



TERRA NORTHEAST REGIONAL SCIENCE & ENGINEERING FAIR

How do I do a Research / Engineering Design Project?

(Students *and their parents and mentors* should read this!)

Selecting a Topic ¹

Try to keep it simple -- what question would you like to answer? Find a topic by looking to favorite hobbies, sports, books, toys or family life for inspiration. Or visit [Science Buddies](#).² (Note to teachers and parents: Please resist assigning a topic. Students put more time and energy into projects inspired by their own interests.)

Find out about your topic by asking professionals in the field, consulting the librarian to find reference books, materials and magazines, and accessing the Internet. (Note to adults: You may help your student locate resources; you do NOT prepare reference lists or fact sheets!)

Purpose & Hypothesis / Engineering Goal

The *purpose* is a description of what you plan to do. The *hypothesis* for an experiment tells what you think will happen. For an engineering design or process, you talk about what you want your machine or process to accomplish.

Experiment / Design Iterations

You must plan exactly what you will do.

For your safety, complete all of the [TNRSEF paperwork](#) ³ required for your grade including signatures BEFORE you begin your experiment or start your engineering design. Record EVERYTHING that does or does not happen as you progress. Remember, the scientific method requires that you vary only one part of the experiment at a time and should do the experiment more than once to verify the results. If you are doing an engineering project, you are free to change lots of things with each iteration, but you document EVERY change you make to your equipment or process, your thinking as to why you are trying this, and what happens on "the next run."

Senior Level R/ED: Do you want the chance to go to the Intel International Science and Engineering Fair? Be sure to access the [IISEF Student Handbook](#)⁴ so you meet their requirements.

¹ You will find more on choosing a project idea at the end of this guide.

² *Science Buddies URL* sciencebuddies.org/science-fair-projects/recommender_register.php

³ *SRC link* www.yingtrsef.org/tnrsef-src

⁴ *IISEF Student Handbook* <https://member.societyforscience.org/document.doc?id=632>

Terra Northeast Regional Science and Engineering Fair

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501(c)3 nonprofit association – Affiliate / Intel International Science & Engineering Fair (IISEF)

Communicating the Results

Written Report

This can be one or many pages and it can contain charts, illustrations and photographs.

There are four main elements:

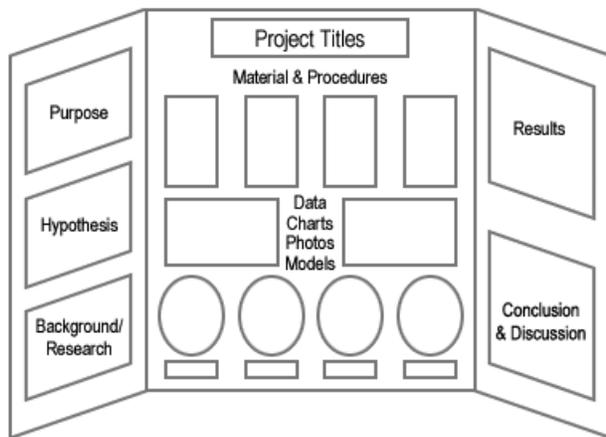
- The topic's name, why it was chosen and what you hoped to find out.
- How you did the experiment or design, and the information that was collected.
- The conclusion you reached.
- A bibliography of the research information. Cite *every* source you use!

For images and data downloaded from the Internet, you must include date of access as well as the *complete* URL! (Note: "wiki.com" is NOT a complete URL.)

Exhibit and Presentation

The exhibit is how your research is communicated visually.

You need:



1. A free standing display board (purchased or homemade will be fine)
2. Drawings, photographs, charts or anything else that describes your project visually. See the sample board to the left.

(You **MUST** cite the source for each item, including the photographer's name for any photos. If one person took **ALL** the photos on your display, one label suffices.)

3. Abstract (the summary of your project) – printed copies are on the table.
4. That written report you already prepared (Your report can lie on the table in a notebook or be attached inside a folder). The maximum space allowed for each exhibit is 48 inches wide by 30 inches deep by 72 inches high (above table top). Include in your display photos of any part of the exhibit that does not fit in this space. Be sure to bring all the supplies you need, including tape, scissors, markers, extension cords and A/V equipment. Label *everything* with your own name and your school's name. Set out your written report and at least 5-6 copies of your abstract.

Now, prepare your oral presentation (3-4 minutes). Talk briefly about how and why you chose your topic, the work you did, and the conclusions you reached based upon your results. **YOUR TALK IS VERY IMPORTANT, AND MUST BE BRIEF.**

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More about Project Ideas

Still scratching your head about what to choose as your science fair project? Try this:

1. Decide if you like to work on your own or with a partner; the TNRSEF does allow teams of two students. That will affect how you choose your project topic.
2. Then give your imagination free rein. Walk outside and see if you come across something fascinating that sparks a question in your mind. Take some time to sit quietly and see where your curiosity carries your daydreams. You may find your idea there. Next stop is the public library. Start with a topic that interests you and read along from topic to narrower topic to narrower topic until you find there's a question you've not found an answer to yet. Voila your project!

More Resources

Science Buddies

If time is short or you really want to jumpstart the process, Science Buddies opens a treasure chest of ideas and resources for middle and high school students starting out in the science fair process. To sections on "Getting Started" to "Abstract" and "Display Board," the team at Science Buddies adds a block of pages on Tools, Techniques, and Reference Information and Science Fair Project Additional Resources.

- [Science Buddies: Topic Selection Wizard](#) ⁵
You work your way through this wizard, following your own interests until you identify a personalized cluster of projects from their library of over 800 ideas.
- [Science Buddies: Project Ideas Directory](#) ⁶
Prefer to wander around a library? Then click here to browse through those 800+ ideas organized by the area of science, technology or mathematics.

Archimedes Initiative

So ... you don't want to do any old science fair project. You want to blow the judges out of the water? Visit the [Archimedes Initiative!](#)⁷ Kids themselves tell you about everything from why they wanted to do a science fair project to how they chose their topics, did their projects, or even talked with judges. You can follow the story of one of the dozens of successful science fair students or see what each of them has to say about the issue you need to understand better.

⁵ *Topic Selection Wizard* sciencebuddies.org/science-fair-projects/recommender_register.php

⁶ *Project Ideas Directory* www.sciencebuddies.org/science-fair-projects/project_ideas.shtml#browseallprojects

⁷ *Archimedes Initiative* www.archimedesinitiative.org/

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