SCIENCE FAIR CENTRAL

PARENT TIP SHEET

What is the parent's role?

The parent's role is not exactly hands-on, but not exactly hands-off either. Think of yourself as chief facilitator. Your place is in the back seat, hands folded (make that clasped!) in your lap, with the student at the wheel (except, of course, for those trips to the craft store and transporting delicate 3-D models and display boards).

Based on your available time, you may end up wearing several hats: lab assistant, personal shopper, deadline cop. Be there for moral support, to help gather supplies, keep an eye on the calendar, monitor progress, and to make sure things don't (unintentionally) explode, catch on fire, or slip through the cracks.

Regardless of your level of expertise in science or engineering, consider volunteering to help in the classroom or at the science fair and STEAM event itself. Teachers usually welcome extra help, as well as students whose parents may not have as much time to help as they'd like.

Some fairs and events include a formal presentation and judging. Towards the end of the process, build in time to listen to your child rehearse the oral presentation. Be a kind audience member, give gentle reminders and a bit of constructive criticism, and ask helpful questions. Do some role playing and add some humor if your child doesn't respond well to the exercise.

On the day of the science fair, your job is to keep things calm and cool, and to remind your child to relax and enjoy the event. If a competition is involved, consider doing something special back at home that evening. Bake a special cake, or have a sibling make a hand-made ribbon or trophy to honor their hard work, regardless of where they placed.

How do I help my student come up with a project idea?

Choosing a topic is a difficult task, as the possibilities can seem endless. Parents can help with subtle suggestions and reality checks, but students should ultimately come up with their own idea based on their own personal interests - one they'll be motivated to stick with over a multi-week period.

You can set students up for an interest in science and engineering by providing opportunities to learn about exciting technological advances as well as practical, everyday applications of science all around them. Watch a television science program together. Propose a trip to a science museum or go to the museum's on-line web site. Discuss a STEAM news article from the newspaper or a magazine. A trip to the science or technology section of your local library can help to spark ideas or to fine-tune existing ones.

For those who are STEAM inclined, try to resist the urge to propose ideas of your own. Instead, use your knowledge of how scientists come up with their own questions to get your child to think about what they would like to learn and what kind of investigation they'd like to conduct. Remember that children don't have the same background and experiences as adults. Something that seems to be common knowledge to you will be new to them and worth exploring and learning on their own. Science projects should be about experiencing the process of science.

Some science fairs include inventions and problem solving. If your student is interested in that angle of science and engineering, discuss things around them that may be frustrating and that could be improved by changing them. Watch some of the television programs on engineering and inventing. Look at inventions in museums. Even social engineering is fair game – could they, for example, think of how to get people to throw away less and recycle more? What change would they make and how would they measure that change?

Project Ideas 101

Educate yourself upfront, before you begin any brainstorming. In order to advise on the feasibility of a project idea, you need to understand the basic framework and requirements of the entire process. It's one thing to come with an enthusiastic idea, quite another to come up with a workable, testable project.

Types of Projects

Science Fair projects can get very confusing. There are basically three types.

The Science Report: students have an interest in learning something that is already known. What are galaxies? How are coral reefs endangered? How does a laser work? These projects are interesting, but it must be noted that they do not actually allow students to practice science. Students do learn a lot about what other scientists have done, but the student doesn't actually conduct an investigation or create anything (other than a nice display). Students may make models and they may even repeat some data they have found, but it's still a science report.

The Experimental Investigation: this is where students ask "testable" questions and roll up their sleeves and practice science. The science fair is a unique opportunity for them to experience the

whole science process. Students ask a testable question, identify simple variables, research the background on the question, propose a hypothesis, conduct the investigation, collect data, and draw a conclusion. Even when the project is simple and an adult might know the answer, the student benefits from practicing the science process and finding out for him or herself.

The invention: some students like to see their results put to practical use. They see a local problem, such as a backpack that is too heavy and propose a solution. What makes it scientific is that the change they propose is measured and recorded in some way. The student comes away with proof that the solution worked or it didn't work.

Steps of The Scientific Method Steps	Steps of the Engineering Design Process
State your question	Define the problem
Background research	Background research
Formulate your hypothesis	Specify requirements
Design experiment	Create another solution
Test your hypothesis by doing an experiment	Build a prototype
Analyze your results and draw conclusions	Test and redesign
Communicate results	Communicate results

How much time will we need?

Now this is an area where students can definitely use a parent's help. Together you should build a realistic timeline for completing the project. It's okay to tweak it slightly here and there along the way, as long as a solid framework is in place and the final deadlines are in full view. Most investigations and inventions take a considerable amount of time to prepare, complete, analyze, and document. Anticipate errors, spillages, roadblocks, revisions, and occasional student meltdowns.

A critical point is the decision about the investigation or invention. How much time will it take to set up and collect all the data? Make sure the topic, question, or idea fits within the time frame. Don't forget to subtract the time it will take to put the display together and prepare – usually a couple of weeks.

Keep tabs on major deadlines and mini deadlines, using a wall calendar in your kitchen or other high-traffic area. Keep extra supplies on hand for all stages of the procedure and presentation. Help kids anticipate what they'll need and when they'll need it, which in turn may help prevent parent meltdowns. ("You need *what*? Where are we going to buy double-sided tape at 10 p.m.??")

Parent Tip

Start with the end in mind: Usually, it will take about two weeks to prepare the presentation. So the investigation phase, including collecting all the data, has to be done before then.

- Mark your calendar for the date that the presentation displays must be delivered to the school (usually one or two days before the science fair).
- Back it up two weeks. That's when the data collection has to be completed. Mark the date.
- Back that up to the amount of time it will take to buy or obtain materials, set up the investigations and complete collecting the data, 3 – 4 weeks depending on the project. Mark that date.
- Back that up a week for topic choice and background research. Mark the date and get started!

Sample Timeline for Science Fair Project	
Activity	**Time BSF** *(before the science fair)*
Decide on topic and develop question or solution	6 weeks
Background research on topic	6 weeks
Determine materials and purchase them	5 weeks
Set up project and begin to collect data	5-4 weeks *(depending on project)*
Shop for project display supplies	3 weeks
Prepare project display	2 weeks
Prepare oral presentation	1 weeks
Deliver presentation display to school	1 day
Science Fair Day	0

What should the final project look like?

The final project is the culmination of the entire process and comprises several parts. The main feature is a large display board that tells the whole life story of the student's project, detailing exactly how scientific methodology was used at each stage. This is propped up on a table, where students display accompanying material (which may or may not be required at your particular fair, so check the guidelines). These might include: a journal of detailed notes and sketches, a photo album documenting procedures and materials, and a sample of background research material. Some young scientists also include hand-made models pertaining to their topic. If your child opted to do an invention rather than an investigation, and the invention is transportable, the invention itself will be center stage in front of the display. Pictures of a non-transportable invention are good, too.

Displays

Although there's a bit of room for creativity, the display board format is fairly formulaic. On one hand, this makes things easy because there's no need to reinvent the wheel. On the other hand, those with an artistic spirit may find it limiting. Together you can look at sample layouts to see standard grid formats and sequence of categories. Stress that effective communication is the key, and that accomplishing this within tight parameters is actually a highly creative skill. Check out some books on graphic design from the library and learn about basic design principles and graphic elements. In the end, if your child is itching for something more edgy, suggest they splash out and make the project title as eye-catching and exciting as possible.

Judging Critera

Check out the sample judging criteria at Science Fair Central, and you'll have the distinct advantage of knowing what the judges are looking for upfront. Show these to your child in the beginning of the process, not the end, to keep them mindful of the serious objectives while performing their procedures and analysis and preparing their formal presentations.