

## 2018 Gifted Chemistry Science/Engineering Fair Summer Work

**ASSIGNMENT:** On the other form, elaborate on **3 ideas** that you would like to consider studying and doing an experiment on for a science fair project. You must research **each idea** and come up with **5 sources** of background information (i.e.: science journal articles, books, internet sites) about EACH idea. Make sure the websites have legitimate scientific information and are not “opinion pieces”. If the website has .org or .edu at the end of it, it is likely to be good information. (Websites such as google.com, sciencebuddies.com, all-science-fair-projects.com, etc. DO NOT COUNT for sources!!!!) Background information is concerned with the science behind a project (scientific theories, experiments that have been done before on the same topic – not the same experiment, scientific concepts or phenomena, etc.).

You will fill out a Research Form for **each** topic idea. **You will turn in all three topic idea Research Forms by August 10, 2018.**

**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:

- If you have a hobby or interest that can be researched, you will usually do better.
- Can you find a way to make some aspect of that hobby easier or better suited for the public?
- Is there a scientific phenomenon that you would like to know more about?
- In general human surveys/reactions/preferences are NOT APPROVED. Also, any projects using animals are rarely approved.
- 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 &<br>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.

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.

| <b>Topics To Avoid</b>   | <b>Why</b>   |
|--|--|
| 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.   |

**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](mailto: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](mailto: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](http://space.com) , [spaceweather.com](http://spaceweather.com) ,  
<http://www.noaa.gov/>

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