LA County Science & Engineering Fair

Largest and longest running Regional Science & Engineering Fair in the West

GOALS

- Opportunities to apply creativity and critical thinking to solve problems beyond the classroom.
- Publicly recognize achievements

- Opportunities for professional leaders to network with students & educators
- Promote school-community cooperation in developing scientific potential and communication skills

What does a Regional or State Science & Engineering Fair offer students?

- **Winners receive recognition for their work, and *gain the right to participate at state-level and higher-level competitions.***

- **Simply being *accepted* to a regional fair makes students a better bet for college admission.**

Win Big Prizes

- The first step in competitions that lead up to the **international level**, where prizes total over $3,000,000 and the top winners take home $50,000 scholarships.
- Besides cash prizes, students receive *recognition, **scholarships**, educational opportunities such as **summer Earthwatch Expeditions** and offers of **employment** and **internships**.*

Monetary Awards 2014 ($150 – $1,500, Internships, Expeditions plus Category Cash Awards)

20 Million Minds

Professional Engineers in California Government

DreamWorks Earthwatch Institute

Northrup Grumman

NACE International, The Corrosion Society

Nuclear Society Amonix

Southern California Horticultural Society

Office of Naval Research

Torrance Marriott

DirectTV Dole

Southern California Paleontological Society

Greater Los Angeles Teachers Science Association

Intel Excellence in Computer Science

South Bay Business Environmental Coalition

UCLA Brain Research Institute

California Association of Professional Scientists (CAPS)

Los Angeles County
Science & Engineering Fair

Los Angeles County
Science & Engineering Fair

Non-Monetary Awards (Certificates, Medals, Pins, Membership into Associations)

American Meteorological Society

American Psychological Association

ASM Materials Education Foundation

Association for Women Geoscientists

Intel ISEF

MU Alpha Theta

National Oceanic and Atmospheric Administration

Ricoh Americas Corporation

Society for In Vitro Biology

Society for Science & the Public (Intel ISEF)

Stockholm Junior Water Prize

U.S. Metric Association

U.S. Public Health Service

Yale Science and Engineering Association

Los Angeles County
Science & Engineering Fair

Los Angeles County
Science & Engineering Fair

Higher Level Collaboration/ Presentation Skills

- Students **practice higher-level communications skills** when fine-tuning their presentations to the judges. ***(One of the NGSS SEPs)***
- By participating in a more global event, it helps develop a feeling of **confidence** and competence among students, and **fosters a spirit of scientific inquiry**.

LACSEF Students tend to choose STEM Careers

- Some students find a project so interesting that they **continue to work on a different aspect of the problem for several years**, becoming a skilled investigator as time goes on.
- Occasionally, a project becomes ***the focus for a whole career.***
  - ***How cool is that?***

Eric Zahn, Colorado Lagoon Restoration Manager, Poly grad,
2 years LACSEF science fair participant

Who Can Enter?

- Awards and scholarships in 38 categories ranging from Biology to Engineering to Zoology

- Open to Grade 6-12 students attending LA County Public and Private Schools

- Must compete in a local school or district science fair in order to qualify for regional competition

Team Projects

- No more than THREE people per team
  - Why does this need to be a *team* project?
  - Every team member should have a unique contribution to the project and be able to justify their participation

Regulations

- **Students entries from grades 6 -12 only**
- **Research design based on scientific methodology or engineering principles**

- **IF the project involves tissues/cell lines, human subjects, vertebrate animals, hazardous chemicals or microbes, proper paperwork must be submitted ONLINE and pre-approved by the LA Science Fair *BEFORE* beginning the research itself.**

Regulations

- **Prescreened by the teacher and Science Fair Coordinator at the school**
- **Adhere to all federal, state, and local laws**
- **Work of the entrant and work of others is clearly distinguished**
- **Projects to remain during designated times**

- **Display be self-supporting and not collapse**

Display Regulations

- **Display fits within the prescribed space**
- **Uses a title descriptive of your study**
  - **Subtitles may be used for clarification**
- **NO live animals or plants**
- **NO tissues or microorganisms on display** ***(use pictures or a model instead…)***
- **NO photos which show procedures hurtful to vertebrate animals.**

Display Regulations

- **Equipment** that is small or expensive should be brought to an interview and removed promptly – *you may leave a note to tell judges of your equipment.*
- **ALL equipment** is left

- Give attention to **safety**

Decision of the Science Fair Committee is final

Fair Categories

- **22** Junior Project categories
- **16** Senior Project categories

Animal Biology

- Evolutionary origins
- Genetics
- Growth
- Morphology
- Studies of animals in their natural habitat

Animal Physiology

- **Studies of major organ system functions involving:**
  - **Genetics**
  - **Immunology**
  - **Neurobiology**
  - **Pathology**
  - **Reproduction**
  - **Sensory biology**

Behavioral/ Social Sciences

- Psychology
- Human or Animal Behavior/ Attitudes
- Linguistics
- Ethnology, Societal Values
- Anthropology/Archeology
- Learned/conditioned Responses
- Chemical & Physical Stress
- Reading Problems

SR Category ONLY

Behavioral/ Social Sci - Human

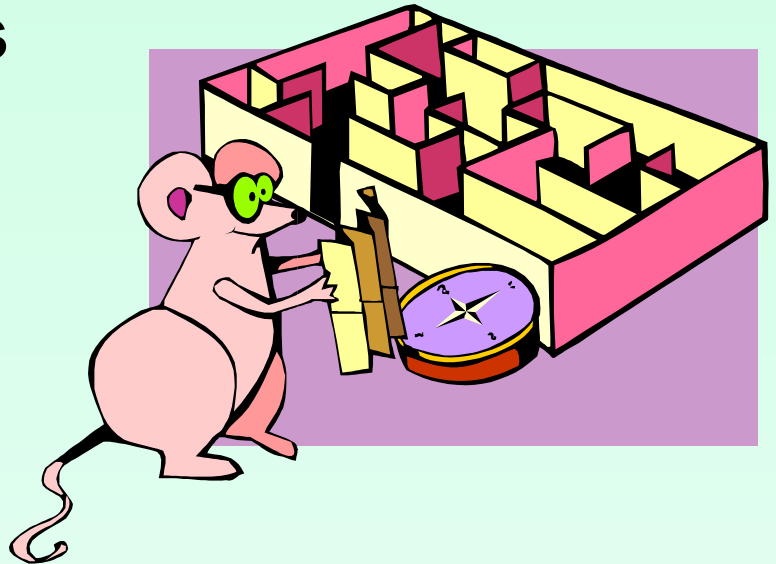
- Psychology
- Human Behavior/Attitudes
- Linguistics
- Societal Values
- Ethnology
- Learned responses
- Chemical & Physical Stress
- Reading Problems

JR Category ONLY

Behavioral/ Social Sci – Non-human

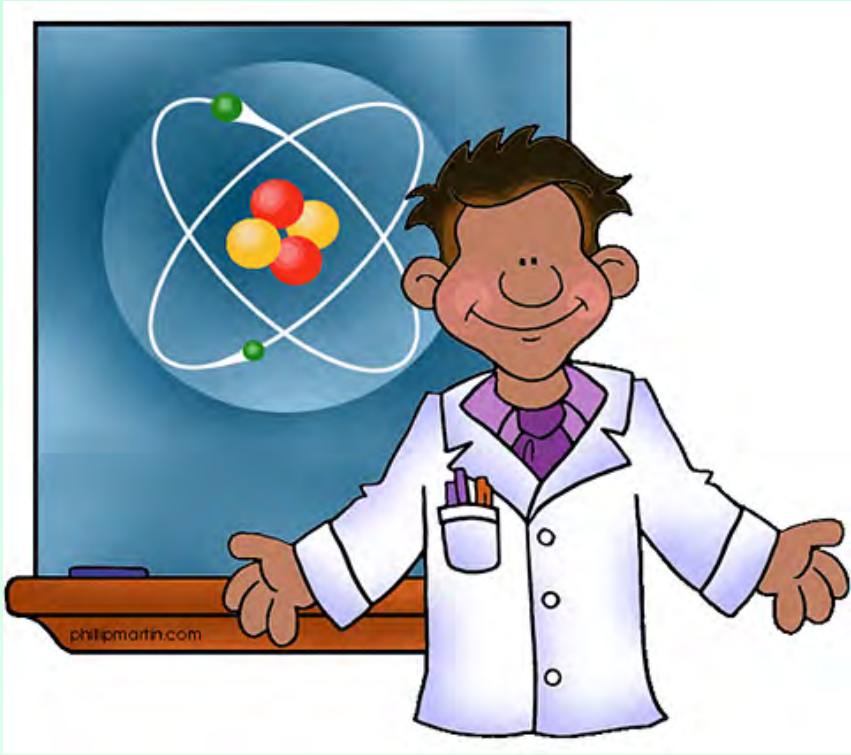
- Psychology
- Perception
- Animal Behavior
- Learned Responses
- Conditioned responses
- Group behavior
- Effects of chemicals on behavior

JR Category ONLY



Biochemistry & Molecular Biology

- Molecular biology
- Molecular genetics
- Enzymes & Hormones
- Photosynthesis
- Blood chemistry
- Protein chemistry
- Food chemistry



Chemistry

- Physical Chemistry
- Inorganic Chemistry
- Organic Chemistry *(other than biochemistry)*
- Materials
- Pesticides
- Fuels, Plastics
- Metallurgy
- Soil Chemistry

SR Category ONLY

Chemistry (General)

- Physical Chemistry
- Materials
- Organic Chemistry *(other than biochemistry)*
- Fuels
- Pesticides
- Plastics
- Metallurgy
- Soil Chemistry

JR Category ONLY

Chemistry-Applied

- Measures and comparisons of materials durability
- Flammability
- Effectiveness for intended use
- Product testing for real world applications.

JR Category ONLY

Earth/Space Science

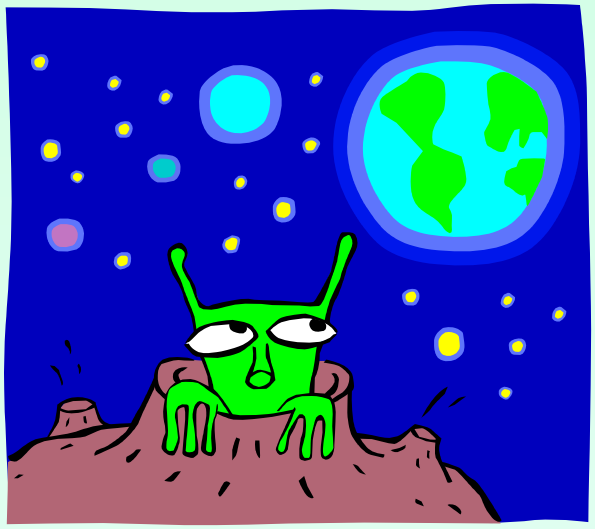
- Geology
- Phys Oceanography
- Meteorology
- Atmospherics
- Petroleum Geology
- Mineralogy
  Topography

Geography

Seismology

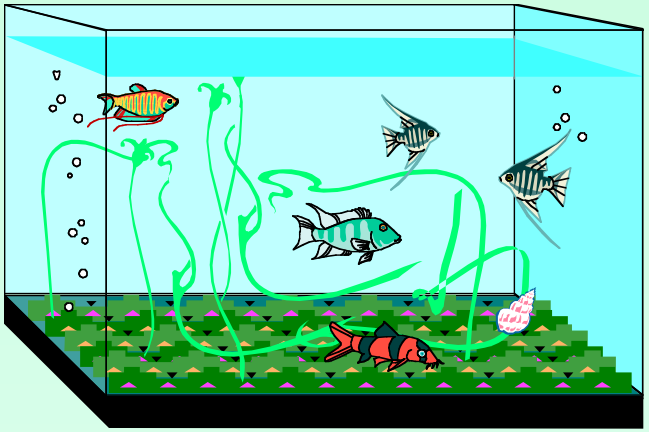
Speleology

Geophysics



Ecology

- Interaction of abiotic & biotic elements within any environmental investigation
- Pollution sources
- Impact studies
- Resource access
- Environmental alteration



Engineering Applications

- **Project in which a potentially useful product is created**

Engineering Research

- Engineering analysis
- Tests of efficacy of commercial products
- Comparisons of physical or biomedical properties of commercial products

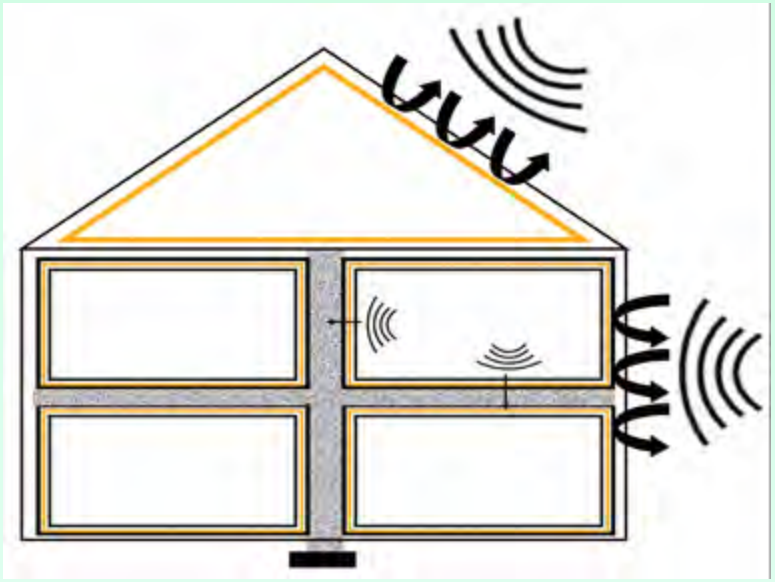
Environmental Management

- Conservation of natural resources and usage modalities
  - Crop rotation
  - Use of renewable energy sources
  - Terrace farming
  - Recycling
- Environmental protections

Materials Science

- **Studies of materials characteristics and their static physical properties**
  - **Thermal, electrical, acoustic, optical, electromagnetic, etc.**

JR Category ONLY



Mathematics/Computer Sci

- Abstract Algebra
- Number Theory
- Statistics
- Probability
- Operations Research
- Calculus
- Geometry
- Logic
- Complex Analysis
- Information systems
- New developments in software or hardware
- Computer methodologies & systems organizations
- Data structures, coding, encryption & information theory

Microbiology

- Bacteriology
- Studies of prokaryotes, Protists & Fungi
  - Genetics, growth, reproduction, and responses to chemical & physical stress

Pharmacology

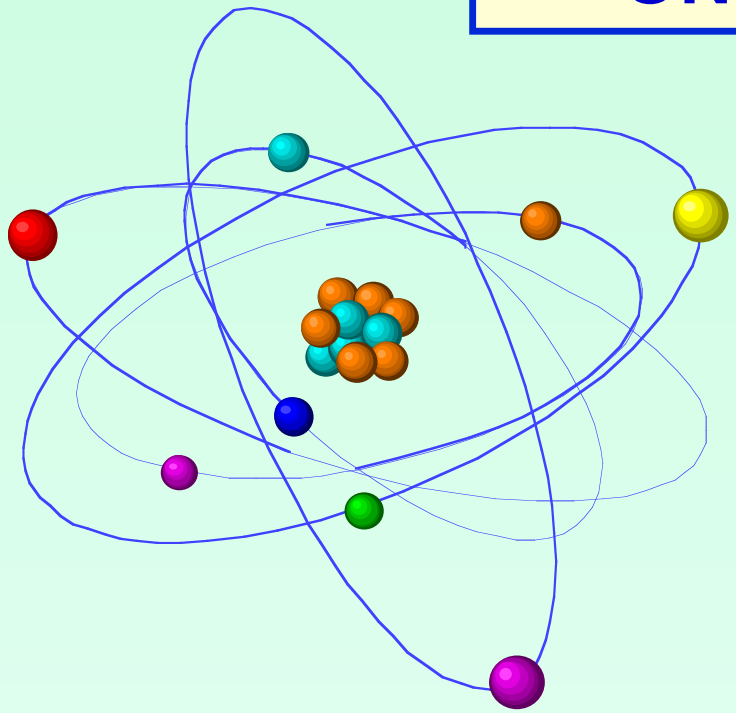
- **Effect of any drug or chemical on any living animal or humans**

- **Studies can be at the cellular or organismal level**

Physics

- **Experimental or theoretical studies of the physical properties of matter in all forms**
  - **Computer simulations of physical systems**

SR Category ONLY

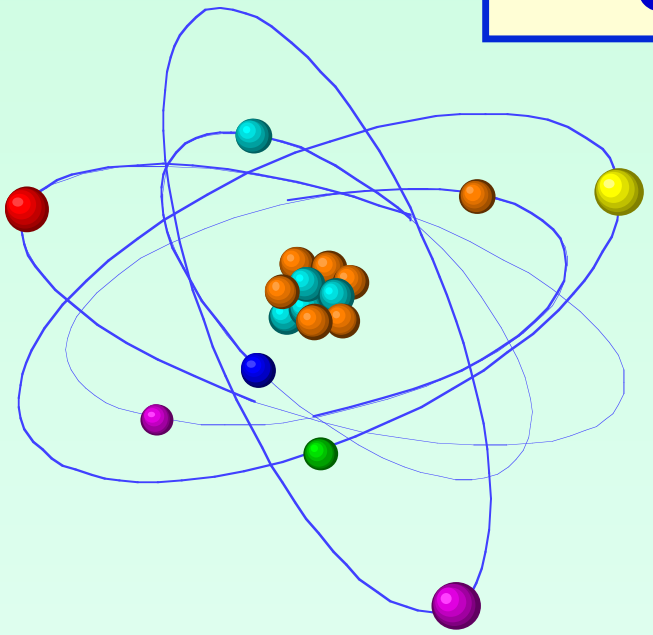


Physics - General

- **Experimental or theoretical studies of the physical properties of matter in all forms *(with the exception of fluids, electricity, and magnetism)***

JR Category ONLY

  - **Computer simulations of physical systems**

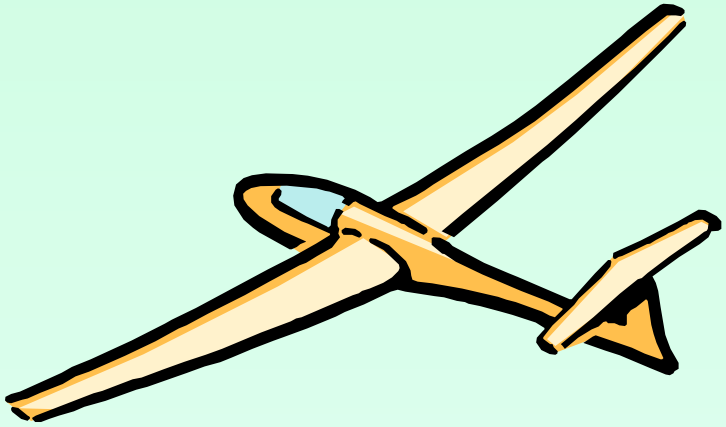


Physics - Aerodynamics/ Hydrodynamics

- **Studies of aerodynamics and propulsion of air, land, water, and space vehicles; aero/ hydrodynamics of structures and natural objects.**

JR Category ONLY

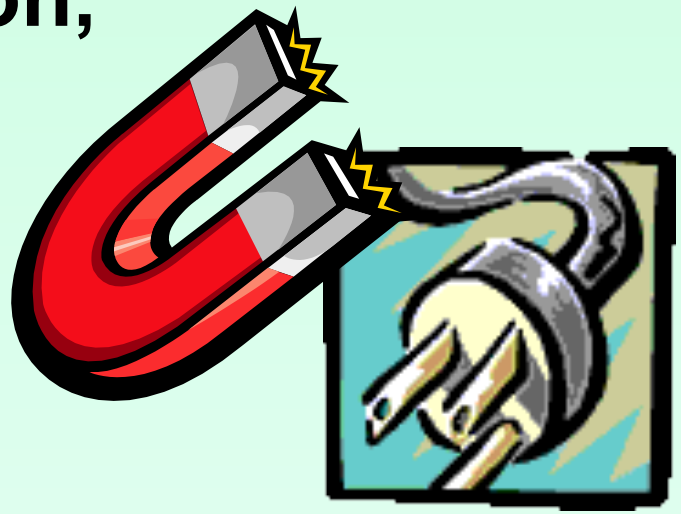
- **Studies of the basic physics of fluid flow.**



Physics - Electricity & Magnetism

- **Experimental or theoretical studies with electrical circuits, electro-optics, electromagnetic applications, antennas and propagation, and power production.**

JR Category ONLY



Plant Biology

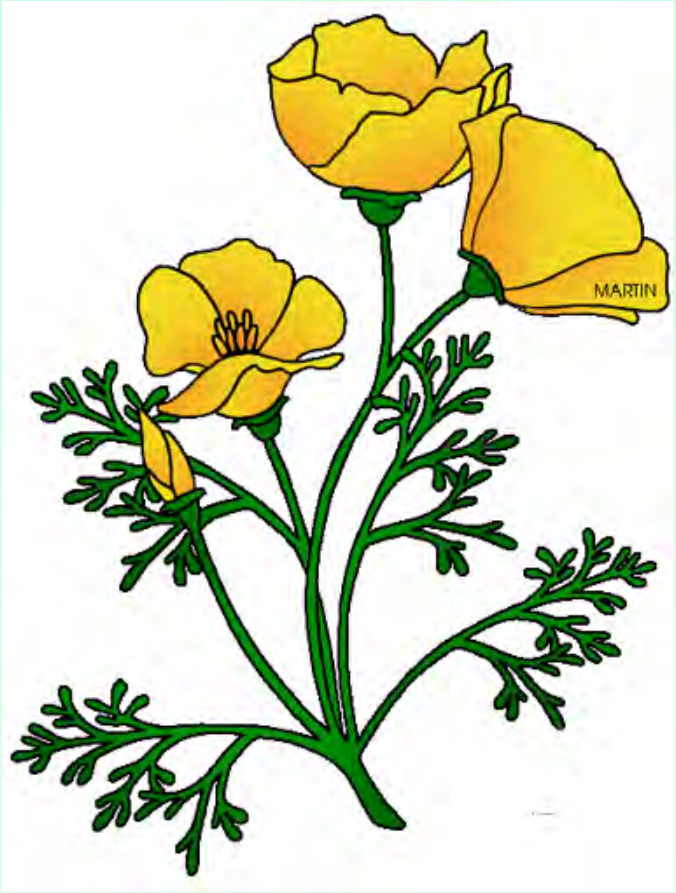
- Agriculture
- Agronomy
- Horticulture
- Forestry
- Plant Taxonomy
- Phycology
- Hydroponics

Plant Genetics

Mycology

Plant Physiology

- **Studies of the major plant organ system functions involving:**
  - **Genetics**
  - **Immunology**
  - **Pathology**
  - **Reproduction**



Product Science

- **Comparison and testing of natural and man-made products**

JR Category ONLY

School Registration

1. Every LA County Middle School and High school receives a notice for entry to the LA County Science Fair in early September.

2. Site Science Fair Coordinator and and online school registration opens mid Sept to end of January.

Every document will be posted and downloadable at http://www.lascifair.org

Notification

4. **The Site Science Fair Coordinators will be notified of approval/rejection of submitted Student Research Plans.**

   – **Check website for specific dates**

Important Dates for Students

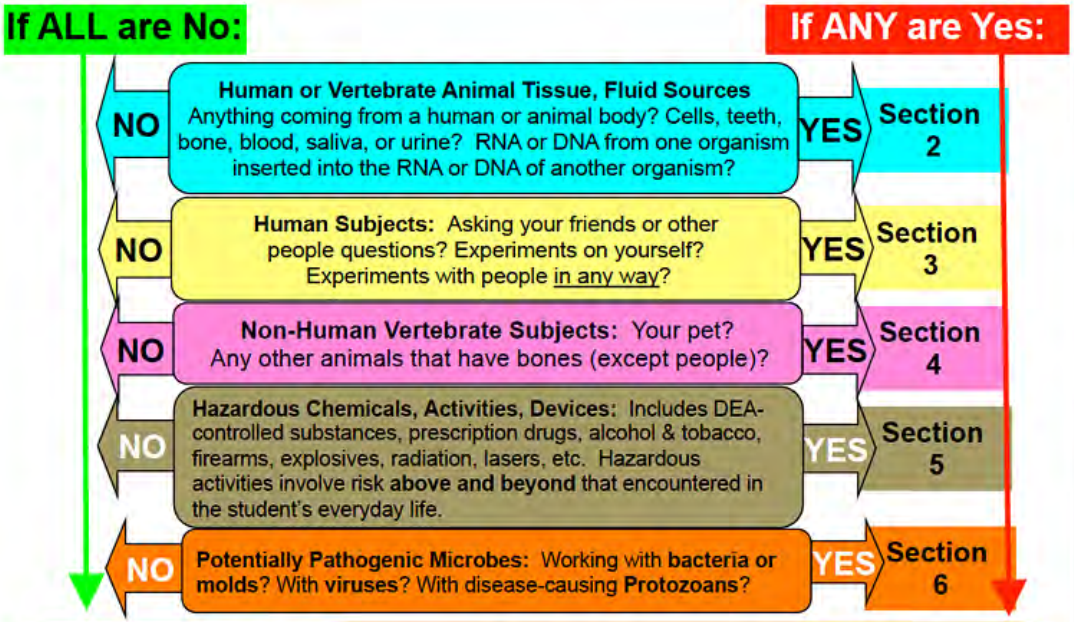
September 14, 2015	**School and Site Coordinator Online Registration opens**
October 16, 2015	**Deadline** for **ONLINE Fall submission** for proposed Student Research Plan involving tissues/cell lines, human subjects, vertebrate animals, hazardous materials and/or microbes.
November 13, 2015	**Deadline** for **ONLINE Winter submission** for proposed Student Research Plan involving tissues/cell lines, human subjects, vertebrate animals, hazardous materials and/or microbes.
December 4, 2015	**Deadline for Early-Bird School Registration Fee Payment** (A 20% discount is given if payment is received by December 4, 2015.) **Mail to:** *8504 Firestone Blvd. #247, Downey, CA 90241*
December 4, 2015	***Final Deadline*** for **ONLINE *re-submission*** of Revised Student Research Plans involving tissues/cell lines, human subjects, vertebrate animals, hazardous materials and/or microbes.
January 4, 2016	***Student and Volunteer On-line Registration Opens***
January 15, 2016	**Deadline** for any ONLINE changes in procedure or protocol for **previously-approved** Jr. Certification Forms or Sr. ISEF Forms * *(Not applicable to all students.)*
January 29, 2016	***School and Site Coordinator Online Registration Closes.***
February 24, 2016	***Student Online Registration and Volunteer Online Registration Closes*** ***(Schools must have already registered.)***
February 26, 2016	***Deadline for students project submissions*** by Site Coordinator
February 26, 2016	***Final Deadline*** - **School Registration Fee**
March 17 - 19, 2016	***66th Annual Los Angeles County Science & Engineering Fair***

Pre-Approval for Projects

Los Angeles County Science Fair

Does your project require Pre-Approval? Find out fast!

Some research projects require Pre-Approval from the Science Review Committee (SRC). If you answer **YES** to any of the questions below, ***review the General Information Section 1 of the 2016 Rules & Regulations in the section noted below.***



Project does NOT need SRC Pre-Approval!

SRC Pre-Approval Required
YOU MUST SUBMIT ONLINE:
Jr. or Sr. Division Research Plan with electronic verification
Sr. Division - ISEF Certification Forms with signatures need to be brought to the fair, for judging

For additional information on 2016 Rules & Regulations and the online pre-approval process, please see the website http://www.lascifair.org/eligibility-categories/ or contact: Jennifer Moses, 323-496-6797 or jmoses@lascifair.org

New Research Rules & Regulations

- **Clearer and more detailed regulations for project safety and procedures, following current state and ISEF guidelines.**
  - **Linked to government safety resources**
  - **Linked to 5 sub-pages targeting projects involving tissues/cell lines, human subjects, vertebrate animals, hazardous materials and/or microbes.**
- **FAQ pages *specifically targeting problem areas for approval***

Online Project Certification Pre-Approval

- **Only** for students with potential projects involving ***tissues/cell lines, human subjects, vertebrate animals, hazardous materials and/or microbes.***

  - **Check website for instructions**

http://www.lascifair.org/eligibility-categories/project-pre-approval/#applying

Research Plan for Submission

- **Objective/Problem/Hypothesis** ***(include evidence of search for alternative to vertebrate animals)***
- **Materials:** ***(detailed)***
- **Bibliographic References** (***a minimum of 3 references, not exclusively Internet***):
- **Procedure/Research Techniques**
  - **Provide a clear and detailed description/outline of proposed procedure, *including equipment to be used, safety measures, and disposal of hazardous chemicals.***
- **Risk Assessment: detail any possible risks**
- **2-3 more pages of information, *digitally verified by return email from Supervising Adults***

Example: Certification Online Template (both Jr/Sr)

Enter online registration webpage here

http://app2.lascifair.org/

HAZARDOUS MATERIALS RESEARCH PLAN

To be completed by the Student Researcher in collaboration with Designated Supervisor/Qualified Scientist:

Objective(s):

Problem: (in the form of a question)

Complete before going online to submit proposal

Hypothesis: *(if applicable):* (IF I do this... THEN this will happen...)

Procedure/Experimental Techniques:

Hazardous Materials List: Identify the hazardous chemicals, activities or devices that will be used, in detail.

Hazardous Materials Source: Describe the source for your materials. (Full detail is required.)

Student Procedures: Describe the procedures to be performed by the student.

Supervisor Procedures: Describe the procedures to be performed by supervising scientist/adult supervisor.

Risks and Safety Precautions:

Risks: Identify and assess the risks involved (for activities, devices or chemicals).

Safety Precautions: Describe the safety precautions to be taken during procedures *(be specific for each hazard involved).*

Safety Information Sources: List the source(s) of safety information.

Disposal Methods: Describe the disposal method(s) to be used for hazardous materials.

Sr. Div. Forms (same as Intel ISEF) have to be brought to the fair itself, with signatures

Research Plan Instructions

A complete research plan is required and must accompany Checklist for Student (1A)

Provide a typed research plan and attach to Student Checklist (1A). Please include your name on each page.
The research plan for ALL projects is to include the following:

A. Question or Problem being addressed

B. Goals/Expected Outcomes/Hypotheses

C. Description in detail of method or procedures (The following are important and key items that should be included when formulating ANY AND ALL research plans.)

- **Procedures:** Detail all procedures and experimental design to be used for data collection
- **Risk and Safety:** Identify any potential risks and safety precautions to be taken.
- **Data Analysis:** Describe the procedures you will use to analyze the data/results that answer research questions or hypotheses

D. Bibliography: List at least five (5) major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

- Choose one style and use it consistently to reference the literature used in the research plan
- Guidelines can be found in the Student Handbook

Items 1-4 below are subject-specific guidelines for additional items to be included in your research plan as applicable:

1. **Human participants research**:
   - **Participants.** Describe who will participate in your study (age range, gender, racial/ethnic composition). Identify any vulnerable populations (minors, pregnant women, prisoners, mentally disabled or economically disadvantaged).
   - **Recruitment.** Where will you find your participants? How will they be invited to participate?
   - **Methods.** What will participants be asked to do? Will you use any surveys, questionnaires or tests? What is the frequency and length of time involved for each subject?
   - **Risk Assessment**
     - **Risks.** What are the risks or potential discomforts (physical, psychological, time involved, social, legal, etc.) to participants? How will you minimize the risks?
     - **Benefits.** List any benefits to society or each participant.
   - **Protection of Privacy.** Will any identifiable information (e.g., names, telephone numbers, birth dates, email addresses) be collected? Will data be confidential or anonymous? If anonymous, describe how the data will be collected anonymously. If not anonymous, what procedures are in place for safeguarding confidentiality? Where will the data be stored? Who will have access to the data? What will you do with the data at the end of the study?
   - **Informed Consent Process.** Describe how you will inform participants about the purpose of the study, what they will be asked to do, that their participation is voluntary and they have the right to stop at any time.
2. **Vertebrate animal research**:
   - Briefly discuss potential **ALTERNATIVES** to vertebrate animal use and present a detailed justification for use of vertebrate animals
   - Explain potential impact or contribution this research may have
   - Detail all procedures to be used
     - Include methods used to minimize potential discomfort, distress, pain and injury to the animals during the course of experimentation
     - Detailed chemical concentrations and drug dosages
   - Detail animal numbers, species, strain, sex, age, source, etc.
     - Include justification of the numbers planned for the research
   - Describe housing and oversight of daily care
   - Discuss disposition of the animals at the termination of the study
3. **Potentially Hazardous Biological Agents**:
   - Describe Biosafety Level Assessment process and resultant BSL determination
   - Give source of agent, source of specific cell line, etc.
   - Detail safety precautions
   - Discuss methods of disposal
4. **Hazardous Chemicals, Activities & Devices**:
   - Describe Risk Assessment process and results
   - Detail chemical concentrations and drug dosages
   - Describe safety precautions and procedures to minimize risk
   - Discuss methods of disposal

Student Online Registration

6. Student online registration in early January at:

   http://www.lascifair.org/registration

7. Site Science Fair Coordinators must submit online student verification information and *ADHERE TO ALL DEADLINES.*

General Fair Schedule

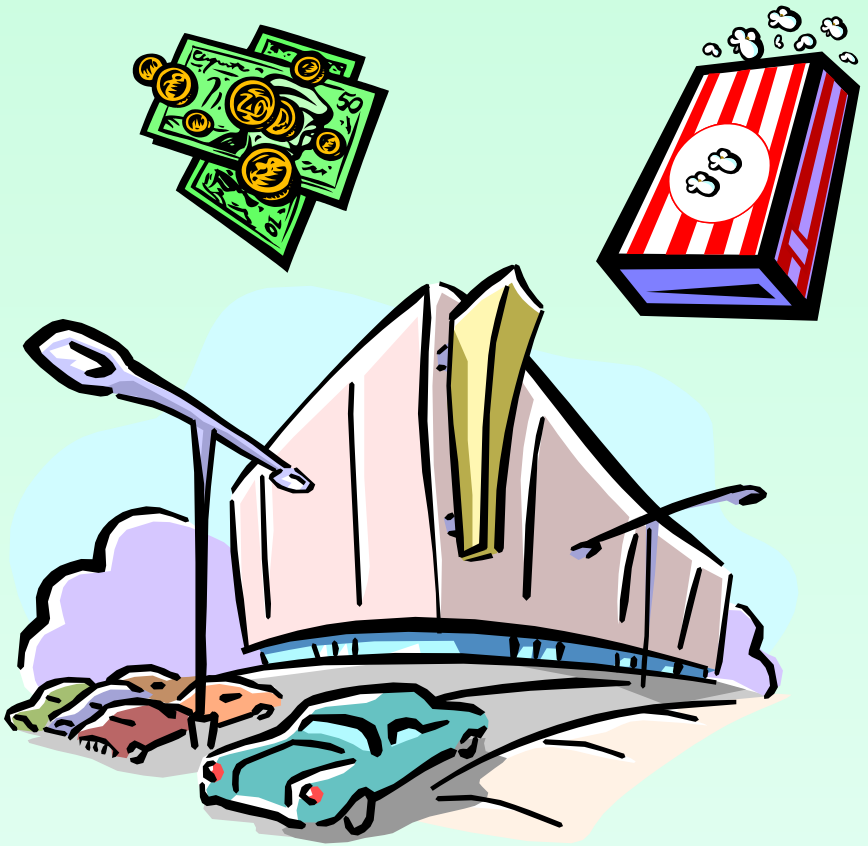
Pasadena Convention Center

• Registration & Set Up	Day 1	2:00pm - 9:00pm
• Judging & Interactive Science:	Day 2	9:00am - 5:00pm
– *ALL students present for interviews*		
– Interactive Science Activities – students	Day 2	10:00am- 3:00pm
• Interactive Science Activities and Exhibit Hall open to the public	Day 3	10:00am- 4:00pm
• Presentation of Awards	Day 3	6:00pm - 9:00pm
• Students Remove Projects	Day 3	4:30pm- 5:30pm 9:00pm-10:30pm

Check http://www.lascifair.org for specific dates, locations and special events.

The Day of the Fair

- Have good directions to the site
- Bring money for parking & food
- Arrive early
- Know where to register



The Day of the Fair

- Bring a book for waiting time
- Bring a camera to snap friends’ projects

The Day of the Fair

- **Set up** quickly
- **Relax**, view other projects
- **Be positive!** You've done the *very best* you could, given the present circumstances.
- ***Don't miss an interview!***

Awards

- Students compete for first, second, third and honorable mention place **medals**

- **Special awards** and scholarships provided by the business community.

- **First, second and third place** winners qualify to compete in the *California State Science Fair*.

International Science & Engineering Fair

- **Top 2-7 student projects in the Senior Division may be selected *<u>for international</u>* competition!**

Cour

Judging


OF
IONIZED
AIR ON
FRUIT
FLIES


Statement
Methods and
Los Angeles County
Science & Engineering Fair
S0802
Braeden Benedict

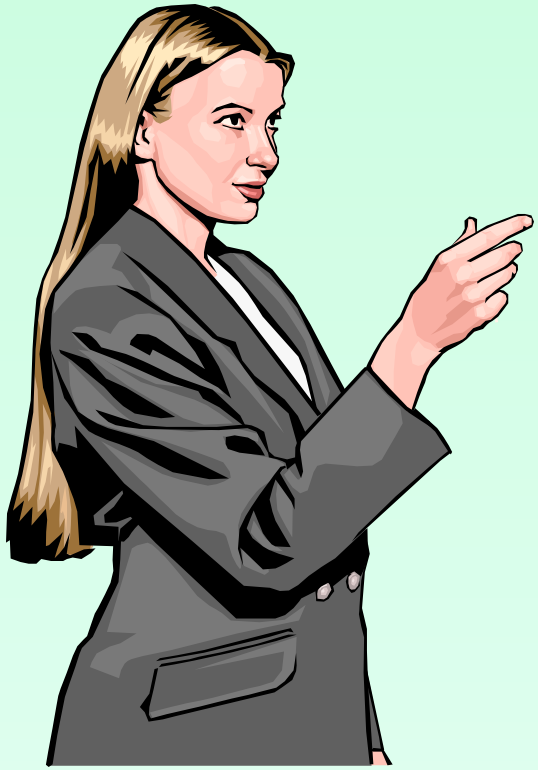
Judging

- **Clothing**: Neat, preferably business style– it shows your respect for the judges

Judging

- **Introduce** yourself to each judge, shake their hands

- **Courtesy**: If able, stand when judges come to your exhibit and remain standing until they leave



What Judges Expect from Students

- ***Enthusiasm!*** **An interview can be fun!**
- **Pride in your projects and accomplishments**
- **Give as much information as possible, *BUT…***
- **Be able to explain your projects clearly and concisely**
- **To be able answer questions appropriate to your grade level and age**

The Judges Will Want To Know:

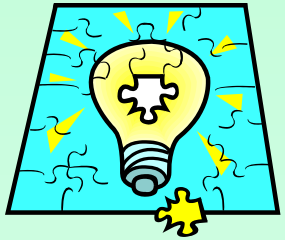
- **How was your project topic selected?**
- **Did you receive help and if so, how much?**
- **What has been previously known about the project's general subject area?**
- **What would the you do if there were additional time to spend on the project?**
- **What have you learned through the investigation?**
- **If this project was continued, what would be the next step(s)?**

Judging

- **Rehearse Your Presentation**
  - You will more composed if you are prepared.
- **Do your BEST!**
  - Be calm, confident and professional.
  - Know what you are talking about and you will do ***fine!!!***

Judging Standards-Science

- **Creativity**
  - Originality, uniqueness of approach



- **Scientific Thought**
  - Depth of study and effort in using scientific procedures to solve a clearly defined problem

- **Thoroughness**
  - Study is complete within the scope of the problem.

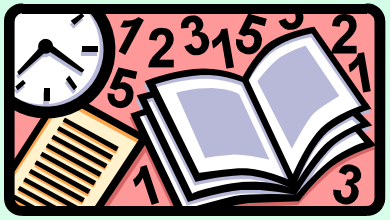
Judging Standards-Science

- **Special skills**
  - Construction or equipment use; computational and design skills

- **Clarity**
  - Clearly explained orally and through the display.
  - Project notebook is well organized, neat and accurate.
  - Sources of ideas, data and assistance are clearly identified

Judging Standards-Math

- **Math & Computer Creativity**
  - Concepts used ingeniously, new viewpoint or interpretation of results
- **Analytical Methods**
  - Depth of study and effort, clarity, refining
- **Presentation**
  - Good visuals, clear explanations
- **Background**
  - Appropriate literature search, special skills evident, detailed notebook



Judging Standards-Teams

- **Team Aspects**
  - **Why is this a *team* project?**
  - **Do all understand objectives & outcome?**
  - **Unique contributions of team members?**
- **Good Science Aspects**
  - **Creativity, scientific thought, thoroughness, skill, clarity**
- **Research Notebook**
- **Quantitative Analysis**
- **Qualitative Analysis**

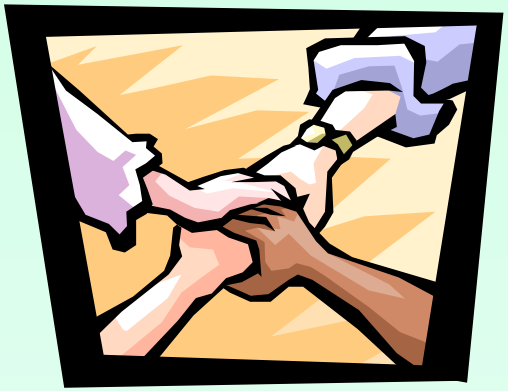


Exhibit Hall Open to the Public

Day 3, 10am- 4 pm

Interactive Science Exhibits

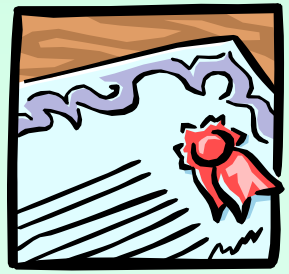
Day 2, 10:00 am – 3:00 pm (general public)
Day 3, 10:00 am – 4:00 pm (general public)

Awards Ceremony

Day 3 6:00- 9:00pm

Awards Ceremony

- **ALL students should plan to be present**
- ***1st, 2nd, 3rd place or Honorable mention in each category***
- ***Special Awards from professional organizations***
  - ***or prizes from fair sponsors***



- **Decision of the judges is FINAL**

Junior Sweepstake Winners!

After Public Viewing

- Take down projects promptly

- All projects must be removed by 10:30 pm

- No storage space: uncollected projects go in the trash

Developed by

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