

Lincroft School Students:

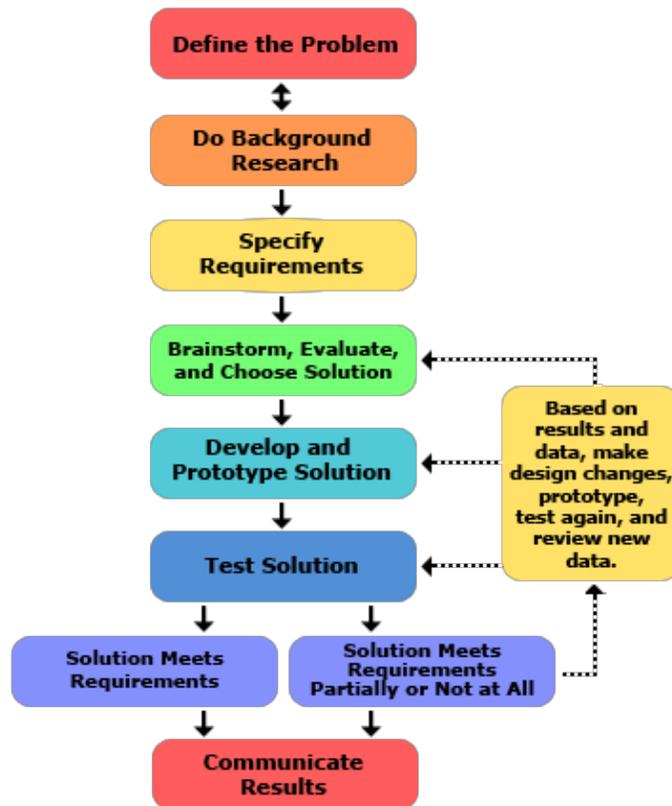
We are so excited you have decided to participate in the first **STEMFest!** Everything you need to know to complete an amazing project is in this packet. However, if at any time you have questions, please have one of your parents contact Michelle Oliveri mich224@gmail.com or Rachel Warnick rowarnick@gmail.com.

GOAL: The goal of the STEM Fest is to get you excited about science, technology, engineering and math and to provide an environment where learning and discovery are fun.

NEW FOR 2019: INCORPORATE LEGOS IN YOUR EXPERIMENT OR PROJECT

WHERE TO START: You will perform a simple project at home with parental supervision using the engineering design process. (More details below)

Engineering Method



Source: <https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-process-steps#theengineeringdesignprocess>

FINDING A PROJECT: Start by looking on the internet for a project that looks interesting to you and is designed for elementary school students! You do not have to pick a project from the websites below, but we found some cool ones at:

- <https://www.pinterest.ca/radleyschem/lego-science-projects/?lp=true>
- <https://leftbraincraftbrain.com/28-days-of-steam-projects-for-kids/>
- <https://www.learningliftoff.com/10-fun-lego-science-activities/>
- <http://www.stevespanglerscience.com/>
- http://www.sciencebuddies.org/science-fair-projects/project_ideas.shtml
- <http://www.education.com/science-fair/>
- <http://www.all-science-fair-projects.com/>
- <http://www.planetsmarty.com/2017/02/science-fair-projects-with-lego.html>
- <https://thestemlaboratory.com/lego-stem-activities/>
- https://www.huffingtonpost.ca/2016/06/15/science-experiments-for-kids_n_10485620.html#gallery/560988/11

THE ENGINEERING DESIGN PROCESS

Define the Problem: Ask a question about a problem that you see: What is the problem? Who has the problem? Why is it important to solve the problem?

Write a Problem Statement: [Who] need(s) [what] because [why].

Do Background Research: Did someone else have the same problem? How did they solve it? You can learn from how they solved a similar problem.

Don't do all your research on Wikipedia, it can contain incorrect information.

Specify Requirements: What are the important characteristics that your solution must meet to succeed. You can identify these, the design requirements, for your solution by looking at something similar that already exists and note its key features.

Write a Design Brief containing:

- A description of your target user.
- A definition of the problem you intend to solve. [Who] need(s) [what] because [why].
- A description of how existing products are used and why they don't completely address the problem.
- A list of all the needs or requirements for your design. Each project should have three to five requirements.

Brainstorm, Evaluate and Choose Solutions: How can you fix the problem? Don't stop with just one idea. Be creative and try to think of more ways to solve the problem. You can also ask others how they would solve the problem to get even more ideas. Then, draw or sketch your ideas.

Take the ideas you have come up and see how they match up with your design requirements. Some solutions probably meet more requirements than others.

Then you need to select the solution you want to try to solve the problem.

Develop and Try Solutions: Now that you have a solution, you need to try and make it work. You can start with a drawing to look at how different parts of your design will work. You can also use a model to try and solve the problem or you can develop a prototype. This is just a version of your that can be made to test your solution. Prototypes are a key step in the development of a final solution, allowing you to test how the solution will work.

Test and Redesign: The design process involves multiple tries until you arrive at a final solution. You will most likely test your solution, but find problems, so, try again after making changes and test your new solution. It may take a few tries before you settle on the final design.

Share Your Results: To complete your project, communicate your results on a display board.

"The Engineering Design Process." *The Scientific Method*. Kenneth Lafferty Hess Family Charitable Foundation Science Buddies, n.d. Web. 22 Jan. 2014

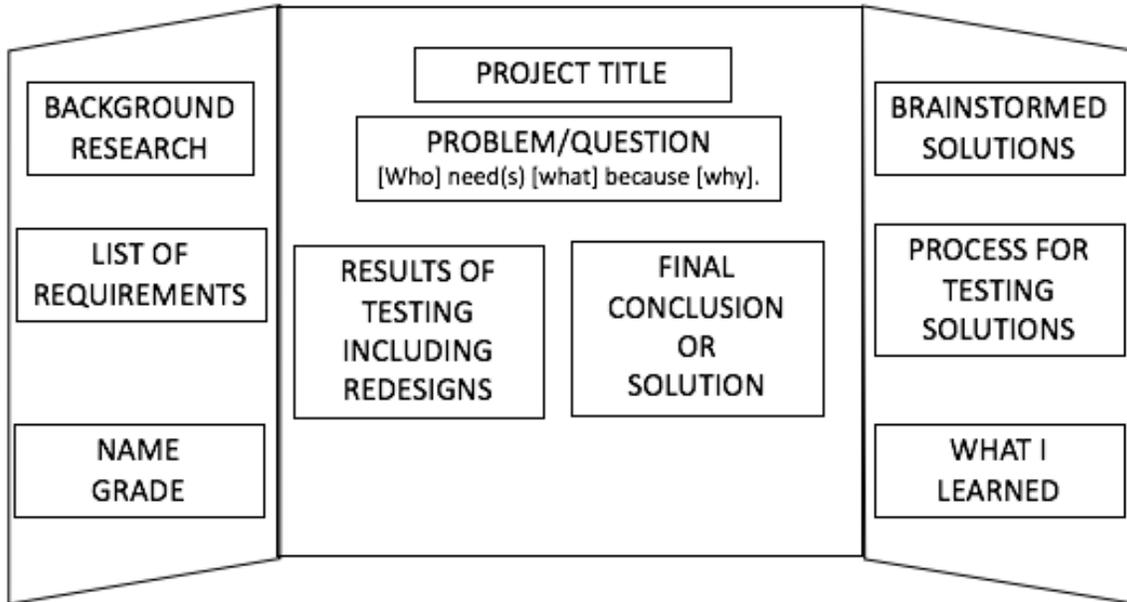
For additional information on The Engineering Design Process, go to
<https://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-process-steps#theengineeringdesignprocess>

How do I share my project?

You will share your project at STEM Fest on a tri-fold presentation board. You do not have to prepare a formal spoken presentation! However, be prepared to share with students, teachers and parents' key information on your project, especially what you learned about the engineering process in your project! Don't be nervous about sharing your project! Do your best and have fun!

How do I create a project board?

1. Document and present information on a 36" H x 48" L tri-fold poster board.
 - a. Elmer's or other brand tri-fold poster boards 36" H x 48" L are available through Amazon using the Lincroft PTA link. They are also available at Staples (in-store and online), AC Moore, Target and Walmart in store only.
 - b. Follow a presentation format for a tri-fold board similar to the ones below, which include the:
 - i. Title
 - ii. Problem/Question: [Who] need(s) [what] because [why].
 - iii. What you found in doing your Background Research?
 - iv. List your requirements
 - v. List a few of the solutions you brainstormed and which solution you decided to test
 - vi. The procedure for testing your solution
 - vii. Results of the test and if you redesigned those results, too.
 - viii. Conclusion
 - ix. What I Learned
 - x. Name
 - xi. Grade
 - c. You may want to use a presentation application like PowerPoint or Prezi or record your experiment/demonstration. Laptops or iPads are permitted to be used in conjunction with the project board, but are not required. You will be permitted to use your school Chromebook.
 - d. Make a project title and put this across the middle top of the board.
 - e. Include the big question on the board.
 - f. Don't forget to include your Name, Partner's Name if applicable, Grade(s) and Teacher(s) on the board.
 - g. You are welcome to use technology, but there will not be internet access unless you are using your school Chromebook and electricity is very limited.
 - h. Photographs and recordings are a great way to share what you did.



What are some helpful hints to create a great STEM Fest Poster Board?

- Students NOT parents are to create the poster.
- Use a font size of at least 16 points for your main body text. Anything smaller is too hard to read.
- Stick with traditional fonts like Arial, Times New Roman, Calibri or similar typefaces.
- Use *italics* or bold for emphasis, not for all your text.
- Don't place your text on top of a picture; that makes it difficult to read.
- Don't use ALL CAPS; THEY ARE MUCH HARDER TO READ.
- Don't use more than two or three different fonts on your board. Times New Roman for body copy and Arial for headings makes for a nice combination.
- Plagiarism is a no-no. Make sure you use references if they are choosing to copy information from a published source. This goes in your bibliography.

What information do I need to know for the day of the STEM Fest?

- What to bring?
 - Your project presented on a tri-fold poster board that stands on its own
 - Any items that go in front of the display board (Laptops are permitted)
 - Pen, tape, glue and other quick-fix items in case the display board gets damaged in transit
- Do NOT bring the following items:
 - Hazardous chemicals
 - Food
 - Live insects or animals)
 - Items to hand out. No materials may be handed out or tasted due to allergies. This includes food (rock candy, rock candy solutions, cookies, etc.) and non-food items (balloons, etc.).

Note: Consider using pictures or other media to display prohibited items.

- Can I perform a demonstration?



- You can perform a controlled demonstration of your project (e.g. bubbles, volcanoes, reactions, etc.). Please ensure you have enough materials to demonstrate. Also, please bring in wipes and paper towels in case of spills.
- If your project uses dry ice, one of your parents must handle the dry ice AND be present at all times.
- Your plan for demonstrating the project must be reviewed before the fair. Please contact Michelle Oliveri mich224@gmail.com or Rachel Warnick rowarnick@gmail.com to discuss.
- Are there awards given as part of STEM Fest?
 - There are no awards given.
 - Each student will receive a certificate of recognition.
- Who do I contact if I have questions about what I can or cannot bring?
 - Please contact Michelle Oliveri mich224@gmail.com or Rachel Warnick rowarnick@gmail.com
- When do I drop off the project?
 - Students should arrive on January 24th from 6:00 to 6:15 pm to set up their project. Students will be sharing projects with attendees from 6:30 to 7:30 pm. Additionally, students can share projects with all students on January 25th from 9:00 to 10:30am.
- When do I take home the project?
 - Projects can be taken home following the evening session.
 - Projects that remain for the morning session, can be picked up from 10:30 to 11:00am. Any remaining projects (small enough to store and transport) will be delivered to the students classroom, so they can take home.
 - All projects must be taken home at the conclusion of the day on January 25. Any project left will be disposed of as there is no storage space.

What do I do if I have questions?

Michelle Oliveri mich224@gmail.com or Rachel Warnick rowarnick@gmail.com