HOW TO SELECT A SCIENCE FAIR TOPIC

STEP #1
List five things you are interested in.
Examples: Music, Football, Rock-Climbing, Computers, Horses, or Shopping

1.

2.

3.

4.

5.

STEP #2
Pick one of the items you listed and ask yourself five questions about it. Be sure these are questions you'd really like to know the answers to.

For example, let's say you like football. Your questions might be: "Can I write a computer program to predict the outcome of next year's NFL games?" "Do players with thicker necks suffer fewer injuries?" "Does artificial turf help or hinder a team's performance?" "What is the relationship between body fat and running speed?" Get the idea? Now it is your turn!

MY QUESTIONS ARE:
1.

2.

3.

4.

5.

STEP #3

Now decide which question interests you the most and, after you fill in the next blank, you're on your way!

THE QUESTION I WILL TRY TO ANSWER FOR MY SCIENCE PROJECT IS:

_____

_____

_____

_____

STEP #4

In choosing your topic, be sure to not take on more than you can handle. Narrow it down, take an in-depth look at a single aspect of the problem that interests you. Tackle something that hasn't been done over and over again.

Before you go onto the next section, re-write your question as a working title, one that simply and accurately describes your research.

THE TITLE OF MY PROJECT WILL BE:

_____

_____

*Remember, your project must involve actual experimentation. It should not be simply a report, a description, a model or a system (however advanced) built from someone else's plans.

BACK GROUND RESEARCH FOR MY SCIENCE PROJECT

STEP #1
Now that you have selected a topic you'll need to find out what's already known about the subject. Not only will you want to know information regarding the specifics of your topic, you will want to know about different things that are related to you project.

For example, let's say that you are interested in how oil spills affect sea creatures such as sea anemones. Not only will you want to research the properties of oil and the lifecycles of sea anemones but you may also need to understand a little more about wave patterns and ocean currents. In addition you may also want to research other substances that could affect sea anemone growth or what can be done to prevent or clean up oil spills.

List five or more research topics related to your question.

1.

2.

3.

4.

5.

STEP #2 Head for the library!
You should look up and consult at least 10 references regarding your project. However, remember that more is better! Be sure to list these references on a bibliography page.

STEP #3
Talk to your teacher and to experts on your subject. Write letters, make phone calls, do whatever it takes to find out more information regarding your project before you begin experimentation.

THE EXPERTS I WILL CONSULT ABOUT MY PROJECT ARE:

1.

2.

3.

STEP #4
Before you consult an expert think about the questions you would like to ask them. Be sure your questions are good ones. Don't say, "I'd like to do a project on holograms. Where should I start?" Instead, ask specific questions that show you have already taken the trouble to learn something about your topic.

FIVE QUESTIONS ABOUT MY PROJECT THAT I WOULD LIKE TO ASK AN EXPERT ARE:

1.

2.

3.

4.

5.

*Be sure to keep track of all of your research and answers you may receive from experts and from your teachers.

BIBLIOGRAPHY

1.

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FORMING A HYPOTHESIS

Based on what you have learned while researching, you're going to have to make an "educated guess" about the probable outcome of your project.

Let's say you've been researching sales psychology and everything you've read indicates that both visibility and eye-catching displays are directly related to the volume of sales a merchant can expect. You have decided to test these theories on the sale of candy bars and a store manager has agreed to help you with this experiment in his store. Your educated guesses or hypotheses could be:

1. Candy bars displayed at eye level will sell better than those at the bottom of the display case or

2. Candy bars displayed against contrasting colors will sell better than those on backings similar in color to their wrappers.

Based on your own research, what do you think the outcome of your project will be? Remember that a hypothesis is a simple, straightforward statement (not a question) as to what you think the results of your experiments will be.

MY HYPOTHESIS IS:

_____

_____

_____

_____

Remember that it is okay if your hypothesis turns out to be wrong when your experiments are complete. Don't alter your experiments or your results to match your hypothesis.

DESIGNING YOUR EXPERIMENT…SOME TIPS

Simplicity

Keep things as simple as possible. Many students think that they need to have many variables in an experiment to make the experiment valid. This is not the case. It's much better to test only one variable thoroughly than to test many at once. For example, if you're investigating the effects of freezing temperatures on tropical plants, don't add different lighting sources and nutrients as well. Only look at the effect of freezing temperatures.

Controls

All experiments need to have an appropriate control. You need to have a standard to test your experimental results against. For example, if you're studying the effect of freezing temperatures on tropical plant growth, you will probably put some of your plants outside for a few cold nights. When you take them back in your house to see how the cold affected their growth, you'll need to have some plants that were not exposed to those cold temperatures to compare them to. The plants that did not see the colder temperatures are called a "control". All experiments must have controls and it's worth taking time to figure out what a good control would be for your experiment.

Sample Size

You will need to have several "subjects" in your experiment. For example, back to the effects of freezing temperatures on tropicals, you'll need to set several plants out in those temperatures, not just one.

Time

Allow enough time for the experiment to be repeated. Also, allow enough time for complications- things don't always (if ever) go right the first time and you might need to start your experiment over again. Begin early! Understand the project before you begin, and allow 6-8 weeks to complete the experiment.

Keep a detailed notebook

- Don't cross anything out, you might need to refer back to it later.
- Entries should be dated with the date and the number of days into the experiment.

Include all observations don't assume you'll remember points and particulars. What might not seem important at the time might be an important result later and might actually support your conclusion, so you'll want an accurate record of it.

Collecting data

Quantify your results by reporting things in numbers, not just observations. For example, say that your plants grew 1 centimeter. Don't say that the plants "look bigger today than they did yesterday". Words like "bigger" mean different things to different people, so reporting your results using words can lead to confusion. You want to tell people exactly how much your plants grew.

Formulating a conclusion

Did your data support your hypothesis? If not, that's a result too. It doesn't mean that the experiment didn't work. Also, consider other possible explanations for your results. Did your treatment kill your plants or was it that you left them outside and some insects ate some of the leaves? You're not out to "prove" your hypothesis. Think more along the lines of "here's what I thought was going to happen and here's what actually happened" and then go on to explain why you think it happened the way it did.

The Final Presentation: Tips For the Science Fair

There are several essential elements to a good presentation:

- Present your data using averages, not individual measurements. Also, don't present the data more than once. Don't make a line graph and pie chart of the same data. Finally, don't include more than one variable on a graph or it gets confusing.
- Report sample size (n=?). Older students should give some statistical analysis of their data, such as standard deviation, anova or t-test.
- Have print large enough to read from a distance.
- Be sure that you understand all the terms and acronyms you present.
- Think about future experiments and how you could expand on a project. Many students do science fair projects in consecutive years. You should think about expanding and significantly changing your project, not just repeating the same project.

MY EXPERIMENT – Research Plan

THE QUESTION I AM TRYING TO SOLVE FOR MY SCIENCE PROJECT IS:

_____

_____

_____

MY HYPOTHESIS IS:

_____

_____

THE CONTROL IN MY PROJECT IS:_____

THE VARIABLES I WILL TEST, COMPARE OR EXAMINE ARE:

1.
2.
3.
4.
5.

IN ORDER TO ACHIEVE VALID RESULTS, I WILL TEST EACH OF THE VARIABLES AT LEAST_____TIMES.

SUPPLIES THAT I WILL NEED:

1. 6.

2. 7.

3. 8.

4. 9.

5. 10.

THIS IS HOW I WILL CONDUCT MY EXPERIMENT (MY PROCEDURE):
(be specific and include all details – use another sheet of paper if necessary)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

MY RESULTS:
(*include graphs, pictures and other figures on additional pages*)

MY CONCLUSION: