Hawai‘i State Science & Engineering Fair

Handbook

Hawai‘i Academy of Science

A Program of the Hawai‘i Academy of Science
in cooperation with the
Hawai‘i State Department of Education and the College of Education at the University of Hawai‘i

Please keep this Handbook for future reference.

»»» IMPORTANT RULE CHANGES «««

1. Junior Display Projects (JD)

JD category awards will be awarded at the DISTRICT level only. Top JD winners from the district fairs will be invited to participate at the state fair where projects will be eligible for Agency awards.

2. Team Projects

ISEF no longer recognizes team projects as a separate category and there is no separate "point system" for judging team vs. individual projects. As a result, HSSEF will also eliminate the Team Award, and the separate judging criteria. Other rules regarding team projects remain the same.

3. Forms

ALL forms, complete with signatures, are now being required at the HAS Office to be eligible for entry. Scientific Review will now be conducted electronically prior to the fair in order to facilitate check-in at the site.

For more information please contact our office:

Email: acadsci@hawaii.edu
Phone (808) 956-7930
Fax (808) 956-5183

Attention Teachers and Students:

Having a copy of the ISEF Rules Book is ***strongly recommended!***

The ISEF website contains more detailed information that we are not able to include in this handbook (see websites on back inside cover). This booklet is an overview of the process to attend the Hawai'i State Science and Engineering Fair only; and not intended to be the official International Science Fair rulebook.

About the Cover

Logo designs used on pins and t-shirts from the last five Hawai'i State Science & Engineering Fairs are featured.

Table of Contents

Hawai'i State Science & Engineering Fair Handbook
Published by the Hawai'i Academy of Science 2011.

Benefits of a Science Fair Project

- You will experience the power and depth of science
- You will learn important skills including how to:
    - —Review published research and literature
    - —Design an experiment
    - —Conduct and understand statistical analysis
    - —Write an organized, well thought-out scientific paper
    - —Summarize and display research on a display board
    - —Communicate findings to the judges and peers
- You may include science fair participation on college applications and job resumes
- You may have the opportunity to continue and expand your project work and possibly get your research published
- You may win awards and scholarships

Levels of Competition Among Science Fairs

Any student in grades 6–12 in Hawai'i is eligible to participate in the science fair program. Since science fair projects begin at the school level and advance to the district, state or international levels, rules and procedures for the international fair need to be followed by all the fairs. This avoids disqualifications at the higher levels.

School Science Fairs—if there is no district fair, then projects may advance from their school fair directly to the state fair, upon review and recommendation from teachers and HAS officials.

District Science Fairs—students from the district fair are recommended or provisionally recommended to the state fair. District fairs *that are affiliated* with the International Science and Engineering Fair (ISEF), may advance their top senior research project(s) to the international fair at the district level.

Hawai'i State Science & Engineering Fair (HSSEF)—top senior research projects at the state fair advance to the international fair. ISEF allocates the number of projects a region is allowed to advance.

International Science & Engineering Fair (ISEF)—the top senior research projects from ISEF-affiliated fairs compete at the international fair.

Research & Display Projects

A research project is an investigation; where you form a hypothesis (inquiry), design and conduct experiments, record data, and draw a conclusion from your data to answer your question. A research project can also be an engineering project involving the design, building and testing of something; or it can be a field study where data is gathered through observation.

A display project explains or demonstrates a scientific principle, apparatus, technique, design, or application. It usually does not pose a hypothesis or include experiments but is based on fact-finding through extensive library research and other sources.

Project Divisions at the State Science Fair

Senior Research, Junior Research, and Junior Display are the divisions at the science fair. Senior Research is for grades 9–12, Junior Research and Junior Display are for grades 6–8. Display projects from grades 9–12 are not accepted at the state science fair.

Path to successful science fair projects: Scientific Inquiry!

The steps of the scientific method are:

(1) making observations

(2) developing a hypothesis

(3) predicting the outcome of your research

(4) designing and executing your experiment

(5) collecting and analyzing your data

(6) drawing your conclusions

Steps for a Successful Science Fair Project

For more information see the ISEF website: **http://www.societyforscience.org/document.doc?id=12**

Select a topic:

- Pick a topic that you are actually interested in. Ask the question: What do I want to find out?
- Limit the scope and develop a question that is testable
- Ensure that the project will answer the question and not just display your work.

  Good question: What causes a plant to grow?

  Bad question: Will a hurricane hit the coast of Florida in 2025?

Gather background information & research:

- List knowledge you already have about the topic to include why you choose it
- Use a variety of sources and gather more information: Check with experts in the field of study, library, Internet
- ***Ask the question:*** What have I learned about my topic?

Determine a hypothesis:

- Decide what you want to learn or test.
- Construct a sentence that states: "This is what I think will happen"
- Hypothesis include purpose of experiment, what is measured, conditions, expected results

  Examples:

  Water will evaporate sooner in the sun than in a shady location.

  Short-term memory varies based upon gender.

Consult with Teacher or Adult Supervisor:

- Discuss plans and share what you have learned
- Get a signature of approval
- Determine and complete additional forms and prior approval, if needed
- Continue communicating with your teacher or adult mentor/supervisor throughout the project

Conduct the experiment:

- Use instruments - tape measures, scales, thermometers, or any instrument appropriate for the experiment.
- Decide on controls and variables. A control is a standard that applies to all parts while a variable is the part of the experiment that you change. In a study of shadows, the control is the location that you test and the variable is the time of day.
- Determine length of experiment
- Use trial and error, true scientists believe that errors are important
- Incorporate replication, the results must be repeatable if the are to be trusted.
- Observe carefully, pay attention to the entire experiment, you may miss something important with just glances.
- Measure and record data accurately in a log, too much or too little will change results and make them inaccurate.

(continued)

Analyze the collected data:

- Answer the question, "What happened?"
- Include observations, graphs, and charts that help answer: "What steps were important in the experiment? What did I do that had the greatest effect on the experiment? Least effect? No effect? What facts, numbers, or information developed from the experiment?"
- Review events or changes that happen when conducting the experiment, including the errors.
- Draw tentative conclusions

Draw Conclusion:

- Ask "What did I find out? Did the variable(s) tested cause a change when compared to the standards you used? Did you collect enough data? Do you need to conduct more experiments?"
- Realize that results collected may not support the hypothesis, that's okay. Explain why the results do not match what readings predicted, identify sources of error that may have caused differing results – you have successfully conducted scientific research because you have taken a question and worked to discover the answer through quantitative testing.
- Review all your material and write your research paper. Include a title page, table of contents, introduction, materials and methods for experiment, results, discussion, conclusion, references / bibliography
- Remember to include how the experiment could be improved and how it might be done differently
- Summarize your finding, new information, changes and what you learned

Prepare project display:

- Design a layout to display all parts of the project, include the question, the hypothesis, details of the experiment, results, conclusion and bibliography.
- Share your display plans, get feedback, modify and construct
- Display the information attractively and neatly; mount graphs, charts, photographs, etc,

Prepare for Judge Interviews:

- <u>Practice, practice, practice.</u> Ask your teacher, mentor, parents and friends to ask you questions about your project. Consider working with your school's speech, debate or performing arts coach for oral presentation tips.
- Work to get responses to such questions as: Did the results of your experiment confirm or deny your predictions? Are there any questions or issues that remain unanswered?, Are there any changes that could have been made? Was the experiment important? Why or why not? How would you modify the experiment if you were to do it again?

Category Description List

Projects may be entered in one of the following categories from the ISEF Rules Book. **For a full description and definition of the Intel ISEF categories visit their website:** http://www.societyforscience.org/isef/project_categories#AS

ANIMAL SCIENCES (Code: AS)
Study of animals and animal life, including the study of the structure, physiology, development, and classification of animals. Animal ecology, physiology, animal husbandry, cytology, histology, entomology, ichthyology, ornithology, herpetology, etc. Areas include Development, Ecology, Animal Husbandry, Pathology, Physiology, Population Genetics, and Systematics.

BEHAVIORAL AND SOCIAL SCIENCES (Code: BE)
The science or study of the thought processes and behavior of humans and other animals in their interactions with the environment studied through observational and experimental methods. Areas include Clinical & Developmental Psychology, Cognitive Psychology, Physiological Psychology, and Sociology.

BIOCHEMISTRY (Code: BI)
The study of the chemical substances and vital processes occurring in living organisms, the processes by which these substances enter into, or are formed in, the organisms and react with each other and the environment. Area include General Biochemistry, Metabolism, and Structural Biochemistry.

CELLULAR AND MOLECULAR BIOLOGY (Code: CB) The study of the structure and formation of cells. Areas include Cellular Biology, Cellular and Molecular Genetics, Immunology, and Molecular Biology.

CHEMISTRY (Code: CH)
The science of the composition, structure, properties, and reactions of matter, especially of atomic and molecular systems. Areas include Analytical Chemistry, General Chemistry, Inorganic Chemistry, Organic Chemistry and Physical Chemistry.

COMPUTER SCIENCE (Code: CS)
The study of information processes, the structures and procedures that represent processes, and their implementation in information processing systems. It includes systems analysis and design, application and system software design, programming, and datacenter operations. Areas include Algorithms, Data Bases, Artificial Intelligence, Networking and Communications, Computational Science, Computer Graphics, Software Engineering, Programming Languages, Computer System, and Operating System.

EARTH AND PLANETARY SCIENCE (Code: EA)
The study of sciences related to the planet Earth (Geology, minerology, physiography, oceanography, meteorology, climatology, speleology, sesismology, geography, atmospheric sciences, etc.) Areas include Climatology, Weather, Geochemistry, Mineralogy, Historical Paleontology, Geophysics, Planetary Science, and Tectonics.

ENGINEERING: Electrical and Mechanical **(Code: EE)**
The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical structures, processes, and systems. Areas include Electrical Engineering, Computer Engineering, Controls, Mechanical Engineering, Robotics, Thermodynamics, and Solar.

ENGINEERING: Materials and Bioengineering **(Code: EN)**
The application of scientific and mathematical principles to practical ends such as the design, manufacture, and operation of efficient and economical machines and systems. Areas include Bioengineering, Civil Engineering, Construction Engineering, Chemical Engineering, Industrial Engineering, Processing and Material Science.

ENERGY & TRANSPORTATION (Code: ET)
The study of renewable energy sources, energy efficiency, clean transport, and alternative fuels. Areas include Aerospace and Aeronautical Engineering, Aerodynamics, Alternative Fuels, Fossil Fuel Energy, Vehicle Development, and Renewable Energies.

ENVIRONMENTAL MANAGEMENT (Code: EM)
The study of managing mans' interaction with the environment. Areas include Bioremediation, Ecosystems Management, Environmental Engineering, Land Resource Management, Forestry, Recycling, and Waste Management.

ENVIRONMENTAL SCIENCE (Code: EV)
The analysis of existing conditions of the environment. Areas include Air Pollution and Air Quality, Soil Contamination and Soil Quality and Water Pollution and Water Quality.

continued on page 9

Category Description List (cont.)

MATHEMATICAL SCIENCES (Code: MA)
The study of the measurement, properties, and relationships of quantities and sets, using numbers and symbols. The deductive study of numbers, geometry, and various abstract constructs, or structures. Mathematics is very broadly divided into foundations, algebra, analysis, geometry, and applied mathematics, which includes theoretical computer science.

MEDICINE AND HEALTH SCIENCES (Code: ME)
The science of diagnosing, treating, or preventing disease and other damage to the body or mind. Areas include Disease Diagnosis and Treatment, Epidemiology, Genetics, Molecular Biology of Diseases, Physiology and Pathophysiology.

MICROBIOLOGY (Code: MI)
The study of micro-organisms, including bacteria, viruses, prokaryotes, and simple eukaryotes and of antibiotic substances. Areas include Antibiotics, Antimicrobials, Bacteriology, Microbial Genetics and Virology.

PHYSICS AND ASTRONOMY (Code: PH)
Physics is the science of matter and energy and of interactions between the two. Astronomy is the study of anything in the universe beyond the Earth. Areas include Atoms, Molecules, Solids, Astronomy, Biological Physics, Instrumentation and Electronics, Magnetics and Electromagnetics, Nuclear and Particle Physics, Optics, Lasers, Masers, Theoretical Physics, Theoretical or Computational Astronomy.

PLANT SCIENCES (Code: PS)
Study of plant life. Ecology, agronomy, horticulture, forestry, plant taxonomy, physiology, pathology, plant genetics, hydroponics, algae, etc. Areas include Agriculture, Development, Genetics, Photosynthesis, Plant Physiology (Molecular, Cellular, Organismal), Plant Systematics, and Evolution.

Judging Criteria

Overall, judges look for well thought-out projects. They look at how significant your project is in its field and how thorough you are. Judges want to see if you understand what you did, why you did it, and how you did it. Judges also would like to see if you understand how you got your statistics and conclusions. Ask your teacher or mentor to make sure you understand what your numbers mean, and how you got them. Judges applaud students who can speak easily and confidently about their projects; memorized speeches or information will not impress them.

RESEARCH PROJECTS (Applies to Individual and Team Projects)* see Team Project rules on pg. 12

30% Creative Ability: originality in questions and hypotheses, as well as in methods, data analysis, and interpretation of data

30% Scientific Thought: well-defined goals, hypotheses, variables, controls, methods, relevant and adequate data or testing, **OR** Engineering Goals: clear objective, relevant, economically feasible, workable, tested for performance under conditions of use

15% Thoroughness: completeness of data gathered, goals achieved, knowledge of literature on the topic

15% Competence/Skill: complexity, skill in design, lab techniques, computation, overall skill, assistance received, able to explain statistics

10% Clarity: clearly described/explained, readable, good use of visuals

DISPLAY PROJECTS (Applies to Individual and Team Projects)* see Team Project rules on pg. 12

20% Creative Ability: originality of approach, methods of explaining or demonstrating

20% Scientific & Technical Accuracy: scientific principles understood, purposes carried out, problem was studied thoroughly

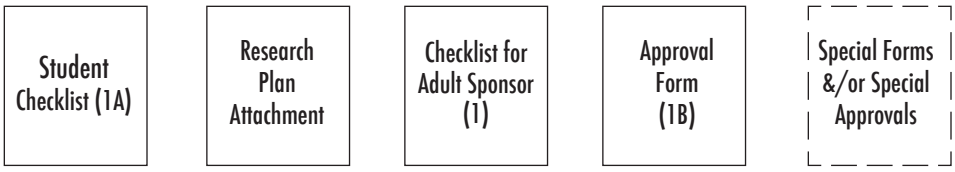
15% Instructional Value: accuracy, presentation effectiveness, significance of topic

15% Dramatic Value: visual quality of exhibit (attractiveness, involves the viewer)

15% Clarity: clearly described and explained, good use of language and graphics, easily readable presentation board

15% Craftsmanship: amount of assistance received, workmanship

BEFORE EXPERIMENTATION Forms to enter your project in the Science Fair can be downloaded from our website (see back cover). Special Forms/Approvals may be required (dashed line box).



_____ 1. Student completes Student Checklist (1A) and the Research Plan Attachment.

_____ 2. Student reviews form 1A with Adult Sponsor.

_____ 3. The Adult Sponsor completes the Checklist for Adult Sponsor (1) Form. This form determines if the student or team needs any special approvals or special forms before starting experimentation.

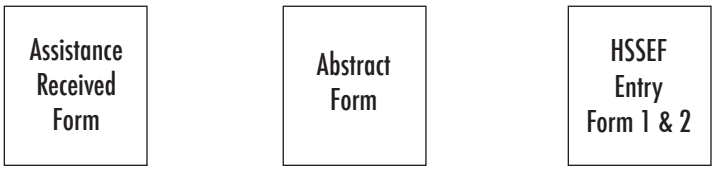
_____ 4. Student gets signatures for Approval Form (1B). Each team member must complete an individual Approval form (1B).

_____ 5. Get special approvals if needed. Fill out any special forms if needed (see page 12).

_____ 6. Make copies of all forms. Keep the original forms in your notebook, and give copies to your teacher and science fair officials if they ask for one. SRC and IRB must sign originals, so keep a copy when you send for their approval.

_____ 7. Bring all original forms to the state science fair when you set up your project.

AFTER EXPERIMENTATION Forms to enter your project in the Science Fair can be downloaded from our website (see back cover).



_____ 1. Write a (maximum) 250 word, one-page abstract of your project. Teams *jointly* submit one abstract.

_____ 2. Complete the Abstract Form. Either type directly on the form, or attach your abstract to the form.

_____ 3. Complete the Assistance Received Form.

_____ 4. Complete the HSSEF Entry Form 1 & 2. You need to fill out a new form if you change any information on the form, including your project title. The Science Fair Office uses the information on this form for certificates, awards and the official program, so type or print clearly if you fill it out by hand (All forms are available as pdfs). Bring all forms with you on exhibit set-up day.

_____ 5. Make copies of the Abstract Form (and abstract, if separate), the Assistance Received Form, and your HSSEF Entry Form. Keep your original forms and use the copies to give to teachers and science fair officials. PRINT LEGIBLY OR USE THE ONLINE PDF.

_____ 6. Turn in a copy of the completed Abstract Form when you register at the State Science Fair.

_____ 7. Tape your Assistance Received Form to the table top at the science fair.

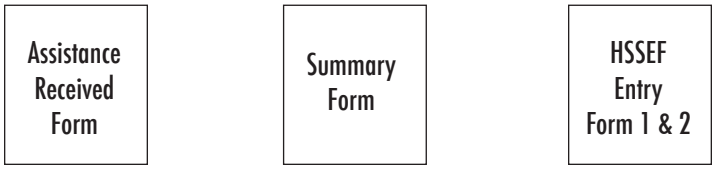
All display forms can be downloaded from our website (see back cover).
You will need: 1) HSSEF Entry Forms 1&2; 2) Display Certification Form; 3) Assistance Recieved Form; 4) Summary Form

BEFORE STARTING ON YOUR PROJECT

_____ 1. Make copies of the Display Certification Form. Each team member needs to complete an individual certification form.

_____ 2. Keep the original form in your notebook, and give a copy to your teacher and science fair officials if they ask for one.

AFTER PROJECT IS COMPLETED



_____ 1. Write a (maximum) 250 word, one-page summary of your project. Teams jointly submit **one** summary.

_____ 2. Fill out the Summary Form. Either type directly on the form, or attach your summary to the form.

_____ 3. Fill out the Assistance Received Form. Teams jointly fill out **one** form.

_____ 4. Fill out the HSSEF Entry Form 1 & 2. You need to fill out a new form if you change any information on the form, including your project title. The Science Fair Office uses the information on this form for certificates, awards and the official program, so type or print clearly if you fill it out by hand.

_____ 5. Make copies of all your completed forms. Keep your original forms and use the copies to give away if someone asks for one.

_____ 6. Bring all your forms to the state science fair when you set up your project.

_____ 7. Turn in a copy of the Summary Form when you register at the State Science Fair.

_____ 8. Tape your Assistance Received Form to the table top at the science fair.

Special Forms Checklist

Project Risks / All Form(s) Needed

Potentially Hazardous Agents (BSL-2)?	Qualified Scientist Form (2)	Risk Assessment Form (3)	Regulated Research Institutional/Industrial Setting Form (1C)**	PHBA Risk Assessment Form (6A)	Human & Vertebrate Animal Tissue Form (6B)
DEA-Controlled Substances?	Qualified Scientist Form (2)				
Human Subjects?	Qualified Scientist Form (2)**	Human Subjects Form (4)**	Regulated Research Institutional/Industrial Setting Form (1C)**		
Vertebrate Animals?	Qualified Scientist Form (2)**	Vertebrate Animal Form (5A)			
Continuation of a previous project?	Contuning Projects Form (7)				
Regulated Research Institution?	Qualified Scientist Form (2)	Vertebrate Animal Form (5B)	Regulated Research Institutional/Industrial Setting Form (1C)		

**** If Applicable**

ISEF Rules Wizard

The ISEF website provides an excellent, interactive "help" system to guide you toward the necessary forms. Start here: http://www.societyforscience.org/page.aspx?pid=312 and look for the Rules Wizard resource link.

Note About Team Projects

ISEF no longer recognizes team projects as a separate category and there is no separate "point system" for judging team vs. individual projects. As a result, HSSEF will also eliminate the Team Award, and the separate judging criteria. Other rules regarding team projects remain the same:

1) Team may be up to three members;

2) Team membership cannot be changed *during a given research year* including converting from an individual project or vice versa.

3) Each team should appoint a team leader to coordinate the work and act as spokesperson. However, each member of the team should be able to serve as spokesperson, be fully involved with the project, and be familiar with all aspects of the project. The final work should reflect the coordinated efforts of all team members and will be evaluated using similar rules and judging criteria as individual projects.

Adult Roles and Responsibilities

In certain cases there could be multiple adults supervising a student's science fair project. The titles listed below are the roles adults play in a student's project. Adults listed below cannot serve on the SRC or the school IRB for their student's project.

Adult Sponsor An Adult Sponsor may be a teacher, parent, university professor, or scientist in whose lab the student is working. This individual must have a solid scientific background and should have close contact with the student during the course of the project. The Adult Sponsor is ultimately responsible not only for the health and safety of the student conducting the research, but also for the humans or animals used as subjects. The Adult Sponsor is responsible for ensuring the student's research is eligible for entry in the Intel ISEF.

Qualified Scientist The Qualified Scientist should have an earned doctoral/professional degree in the biological or medical sciences as it relates to the student's area of research. A master's degree with equivalent experience and/or expertise in the student's area of research is acceptable when approved by an SRC. The Qualified Scientist and the Adult Sponsor may be the same person if qualified as outlined above. A student may work with a Qualified Scientist in another city or state, but must work locally with a Designated Supervisor who has been trained in the techniques the student will use.

Designated Supervisor The Designated Supervisor is an adult who is *directly* responsible for overseeing student experimentation. The Designated Supervisor need not have an advanced degree, but should be trained in the student's area of research. The Adult Sponsor may act as the Designated Supervisor. If a student is experimenting with live vertebrates and the animals are in a situation where their behavior or habitat is influenced by humans, the Designated Supervisor must be knowledgeable about the humane care and handling of the animals.

Abstracts and Summaries

After finishing research and experimentation, you are required to write a (maximum) 250 word, one-page abstract. The abstract should include the following:

a) purpose of the experiment; b) procedure; c) data; d) conclusions

It may also include any possible research applications. Only minimal reference to previous work may be included.
A summary should include as many elements as above that are relevant to the project, keeping in mind that an experiment was not performed by the student.

Controlled Substances DEA classed substances, prescription drugs, narcotics, alcohol and tobacco.

Hazardous Substances or Devices These include hazardous chemicals and equipment, firearms, radioactive substances and radiation.

Human and Animal Tissue These include all viable fresh tissue, organs, human or animal parts, including blood, blood products, teeth, primary cell cultures and body fluids (urine, saliva).

Nonhuman Vertebrate Animals Any animal with a vertebra (back bone). E.g., mice, rats, guinea pigs, rabbits, goldfish, guppies, etc.

Pathogenic Agents These are disease-causing or potentially disease-causing agents such as bacteria, viruses, fungi, molds and parasites.

Registered Research Insitution/Industrial Setting An example of a registered research institution would be the University of Hawaii. An example of an industrial setting would be a Chevron lab.

rDNA/Recombinant DNA Molecules that are constructed outside living cells by joining natural or synthetic DNA segments to DNA molecules than can replicate in a living cell. Or, molecules that result from their replication.

Institutional Review Board (IRB)

Each participating school is required to have an IRB. The IRB's purpose is to evaluate the potential physical or psychological risk of research involving human subjects, including projects with surveys. Each school must have an IRB if there are ***projects involving human subjects***, whether students are going to enter a school, district or state fair. For more information see: http://www.societyforscience.org/isef/document

The committee needs to have at least 3 members:

1. An educator

2. A school administrator, and

3. One of the following: a psychologist, a psychiatrist, a medical doctor, a physician's assistant, licensed social worker or professional counselor, or registered nurse.

Scientific Review Committee (SRC)

An SRC member must be contacted for approval of projects involving non-human vertebrates, recombinant DNA, tissue culture, controlled substances and hazardous substances or devices.

Each District Fair should have its own SRC. Where there is no district fair, then students must contact the State Scientific Review Committee for approval. State SRC member contact information is listed on our web site (www.hawaii.edu/acadsci).

An SRC is composed of a minimum of three members, including at least one biomedical scientist (PhD, MD, DVM, DDS or DO) and one educator. One member must be familiar with animal care procedures. A teacher whose student's project is being reviewed cannot be a member of the SRC. Refer to the ISEF Rules Book for guidelines on the work this committee performs.

Project Safety Rules

Please note: ALL exhibits are checked for safety.

NOT Acceptable for Exhibit:

- Living organisms (i.e., plants, animals, microbes)
- Soil, sand, rock, and/or waste samples even if permanently encased in a slab of acrylic
- Taxidermy specimens or parts
- Preserved vertebrate or invertebrate animals
- Human or animal food
- Human/animal parts or body fluids (e.g., blood, urine)
- Plant materials (living, dead, or preserved) that are in their raw, unprocessed, or non-manufactured state (Exception: manufactured construction materials used in building the project or display)
- All chemicals including water (projects may not use water in any form in a demonstration)
- Poisons, drugs, controlled substances or devices (i.e., firearms, weapons, ammunition, reloading devices) .
- Dry ice or other sublimating solids, i.e. solids which vaporize to a gas without passing through a liquid phase
- Sharp items (i.e., syringes, needles, pipettes, knives)
- Flames or highly flammable materials
- Batteries with open top cells
- Awards, medals, business cards, flags, logos, CDs, DVDs, flash drives, brochures, booklets, endorsements, acknowlegements, etc.
- Photographs or other visual presentations depicting vertebrate animals in surgical techniques, dissections, necropsies, or other lab procedures
- Postal addresses, world wide web and e-mail addresses, telephone and fax numbers of Finalist
- Active Internet or e-mail connections as part of displaying or operating the project
- Prior years' written material or visual depiction unless continuation is part of title (and Continuation Form is displayed).
- Glass or glass objects (unless integral such as computer screen)
- Any apparatus deemed unsafe by fair officials

Acceptable for Exhibit Only (NOT for operation):

- Class III and IV lasers
- Projects with unshielded belts, pulleys, chains and moving parts with tension or pinch points
- Any device requiring voltage over 125 volts

Acceptable for Exhibit & Operation (with Restrictions):

- Photograph/visual image/chart/table and/or graph if:

  a) It is not deemed offensive or inappropriate by Fair Officials. The decision by the committees is final.

  b) Credit lines of their origins are attached. (If all images displayed were taken by the student or from the same source, one credit line prominently displayed is sufficient.)

  c) It is from the Internet, magazines, newspapers, journals, etc. and credit lines are attached.

  d) Photographs or visual depictions of human subjects with signed consent forms at the project.

- Class II lasers:
  a) the output energy is < 1 mW and is operated only by the student exhibitor,
  b) can be operated only during safety check and judging,
  c) posted sign must read:
  "Laser Radiation: Do not Look into Beam",
  d) must have protective housing that prevents access to beam,
  e) must be disconnected when not operating.
- All electrical work must conform to the National Electrical Code or exhibit hall regulations.
- 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 other than the Finalist. Exposed electrical equipment or metal that possibly may be energized must be shielded with a non- conducting material or with a grounded metal box to prevent accidental contact.
- There must be an accessible, clearly visible on/off switch or other means of disconnect from the 120 or 220 Volt power source.

Avoiding Mistakes at the Science Fair

• After the student completes Form (1A), the Adult Sponsor should fill out the Checklist for Adult (1) Sponsor to determine if special approvals and/or special forms are needed.

• To obtain IRB / SRC approval, Approval Form (1B) and the appropriate special forms need to be submitted for signature approval. If you are not sure where to send the form, contact the science fair office. When obtaining approval, submit your original, but be sure to keep copies.

• Projects involving non-human vertebrate animals, rDNA, pathogens, controlled substances, and human and animal tissue require SRC approval **before** experimentaion begins.

• Projects involving humans must be approved by the school's IRB **before** experimentation begins. If more than minimal risk is involved (risk is determined by the school's IRB), then a copy of any test, survey or questionnaire must be provided for parental review and approval.

• Projects involving pathogenic agents may not be done in a home environment. Specimens may be collected at home, but the specimens must be cultured in a science laboratory and be disposed of following proper safety procedures.

• Projects with a death rate of **30%** or more in any group or subgroup of nonhuman vertebrate animals will not qualify for competition.

• Try to replace nonhuman vertebrate animals with invertebrates (or other lower life forms) in projects. If you need suggestions, ask your science teacher.

• Nonhuman vertebrate animals should be taken care of properly. Every consideration should be given to their comfort and well-being. Experiments involving common lab animals (e.g., mice, guinea pigs, rats, rabbits) are only allowed in an institutional or school setting (if housing standards are maintained). Only non-invasive, behavioral studies involving pets (e.g., fish, livestock) may be done at home.

• Using alcohol, acid rain, herbicides, insecticides and heavy metals in toxicity or behavioral studies on live vertebrates is not allowed.

• For vertebrate animals, proper euthanasia at the end of experimentation for tissue removal and/or pathological analysis, should be done by the Animal Care Supervisor, Qualified Scientist or Designated Supervisor. Student researchers are prohibited from performing euthanasia.

• There are many rules regarding treatment of vetebrate animals. Please consult the ISEF guidelines and rules at http://www.societyforscience.org/isef/document

Building & Displaying Your Exhibit Board

Exhibit Size

Exhibit may be smaller, but should not exceed the guidelines below:

Height—72 inches if set on a table top, 108 inches when set on the floor
Width—48 inches (122 cm) maximum side to side, including add-ons
Depth—30 inches (76 cm) maximum front to back

Safety

All projects need to conform to the Safety Rules listed on page 15.

Backboard Construction

Exhibit backboard should be a free-standing, rigid material. Lightweight material is recommended for ease of transportation and shipping, but poster board is not advisable unless it is framed.

Lettering should be clearly readable at a distance of at least 6 feet. Your title is an important attention-grabber. A good title should accurately present your research while also making the casual observer want to know more.

During Exhibit Set-up, bring all necessary supplies to assemble your exhibit, e.g., scissors, string, tape, tools, glue, etc.

Items Required at Your Exhibit

In addition to your display board, the following forms and items should be kept at the exhibit during judging: (see pages 10-11)

- Written report
- Required forms

Research projects:	Checklist for Adult Sponsor (1)
	Student Checklist (1A)
	Research Plan Attachment
	Approval Form (1B)
	Special Forms (if any)
	Abstract Form
	Assistance Received Form (taped to the table)
Display projects:	Display Certification Form
	Summary Form
	Assistance Received Form (taped to the table)

- Project data book (for research projects)
- SRC Clearance Sticker (upon approval at fair)

Liability & Safety Issues for Your Project

• The Hawai‘i Academy of Science cannot and will not assume liability for damage to or theft of exhibits (including all equipment, databooks, and anything else associated with your exhibit).

• Valuable equipment, such as computers, should be removed immediatey after judging because valuables could be stolen or vandalized when the Fair is open to the public.

• Written reports and data books must also be removed immediately after judging has been completed.

• Exhibits left behind after take down time will not be saved.

District Fairs

• Currently, Hawai‘i is comprised of six affiliated districts, two non-affiliated districts, and one affiliated state district (HSSEF).

Affiliated districts include:

Leeward, Windward, Hawai‘i Association of Independent Schools (HAIS) - OAHU
MAUI
KAUAI
EAST HAWAI‘I ISLAND

Non-affiliated districts include:

Central - OAHU
Farrington/Kalani/Kaiser Complex - OAHU

• Any school that is not included in one of these districts should contact HAS to determine the procedure for sending projects to the state fair.

• District Coordinators are responsible for project SRC approval in compliance with International (ISEF) Rules and pertinent laws and regulations. Local SRCs may be formed to assist the Affiliated Fair in reviewing and approving projects.

• Contact your District Coordinator or HAS for more information regarding District Fairs.

How to Get a Copy of the ISEF Rules Book

ISEF Website

http://www.societyforscience.org/isef/

The ISEF Rules Book can be viewed and downloaded in pdf format from the ISEF web site. This includes all ISEF guidelines. ISEF forms can be obtained from your science teacher, or the Hawai'i Academy of Science Educational Programs office. Forms are also available on The Academy's website: http://www.hawaii.edu/acadsci

Complete Rules Available online:

http://www.societyforscience.org/isef/document

ISEF Rules Wizard at:

http://apps.societyforscience.org/isef/students/wizard/index.asp

Questions Regarding ISEF Rules and Regulations?

E-mail: src@societyforscience.org

Call: (202) 785-2255

Fax: (202) 785-1243

Hawai'i Academy of Science & the Science Fair Program

Founded in 1925, and affiliated with the American Association for the Advancement of Science, the Hawai'i Academy of Science (HAS) is a private, nonprofit, professional society whose mission is the promotion of scientific research and the diffusion of scientific knowledge, particularly as related to Hawai'i and the Pacific.

A major focus of the Academy's activities is the support and improvement of secondary science education in Hawai'i. Toward this end, the Academy has sponsored the Hawai'i State Science & Engineering Fair (HSSEF) since 1957.

The HSSEF is the oldest and largest science education program in Hawai'i. It is an enrichment program which stimulates interest in science and engineering and encourages entry into a science related career. Excellence of student achievement is recognized and rewarded. Students have the opportunity to interact personally with professional scientists and engineers in the program. The HAS enjoys the support of the scientific, business and education communities in Hawai'i.

State Science Fair Office

Science Fair (HSSEF) Office Website

This handbook as well as all HSSEF and ISEF forms
may be downloaded from the HSSEF website:
http://www.hawaii.edu/acadsci

Contacting Our Office

Email: acadsci@hawaii.edu
Phone (808) 956-7930
Fax (808) 956-5183

Sending Us Mail

Hawai'i Academy of Science
c/o College of Education
1776 University Avenue, UA 4-4
Honolulu, HI 96822

Hawai'i State Science & Engineering Fair Handbook
Published by the Hawai'i Academy of Science 2011