Science Saint Gabriel School

Mr. McGovern January 14, 2010

Picking a Project

Chances are, your child is full of questions about the world, and that's a great place to start. Make a list of what fascinates and interests her: Does she ask how plants grow? Is she is always taking things apart to see how they work? Or is she a rock collector? Any of these starts can yield a fantastic project. Remember when thinking of ideas that a good project doesn't have to involve chemistry, biology, or physics. Agriculture, computers, engineering, genetics, and psychology are all part of science. And science can be found in almost every area of life, from art to food to sports. A project on why a violin makes a different sound than a cello is just as valid as one that explains why the seasons change. What's important is that your child is genuinely curious to discover the answer.

If you're stuck for ideas, you and your child can go to the library and look through books about science fair projects or search the Internet for ideas. If you're really stuck, look at what your student will be learning in science in the next two or three months and brainstorm a project based on the curriculum.

Once you choose a general area, help your child narrow it down to a manageable size. Keep it as simple and specific as possible. Instead of, "Does warm air and lots of water make plants grow faster?" narrow it to something like, "Does raising the temperature 10 degrees encourage a fern to grow faster?" If there is a competition aspect involved, be aware that usually the judges are looking for an experiment, not a demonstration of how something works or a well-labeled exhibit of your budding entomologist's insect collection. If your child wants to compete, steer him towards a question he can answer with a "yes" or "no" through the scientific method, such as, "Does heat make paint dry faster?"

The last thing to consider when selecting a project is, "Can my child do this project mostly by himself?" Bear in mind your child's age and the safety of the project. While it's great to help him brainstorm and take him to the library and to get supplies, you should not be the one conducting experiments or maintaining budding seeds. If there's any hazardous element to the experiment (like chemicals or electricity), consider if you will have the time to monitor and safeguard your child's work before you tell him it's okay.

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Planning & Research

Now that your child has focused on a topic, it's time to get started — the earlier the better. Some projects may only take two weeks to complete, but most will require a month or more to carry out. The first step is to help her figure out a timeline for the project. For a project about the popular topic of mold, it might look something like this:

Week 1: Research
Week 2: Design experiment; buy supplies
Week 3: Set up & run first test of molds on bread slices
Week 4: Set up & run second test
Week 5: Analyze results; come up with conclusion
Week 6: Write report
Week 7: Build display & prepare for fair

You see how quickly the time adds up! Obviously, there are steps that can be condensed, but others cannot be rushed: you can't force seeds to sprout or mold to proliferate. Even a simple

taste-test project, like, "Do people prefer Coke to generic cola?" will take several afternoons of getting subjects to drink soda out of unmarked cups before there's enough data to report. You may want to come up with the timeline after a trip to the library, so your child has a better idea of what the experiment will entail. Once she's got a basic idea, sit down and make a checklist (like the timeline above) that breaks down the entire process into manageable steps. Then post it somewhere you and she can easily see it and be reminded of what should be happening and what's next.

One supply that's essential to every science fair project is a lined notebook for your child to take notes in, right from the initial research trip. It's also a good idea to set aside a folder for loose papers and copies of articles. That way, every step from beginning to end is documented in one place. Encourage your young scientist to record observations, thoughts, and daily progress every day, like a journal.

Before she begins her experiment, she should gather background information from books, magazines, newspapers, the Internet, and people she can interview. The more she knows, the better she will be able to design the right tests and understand how something works. Once she's gotten a base of knowledge about her topic, she must conduct her experiments according to the scientific method.

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The Scientific Method

The heart of most science fairs is the scientific method, which has seven general steps:

1. Make observations
2. Ask questions
3. Form a hypothesis
4. Find a method of testing
5. Perform experiments
6. Gather results
7. Reach a conclusion

You and your child completed steps one and two by picking a project: looking at the world and wondering why something is the way it is. Narrowing those questions down to a single one that can be answered with a "yes" or "no" was the first step to forming a **hypothesis**, which is simply a guess to what the answer is going to be. So, if your scientist's narrowed question is, "Does heat make paint dry faster?" and he believes the answer is "yes," his hypothesis would be, "Heat makes paint dry faster."

Step 4 is probably the most crucial part of the process. The trick is to figure out an experiment that will answer the question **and no other**. Sticking with the paint example, to make sure that it was only heat that changed drying times, he would want to make sure all the paint was the same color, the same brand, applied at the same thickness and on the same surface, and even was exposed to the same amount of light **before** he heated it up. An important part of most experiments is the **control** subject: for every strip of paint he takes a hair dryer to, there must also be one that he lets dry naturally.

Next, he'll perform his experiments, taking notes at every step and then recording results. Finally, by looking at those results, he should be able to see if his hypothesis was correct. Don't worry if it isn't — that's just as valid a result. What's important is that by the end, he can explain how he found the answer and why he got his results.

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The Presentation

The research has been analyzed, a conclusion has been reached, now all that's left is to present your child's new discovery to the world. Older children (grades 5 and up) will not only be expected to create a display for the fair, but also prepare a research paper detailing the experiment from beginning to end. Check with your child's teacher for specific requirements.

The display, typically, is a 3-paneled poster board. You can buy pre-made ones or create it yourself with matte or foam core board joined with tape or hinges. Typically, the center panel presents the title of the project as well as photographs, drawings, and diagrams. The left side presents the purpose and methods your child employed, and the right displays the results and her conclusion. The display doesn't have to be flashy and bright, but making it clear to read and a bit eye-catching is a good idea.

Your scientist will also have to be able to talk about his project with judges or his teacher. Spend a night or two practicing with him to ease nervousness and help remember what he's learned. Ask him not only questions about his project, but also if he would do it again or what he would do next if he had more time. It's a perfect opportunity to sit back and marvel at just how much he has learned.