Phase 1—Generating an Idea: Science Fair Success

DURING THIS PHASE, YOU WILL

1. brainstorm five possible subjects
2. come up with two investigative questions per topic
3. consult with your teacher and parents about project possibilities
4. choose a suitable topic and investigative question
5. form a hypothesis
6. discuss topic and hypothesis with your teacher and gain approval
7. record ideas in your science project journal

Remember to update your Student's Progress Report as you go along. You will have until _____ to finish Phase 1.

Your Journal: The Most Important Tool You'll Use
The first thing you'll need to do is sit down with your science project journal and brainstorm a list of possible science project topics. Keep all notes that you take and data that you collect in this journal. The point of having a science project journal is simple: if you write everything down in one place, you'll know where all of your information is during the entire project. It will also be much easier for you to show your progress to your teacher and parents. Because all of your project information will be in your journal, be sure to keep it in a safe place.

Brainstorming for Topics

Here's where it all begins. By following the steps outlined in this section, you will take a general idea and narrow it down into a working science project. You will start with a general topic, choose a specific research question, and then develop the hypothesis that your experiment will test.

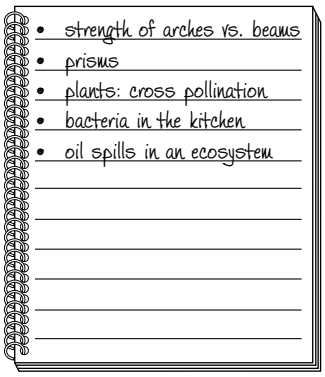
Copyright © by Holt, Rinehart and Winston. All rights reserved.

Ideas Galore! Brainstorming means coming up with as many interesting ideas as possible and writing them down in a list. Don't worry about how your ideas sound or whether you will actually pursue each topic. The important thing at this stage is to come up with a lot of ideas to choose from. The more ideas you have, the more likely it is that you will find one that is interesting and one that you'll enjoy working on for the entire length of the project.

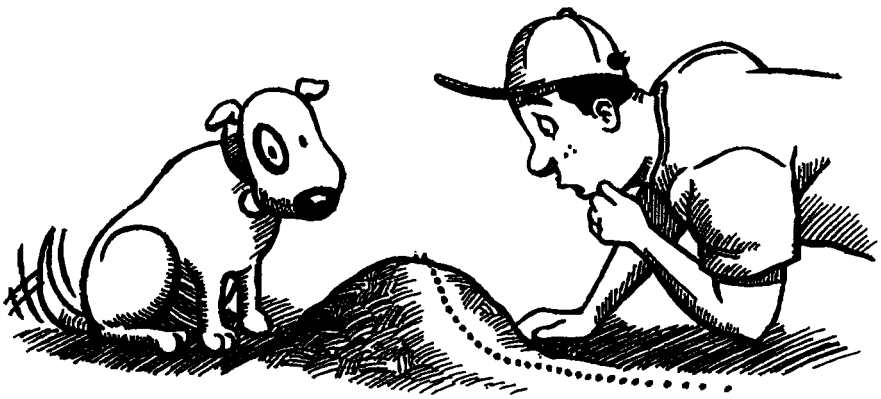
Make It Fun Since you'll be spending weeks or months preparing for the science fair, you really want to be sure that you have a true interest in finding out about your topic. Even though all of what you learn in school is worthwhile, most of the topics have been chosen by someone else. Take full advantage of the chance to choose something you're really interested in for your science project.

Getting Started

Find Out More To begin the brainstorming process, think about scientific topics you've always wanted to know more about. Maybe you've always been interested in the way mirrors work or the way light waves travel. Have you been on a field trip recently that sparked your interest or brought up some interesting questions? Now is your chance to find out more about your favorite science topics.



Solve a Mystery Another way to begin is to make a list of things that have mystified you. What makes a microwave oven cook some foods more quickly than a conventional oven? How do ants know to travel in a single line? Why are some bicycles faster than others? If the idea involves a mystery, chances are good that it would make an excellent topic for a science project.



Copyright © by Holt, Rinehart and Winston. All rights reserved.

The Library: Where the Topics Are Many kids get ideas from library books or even from the Internet. If you start researching early on in the process, you can get an idea of how much information has been written about your topic. Even though your goal is to design your own experiment, you're still going to have to research the topic. You will want to get some background information and determine how to go about testing your hypothesis. So don't be afraid of research. In the long run, it will actually make your project much easier for you.

TIP

An adult can help you think of an idea, but it is very important that your science project is clearly your own. At the science fair, your work will be compared only with that of other students close to your age.

From the list of topics that you brainstormed, choose five subjects that interest you most. Not all of these subjects have to be developed into an experiment; this is just a list of ideas of things that you may like to learn more about.

Investigative Question

When you've chosen five possible topics, you'll want to figure out what you want to know about each topic. Your investigative question is what you intend to find out during the course of your experiment. Using the topics you brainstormed earlier, you will choose a related question that your experiment will answer.

The Search Continues At the library, start by searching through the card catalog. (If you need help, ask your teacher or librarian. The faster you understand how to use the library's resources, the easier your research will be.) Look up key words from the subject that you are interested in. Looking up "oil spills" in the card catalog or *Reader's Guide to Periodical Literature* will lead you to a number of articles. If you have Internet access, you could try a search on "oil spills." You may include the word "penguin" in your search to find articles about how oil spills have affected penguins.

Copyright © by Holt, Rinehart and Winston. All rights reserved.

While you're at the library, try to think of two investigative questions that go with each topic you brainstormed. Record these ideas in your science project journal.

Here's an Example Let's say you decide to pursue the topic *oil spills*. You probably already know that large amounts of oil spilled into water can hurt the animals in an environment, but you want to know more. Maybe you want to know how an oil spill would affect a penguin's life span. Two investigative questions for this topic would be "How does oil in the water affect a marine ecosystem?" and "How do oil spills affect the life span of penguins?"

Choosing the *Best* Investigative Question The question "How does oil in the water affect a marine ecosystem?" is too broad to study in a short-term science experiment. Now consider the next question: "How do oil spills affect the life span of penguins?" The chances that you'll be able to do tests using penguins are very slim. You'll have to think of experiments that use resources available to you.

You don't have to throw out the topic if a particular experiment is not workable. Instead, think of a different testable question related to the same topic. For instance, you may want to learn more about how the ecosystem or food web of an area is affected when a large quantity of oil is introduced. This food web probably includes plant matter. Therefore, "How does oil affect plants?" is an example of a reasonable investigative question that you can test.

- strength of arches vs. beams
- prisms
- plants: cross pollination
- bacteria in the kitchen
- oil spills in an ecosystem
  - How does oil affect a penguin's life span?
  - How does oil affect plants?

Consult with Your Teacher

Now you have ten investigative questions, two for each of five topics. It will become very clear that some of the possible experiments you are interested in would be too involved to do in a science project that lasts only 6 or 8 weeks. Or, you may be able to think of a way to do an experiment but realize that the materials you would want to use would be too expensive. At this stage, you'll have a conference with your teacher about the investigative questions that you have. He or she will help you settle on one investigative question to use for your science project.

Copyright © by Holt, Rinehart and Winston. All rights reserved.