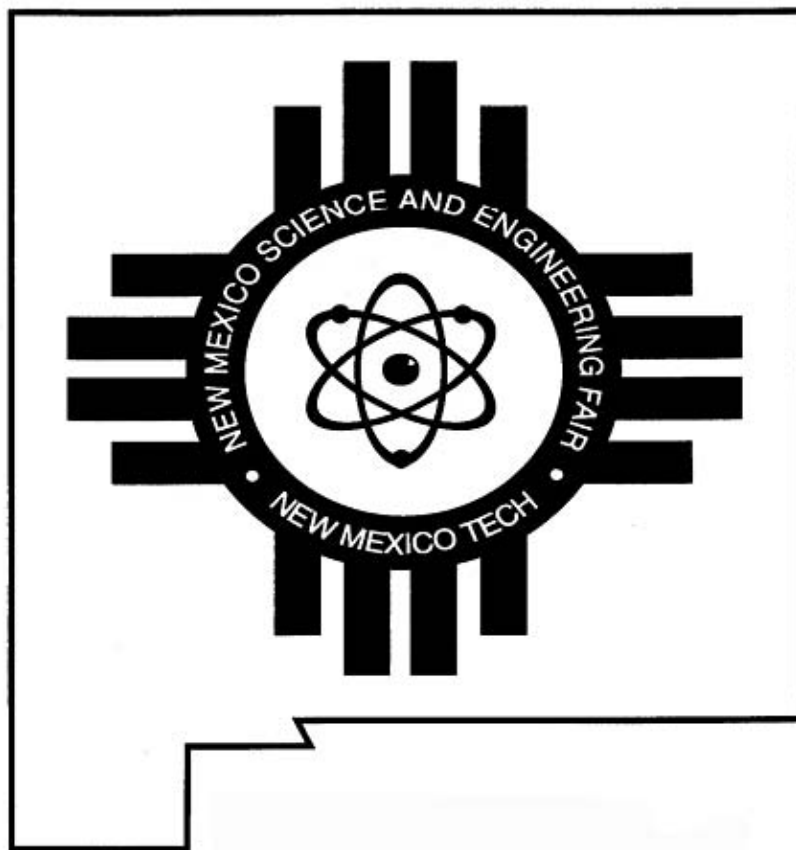


60th New Mexico Science & Engineering Fair

Handbook for Exhibitors



March 30-31, 2012

New Mexico Tech
Socorro, NM

INTRODUCTION: YOUR STATE QUALIFIER'S PACKET

Your State Qualifier's Packet contains the following:

State Qualifiers Participation Form—the enclosed form must be filled out by every State Fair qualifier and returned to New Mexico Science & Engineering Fair office **immediately**. Indicate whether or not you are able to attend.

New Mexico Science and Engineering Fair receives a copy of the entry form that you sent to your regional fair, and you are required to bring the same project to the New Mexico Science and Engineering Fair. However, you may change the name of your project, change categories, or change from a table to a floor exhibit (or vice versa).

Handbook for Exhibitors and Sponsors—this booklet has all the information needed to bring your exhibit to the State Science Fair. Please read this handbook carefully. You should bring this booklet with you as a point of reference.

Please share this information with your sponsor. All information contained in the qualifier's packet can also be viewed at http://infohost.nmt.edu/~science/fair/Student_Sponsor%20Info.htm.

ORGANIZATION

NMSEF accepts the top exhibits from the six regional science fairs in the state. It is held each spring on the campus of NM Tech in Socorro. Its objectives are 1) to recognize and reward excellence in science, mathematics, and engineering projects carried out by middle and high school students from throughout New Mexico and; 2) to select the projects which will compete in the Intel International Science and Engineering Fair (Intel ISEF) held in May in a major city each year. The 2012 Intel ISEF will be held in Pittsburgh, PA, May 13-18, 2012.

The fair is divided into two divisions. The **Junior Division** includes students in grades 6-9. The **Senior Division** includes students in grades 9-12. Ninth graders may choose either of the two divisions. Each division is further divided into the following categories:

*Behavioral and Social Sciences
Botany (Plant Sciences)
Cellular & Molecular Biology
Chemistry
Computer Science
Earth & Planetary Science
Engineering*

*Energy and Transportation
Environmental Science
Mathematics
Medicine and Health
Microbiology
Physics & Astronomy
Zoology (Animal Sciences)*

Please be sure that your exhibit is in the right category!

There must be at least six (6) exhibits per category. NMSEF personnel reserve the right to reassign exhibits as deemed necessary.

PARKING

Vehicles may park in any parking lot on campus. Vehicles **MAY NOT** pull into the area behind the Exhibit Hall (Gymnasium) at any time.

REGISTRATION AND SET UP

Registration will take place from 2:00 to 8:00 p.m. on Friday, March 30, 2012. Registration will be held in the lobby of the Joseph A. Fidel Center. You must register before you will be allowed to set up your exhibit. ***Exhibitors may not register or set up exhibits on Saturday morning. No exceptions will be made.***

The registration fee is \$25.00 per exhibitor. Included in your packet will be a Participation Certificate, a Science Fair pin, one Saturday lunch ticket. Extra lunch tickets are available for purchase on Saturday, on the third floor of the Fidel Center Ballroom. The cost is approximately \$7.50-8.50 per person.

Registration fees for student exhibitors may be prepaid by a school purchase order. Purchase orders may be mailed or faxed, (575) 835-5274, to the Science Fair office prior to the Science Fair. Purchase orders **MUST** include student name(s), school name and name(s) of sponsors and bus drivers, if they are being paid for.

Students note: if a school is responsible for paying your registration fees these fees MUST be paid in advance—otherwise you will be responsible for payment of your own fees.

Once a Student Exhibitor has registered and received his/her registration packet, they may take their project to the Exhibit Hall (Gymnasium) to set up.

120-volt grounded electrical outlets are available for exhibitors upon request. Exhibitors should come prepared with tools and other equipment to set up and repair their displays. These items are not supplied by Science Fair personnel.

After your exhibit is completely set up, it is your responsibility to find a Project Checker to review and approve your display. Checkers will be wearing orange vests. Your project will not be eligible for judging unless the approval sticker is properly displayed. Nothing may be added to the exhibit after it has been approved by the checker. **The Exhibit Hall closes at 8:00 p.m. on Friday. Plan your set-up time accordingly.**

New Mexico Science and Engineering Fair and its affiliates are not responsible for lost, stolen, or damaged equipment or supplies to any project while on display during the New Mexico Science and Engineering Fair. This includes set-up and tear-down times.

On Saturday morning, from 7:45 to 8:00 a.m., the Exhibit Hall will be open to exhibitors only to briefly come in to turn on displays, equipment, etc. in preparation for judging. ***This time is to be used for this purpose only, and cannot be used to complete your exhibit set up.***

PROTOCOLS

All projects dealing with humans, non-human vertebrate animals, pathogenic agents, controlled substances, recombinant DNA (rDNA) or human and animal tissue must have the appropriate forms and certificates (protocols) on file with the Science Fair office. These forms must be signed and dated in accordance with Intel ISEF regulations and your regional fair's deadline. Your regional fair will forward them to the State Science Fair Office, and they will be reviewed by the State Fair Scientific Review Committee. **Exhibitors who fail to present the proper protocols will be disqualified.**

AWARDS

There are two types of awards presented at the New Mexico Science and Engineering Fair, special awards and category awards.

Special awards are provided by industries, businesses, professional organizations, universities, and the branches of the Armed Forces. They include plaques, cash awards, saving bonds, merchandise, and scholarships.

Category awards are given to first, second, third place, and honorable mention in each category. First place category winners in the Junior Division receive savings bonds. In the Senior Division, savings bonds are awarded to 1st, 2nd, and 3rd place winners.

In addition, Grand Award Winners are selected for each of the two divisions. In the Junior Division, there are two Grand Award winners, one in the life sciences and one in the physical sciences. These exhibitors receive savings bonds and/or merchandise awards.

In the Senior Division, there are four Grand Award winners, two in the life sciences and two in the physical sciences. Grand Award winners qualify to exhibit at the Intel International Science and Engineering Fair. Their awards include all-expense paid trips to the Intel ISEF for both the student and their sponsor. Team projects are also eligible to receive Grand Award status.

Two awards programs will be held on Saturday evening in the Macey Center Theatre. Names of winners will not be available to exhibitors or the general public until they are announced at the awards programs.

In the Junior Division, each student exhibitor will receive two tickets to their Awards Assembly (one ticket will be for the student exhibitor and the other for a guest). The awards program for the Junior Division begins at 6:00 p.m. Open seating for non-ticket holders will begin at 5:45 p.m. on a first-come, first-served basis.

The Senior Division program begins at 7:30 p.m. and includes a presentation by the winner of the Junior Academy of Science Paper Reading Competition.

Tear-down of exhibits begins at 6:00 p.m. Student exhibitors must have their name tag to enter the Exhibit Hall to tear down. **Exhibits may not be taken down before 6:00 p.m. on Saturday.**

JUDGING

Category award judges are drawn from the industrial, professional, scientific, and engineering communities from around the state. They are formed into committees, one for each category in each division. Each committee is responsible for determining the winners in that particular category.

Special award judges are usually selected by the sponsoring organization.

Overall, judges look for well thought-out research. They look at how significant the project is in its field, as well as how thorough the student was.

Judging begins at 8:00 a.m. on Saturday *without* exhibitors at their exhibits. Each exhibit is judged initially by three category award judges. After initial judging, the judging committee meets and reviews the exhibits and their scores. Special award judges follow their own criteria to determine their awards.

Judges interview exhibitors from 10:30 a.m. to noon and from 1:30 to 3:30 p.m. Please be at your exhibit promptly. The length of the interview period will depend on the committee. Exhibitors should remain at their exhibits throughout the judging interview periods for special and grand award judging. **Although not all student exhibitors will be re-interviewed**, it is necessary for them to remain at their exhibit until 3:30 p.m. or until they are dismissed by Science Fair personnel.

PUBLIC VIEWING OF EXHIBITS

The Exhibit Hall is open to the public from 4:00 to 6:00 p.m. on Saturday. Exhibitors are encouraged to be at their exhibits for at least part of the time on Saturday afternoon if possible.

SPECIAL ACTIVITIES DURING THE FAIR **

New Mexico Science Teachers Association (NMSTA) Annual Meeting is held from 10:00 am to 11:45 am in Workman 101. 10:00 to 10:30 am, *Coffee & Muffins* will be served. 10:30 to 11:45 am, the *Combined NMSTA Executive Board and Membership Meeting* is held. Special door prizes for teachers are given.

On Saturday afternoon, from 1:30 to 3:00 pm, parents and sponsors are invited to attend the *Parents and Sponsors Appreciation Reception*. Parent/Sponsor Appreciation hosted by NM Bureau of Geology and NMSTA. Refreshments, Door Prizes!

*** Activities subject to change*

MEALS AND LODGING

Lunch is provided from 11:00 am to 2:00 pm on Saturday. As part of the exhibitor registration package, student exhibitors receive one (1) lunch ticket. Additional tickets may be purchased at the entrance of the Joseph A. Fidel ballroom located on the third floor on Saturday from 11:00 am to 2:00 pm. Other meals are the responsibility of the participants.

Overnight accommodations in Socorro are the responsibility of Science Fair participants. The State Science Fair office does not make motel reservations, nor are any dormitory facilities available on campus. **Make your reservations early!** For lodging information visit the Socorro County Chamber of Commerce website at <http://www.socorro-nm.com/Lodging.htm>.

Intel ISEF PARTICIPANTS' RECEPTION AND MEETING

On Saturday evening, immediately following the Senior Division Awards Ceremony, a reception will be held in the Galena Room of Macey Center for all *Intel International Science and Engineering Fair* (Intel ISEF) qualifiers, alternates, their sponsors and parents. This includes all regional Intel ISEF participants. Regional Director's will be in attendance to answer questions and assist in filling out forms. Intel ISEF winners from around the state will be honored and plans will be finalized for the trip to Intel ISEF in May. It is important that everyone who will be a part of the New Mexico delegation to Intel ISEF attend this meeting.

Intel ISEF qualifiers, their sponsors, Regional Fair personnel, and State Science Fair personnel make up the Official Party to the *Intel ISEF*. Non-supported persons (those going to Intel ISEF at their own expense) are responsible for their own arrangements.

NEW MEXICO SCIENCE AND ENGINEERING FAIR RULES

The *New Mexico Science and Engineering Fair* is an affiliate of the *Intel International Science and Engineering Fair* (Intel ISEF) and is bound by the rules governing that organization. The *International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, 2011-2012* must be strictly followed. Complete rules are available from your regional fair office or online at [http://www.societyforscience.org/Intel ISEF/document](http://www.societyforscience.org/Intel%20ISEF/document). Listed below is a condensed version taken from the *International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, 2011-2012*.

Ethics Statement: Scientific fraud and misconduct are not condoned at any level of research or competition. Such practices include plagiarism, forgery, use or presentation of other researcher's work as one's own, and fabrication of data. Fraudulent projects will fail to qualify for competition in affiliated fairs or the *Intel ISEF*.

Exhibitor Eligibility: Any student, enrolled in grades 6-12, selected by a regional science fair as a State Science Fair qualifier, is eligible to exhibit at the State Science Fair. Students who will have reached age 21 on or before May 1 preceding the Intel ISEF are not eligible to participate. In addition, eligibility requirements established by the New Mexico Activities Association apply to all participants.

Each student exhibitor may enter only **one** project which covers research done over a maximum of 12 continuous months between January 2011 and May 2012.

Students may compete in only one Intel ISEF Affiliated Fair, except when proceeding to a state/national fair affiliated with the Intel ISEF from an affiliated regional fair.

Team Projects: Team projects will compete within the scientific category of their research and will no longer be a separate judged category.

Teams may have up to three members. Teams may not have more than three members at a local fair and then eliminate members to qualify for the Intel ISEF.

Team membership cannot be changed during a given research year including converting from an individual project or vice versa. In future years, the project may be converted from an individual to a team project, from a team to an individual project or have a change of team members.

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.

Each team member must submit an **Approval Form (1B)**. However, team members must jointly submit the **Checklist for Adult Sponsor (1)**, one abstract, a **Student Checklist (1A)**, a **Research Plan** and other required forms.

Full names of all team members must appear on the abstract and forms

Adult Sponsors: Every student exhibitor at the New Mexico Science and Engineering Fair must have an accompanying adult sponsor. Sponsors are responsible for their students during the entire fair. Sponsors usually are teachers, but may be parents. One person may serve as sponsor for more than one student. The Adult Sponsor must review the **Students Research Plan (1A)** to make sure that: a) experimentation is done within local, state, and federal laws and the International Rules for Precollege Science Research (see *International Rules for*

Precollege Science Research); b) forms are completed by other adults involved in approving or supervising any part of the experiment; and c) criteria for the qualified scientist adhere to those set forth below.

The Adult Sponsor must be familiar with the regulations that govern potentially dangerous research as they apply to a specific student project. These may include chemical and equipment usage, experimental techniques, research involving human or vertebrate animals, and cell cultures, microorganisms, or animal tissues. The issues must be discussed with the student when completing the Research Plan. Some experiments involve procedures or materials that are regulated by state and federal laws. If not thoroughly familiar with the regulations, the Adult Sponsor should help the student enlist the aid of a Qualified Scientist.

The Adult Sponsor is responsible for ensuring the student's research is eligible for entry in the NMSEF.

Exhibit Size: The overall dimensions of the exhibit display are limited to:

- Depth (front to back): 30 inches or 76 centimeters
- Width (side to side): 48 inches or 122 centimeters
- Height (floor to top): 108 inches or 274 centimeters

The tables are 76 cm (30 in) high, so table exhibits cannot be higher than 198 cm (78 in) measuring from the table top to the top of the exhibit. The display may not extend beyond the front edge of the table.

Abstract: After finishing research and experimentation, you need to write an abstract. The abstract needs to be a maximum of 250-words on one page. An abstract should include the (a) purpose of the experiment, (b) procedures used, and (c) data and (d) conclusions. It also may include any possible research applications. Only minimal reference to previous work may be included. The abstract must focus on work done in the current year and should **not** include: a) acknowledgments or b) work or procedures done by the mentor. See *Intel ISEF Student Handbook for guidelines and examples* (<http://www.societyforscience.org/document.doc?id=12>)

Project Data Book and Research Paper: Each student should display a project data book and a research paper. This helps the judges determine consistency and thoroughness. See *Intel ISEF Student Handbook for guidelines and examples*, <http://www.societyforscience.org/document.doc?id=12>.

Required Forms: All required forms and appropriate certifications must have been submitted to, and approved by, the regional fair Scientific Review Committee and Institutional Review Board (see *International Rules for Precollege Science Research: Guidelines for Science Fairs, 2011-2012*, <http://www.societyforscience.org/ISEF/document>).

Every student must have completed a Research Plan (1A), Research Plan Attachment and Approval Form (1B) and review the project with the Adult Sponsor as the Checklist for Adult Sponsor (1). All required forms, certifications, and permits must be available for review at the State Science Fair. These should be kept in your project data book.

Important Considerations for the Project Display:

- Acknowledgements will be allowed in the research papers or project notebooks, **NOT** on the display board.
- **The exhibitor's name, address, and school will NOT be allowed on the display board.**
- Any abstracts which are presented in the display area cannot contain the exhibitor's name, address, and school. Those containing name, address, and school name must be kept in the project notebook.
- Human Subjects Form (4) or equivalent form provided by a regulated 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 project notebook in case requested for by a judge or other NMSEF official.
- Human Subjects Form (4) signed by the human subject is required for visual images of humans (other than the Finalist) displayed as part of the project.

Display and Safety Regulations:

Not Allowed at Project

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) 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 (Exceptions: water integral to an enclosed apparatus)
- All hazardous substances or devices. (For example, poisons, drugs, firearms, weapons, ammunition, reloading devices, and lasers (as indicated in items 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, or 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 integral part of the project (Exception: The current year Science Fair pin may be worn).
- 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
- Prior years written material or visual depictions on the vertical display board. Exceptions: the project title displayed in the finalists' booth may mention years or which year the project is (for example, "Year 2 of an Ongoing Study"). Continuation projects must have the Continuation Project Form (7) vertically displayed.
- Glass or glass objects unless deemed by the Chief Checker to be an integral and necessary part of the project (Exception: glass that is an integral part of a commercial project such as a computer screen).
- Any apparatus deemed unsafe by the Scientific Review Committee, the Rules Checkers, or NMSEF (for example: large vacuum tubes or dangerous ray-generating devices, empty tanks that previously contained combustible liquids or gases, pressurized tanks, etc.

Allowed at Project or in Booth BUT with the Restrictions Indicated

Soil, sand, rock and or waste supplies if permanently encased in a slab of acrylic.

Any paperwork which contains name, address, and school name of the Exhibitor must be kept in the project notebook. Postal addresses, World Wide Web and e-mail addresses, telephone numbers, and fax number of the Exhibitor must be kept in the project notebook.

Photographs and/or visual depictions **if**:

They are not deemed offensive or inappropriate by the Scientific Review Committee, Rules Checkers, or NMSEF. This includes but is not limited to visually offensive photographs or visual depictions of invertebrate or vertebrate animals, including humans. The decision of any one of the groups mentioned above is final.

Credit lines of their origin: "Photograph taken by..." or "Image taken from..." are attached. (If all photographs being displayed are taken by the Finalist or from the same source, one credit line prominently displayed is sufficient.)

c) 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.

e) 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 paperwork)

4. Any apparatus with unshielded belts, pulleys, chains, or moving parts with tension or pinch points **if for display only and not operated.**

5. Class II lasers **if**:

The output energy is <1mW and is operated only by the finalist

b) Operated only during Display & Safety inspection and during judging

c) Labeled with a sign reading "Laser Radiation: Do Not Look Into Beam."

- d) Enclosed in protective housing that prevents physical and visual access to beam.
- e) Disconnected when not operating.
- 6. Class III and IV lasers **if for display only and not operated**
- 7. Any apparatus producing temperatures that will cause physical burns **if adequately insulated.**

Electrical Regulations

1. Finalists requiring 120 Volt A.C. electrical circuits must provide a UL-listed 3-wire extension cord which is appropriate for the load and equipment.
2. Electrical power is supplied to projects and, therefore, the maximum allowed for projects is 120 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 NMSEF personnel. For all electrical regulations, "120 Volt A.C." is intended to encompass the corresponding range of voltage as supplied by the facility in which NMSEF is being held.
3. 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.
4. 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 Exhibitor. 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.
5. Wiring not part of a commercially available UL-listed appliance or piece of equipment must have a clearly visible fuse or circuit breaker on the supply side of the power source and prior to any project equipment.
6. There must be an accessible, clearly visible on/off switch or other means of disconnect from the 120 volt power source.
7. 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.

The rules listed above are a condensed version taken from the *International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, 2011-2012*
<http://www.societyforscience.org/isef/document>.

Complete rules are available from your regional science fair office or online at
<http://www.societyforscience.org/ISEF/document>. The *International Rules for Precollege Science Research: Guidelines for Science and Engineering Fairs, 2011-2012* must be strictly followed.

2012 New Mexico Science and Engineering Tentative General Schedule

Friday, March 30

2:00-8:00 p.m.	Registration	Front Lobby, Joseph A. Fidel Center
2:00-8:00 p.m.	Exhibit set-up (Exhibit hall must be vacated by 8:00 p.m.)	Exhibit Hall
5:00-7:30 p.m.	New Mexico Junior Academy of Science Paper Reading Competition	MSEC 101 and 103
8:00 p.m.	Star Party Directions available at registration. Weather and viewing conditions permitting.	Etscorn Observatory

Saturday, March 31

7:45-8:00 a.m.	Exhibit Hall open to exhibitors <i>only</i> , to turn on displays, etc.	Exhibit Hall
8:00-10:00 a.m.	Initial judging without exhibitors present.	Exhibit Hall
10:00 – 11:45 a.m.	New Mexico Science Teachers Association (NMSTA) Annual Meeting	Workman 101
10:30 a.m.-Noon	Judges' interviews with <i>all</i> exhibitors.	Exhibit Hall
Noon-2:00 p.m.	Luncheon	Third Floor, Joseph A. Fidel Center
1:30-3:00 p.m.	Parents and Sponsors Appreciation Reception. Special Science presentation. Everyone welcome. Hosts: NM Bureau of Geology and NMSTA.	Workman 101
1:30-3:30 p.m.	Judges' interviews with exhibitors. Additional interviews by category judges, special and grand award judging.	Exhibit Hall
4:00-5:00 p.m.	Exhibit Hall open to the public.	Exhibit Hall
6:00-7:00 p.m.	Awards Program, Junior Division	Macey Center Theater
5:00-8:00 p.m.	Exhibit tear-down, name tags must be worn to enter Exhibit Halls. (You may not remove your exhibit before 5:00 p.m.)	Exhibit Hall
7:30-8:30 p.m.	Awards Program, Senior Division	Macey Center Theater
8:45 p.m.	ISEF Participants' Reception and Planning Meeting	Macey Center Theater

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