

IV. PROCEDURE

The procedure includes a quantitative list of the materials used in the investigation, a numbered step-by-step description of the investigative method used, and the identification of the experimental variable, the control, and factors that are held constant. If the experiment does not have a control it should be noted in the procedure. The student should understand what a control is and why it was not appropriate for his/her project.

V. DATA

Data refers to the measurable information gathered in an investigation. These may include:

Hand Written Scientific Journal (sloppy copy or log)
Drawings
Measurements (metric)
Photographs
Tables, graphs

The following items should be thoroughly explained and emphasized:

- Precision in recording data
- Consistent use of uniform intervals of time
- Specific labeling of groups, specimens, subjects, etc.
- An adequate number of trials (3 or more depending on problem)
- Averaging of data where appropriate
- Use of photographs
- Appropriate graphs

VI. GRAPHS

Graphs are an organized way to display the data collected during an investigation. They enable the student to see the relationship between the variable and the results.

VII. CONCLUSIONS

Consider the analysis of the data as it relates to the "purpose" or question when forming the conclusion. The conclusion may include a statement of support or non-support for the hypothesis.

VIII. ABSTRACT

The abstract is a one-page summary to include the purpose, hypothesis, procedure, conclusion and a bibliography. The abstract must be placed in the lower left corner of the board. (A sample abstract follows this page.)

IX. DISPLAYING PROJECT

The manner in which students display their project should neatly and accurately exhibit their work and knowledge. These guidelines and suggestions are intended to give all students an equal starting point.

Maximum size for any display is 76 cm deep, 122 cm open width and 274 cm high. Only paper and pictures should be on the display board. There should not be any other items attached to the board, such as 3-dimensional objects, vines, foam board backing, aluminum foil, fabric, lights, etc. Items other than paper and pictures will be removed. Corrugated border or paper border is acceptable.
At the school level of competition, it is suggested that students use 2 overlapping legal size folders. Only projects selected by schools for district level competition are required to be displayed on the large display board. No plants or animals can be part of a student's exhibit at the district level.

Important!!

While it is expected that projects be neat and legible, a Science Fair project is not an art project. Rather than spending time on the appearance of the display, students should be encouraged to improve their project by conducting more research for their abstract, performing more trials, adding more details to their procedures, etc. The emphasis should be on understanding and applying the scientific process.

Please note that no items should be attached to the display board except for paper and photographs. Please do not attach any 3-dimensional items, lights, aluminum foil, fabric, etc. to the display board. School science contacts are required to screen all display boards for such items before they come to the District Science Fair. If in doubt, please remove it.

ABSTRACT

TITLE (ALL IN CAPITAL LETTERS)

Student Name

First paragraph includes the purpose and hypothesis.

Second paragraph is the procedure, do not number.

Third paragraph is the conclusion.

Bibliography:

The bibliography should be at least three (3) sources.

Abstract must be placed in the bottom left corner of the display board.

NAME: _____

STUDENT PROJECT CHECKLIST

_____ 1. Can your question be answered through an experimentation process?

_____ 2. Do you have a materials list?

_____3. Can you identify the
Variable? _____
Control? _____
Factors being held constant? _____

_____ 4. Could someone else set up and carry out your experiment from your step-by-step directions?

_____ 5. Can your investigation be measured in specific metric units?

_____ 6. Are you keeping an investigation log/journal?

_____ 7. Have you collected data and displayed it on a graph?

_____ 8. Is your conclusion a reflection of the data?

_____ 9. Is your abstract in the bottom left hand corner?

_____ 10. Did you include a bibliography on your abstract?

_____ 11. Is your project sturdy and free-standing?

_____ 12. This project is not a model, a demonstration, or a product comparison.

SELECTING A TOPIC

1. To find a topic:
   Read science books, magazines, newspapers
   Talk to your teacher, family members, or friends
   Visit professional people and museums

2. Select a topic that interests you. Selecting something new may arouse your curiosity.

3. Select a topic that you know something about, but you want to investigate further.
4. Select a topic that would have results that can be measured.

GOOD TOPICS

1. What is the effect of the mass of the bob on the period of a pendulum?
   This is a good topic because it requires experimentation that you can do yourself. You must use the scientific method in completing this project.
2. How does the pH of the medium affect the reproduction rate of the yeast?
   This topic suggests the use of an experimental method. Asking a question is a good approach toward developing your topic.

POOR TOPICS

1. How volcanoes erupt?
   This topic will not allow experimentation without visiting real volcanoes. Making a model that erupts is a demonstration not an experiment.
2. Microscopes
   This topic is too general. Telling how one works is not experimentation.
3. Which popcorn pops better?
   This topic is a comparison.

TITLES DO NOT HAVE TO BE IN THE FORM OF A QUESTION, BUT CAN BE TWO OR THREE WORDS. TITLES MAY BE GIVEN AFTER THE INVESTIGATION.

PURPOSE

The purpose can be stated:

"I wonder what would happen if _____."

or

"What is the effect of on _____?"

This one sentence should explain why you are doing the experiment.

If your purpose is well worded you will have little difficulty writing a title for your project.

HYPOTHESIS

The hypothesis states what you think might happen based on the general understanding of your topic.

Here is an example:

Purpose: I wonder what would happen to plants when exposed to different intensities of light.

Hypothesis: I hypothesize that bright light will affect the way a plant grows.

MATERIALS

List all materials used in your experiment. Include what, how much, and what kind of materials you used. Keep in mind quantities are very important. Remember to use metric units.

GOOD LISTING

- 250 ml graduated beaker
- 750 ml water 20 degrees C
- 1-20 x 20 cm sq cake pan
- Celsius thermometer
- clock with a second hand

POOR LISTING

- measuring cup
- water
- container
- thermometer
- clock

VARIABLE, CONSTANTS AND THE CONTROL

1. Variable –The one "thing" you change on purpose in an experiment.

2. Constants – Factors that are held constant throughout the experiment.

3. Control –The control in an investigation is the trial done without changing the original factors. If the experiment does not have a control, it should be noted in the procedure. The student should have an understanding of what a control is and why it was or was not appropriate for his/her project.

STEP-BY-STEP DIRECTIONS

Directions should be sequenced and clear so that anyone could set up the experiment (like a recipe). Remember to use metric units for measurements.

Examples of Good Directions

1. Add 3 mL magnesium sulfate solution into a test tube.
2. Observe the contents for 5 minutes.
3. Wear safety goggles.

Examples of Poor Directions

1. Put magnesium sulfate solution to one test tube
2. Observe the contents.
3. Use safety equipment.

DATA/LOG

Data refers to information gathered during your experiment. Writing in a notebook is the most convenient way to keep a log. Remember this is a rough draft so do not go back and change any of your previous thoughts. Turn in your original "sloppy copy" for your log.
Your log should include:

1. A list of all the materials you use.
2. Notes on all the preparations you made prior to starting your experiment.
3. Day-by-day notes on the progress of your project.
4. Data that you gather from your experiment.
5. Be sure that you date each entry in your log.

QUANTIFICATION OF DATA

The data collected during the course of your experiment needs to be measurable. Scientists use metrics when making their measurements. They do not use standard measurements and then convert them to metrics.
Metric measurements are required.

VOLUME	milliliter (ml)	1000ml = 1L
	liter (L)	
LENGTH	millimeter (mm)	10mm = 1cm
	centimeter (cm)	100cm = 1m
	meter (m)	1000m = 1km
	kilometer (km)	
MASS	milligram (mg)	10mg = 1cg
	centigram (cg)	100cg = 1g
	gram (g)	1000g = 1kg
	kilogram (kg)	

GRAPHING THE DATA

A graph is a display of data to make information easier to read and understand. Graphs are also used to make predictions. A graph should be neat and easy to read.

TITLE: The title is a short description of the data being displayed on the graph.

HORIZONTAL AXIS: Is called the X axis; displays independent data (does not depend on other data). Appropriate units displayed on the horizontal axis, i.e., time, days, weeks, distance.

VERTICAL AXIS: Called the Y axis; the measurements that happen as a result of what you changed. Appropriate units displayed on the vertical axis, i.e., growth, weight, height, temperature.

GRAPHS

BAR GRAPHS: A bar graph is used to display data that does not occur in a continuous manner.

LINE GRAPH: A line graph is used to display data that occurs in a continuous manner.

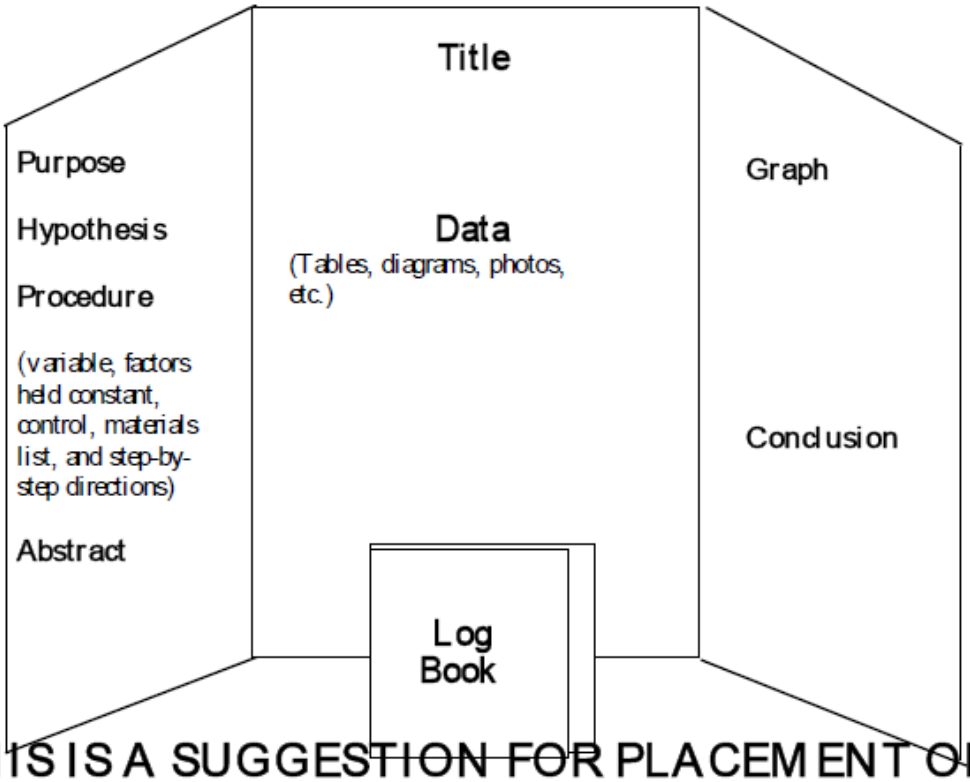
REMEMBER: ALL GRAPHS MUST HAVE TITLES
Each axis must be labeled. The graph should show the results of each trial and an overall average of those trails.

CONCLUSION

Your conclusion should include:

1. Statement of support or non-support of the original hypothesis (not "prove" or "disprove").
2. Descriptions of any problems or unusual events that occurred during your investigation.
3. What you would do differently next time.
4. Additional experiments that can continue from present experiment.
5. Who (or what industry) could benefit from your investigation?

PHYSICAL DISPLAY



THIS IS A SUGGESTION FOR PLACEMENT OF INFORMATION ON THE DISPLAY.

THE DISPLAY SHOULD BE CLEAR AND EASY TO FOLLOW.

STUDENT RECORD OF SCIENCE PROJECT

Activity	Due	Done
Begin Log		
Brainstorm ideas for project		
Select topic		
Write the purpose		
Obtain teacher's approval		
Research topic		
Formulate hypothesis		
Plan your investigation		
Identify your variable		
Identify your control		
Identify factors held constant		
List and collect materials		
List step-by-step directions		
Begin investigation		
Collect data		
Analyze data		
Graph data		
Write conclusion		
Write abstract		
Begin display board		
Science project due		
Science fair		

RESEARCH YOUR TOPIC

You should find out as much as you can about your topic. You may use several sources that include teachers, professionals, librarians, books, encyclopedias, magazines, newspapers, videos, etc. Take notes by writing down the most important facts.

Source of Information:

_____

_____

_____

Important Facts:

Variables and Factors Held Constant

When testing your hypothesis, your test must be valid. There are many variables, things that you can change or have some control over, in an experiment. You must change only one variable when testing your hypothesis.

Below are examples of possible science projects. The purpose is written for you. Write a hypothesis for the experiments. Then list the variable you will use when testing your hypothesis and the factors held constant.

Purpose: To find out if the number of propeller winds on a rubber band powered plane has an effect on the distance traveled by plane.

Hypothesis: _____
_____

Variable: _____

Factors Held Constant: _____
_____
_____

Purpose: To find out if, when released on an inclined plane, the circumference of the wheels on a race car will have an effect on the distance the car travels.

Hypothesis: _____
_____

Variable: _____

Factors Held Constant: _____
_____

THE CONTROL

The control in an investigation is the trial done without changing the original factors. For example, if you are investigating whether fertilizer affects the growth of plants, then the trials done without fertilizer would be your control. If you are investigating whether salt has an effect on the freezing rate of tap water, then the control would be the trials done using plain tap water, no salt. There could be investigations without a control, for example, in the fields of engineering, physics and mathematics. If you are investigating whether the number of propeller winds on a rubber band powered plane has an effect on the distance the plane travels, there will be no control. You are not going to have any trials with zero winds (this would be the absence of the variable.)

You are investigating whether soap has an effect on the number of water drops that will fit on a penny. Should there be a control? If so, what will it be?