Intel International Science and Engineering Fair

The Intel International Science and Engineering Fair (Intel ISEF) is the world's largest pre-college celebration of science. Held annually in May, the Intel ISEF brings together over 1,200 students from 40 nations to compete for scholarships, tuition grants, internships, scientific field trips and the grand prize: a trip to attend the Nobel Prize Ceremonies in Stockholm, Sweden. Science Service founded the ISEF in 1950 and is very proud to have Intel as the title sponsor of this prestigious, international competition.

To qualify for the Intel International Science and Engineering Fair (ISEF), you must compete in a local fair that's affiliated with Intel ISEF and be selected to represent that fair at Intel ISEF. Follow Intel ISEF rules to ensure your project will be eligible for Intel ISEF, should your local fair choose you as a finalist.

Why Complete a Science Fair Project?

The following statement is excerpted, with thanks, from the Greater San Diego Science and Engineering Fair Web site.

A science fair project is the ultimate answer to the often-asked student question: "Why do I need to learn this stuff, anyway?"

It integrates, into one functional activity, virtually all of the skills and arts that are usually taught separately (sometimes not at all or without obvious "purpose") in many schools. When brought to completion, the project is an amalgamation of reading, writing, spelling, grammar, math, statistics, ethics, logic, critical thinking, computer science, graphic arts, scientific methodology, self-learning of one or more technical or specialty fields, and (if the project qualifies for formal competition) public speaking and defense in front of expert judges. It is, perhaps, the only educational activity that allows students to teach themselves, to take from the established information what they need to discover something exciting and new, and to identify and choose the tools that they need to conduct and conclude their project. When a student completes a science fair project, year after year, through junior and senior high school, the science fair process yields mature, self-confident, skilled, and competitive young leaders who have career goals and the preparation, discipline, and drive to attain them.

A science fair project can be self-validating and exciting because it is not just practice. It involves real discovery of little known or even unknown information.

It develops personal power of importance in students, where perhaps none or little existed before. The project usually is based on scientific questions or interests that the students already have, and allows them to develop the questions independently into formal, testable, solvable problems. When such studies are undertaken in earnest, the students often become driven by their projects. Learning the outcome and finding the answer can be an electrifyingly powerful moment of discovery. It proves to students, and to others, that they were successful and that they did it on their own! The result? An ordinary student is motivated to become an excellent student, and an excellent student to become a scholar. Of all the programs that a school might offer a student to improve self esteem, it seems that participation in a science fair is one sure-fire way to build student confidence, challenge potential, and instill the incredible feeling of independent achievement that the successful science fair project provides.

Science fair projects can pay off in cash and open the doors of academic opportunity.

Well-done projects generally lead to competition and awards at Intel ® ISEF-affiliated regional fairs. First-place winners at regional fairs usually have the opportunity to compete for additional awards in the California State Science Fair. Top first-place winners from junior and senior divisions in many fairs are selected as sweepstakes winners and receive cash awards. Additionally, selected senior sweepstakes winners (the best of the best) go on to compete with other grand prize winners from throughout the world for substantial cash and scholarship prizes at the annual Intel International Science and Engineering Fair.

Perhaps most importantly, however, graduating high school students with records of awards for original research or engineering at the regional fair and beyond, have a distinct advantage over other college applicants in being considered and accepted by the schools of their choice. This is because science fair honors rank high among the screening factors used by admissions officers at most top universities.

Lastly, students who participate in regional fairs have their projects evaluated by top local scientists from research and industry. Participants whose projects are judged to be worthy of international competition will be judged by the top scientists of the world. Imagine your student discussing a project with a Nobel Prize winner. The exposure and self confidence such an opportunity generates cannot be quantified.

Tips to Encourage Participation

If you have talented students who are interested in science, here are some ways to encourage them to participate in a science fair.

In the Classroom:

Introduce science fair at the beginning of each semester and even at the end of the school year to get students interested in working on projects over the summer.

Determine a plan for working within a school's semester or block scheduling of science classes so that everyone can be encouraged to participate.

Stress hands-on labs with data collection in your science classes. This reinforces concepts and helps students learn the scientific method in a concrete fashion.

Urge research experiments, rather than models or collections. To continue on to an Intel ® ISEF affiliated fair, only research experiments are allowed.

Require students to write up their lab experiments using the scientific method. Make sure they have all the parts of an experimental summary: question, hypothesis, materials, procedures, results in chart or graph form, analysis, and conclusion.

Outside of the Classroom:

Encourage students to pursue their individual interests within the scientific topic being learned and to go beyond their classroom learning.

Start a science club to help students that are not currently enrolled in a science class and to provide extra-curricular opportunities in science exploration and discovery.

Be familiar with the Intel ISEF Rules and Regulations so that you may advise your students. Hold a seminar to explain them, or if appropriate, draft a science fair handbook with reference to these rules for your students. (Many districts have a science fair handbook; check this out before you start writing your own.) Include:

- Deadlines for entry.
- Individual or team entries allowed.
- Method for reviewing rules and getting appropriate approvals.
- Display & Safety Guidelines: Size of board and what can and cannot be on the board.

Work with the community to connect students to mentors - at the local university, hospital, or veterinary practice.

Teachers Checklist

If you are advising a student who is participating in an Intel ISEF-affiliated science fair, you can use this checklist as a guideline.

START EARLY!

Students should begin planning their science fair projects at the beginning of the school year or even at the end of a school year so that they can work over the summer.

Participate in a school science fair.

- Follow guidelines for your school, but if your students are considering entry into a local Intel ISEF-affiliated fair, you must comply with International Rules as well.
- Work with your school science fair coordinator to avoid conflicts between dates for your school fair and the local affiliated Intel ISEF fair.

Participate in a local Intel ISEF-affiliated fair

- Contact the fair to learn about possible workshops or clinics and encourage students and parents to attend.
- Prepare a student timeline with key dates.
- Encourage students to select a topic for their research project and direct them to research sources.
- Approve projects and direct students to fill out a research plan. Research plans must be submitted and approved prior to the start of the project. Refer to the Intel ISEF student handbook for forms and guidelines.
- Review judging expectations with your students. Let them know how their projects will be evaluated.
- If possible, schedule time with your science fair coordinator for students to work on their project boards after school. Recruit parent volunteers to help with project completion at after school sessions.
- Hold a classroom science fair to help students practice their project presentations and to polish and edit their project.
- Compete at your local Intel ISEF-affiliated fair. Celebrate your student's accomplishments.
- If a project is selected for the Intel ISEF, help your student(s) polish their presentations before heading to the Intel ISEF.

Student Science Fair Checklist

START EARLY!

Many students begin planning their research at the end of the school year so that they can conduct research during the summer and fall.

- Decide what science fairs you are going to enter: School fair or Intel ISEF-affiliated fair
- Attend a science fair clinic (many regional fairs offer clinics in the fall, ask your teacher)
- Find a topic that interests you and research what is already known about the topic.
- Narrow the topic to a specific scientific problem and develop an experiment to solve that problem. (See the Scientific Method to help plan your experiment.
- Discuss the project with your parents and teacher and review with them the ISEF Rules and Regulations, noting the specific rules that might apply to your type of research (i.e. are you working with human subjects or animals or working with hazardous substances?).
- Write a detailed research plan about how you will conduct the research and obtain the appropriate approvals as needed before beginning research.
    - Develop a hypothesis (Scientific Method)
    - Develop a procedure; investigate to test the hypothesis
    - Make observations and collect data in a project journal (all participants must keep a journal)
    - Interpret the data and observations
    - Draw conclusions
- Complete the required Intel ISEF forms and any additional local science fair forms required.
- Begin your experimentation following your research plan and any revisions that those supervising or approving your research have recommended.
- Finalize your project for presentation.
- Write the research paper and abstract (Intel ISEF does not require a research paper, some regional fairs do require it; check with your teacher or with your regional fair rules and handbook.)
- Create the project exhibit board being sure to follow the Display and Safety Rules.
- Practice your presentation and prepare to answer judges' questions.
- Present the project at your school Science Fair, and/or your regional Intel ISEF-affiliated fair.

The Scientific Method

The following is a review of the Scientific Method with some key questions and directions on how to design and conduct an experiment.

PROBLEM/PURPOSE

- What is your goal?
- What idea are you trying to test?
- What is the scientific question you are trying to answer?

HYPOTHESIS

- Explain how you think your project can demonstrate your purpose.
- Make a prediction regarding the outcome of your experiment.
- State the results you are predicting in measurable terms.

PROCEDURE

- Give a detailed explanation of how you will conduct the experiment to test your hypothesis.
- Be clear about the variables (elements of the experiment that change to test your hypothesis) versus your controls (elements of the experiment that do not change).
- Be very specific about how you will measure results to prove or disprove your hypothesis. You should include a regular timetable for measuring results or observing the projects (for example, every hour, every day, every week).
- Your procedure should be like a recipe - Another person should be able to perform your experiment following your procedure. Test this with a friend or parent to be sure you have not forgotten anything.

MATERIALS

- List all materials and equipment that were used.
- Your list of materials should include all of the ingredients of the procedure recipe.

OBSERVATIONS/DATA/RESULTS

- Keep a detailed journal of observations, data, and results. Your journal should contain data measurements and written notes about what you are sensing (hearing, seeing, or touching) about your experiment.
- If appropriate, photograph your project results or phases of the project to help your analysis and possibly to demonstrate your experiment on your exhibit board.

ANALYSIS

- Explain your observations, data, and results. This is a summary of what your data has shown you.
- List the main points that you have learned.
- Why did the results occur? What did your experiment prove?
- Was your hypothesis correct? Did your experiment prove or disprove your hypothesis? This should be explained thoroughly.

CONCLUSION

- Answer your problem/purpose statement.
- What does it all add up to? What is the value of your project?
- What further study do you recommend given the results of your experiment? What would be the next question to ask?
- If you repeated this project, what would you change?

Tips and Advice for Students

RESEARCH SCIENCE FAIRS

Decide which science fairs you're going to enter. You can enter a school science fair or any of the Intel ISEF-affiliated fairs. You should also attend a science fair clinic. Many regional science fairs offer clinics in the fall; ask your teacher for information.

PICK YOUR TOPIC

Find a topic that interests you.

ADVICE FROM ALUMNI

Explore the areas of your interest. Look for questions within that area that might be worth exploring.

Along with interest, you should also choose a topic that can benefit your community or society in general. Look around your community and try to find something that you can discover, study, design, create or improve that will solve a troublesome problem. Why not choose a topic that will allow you to contribute to society and to make a difference?

Don't be afraid to try something even though it might not work. Let your imagination run wild and be creative. Sometimes the simplest solutions and the smallest contributions are the most important.

Read science magazines like *Science News* and *Scientific American* and research on the Internet to see what is currently being done in science. Always choose a topic that interests you and make sure whatever you choose is possible to do in time and with the equipment available.

Read. Talk to people. You'll find out there's a lot of stuff out there you don't know that you would like to know by doing these things.

RESEARCH YOUR TOPIC

Research what is already known about the topic. Narrow the topic to a specific scientific problem.

PLAN YOUR EXPERIMENTS

Develop an experiment to solve the specific scientific problem you've chosen. See the Scientific Method to help plan your experiment.

Consult Your Adult Sponsor

Discuss the project with your parents and teacher. Review with them the International Rules as well as the specific rules that might apply to your type of research. For example, if you are working with human subjects or animals or hazardous substances, specific rules apply.

ADVICE FROM ALUMNI

My experience with mentors has been fantastic. In addition to wonderful mentors who I found at my high school, I have been fortunate to work with researchers at several major scientific institutions. Finding these people was by no means easy, and I think that my success was probably due to persistence more than anything else. Even after I was rejected by administrators (who may view you as being too young), I continued to press my case until I was granted interviews with a few prospective mentors. Getting an interview is essential. The interview is when you and the mentor see if you are personally compatible.

Ask your science teacher for help. Don't be shy--call professors at local universities or even E-mail them.

You should try to find someone to act as your mentor for support and suggestions. Nevertheless, it is not always required to work in a large institution with a specialist in your area of interest. I spent my time working at home in my father's workshop, using parts I found around the house to build my inventions and to solve a few problems. I also spent time working at school in the workshops and labs or out on the lake. A mentor is a guide, not a solution. Don't be afraid to seek help from several sources and to use the resources that are at your disposal.

WRITE A RESEARCH PLAN

- Write a detailed research plan describing how you plan to conduct your research:
- Develop a hypothesis using the Scientific Method.
- Develop a procedure.
- Obtain the appropriate approvals before starting your research.

COMPLETE THE REQUIRED FORMS

Complete the required forms for Intel ISEF and any additional local science fairs.

CONDUCT YOUR EXPERIMENTS

Begin your experimentation following your research plan and any revisions recommended by the people supervising or approving your research. Investigate to test the hypothesis. Make observations and collect data in a project journal (a project journal is required). Interpret the data and observations.

WRITE THE ABSTRACT

Finalize your project for presentation. Write the abstract (required by Intel ISEF). If required for a local science fair, write a research paper.

PREPARE YOUR PRESENTATION

Create the project exhibit board, being sure to follow the display and safety rules. Practice the presentation and prepare to answer the judge's questions. Present the project at your school science fair and/or at an Intel ISEF-affiliated fair.

ADVICE FROM ALUMNI

Your presentation board should be appealing to the eye and should explain both what you did and what you found. Pictures are very helpful and often say more than words. Diagrams are also very useful as they allow the public to follow your train of thought easily and without confusion. Avoid putting up your entire written report; try explaining your project visually with graphs, diagrams, pictures and subtitles. Use color to separate ideas and arrows to direct your audience. Avoid buying expensive presentation tools. Your artistic touch is much more appreciated and shows your involvement in the project. Make sure your posters clearly outline what your project is about. You should be able to get what the project is, how it works, and how it was created from the posters.

Have you display board look professional and not too crowded. Remember that large boards do not always indicate good projects.

You will see a tremendous range of backboards at the Intel ISEF. Some will be equipped with remote controls, projection screens, fancy lights, or even personal power supplies. Some will look like they were assembled in an hour, because in many cases they were. Remember, people come to the Intel ISEF from all around the world, and sometimes they can't ship their completed backboards, and have to build them on-site. While it may seem that being in this position puts you at a serious disadvantage, don't worry. The reality is that the judges are keen enough to recognize good science, as long as it is presented reasonably well. The most important part of your presentation is verbal, and few judges will actually read most of your backboard. My advice is to not devote too much time to making your backboard look good, and to spend that time on your research.

REHEASE YOUR PRESENTATION

Do not memorize your presentation. I repeat, do not memorize your presentation. You should target your presentation to your audience every time, and this means changing it. To do this, of course, you have to know something about your audience. I suggest you use the first minute or two of your time to ask your judge about his background. You may learn, for example, that the last time your physics judge saw anything related to your project was in college, and that he's spent the last 30 years doing an entirely different kind of research. Or, you could find out that your military judge really wants to know if your project can help build a better computer (perhaps for nuclear weapons simulations, but not necessarily so).

Relax. The judges are usually are friendly, and they aren't out to make mince meat of your project. Just tell them what it's about naturally, and answer their questions.

Practice in front of a mirror and try to eliminate "ummm" from your speech. Don't spend too much time explaining your project so that the judge will have plenty of time to ask questions. Be confident in yourself. Look professional, smile, and relax.

I've learned through experience and friends that the more enthusiastic you are about your project, the more excited the judges will be about it. Also, make your project appear wonderful, because in a lot of ways it probably is, but also remember the limitations of your project. Recognizing the limitations of data is a key to almost any scientific pursuit.

Rehearse, rehearse, rehearse. The best presentations are made by the groups most comfortable doing them. Anticipate questions that might be asked. Be prepared.

The oral presentation is also very important. Make sure you speak clearly and that you take the time to ask your audience if they have any questions. It is important to cover everything briefly, even your failed attempts, and to do so in a logical pattern. Don't spend too much time on one thing. If you are working with a partner, take your turn explaining the project and switch every five minutes or so. This way, it allows your audience to differentiate between sections and will add energy to your presentation. Teamwork is essential. Work together and help each other out.

ENJOY THE EXPERIENCE

Don't participate in science fairs for the awards. Don't do science for the recognition. Don't compare yourself to anyone else and don't force yourself to do it. Do it because you love it and because you can make a difference. Help your community and contribute to society. Learn through your experiences and discover the world around you. Such is the true reward of science.

Don't be afraid to try something even though it might not work. Things rarely work the first time. Learn from your mistakes, discover as you try different things, and never give up.

Remember that science fair is supposed to be fun and don't let it stress you out too much and good luck to everyone!

Tips and Advice for Parents

- Give encouragement, support, and guidance.
- Make sure your child feels it is his or her project. Make sure the work is primarily the work of the child.
- Realize the main goal of a science fair project is to help your child use and strengthen the skills he or she has learned and develop higher-level skills. The main goal should not be the ribbon or prize.
- Provide transportation to libraries, nature centers, or universities that can help your child find project information.
- Locate Internet access, either at home or at a school or library.
- Help your child design a project that is safe and properly supervised.
- Help at your local school Science Fair. Contact your child's teacher to volunteer.
- Help your child plan a mutually agreed upon timeline to prevent a last minute project. Some projects may take 6 to 10 months. It is suggested to allow at least 12 weeks to conduct an experiment and prepare the presentation.
- Do not worry or get upset if your child doesn't win a prize at the science fair. The skills the child has gained are worth all of the effort.
- Help your child begin to plan for next year.
- Feel a sense of pride and accomplishment when the science fair is over. You and your child have earned it!

Reading the International Rules and Guidelines

All students should begin their science fair project by reviewing the International Rules for Pre-college Science Research and Guidelines for Science and Engineering Fairs. Many projects require adult supervision and approval by a Scientific Review Committee (SRC) or an Institutional Review Board (IRB) before experimentation begins.

Intel ISEF Display and Safety Regulations

General Requirements

The Intel ISEF Display and Safety Committee is the final authority on display and safety issues for projects approved by the SRC to compete in the Intel ISEF. Occasionally, the Intel ISEF Display and Safety Committee may require students to make revisions in their display to conform to display and safety regulations.

Maximum Size of Project at the Intel ISEF

30 inches (76 centimeters) deep

48 inches (122 centimeters) wide

108 inches (274 centimeters) high from floor to top of project

At the Intel ISEF, fair-provided tables will not exceed a height of 36 inches (91 centimeters).

Project must be positioned at the back of the booth and parallel to the rear of the booth.

Maximum project sizes include all project materials and supports. If a table is used, it becomes part of the project and may not itself exceed the allowed dimensions nor may the table plus any part of the project exceed the allowed dimensions.

At the Intel ISEF, any project with a component that will be demonstrated by the Finalist may be demonstrated only within the confines of the Finalist's booth. When not being demonstrated, the component plus the project may not exceed allowed dimensions.

Items Required to be Visible and Vertically Displayed at the Intel ISEF

- Original Official Abstract and Certification as approved and stamped/embossed by the Intel ISEF Scientific Review Committee
- Completed Intel ISEF Project Set-up Approval Form SRC/DS2 (Received on-site at the Fair)
- Registered Research Institutional/Industrial Setting Form (1C) - if applicable
- Continuation Projects Form (7) - if applicable

Items Required to be at the Project But Not Displayed at the Intel ISEF

Forms including, but not limited to, **Checklist for Adult Sponsor (1), Student Checklist (1A), Research Plan** and **Approval Form (1B)** which are required for the project or for Scientific Review Committee approval do not have to be displayed as part of the project but must be available in the booth in case asked for by a judge or other Intel ISEF official.

Human Subject Forms (4) (or equivalent form provided by a registered research institution) for human subjects of the research, surveys, photographs, etc. (if applicable) are confidential information, must **not** be displayed, but **must be available in the booth** in case asked for by a judge or other Intel ISEF official. Human Subjects Form (4) or an equivalent photograph release signed by the human subject is required for visual images of humans (other than the finalist) displayed as part of the project.

Handouts/Official Abstract and Certification at the Intel ISEF

The Intel ISEF Scientific Review Committee defines the "official abstract and certification" as an UNALTERED original abstract and certification as stamped/embossed by the Intel ISEF Scientific Review Committee. If the Scientific Review Committee requires a Finalist to make changes to the abstract and certification submitted with registration papers, the revised version will be stamped/embossed, will replace the earlier version, and will become the Finalist's official abstract and certification.

The only abstract allowed anywhere at a project is the official abstract. The term "abstract" may not be used as a title or reference for any information on a Finalist's display or in a Finalist's materials at the project except as part of displaying the official abstract.

An original stamped/embossed official abstract and certification must appear on the display board or in a vertical position at the project.

Handouts to judges and to the public must be limited to **UNALTERED photocopies** of the official abstract and certification.

Items Not Allowed at Project or in Booth

- Living organisms, including plants
- Taxidermy specimens or parts
- Preserved vertebrate or invertebrate animals
- Human or animal food
- Human/animal parts or body fluids (for example, blood, urine)
- Plant materials (living, dead, or preserved) which are in their raw, unprocessed, or non-manfactured state (Exception: manufactured construction materials used in building the project or display)
- Laboratory/household chemicals including water (Exceptions: water integral to an enclosed apparatus or water supplied by the Display and Safety Committee)
- All hazardous substances or devices (for example, poisons, drugs, firearms, weapons, ammunition, reloading devices, and lasers (as indicated in item 5 in the

section of these rules entitled "Items Allowed at Project or in Booth BUT with the Restrictions Indicated."))

- Dry ice or other sublimating solids
- Sharp items (for example, syringes, needles, pipettes, knives)
- Flames or highly flammable materials
- Batteries with open-top cells
- Awards, medals, business cards, flags, endorsements and/or acknowledgements (graphic or written) unless the item(s) are an integral part of the project (Exception: Intel ISEF medal(s) may be worn at all times.)
- Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures
- Active Internet or e-mail connections as part of displaying or operating the project at the Intel ISEF
- Prior year's written material or visual depictions on the vertical display board. Exception: the project title displayed in the Finalist's booth may mention years or which year the project is (for example, "Year Two of an Ongoing Study"). Continuation projects must have the Continuation Form (7) vertically displayed.
- Glass or glass objects unless deemed by the Display and Safety Committee to be an integral and necessary part of the project (Exception: glass that is an integral part of a commercial product such as a computer screen)
- Any apparatus deemed unsafe by the Scientific Review Committee, the Display and Safety Committee, or Science Service (for example, large vacuum tubes or dangerous ray-generating devices, empty tanks that previously contained combustible liquids or gases, pressurized tanks, etc.)

Items Allowed at Project or in Booth, BUT with the Restrictions Indicated

- Soil or waste samples **if permanently encased in a slab of acrylic**
- Postal, Web and e-mail addresses, telephone and fax numbers **of finalist only**
- Photographs and/or visual depictions **if**:
    - They are not deemed offensive or inappropriate by the Scientific Review Committee, the Display and Safety Committee, or Science Service.
    - Credit lines of their origins: "Photograph taken by." or "Image taken from." are attached. (If all photographs being displayed were taken by the Finalist or are from the same source, one credit line prominently displayed is sufficient.)
    - They are from the Internet, magazines, newspapers, journals, etc., and credit lines are attached (If all photographs/images are from the same source, one credit line prominently displayed is sufficient.)
    - They are photographs or visual depictions of the Finalist.
    - They are photographs of human subjects for which signed consent forms are at the project or in the booth. (Human Subjects Form 4 or equivalent photo release signed by the human subject must be included in the paperwork and properly checked on the Official Abstract and Certification.)

- Any apparatus with unshielded belts, pulleys, chains, or moving parts with tension or pinch points **if for display only and not operated**
- Class II lasers **if**:
  - The output energy is <1mW and is operated only by the Finalist.
  - Operated only during Display and Safety inspection and during judging
  - abeled with a sign reading "Laser Radiation: Do Not Look Into Beam."
  - Enclosed in protective housing that prevents physical and visual access to beam.
  - Disconnected when not operating.
- Class III and IV lasers **if for display and not operated**
- Any apparatus producing temperatures that will cause physical burns **if adequately insulated**.

Electrical Regulations at the Intel ISEF

- Finalists requiring 120 or 220 Volt A.C. electrical circuits must provide a UL-listed 3-wire extension cord which is appropriate for the load and equipment.
- Electrical power supplied to projects and, therefore, the maximums allowed for projects is 120 or 220 Volt, A.C., single phase, 60 cycle. Maximum circuit amperage/wattage available is determined by the electrical circuit capacities of the exhibit hall and may be adjusted on-site by the Display and Safety Committee. For all electrical regulations, "120 Volt A.C." or "220 Volt A.C." is intended to encompass the corresponding range of voltage as supplied by the facility in which the Intel ISEF is being held.
- All electrical work must conform to the *National Electrical Code* or exhibit hall regulations. The guidelines presented here are general ones, and other rules may apply to specific configurations. The on-site electrician may be requested to review electrical work on any project.
- All electrical connectors, wiring, switches, extension cords, fuses, etc. must be UL-listed and must be appropriate for the load and equipment. Connections must be soldered or made with UL-listed connectors. Wiring, switches, and metal parts must have adequate insulation and over-current safety devices (such as fuses), and must be inaccessible to anyone but the Finalist. Exposed electrical equipment or metal that is liable to be energized must be grounded or shielded with a non-conducting material or with a grounded metal box or cage to prevent accidental contact.
- Wiring which is not part of a commercially available UL-listed appliance or piece of equipment must have a fuse or circuit breaker on the supply side of the power source and prior to any project equipment.
- There must be an accessible, clearly visible on/off switch or other means of disconnect from the 120 or 220 volt power source.
- Any lighting that generates considerable and excessive amounts of heat (high-intensity lamps, certain halogen lights, etc.) must be turned off when the Finalist is not present.

Other Intel ISEF Information and Requirements

- Finalists must be present at their projects for the Display and Safety inspection. The inspection is a process that takes place between the Finalist and inspector; therefore, no other persons should be present representing the Finalist except for an interpreter if necessary.
- No changes, modifications, or additions to projects may be made after approval by the Display and Safety Committee and the Scientific Review Committee.
- A project data book and research paper are not required but are recommended.
- The only acceptable informed consent form for use at the Intel ISEF is the official Human Subjects Form (4) in the International Rules for Precollege Science Research or an equivalent form provided by a registered research institution (see Form 1C) or, in the case of display of photographs only, an equivalent photograph release signed by the human subject.
- Finalists using audio-visual or multi-media presentations (for example, 35mm slides; videotapes; images, graphics, animations, etc., displayed on computer monitors; or other non-print presentation methods) must be prepared to show the entire presentation to the Display and Safety inspectors before the project is approved.
- If a project fails to qualify and is not removed by the Finalist, Science Service will remove the project in the safest manner possible, but is not responsible for damage to the project.
- Any disks, CD's, printed materials, etc. (including unofficial abstracts) designed to be distributed to judges or members of the public which are confiscated by the Display and Safety Committee will be discarded immediately.
- Project sounds, lights, odors or any other display items must not be distracting.
- No food or drinks, except small containers of bottled water for personal consumption, are allowed in the exhibit hall.

e-Mentor Resource Page for Teachers & Students

e-Mentoring is an opportunity to work directly with Professionals and bridges the geographic isolation by increasing resources available to teachers for instruction and students in developing research projects.

- Teachers can contact **e**-mentors in regards to clarifying a concept about a particular lesson for the classroom, help in designing an activity that demonstrates a particular principal or event, or just answer a question.
- Students designing a research project for the AISEF may approach **e**-mentors regarding ideas and guidance in the development of their projects.

How to use this resource?

- Select and click on a category from the list below – you will be taken to a list of **e-**mentors willing to help you.
- Click on the email address and write an email requesting help.
- Send your email!

Hints and suggestions before getting started:

In the email, introduce yourself and tell the mentor a little bit about yourself (i.e. grade, school, subject you teach or are taking)

Choose someone with a knowledge or experience in the field that you will need assistance with.

e -mentors are anxiously awaiting to help from you! So get started below…

Behavioral/Social Sciences

Dr. Rachel Gross Rachel.Gross@apg.amedd.army.mil

Ph.D in Social & Behavioral Sciences within the prevue of Public Health from John Hopkins.

Medicine/Health

N. Page ninapage@us.army.mil

Expertise in nursing management, research and intensive care.

Biochemistry

Dr. Vipin Rastogi vkrastog@hotmail.com

Knowledge of biology & microbiology.

Botany

Dr. Vipin Rastogi vkrastog@hotmail.com

Knowledge of biology & microbiology.

ENGINEERING

Dr. Richard Boyle rboyle@mail.arc.nasa.gov

Knowledge of computer sciences, electrical and mechanical engineering, microscopy of biological samples and physiology.

Wayne Johnson Wayne.r.Johnson@nasa.gov

Knowledge of research and development related to aeromechanics of helicopters, rotorcraft, and wind turbines; development of computer programs to calculate rotorcraft performance, loads, stability; wind tunnel and flight-testing.

Dr. Preston B. Martin pbmartin@mail.arc.nasa.gov

Knowledge of aerodynamics involving flight of types of aircraft. Also wiling to assist in problems related to Math, Physics, Aeronautics, or Space Flight.

Nans Kunz Nkunz@mail.arc.nasa.gov

Knowledge of mechanical engineering in subjects as diverse as wind tunnels, space shuttle, space lab racks, wind tunnel models, biological satellites, laser and optical hardware, aircraft, rotor blades, instrumentation, etc. >

Duane Armstrong c.d.armstrong@larc.nasa.gov

Knowledge in electronic engineering.

EARTH/SPACE SCIENCES

Dr. Preston B. Marti pbmartin@mail.arc.nasa.gov

Knowledge of aerodynamics involving flight of types of aircraft. Also wiling to assist in problems related to Math, Physics, Aeronautics, or Space Flight.

Paul Soderman Paul.T.Soderman@nasa.gov

Knowledge of aeronautical engineering but can answer questions regarding engineering, science, math, career choices, university programs, aeronautics, atmospheric effects, flight, etc.

Mike Matessa Michael.P.Matessa@nasa.gov

Knowledge of improvements for computer displays (such as space shuttle instrument displays) by creating computer simulations of how people interact with those displays.

Mark Mallinson Mark.V.Mallinson@nasa.gov

Knowledge of mechanical engineering and is willing to answer questions on math, physics, and basic chemistry.

Lisa Chu Thielbar lchu-thielbar@mail.arc.nasa.gov

Knowledge of space and earth sciences. Formal training is in science writing and journalism.

Diane H. Woode wooden@delphinus.arc.nasa.gov

Knowledge in astrophysics.

PHYSICS

Dr. Preston B. Marti pbmartin@mail.arc.nasa.gov

Knowledge of aerodynamics involving flight of types of aircraft. Also wiling to assist in problems related to Math, Physics, Aeronautics, or Space Flight.

CHEMISTRY

Mark Mallinson Mark.V.Mallinson@nasa.gov

Knowledge of mechanical engineering and is willing to answer questions on math, physics, and basic chemistry.

ECOLOGY & ENVIROMENT

Chris Hansen chris.hansen@phoenix.gov

Knowledgeable in emergency response procedures for hazardous materials and environmental regulations for hazardous waste disposal.

Microbiology

Dr. Vipin Rastogi vkrastog@hotmail.com

Knowledge of biology & microbiology.

MISC.

Jason Samson jsamson@mail.arc.nasa.gov

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