

2018 STEM Chemistry Science/Engineering Fair Summer Work

ASSIGNMENT: You have already completed most of the required summer work in the Scientific Research class. However, you should continue to complete your background research, contact mentors/advisors/ edit your Research Design sheet.

You will turn in your updated Research/Engineering Design Form by August 10, 2018.

Useful information can be located at the following sites:

For ISEF official rules, student handbook, forms, and other paperwork go to:

<http://www.societyforscience.org/page.aspx?pid=312>. Here, you can find online forms and information for students and parents. In particular, check under the “Get Started” heading for helpful information.

Check out the Fayette County Science Fair site: <https://sites.google.com/a/mail.fcboe.org/fcboe-student-science/>

Be aware of the following:

1. Experimentation may *not* begin in any form until project approval. If you want to start the experimentation part of your project this summer you can do so after you receive approval for your project. To receive approval, complete the required forms and submit to me at clark.mary@mail.fcboe.org.

2. All “sensitive” projects require a much higher level of documentation and scrutiny including how materials were neutralized and that disposal was safe and proper. Additional forms are required for “sensitive” projects. Sensitive projects include any project involving a level of risk above and beyond that encountered in a student’s everyday life as well as any of the following:

- a) Human or animal subjects
- b) Non-human vertebrate animals
- c) Human and animal tissues
- d) Recombinant DNA
- e) Hazardous substances, devices, or activities that involve a level of risk above and beyond that encountered in the student’s everyday life
- f) Strong acids or bases regardless of the concentration
- g) Production or use of alcohol
- h) Production, cultivation, or use of bacteria, yeast, mold, spores, fungus. Many projects falling in this category have been well documented and lack the detailed science and quantitative analysis to compete in Science Fair.
- i) Use of pathogenic agents or controlled substances

Document everything and keep electronic copies. You may be asked to submit any part of these projects to an electronic platform. **If you have any questions, please email Ms. Clark @ clark.mary@mail.fcboe.org**

Good brainstorming online magazines to read through:

<http://www.scientificamerican.com/> , <http://www.nationalgeographic.com/> , <http://discovermagazine.com/> ,
<http://www.popularmechanics.com/> , <https://www.si.edu/> , <http://www.who.edu/> , space.com , spaceweather.com ,

If you want to change your topic this summer here is some useful information.

HOW TO CHOOSE TOPICS: You do not have to choose a chemistry topic, **this is a SCIENCE RESEARCH/ENGINEERING fair project**. A list of the ISEF Science Fair categories is listed below. Some tips are listed below:

- a. If you have a hobby or interest that can be researched, you will usually do better.
- b. Can you find a way to make some aspect of that hobby easier or better suited for the public?
- c. Is there a scientific phenomenon that you would like to know more about?
- d. In general human surveys/reactions/preferences are NOT APPROVED. Also, any projects using animals are rarely approved.
- e. You can use this wizard as a guide: <https://apps2.societyforscience.org/wizard/index.asp>

There are many sources out there to help you choose a topic. However, don't be tempted to take a procedure from the internet or from a book you find; this is plagiarism. Those sources can be used as a great starting place, but be sure that your topic is original or find a new innovative way to test a topic that may have been tested before. This is why you need to do some background research about your topic: you want to make sure that the question you're trying to answer has not already been answered! How do you find out? It may seem simple, but "Google©" it! Check the internet and see if you find a project matching yours. If it has been done before, or if the answer to your experimental question is already known, you need to formulate a new idea or 'tweak' your current topic so that your experiment approaches that topic in an original way. The more you read and think about your topic the more ideas of how you can test it, change it, etc. will occur to you.

List of ISEF categories: <https://student.societyforscience.org/intel-isef-categories-and-subcategories>

ANIMAL SCIENCES	ENERGY: CHEMICAL
BEHAVIORAL & SOCIAL SCIENCES	ENERGY: PHYSICAL
BIOCHEMISTRY	ENGINEERING MECHANICS
BIOMEDICAL & HEALTH SCIENCES	ENVIRONMENTAL ENGINEERING
BIOMEDICAL ENGINEERING	MATERIALS SCIENCE
CELLULAR & MOLECULAR BIOLOGY	MATHEMATICS
CHEMISTRY	MICROBIOLOGY
COMPUTATIONAL BIOLOGY & BIOINFORMATICS	PHYSICS & ASTRONOMY
EARTH & ENVIRONMENTAL SCIENCES	PLANT SCIENCES
EMBEDDED SYSTEMS	ROBOTICS & INTELLIGENT MACHINES
	SYSTEMS SOFTWARE
	TRANSLATIONAL MEDICAL SCIENCE

Make sure your topic is high school level work. If it is not, it will not be approved. If you "Google©" ideas and it says it is an "easy science fair project" or it is considered Elementary or Middle School Level, then it is WAY TOO EASY AND WILL BE REJECTED!!!

The following table presents some topics to avoid and why. Projects that involve human subjects are not allowed. All projects must include data that can be accurately measured and analyzed using statistical or graphical methods.

Topics To Avoid	Why
A simple preference or taste comparison. For example, "Which tastes better: Coke or Pepsi?"	These types of experiments are more of a survey and don't involve the kinds of numerical measurements and analysis necessary in a science fair project. Not allowed: Human Subject Training Required
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 only have scientific validity if the investigator fully understands the science behind why the product works and applies that understanding to the experiment. While many consumer products are easy to use, the science behind them is often at the level of a graduate student in college. Not allowed.
Topics that require people to recall things they did in the past.	The data tends to be unreliable. Not allowed: Human Subject Training Required
Effect of colored light on plants	Several people do this project at almost every science fair. Difficult to measure quantitatively. You can be more creative! Not allowed.
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). Not allowed: Human Subject Training Required
Effect of music or talking on plants	Difficult to measure quantitatively.
Effect of color on memory, emotion, mood, taste, strength, etc.	Highly subjective and difficult to measure. Not allowed: Human Subject Training Required
Any topic that requires measurements that will be extremely difficult to make or repeat, given your equipment.	Without measurement, you can't do science. True for any topic!
Any topic that requires dangerous, hard to find, expensive, or illegal materials.	We care about your safety and your parents' pocketbook.
Graphology or handwriting analysis	Questionable scientific validity. Not allowed: Human Subject Training Required
Astrology or ESP	No scientific validity. Not allowed.
Any project in violation of state law, federal law, state science fair rules, or International Science and Engineering Fair rules.	In brief, you may not choose a project that involves: unacceptable risk (physical or psychological) to a human subject. Collection of tissue samples from living humans or vertebrate animals, drugging, pain or injury to a live vertebrate animal, or the use of illegal or prohibited materials is also prohibited.