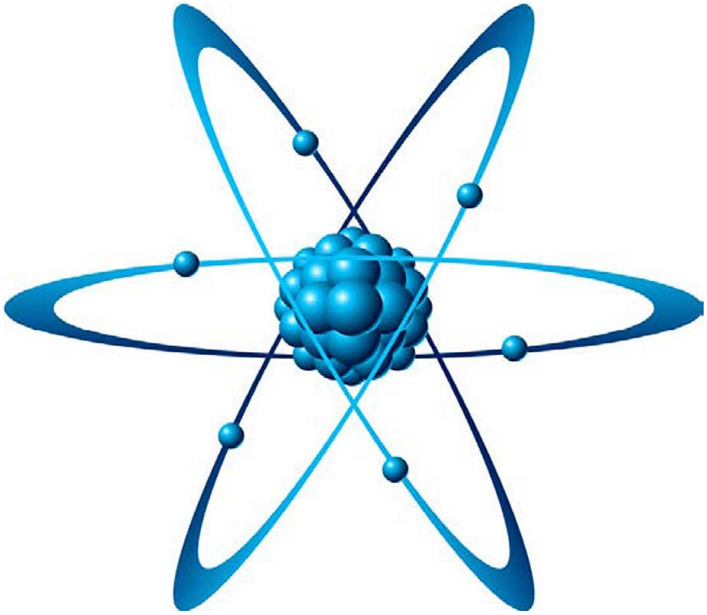


SARASOTA COUNTY STEMFAIR Coordinator Handbook Elementary Grades 3-5

Sarasota County STEM Fair Rules

Dates/Action Steps

The 2023-2024 Sarasota County STEM Fair will be a combination of virtual and in-person events. Please see timeline below for details and Coordinator Action Steps.

2023-2024 **ELEMENTARY Important Dates**		
Date	**Event/Description**	**Coordinator Action Steps**
Thursday, August 15, 2023 5-6 PM	**STEM Fair Coordinator Training: Info Session** Informational session to discuss STEM Fair logistics, coordinator responsibilities, and collaborate with level alike coordinators.	• Join via LINK and participate in the professional learning. • Sign up in the PD System using Section # 13389
FRIDAY, September 8, 2023	**School Registration Due** **Registration Form** must be submitted by all schools that will be participating in the SCS STEM Fair.	• Save PDF as "ES_SCHOOL NAME Registration Form." • Upload saved PDF to STEM Fair Teams or email to cheri.dame@sarasotacountyschools.net.
September-December	**School Site STEM Fairs** All students participating must submit an **Application and Safety Assessment**. It is **mandatory** that this form is completely filled out **BEFORE** experimentation begins.	• Develop plan to conduct schoolwide STEM Fair. • Review and accept/reject applications for all students to ***ensure safety.*** • Collect ALL forms from participating students.
Thursday, December 21, 2023	**School Site STEM Fair Complete** It is strongly suggested that each school has a judging process to determine the top projects that will compete at SCS STEM Fair.	• Determine your top 20 projects. • Collect/create digital files for upload to the virtual STEM Fair site. • Assist/assign video component to students. *Digital files include a PDF of the student display and logbook as well as a <5-minute video submission link.*
Friday, January 12, 2024	**SCS STEM Fair Registration** All paperwork for Initial Round project entries must be completed via zFairs.	• Submit safety form, student PDFs, and video link ***electronically*** via ZFairs. Coordinator Directions • Communicate with parents to ensure each has submitted Media Release ***electronically*** through ZFairs. Parent Directions
Monday-Wednesday January 29-31, 2024	**Initial Round SCS Virtual STEM Fair Judging** Judges will review student work on zFairs.	• No action needed.
Thursday, February 1, 2024	**Notification of Invitation to Final Round Judging** Coordinators receive email invitation for students moving on to Final Round judging.	• Inform students/parents of Final Round Invitation. Students need to design in-person presentation materials (tri-fold board and printed logbook). • Confirm attendance via email to Cheri Dame. • Prepare and collect field trip paperwork. *(Transportation will be coordinated by the district.)*
Tuesday, February 20, 2024	**Project Boards Due at Landings**	• Package boards for delivery with school name labeled. • Choose to pony or drop off project boards at Landings.
Thursday, February 22, 2024 9:30AM-12:30PM	**Final Round SCS STEM Fair Judging** Panel of judges interview students to determine category winners (grades 3-12) at Robarts Arena in Sarasota, FL	• Chaperone students to in-person event. Students bring project board and logbook on the bus.
Thursday, February 22, 2024 5:00PM-7:00PM	**SCS STEM Fair EXPO** Interactive STEM night to celebrate student accomplishments.	• Send invitation to parents of Final Round SCS STEM Fair participants. Coordinators are encouraged to attend.

Eligibility

Students grades 3-5 enrolled in any of Sarasota County public, charter, or private elementary schools are eligible to compete in this year's STEM Fair.

Selection

Each school will be able to enter a total of 20 projects. These entries can be in any combination from the following five categories: Engineering, Earth/Space, Life, Physical Science, and Mathematics/Technology. Students are to be selected through a campus selection process. Schools are encouraged to enter projects in all five categories. It is **highly recommended** that the students go through a judging process like the Sarasota County STEM Fair. The campus selection process will be at the discretion of the school.

Group Projects

No more than three students can compete in a group project. If team members represent multiple grade levels, the team will compete at the lowest grade level. For instance, if a team consists of a 3rd grader and a 5th grader, the team will compete against other 3rd graders.

Required Forms

Each Elementary School that wants to participate in the Sarasota County STEM Fair will need to submit a **STEM Fair School Registration Form** no later than 4:30 PM on **Friday, September 8, 2023**. This form identifies the schools that will be participating and is used for planning purposes. This form can be uploaded into the STEM Fair Teams folder for registrations. Save file as "ES_SCHOOL NAME Registration Form" before uploading.

Students participating in the STEM Fair at the school level and the district level, must complete the **Elementary STEM Fair Application and Safety Assessment** **before** beginning the project to ensure students are aware of safety rules and project guidelines. Each project being entered in the Sarasota County STEM Fair (or each student if a team) must have the Application and Safety Assessment forms submitted through the **Virtual STEM Fair Platform** no later than **Friday, January 12, 2024.**

In addition to the paperwork for each student/project, coordinators will enter all projects being submitted to the Sarasota County STEM Fair through the **Virtual STEM Fair Platform** no later than **Friday, January 12, 2024.** Coordinators will receive direction for logging in to the platform prior to January. Additional training on this platform will also be offered.

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

Project Safety

Student projects must meet the safety requirements explained in the **STEM Fair Safety Guidelines Form**. A few key points of this form include:

- Projects **CAN NOT contain mold** or **bacterial growth**.
- All projects involving humans and live animals must involve minimal risk.

Please refer carefully to this document for further guidance. BEFORE a student begins the experiment or design, consult with STEM directors if you are unsure if the project meets the safety guidelines.

Project Virtual Display, Logbook, and Video

Students are required to create a virtual display of their project. The only acceptable file format is PDF. Students can create the display in any platform you have access to at your school site, but the end product must be exported to a PDF for the Sarasota County STEM Fair.

The virtual display should highlight all the same STEM Fair project components that a typical project board would include. The components should include:

- Experimental Project: title, purpose/question, hypothesis, background research, variables, materials/procedures, data: graphs/charts, data analysis, images, and conclusion.

- Engineering Project: title, problem, background research, needs statement, design requirements, materials/procedures, prototype (build-test-redesign), results, data: graphs/charts, data analysis, images and conclusion.

Logbooks must accompany all projects. This can be done digitally or handwritten. However, the final logbook must be in a format that can be uploaded to the virtual STEM Fair platform. This may mean scanning handwritten logbooks to create a PDF.

In addition to the virtual display, students participating in the Sarasota County STEM Fair will need to create a video presentation of their project. This will replace the interview portion for Initial Round of judging. It is an opportunity for students to showcase their project and any information that is not already included in their virtual display. It is the site coordinator's discretion as to whether a video is required at the school level for school selection purposes.

The video SHOULD NOT be simply the student reading their display/logbook. This

information will already be available to the judges. Students are encouraged to include information not already available. Some talking points aligned with the judging criteria that may assist students in the video creation include:

1. Summarize your project, including the basic science/engineering principles of your project.
2. Describe the support you received from others in completing your project.
3. Discuss strengths and weaknesses of your experimental/engineering design.
4. Explain the importance of your investigation/prototype to the real world.
5. Tell about an unexpected outcome or something you learned during this project.

Technology Requirements: Video should be 5 minutes or less and should incorporate the above talking points. Students have flexibility to be creative in their presentation. The video must be saved and made accessible to share via a sharing link. This can be accomplished by saving the video to One Drive and changing the sharing status to "Anyone with the link". Copy the link and add the link in the virtual platform submission.

Display boards are optional at school site fairs. Physical displays cannot be entered into Initial Round of judging of the Sarasota County STEM Fair, only digital presentations. **They are not required for Initial Round of Judging, however,** if a student is invited to the Final Round in-person judging session, they will need a physical display. This should be a traditional tri-fold board or a digital version.

For all Final Round display boards, or if school sites are having students create display boards that are not virtual for the school site judging, be sure to abide by the following safety considerations.

1. The following **<u>ARE NOT ALLOWED</u>** at the project/display:
    a. Living organisms, including plants
    b. Soil, sand, rock, cement, and/or waste samples
    c. Taxidermy specimens or parts
    d. Preserved vertebrate or invertebrate animals
    e. Human or animal food
    f. Plant materials, living or dead (except those that are used in the manufactured construction materials in building the display)
    g. All chemicals including water
    h. All hazardous substances or devices
    i. Items that may have contained or been in contact with hazardous chemicals
    j. 3-D printers
    k. Dry ice or other sublimating solids
    l. Sharp items

m. Flames or highly flammable materials
n. Batteries with open-top cells or wet cells
o. Glass or glass objects

2. Photographs on the display board must be of the researcher ONLY. The researcher must have parent/guardian permission to have their photograph on display on the board. This is determined by information found in the Sarasota County Student Information System (SIS). The school-based coordinators will be responsible for this information. For non-public schools, a signed media release must be turned in with student paperwork. Photographs of persons other than the researcher ARE NOT ALLOWED on the display board or other presentations.

3. 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. The display board must not display actual materials used in the project; i.e., food, seeds, teeth, crystals, etc.

Judging

At least two independent judges will review each virtually uploaded project. Judges will view the virtual display, logbook, and the student video component. Scores from the judges will be averaged together to arrive at the total score. Of the possible 100 points, 25 points are determined by the video submission. Once a project has been reviewed by the judges, scores will be tallied. If there is a large disparity between the two initial judges, a third judge will review the project. Judging scores will not be released, but coordinators will receive feedback submitted from the judges that can be shared with students.

Awards

Awards will be based upon the scores provided by the judges. For each of the five categories, there will be two winners per grade level, a first place and a second place. An overall category winner will also be chosen. This category winner will have the highest score for that category, regardless of student grade level.

Special Awards

In addition to the 1st and 2nd place awards, students may also receive special award recognition.

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.

Types of Projects

There are two project options for completing a STEM Fair project. An Experimental Project answers a TESTABLE QUESTION and follows the scientific method. An Engineering Project SOLVES A PROBLEM and follows the engineering design

process. Refer to later sections in the handbook that delineate components of these projects.

Experimental Projects

Experimental projects REQUIRE actual manipulation of a variable to determine its effect. This type of project follows the steps of the scientific method. Projects in this category can be entered in the STEM Fair in one of the following categories:

- **Physical Science** is the study of non-living things, including sciences such as chemistry and physics. (i.e. How does paper airplane design affect the distance it can fly?)
- **Earth and Space Science** explores the interconnections between the land, ocean, atmosphere, and life of our planet, including sciences such as geology, meteorology, and astronomy. (i.e. Does the type of plant affect the amount of soil that is eroded from a hill due to rainfall?)
- **Life Science** is the study of plants, animals, and other living organisms, including sciences such as biology, botany, and zoology. (i.e. How does soil type affect the rate of germination of a bean seed?)
- **Mathematics** is the study of quantity, structure, space, and change, including investigating math rules or principles or math in nature (i.e. Do the seeds in fruits occur in specific number patterns?)
- **Technology** is the study of the practical application of science used to improve the quality of life including the sciences of computer hardware, software, and applications. (i.e. How does temperature affect how a PC operates?)

Components of an Experimental Project

TOPIC

Good science projects are based on topics. These topics should be grade appropriate so that students can investigate on their own. An effective 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. Can the topic be answered by doing a test? What variable would change? What would be measured? Having a testable question based on the topic is essential in investigating an experimental project.
- 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.

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 a question or a cause and effect statement.

RESEARCH

Background research is helpful to better understand your experiment or design. Areas of research can include key vocabulary, history of topic, and student questions. Sources for research include books, magazines, experts, internet articles, text books, and encyclopedias. Research should be recorded and sources should be cited in the Bibliography.

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.

VARIABLES

A variable is any factor that can be controlled, changed, or measured in an experiment. The student should include an independent variable, a dependent variable, and all controlled, or constant, variables.

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.

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

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.

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, a review of the effectiveness of the experimental procedure, and real word applications.

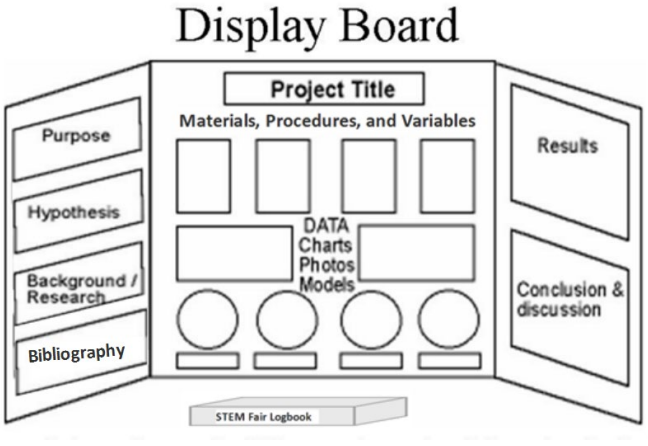
LOGBOOK

Scientists record in a logbook and it is a required part of every project. It should contain all the information from the beginning to the end of the scientific process. Logbook entries should be dated. Logbooks can be done digitally or handwritten. However, the final logbook must be in a format that can be uploaded to the virtual STEM Fair platform. This may mean scanning handwritten logbooks.

DIGITAL DISPLAY

Students will need to create a digital display of their project and findings. The display should highlight the following components: project title, purpose/question, hypothesis, background research, variables, materials/procedures, data: graphs/charts, data analysis, images, and conclusion.

Student invited to Round 2, in-person final judging, will need to create a project display board.



Judging Criteria for Experimental 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

Engineering Projects

Engineering projects are design projects which determine a need for a new or improved product or process. This type of project REQUIRES the development of a new idea or product that will solve a problem or need. This type of project follows the engineering design process. Projects in this category will be entered in the STEM Fair as an **Engineering Project.**

DEFINE THE PROBLEM

A good engineering project is based on a problem that needs a solution. Examining the world is a great way to begin defining a problem.

- An effective way to start to brainstorm engineering project ideas is to have students write down problems that they encounter over a few days. This can give many ideas of problems that one might be able to solve by changing the way something is done or by creating a new device.
- Another idea is to research inventors and their inventions. Think of changes that can be made to this invention to make it better.

RESEARCH

Research will determine that the problem does not already have a solution. It helps a scientist know what was already done. Scientists can also learn from the work that was done before. Areas of research can include key vocabulary, history of

product or problem, and student questions. Sources for research include books, magazines, experts, internet articles, text books, and encyclopedias. Research should be recorded, and sources should be cited in the Bibliography.

NEED STATEMENT

Decide on one problem to solve and write a statement that explains the need and the prototype that will be invented, that is new or improved, that will meet this need.

DESIGN REQUIREMENTS

Identifying design requirements gives exact details about the prototype. It should include specific information such as size, shape, appearance, cost and material. This can include a detailed drawing of the prototype with labels, title, and dimensions (in metric units). Describe what the prototype is expected to do and how it will be tested.

MATERIALS

A clear material list should include everything needed to create and test the prototype. Remember to use the metric system for measurements.

PROCEDURES

This is a step-by-step list of steps in the process of building and testing your prototype.

PROTOTYPE

Build- Using the materials and procedure listed, build the invention prototype.
Test- Use the prototype in multiple trials as specified in the design requirements. Test a minimum of 3 times. Record data to measure if the prototype is successful. Does it solve the problem? Does it need improvements?
Redesign- After analyzing the test, redesign as necessary.
Retest- Use the redesigned prototype in multiple trials. Repeat the recreate and retest steps until satisfied with the prototype.

RESULTS

Results can be displayed as graphs, charts, or other visual representations of the data from the trials.

CONCLUSION

A conclusion analyzes the results, the prototype, and if they supported the original needs statement. It can address questions that came up during the creation and testing of the invention. State other information that was discovered in the process.

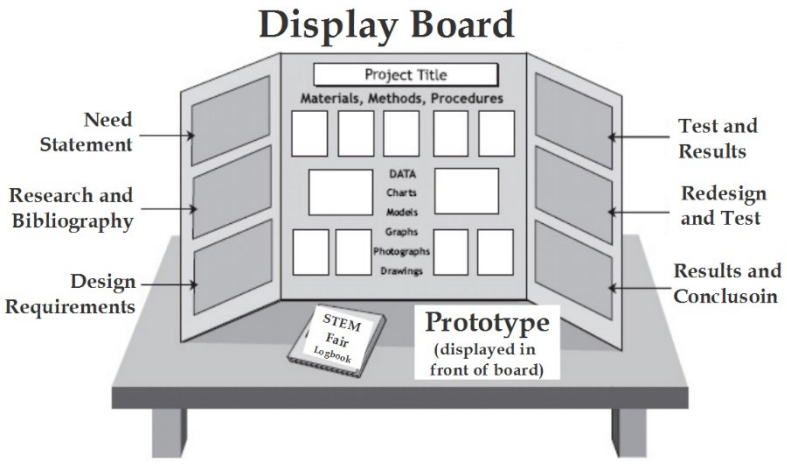
LOGBOOK

Scientists record in a logbook and it is a required part of every project. It should contain all the information from the beginning to the end of the engineering process. Logbook entries should be dated. Logbooks can be done digitally or handwritten. However, the final logbook must be in a format that can be uploaded to the virtual STEM Fair platform. This may mean scanning handwritten logbooks.

DISPLAY

Students will need to create a digital display of their project and findings. The display should highlight the following components: project title, problem, background research, needs statement, design requirements, materials/procedures, prototype (build-test-redesign), results, data: graphs/charts, data analysis, images and conclusion.

Student invited to Round 2, in-person final judging, will need to create a project display board.



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 regard 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