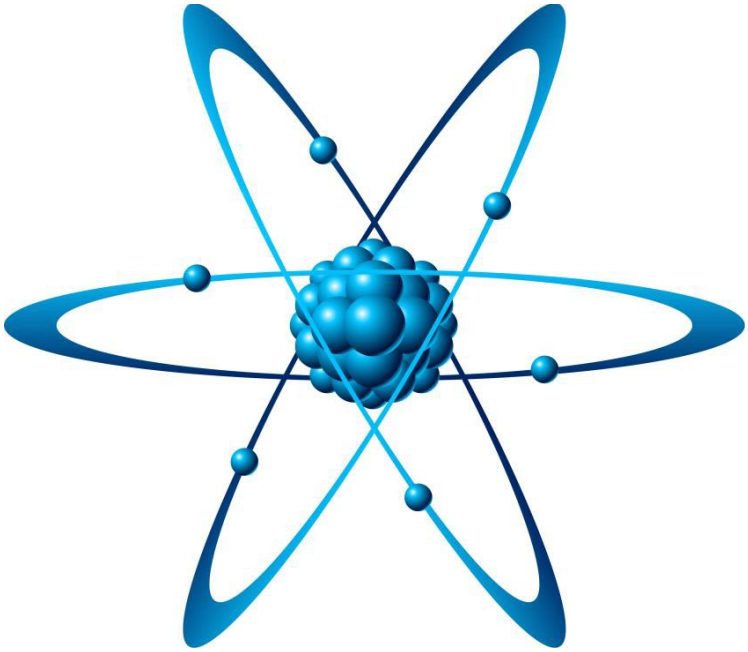


Handbook for the
SARASOTA COUNTY VIRTUAL STEM FAIR
for High School Grades 9-12

SARASOTA
County Schools

Important Dates 2021-2022 High School		
Due Date	**Description**	**Coordinator Action Steps**
Friday, September 17, 2021	**The STEM Fair School Registration Form** must be submitted by all schools that will be participating in the Sarasota County STEM Fair.	Save PDF as "HS_SCHOOL NAME Registration Form." Upload saved PDF to STEM Fair Teams or Mail or email to sarah.burkett@sarasotacountyschools.net.
September TBA	**STEM Fair Coordinator: Updates** to learn more about policies, procedures, and requirements for 2021-2022 STEM Fair participation.	Watch pre-recorded video with all details. Submit FORMS survey after completion.
September-December	**School Site STEM Fairs:** Coordinator and adult sponsor should be working with students to ensure all necessary paperwork is being completed thoroughly and properly prior to beginning experimentation.	School site coordinator holds all of the forms (either digitally or paper) so they are easily available when students are chosen to enter the County STEM Fair.
November TBA	**STEM Fair Coordinator Training: ZFairs** to learn how to upload school site winners to the county STEM Fair virtual platform.	Watch pre-recorded video with all details. Submit FORMS survey after completion.
Wednesday, December 22, 2021	**School Site STEM Fair** must be complete. It is strongly suggested that each school has a judging process to determine the projects that will compete.	Determine your top 20 projects. Begin to collect/create digital files for upload to the virtual STEM Fair site. These include a PDF of the student display and logbook as well as a <5-minute video submission.
Friday, January 14, 2021	**Virtual STEM Fair Registration** should be completed for each project that will be participating in the Sarasota County STEM Fair. In addition, **Required STEM Fair Paperwork** for each project/team that will be entered into the Virtual Fair must accompany the registration.	Submit all SSEF forms, student PDF's, and video link ***electronically*** via ZFairs. Parents must submit Media Release ***electronically*** through ZFairs.
Tuesday-Sunday January 31-February 6, 2022	**Round 1 Sarasota County Virtual STEM Fair Judging** Judges will review student work on ZFairs.com.	No action needed.
Monday, February 8, 2022	**Notification of Invitation to Round 2 Judging** will be sent to each coordinator.	Confirm entrant acceptance of invitation. School sites will need to prepare field trip paperwork and Round 2 students will need to design in person presentation materials.
Thursday, February 24, 2022	**Round 2 Sarasota County STEM Fair Judging and EXPO** Panel of Judges interview students to determine category winners (3-12).	Chaperone students to daytime in-person event.* The evening event is open to parents and students who have projects participating in the STEM Fair.*

Sarasota County STEM Fair

Date and Location: The annual Sarasota County STEM Fair will be conducted in a virtual format during the 2021-2022 school year. Fair dates are January 31st - February 6th, 2022.

Eligibility: Students grades 6-12 enrolled in any of Sarasota County public, charter, or private schools are eligible to compete in this year's STEM Fair.

Selection: Each high school will be able to enter up to 30 projects. These entries can be in any combination from the following categories:

1) Animal Science
2) Behavioral & Social Sciences
3) Biomedical & Health Sciences
4) Cellular/Molecular Bio/Biochem
5) Chemistry
6) Earth & Environmental Sciences
7) Engineering
8) Environmental Engineering
9) Intelligent Machines, Robotics and Systems Software
10) Mathematics & Computational Sciences
11) Microbiology
12) Physics & Astronomy
13) Plant Sciences

A complete description of each category can be found in the SSEF Rules documentation.

Students are to be selected through a school-based selection process. This selection process will be at the discretion of the school. It is **highly recommended** that the students go through a process like that of the Sarasota County STEM Fair. **It is also highly recommended that school-based fairs be conducted in a virtual format this year.**

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

Required Forms: Each high school that wants to participate in the Sarasota County STEM Fair will need to submit a **STEM Fair School Registration Form** no later than 4:00 PM on **Friday, September 17th, 2021**. 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** Drop Box folder for school registrations. Please save the file as "HS_SCHOOL NAME_Registration Form"

Students will use forms from the Intel International Science and Engineering Fair (Intel ISEF), in which the Sarasota County STEM Fair is affiliated. Sarasota County is also affiliated with the State Science and Engineering Fair of Florida (SSEF), which require additional forms for various projects. Each project (or each student if on a team) must have the proper Intel ISEF and SSEF forms submitted to the online virtual STEM Fair platform no later than **Friday, December 21, 2021**. https://ssefflorida.com/rules/

In addition to the paperwork for each student/project, coordinators will register all projects being submitted to the Sarasota County STEM Fair into the virtual fair platform, no later than 4:00pm on **Friday, December 21, 2021**.

Digital versions of the students' projects should be submitted to the online virtual STEM Fair platform no later than **Friday, December 21, 2021**. This is to include a video presentation of the student outlining their project for the judging process. Criteria for this presentation is available below.

NON-PUBLIC SCHOOLS ONLY: In addition to the ISEF and SSEF paperwork, a **Student Media Release Form** will be required.

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

Project/Display: Students are required to create a digital presentation/display of their project highlighting the important components of their science/engineering project. ***The only acceptable file format is PDF!***

Because the Sarasota County STEM Fair is affiliated with the Intel ISEF, there are many rules and guidelines to follow. ***All the following rules should be followed!*** The following list is a general guideline to which students and teachers should adhere:

If the school-based decision is for students to have a physical board.

1. Display for school-based fairs 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. Each component of the investigation must be present in the uploaded virtual project presentation.
2. Maximum space allowed for each display is the length of project board while standing.
3. The display board, log book, and abstract are three required components to have present for each project in the virtual STEM Fair platform. All projects may have a model on display and can be referenced during the video presentation.

However, the following ARE NOT ALLOWED:

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
p. Any apparatus deemed unsafe by the STEM Fair Directors

4. Photographs in the project must be of the researcher ONLY. The researcher must have parent/guardian permission to have their photograph in the presentation. 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 as part of the presentation.
5. If using the display board in the video presentation, 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.

If the school-based decision is to conduct a virtual fair:
(Please note that Round 1 of the county competition is virtual only and Round 2 will require a physical board.)

6. Students are required to create a virtual display of their project. Acceptable file formats are Office 365 Suite products, such as PowerPoint or Sway. Documents uploaded into the virtual STEM Fair platform **must be a PDF document**.

   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.
7. Students will be required to create a short video of themselves outlining their project. This video will replace the interview portion of the judging process during Round 1. 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 the student reading their display board. Students are encouraged to include information not already available to the judges. Students should include the following talking points in their video for entering the county virtual fair: *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 address the above criteria. More detailed information regarding digital components will be provided to school site coordinators.

8. Logbooks should be uploaded into the virtual STEM Fair platform. 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.
9. Any items that are acknowledgements, self-promotions, or external endorsements ARE NOT ALLOWED.
10. The STEM Fair Directors reserve the right to reject projects they deem inappropriate and remove items not in compliance.

Judging: At least two independent judges will review each virtually uploaded project. Judges will review the virtual display, the logbook and the student video component. Scores from the two 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 documents and students' scores will not be released, but the 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 category, there will be two winners, a first place and second place winner. The first-place winner will have the highest score for that category, regardless of student grade level. 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.

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. 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.

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.

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.

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.

ABSTRACT
The abstract is a one-page summary to include the purpose, hypothesis, procedure, conclusion and a bibliography. The abstract must be displayed on the board or at the table in some fashion using the **proper form** provided in TEAMS.

ABSTRACT Tips and Set Up:
TITLE of PROJECT (ALL IN CAPITAL LETTERS and should match the board.)

- First paragraph includes the purpose and hypothesis.
- Second paragraph is the procedure, but not in step-by-step format.
- Third paragraph is the conclusion and future research.
- Bibliography (should be at least **five** sources)

PHYSICAL DISPLAY

This is a suggestion for placement of information on the display board. The exact location for each component is at the discretion of teacher and student. The display, however, should be easy to follow, like reading a book. The Abstract can be placed on the board or can be attached to the table.

Virtual Project Presentation:

Students may use PowerPoint, Sway or the like to create their virtual presentation. It should include all the same components/requirements of the physical board. The digital presentation should be uploaded to the virtual fair platform.

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

Components of an Engineering Project

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

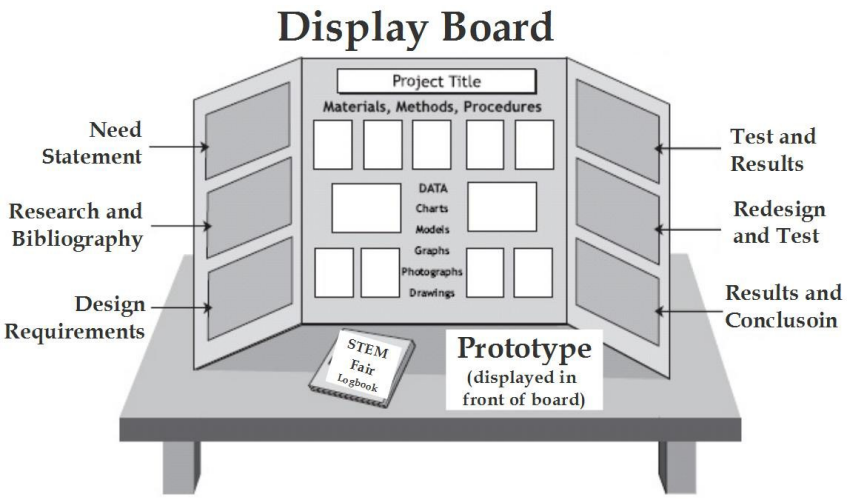
- **Build**- Using the materials and procedure listed, build the invention prototype.
- **Test**- Use the prototype in multiple trials as specified in the design requirements. Test a minimum of 3 times. Record data to measure if the prototype is successful. Does it solve the problem? Does it need improvements?
- **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.

DISPLAY
This is a suggestion for placement of information on the display board. The exact location for each component is at the discretion of teacher and student. The display, however, should be easy to follow, like reading a book. Arrange information so that it is easy to read and flows in a natural order, left to right, top to bottom.



ABSTRACT

The abstract is a one-page summary to include the purpose, hypothesis, procedure, conclusion and a bibliography. The abstract must be displayed on the board or at the table in some fashion using the proper form provided in TEAMS.

Virtual Project Presentation:

Students may use PowerPoint, Sway or the like to create their virtual presentation. It should include all the same components/requirements of the physical board. The digital presentation should be uploaded to the virtual fair platform.

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
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____degree of independence in conducting project
____recognition of potential impact in science, society and/or economics and quality of ideas for further research.