

Your Project Question

The question that you select for your science fair project is the cornerstone of your work. The research and experiment you will be conducting all revolve around finding an answer to the question you are posing. It is important to select a question that is going to be interesting to work on for at least a month or two and a question that is specific enough to allow you to find the answer with a simple experiment. A scientific question usually starts with: How, What, When, Who, Which, Why, or Where. Here are some characteristics of a good science fair project question:

- The question should be interesting enough to read about, then work on for the next couple months.
- There should be at least 5 sources of written information on the subject. You want to be able to build on the experience of others!

Now, for something like a scientific project, it is important to think ahead. This will save you lots of unhappiness later. Imagine the experiment you might perform to answer your question. How does that possible experiment stack up against these issues?

- The experiment should measure changes to the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, weight, voltage, velocity, energy, time, etc. Or, just as good might be an experiment that measures a factor (variable) that is simply present or not present. For example, lights ON in one trial, then lights OFF in another trial, or USE fertilizer in one trial, then DON'T USE fertilizer in another trial. If you can't measure the results of your experiment, you're not doing science!
- You must be able to control other factors that might influence your experiment, so that you can do a fair test. A "fair test" occurs when you change only one factor (variable) and keep all other conditions the same.
- Is your experiment safe to perform?
- Do you have all the materials and equipment you need for your science fair project, or will you be able to obtain them quickly and at a very low cost?
- Do you have enough time to do your experiment before the science fair? For example, most plants take weeks to grow. If you want to do a project on plants, you need to start very early! For most experiments you will want to allow enough time to do a practice run in order to work out any problems in your procedures.
- Does your science fair project meet all the rules and requirements for your science fair? Get advice from your mentors to be sure this is the case. You may have to get a formal approval before you begin.
- Have you avoided the bad science fair projects listed in the table below?

If you don't have good answers for the above issues, then you probably should look for a better science fair project question to answer.

Projects that involve human subjects, vertebrate animals (animals with a backbone) or animal tissue, pathogenic agents, DNA, or controlled or hazardous substances, need additional approval from the SRC (Scientific Review Committee) BEFORE you start experimentation. See CREST staff for additional information.

Examples

These are examples of good science fair project questions, because they are testable, measurable, controllable, and based on valid science:

- How does water purity affect surface tension?
- When is the best time to plant soy beans?
- Which material is the best insulator?
- How does arch curvature affect load carrying strength? *(please turn over)*

- How do different foundations stand up to earthquakes?
- What sugars do yeast use?
- How could you get computers to accurately recognize emotion in recorded speech?
- How could you measure pollution in hard-to-reach environments?
- How does interference (distractions) affect whether or not teens make good/bad choices?

These are examples of bad science fair project topics that you should avoid:

Science Project Topics to Avoid	Why
Any topic that boils down to a simple preference or taste comparison. For example, "Which tastes better: Coke or Pepsi?"	Such experiments usually don't meet the "so what" test – or provide new or important information
Most consumer product testing of the "Which is best?" type. This includes comparisons of popcorn, bubblegum, make-up, detergents, cleaning products, and paper towels.	These projects are typically not high-school caliber. Also, they only have scientific validity if the Investigator fully understands the science behind why the product works and applies that understanding to the experiment.
Any topic that requires people to recall things they did in the past.	The data tends to be unreliable.
Effect of colored light on plants	Several people do this project at almost every science fair. You can be more creative!
Effect of music or talking on plants	Difficult to measure.
Effect of running, music, video games, or almost anything on blood pressure	The result is either obvious (the heart beats faster when you run) or difficult to measure with proper controls (the effect of music).
Effect of color on memory, emotion, mood, taste, strength, etc.	Highly subjective and difficult to measure.
Effect of music on grades or class performance.	Highly subjective and difficult to control.
Graphology or handwriting analysis	Questionable scientific validity.
Astrology or ESP	No scientific validity.
Any topic that requires very dangerous or illegal materials.	Violates the rules of virtually any science fair.
Any topic that requires drugging, pain, or injury to a live vertebrate animal.	Violates the rules of virtually any science fair.
Any topic that creates unacceptable risk (physical or psychological) to a human subject.	Violates the rules of virtually any science fair.
Any topic that involves collection of tissue samples from living humans or vertebrate animals.	Violates the rules of virtually any science fair.

Science Fair Project Question Checklist

Here are some things to consider as you finalize your question:

What Makes a Good Science Fair Project Question?	For a Good Science Fair Project Question, You Should Answer "Yes" to Every Question
Is the topic interesting enough to read about, then work on for the next couple months?	Yes / No
Can you find at least 5 sources of written information on the subject?	Yes / No
<p>Can you measure changes to the important factors (variables) using a number that represents a quantity such as a count, percentage, length, width, weight, voltage, velocity, energy, time, etc.?</p> <p>Or, just as good, are you measuring a factor (variable) that is simply present or not present? For example,</p> <ul style="list-style-type: none">• Lights ON in one trial, then lights OFF in another trial,• USE fertilizer in one trial, then DON'T USE fertilizer in another trial.	Yes / No
Can you design a "fair test" to answer your question? In other words, can you change only one factor (variable) at a time, and control other factors that might influence your experiment, so that they do not interfere?	Yes / No
Is your experiment safe to perform?	Yes / No
Do you have enough time to do your experiment more than once before the science fair?	Yes / No
Does your science fair project meet the Symposium's rules (get advice on this one)?	Yes / No
Have you avoided the bad science fair project topic areas listed in the table above?	Yes / No

Thanks to Science Buddies for this information. This was excerpted and adapted from this web page:

http://www.sciencebuddies.com/science-fair-projects/project_question.shtml