

2019 SMOKY ROW SCIENCE FAIR

SCIENTIST'S GUIDE

Last Updated: November 24th, 2018

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(There's a lot here; please consider before printing)

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All forms and info available on the PTO website

<http://myccs.ccs.k12.in.us/sre/pto/committees> → school enrichment → science fair

If internet links do not send you to sites directly, copy and paste
address into browser

Contact any Science Fair Committee Member with questions

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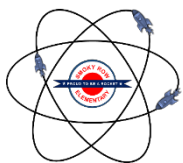
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2019 SMOKY ROW SCIENCE FAIR

FAMILY LETTER

Our young scientists are nearing the culmination of their efforts as they get ready to participate in the science fair! We are trying a new format this year, so please carefully review the schedule and what to expect as described below.

Tuesday, Jan 29th 2019– SRE Cafeteria/Gym

- 5:15 p.m.** **Student drop-off** and check-in; project board set-up
- 6:00 p.m.** Parents leave (or wait in the media center) during judging
Round 1 of judging begins
- 7:00 p.m.** Recognition ceremony with Mrs. Jay.
Semi-finalists moving on to Round 2 of judging are announced
- 7:30 p.m.** **Parents arrive**
Semi-finalists stay for Round 2 of judging (parents wait)
All other students may head home for a good night's sleep ☺
- 8:00 p.m.** Final judging concludes
Students go home while results are tallied

Wednesday, Jan 30th 2019– Winners announced at school! Winners of the 2019 SRE Science Fair will proudly represent our school at the Central Indiana Regional Science and Engineering Fair (CIRSEF) on Saturday, March 2nd 2019 at Marian University in Indianapolis.

PARENTS:

1. Plan for your student to eat dinner early or late this night (or have them bring a water bottle and a light snack to hold him/her over while at the fair). No food is provided for students.
2. You will drop your child off in the cafeteria (Door No. 6 on the school's east parking lot) at 5:15 p.m. and pick them up at 7:30 p.m. **(with potential to stay until 8:00 p.m. if your child advances)**.
3. Parents will not be present during the judging process (starting at 6:00 p.m.). You may leave or wait in the media center – whichever is more convenient for you.

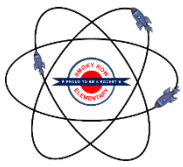
SCIENTISTS:

Check-in:

1. You will check in at the registration table in the cafeteria, attach a number card to your board and bring your project to the assigned table number.
2. Make sure your board is labeled with your name on front and your teacher's name on the back.
3. Set-up: Bring only your display board; leave your experimental items at home. No electricity is provided. There will be up to 6 projects per table, so please make room for your neighbors ☺

Judging:

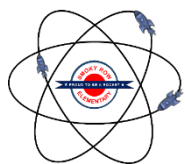
1. There will be a few minutes of announcements and the judging process will begin at 6:00 p.m.
2. You will be visited by two judges, who will read through your project and ask you a few questions about your work. This will only take a few minutes each time. That means there will be a lot of waiting around!
3. Bring a quiet activity to do independently (preferably some homework to do or a book to read). You are allowed to bring a personal electronic device so long as it doesn't distract others, but YOU ALONE are responsible for its safety.
4. Following the initial round of judging, we will hold a recognition ceremony (starting at around 7 p.m.), where each scientist will be acknowledged on stage and presented a certificate.
5. Parents arrive at 7:30 p.m.
6. **If you are chosen as a semi-finalist, you will advance to a second round of judging held from 7:30 - 8:00 p.m.** During this time, you will have the opportunity to visit with multiple judges and share the story of your experiment.
7. You will leave your project display board in the cafeteria and winners will be announced the next day at school!



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STUDENT REGISTRATION

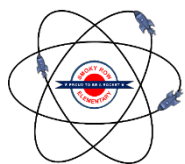
- Follow this link to the online registration form:
<https://goo.gl/forms/63mPshzdiLp5Zr2g1>
- EACH student is required to complete registration, even if they are working with a partner (this is needed for student check-in, project judging and recognition ceremony).
- Registrations will close on Jan. 8th 2019



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INSTRUCTIONAL VIDEO LINKS

- Week 1 Kickoff-Dec. 14th
<http://youtu.be/sih2t2vqFBE>
- Week 2 Testable Question & Research
<http://youtu.be/W3LoZkf9CR8>
- Week 3 Hypothesis & Experimental Design
<http://youtu.be/eYivkW4NNsU>
- Week 4 Conducting Experiment
<http://youtu.be/9tWhYd33Ms0>
- Week 5 Analyzing Data & Display Board
<http://youtu.be/HylQnotCshc>

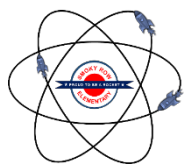


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Calendar Overview

- **Registration Open: 12/10/2018–1/8/2019:**
<https://goo.gl/forms/63mPshzdiLp5Zr2g1>
- **Week 1: Project Proposal: Due 12/21/2018**
 - Submit project proposal at:
<https://goo.gl/forms/NuTd7dOlzUZAD3Gb2>
- **Week 2: Background Research, Hypothesis, Materials and Methods: Due 1/8/2019**
 - Submit background research, hypothesis, materials and methods at: <https://goo.gl/forms/AUNpi1rPi1gk55i02>
- **Week 3: Conduct Experiment and Collect Data; 1/8/2019(suggested date)**
- **Week 4: Data, Results and Graphics; 1/15/2019(suggested date)**
- **Week 5: Draw Conclusions and Start Poster; Due: 1/22/2019**
 - Submit project abstract at:
<https://goo.gl/forms/4MkNbZmayUybUh643>

Keep copies of all your submissions. Students will receive guidance from the SRE Science Fair Committee and may make suggestions to modify your project to meet SEFI guidelines. Please read the SEFI rules page in this packet before you begin your project!

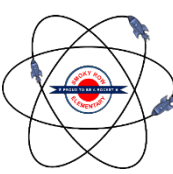


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Overview of Required Submissions

- **Week 1-Dec. 21st: Project Proposal:** Choose a topic that interests you and start a log book. Keep it simple. **Study 1 variable.** Describe your experiment, what you plan to measure and how. Be specific. **Example:** Title: You are my Sunshine! Topic: The effects of sunlight exposure on pea plant height. Question: Does more sunlight exposure make pea plants grow taller? Variable: Sunlight. Proposal: I will grow 3 sets of 5 pea plants (15 total) under the same soil and watering conditions. Daily sunlight exposure: Group 1: 4 hours; Group 2: 6 hours; Group 3: 8 hours. I will measure plant height (mm) after 2 weeks, then calculate average group heights.
- **Week 2-Jan.8th: Background Research, Hypothesis, Materials and Methods:** State your hypothesis and null hypothesis with one sentence each.
Examples:
 - Hypothesis: Pea plants exposed to longer periods of sunlight will grow taller (this is a clear statement)
 - NOT: Sunlight will affect pea plant height (this is a vague statement)
 - Null Hypothesis: Sunlight exposure will have no effect on plant height.
 - NOT: Pea plants with given more sunlight exposure will grow shorter.

❖ TIP: If your 1 variable has a number of sub-groups, rank them in order (best to worst; tallest to shortest) as best applicable.
- **Week 3-Jan 8th: Conduct Experiment and Collect Data** (suggested date): Conduct your experiment. Record your data. Take photos to use in your display (especially if these are items that are allowed to be displayed at the fair).
- **Week 4-Jan 15th : Data, Results and Graphics** (suggested date): Analyze data. Summarize results. Create graphs/tables/ figures/photos-be sure to label appropriately.
- **Week 5-Jan 22nd : Draw Conclusions and Start Poster:** Do the data support your hypothesis? What do your results indicate? What did you learn? Draw your conclusions. Start poster board.



printable poster

The scientific method is a way to ask and answer scientific questions by making observations and doing experiments.

www.sciencebuddies.org

what if...

Find a general topic that interests you and write down the question that you want to answer.

when I... how do...

Ask a Question

The scientific method starts when you ask a question about something that you observe: **How, What, When, Who, Which, Why or Where?**



And, in order for the scientific method to answer the question, it must be about something that you can measure, preferably with a number.

- > Topic Selection Wizard
- > Science Fair Project Ideas
- > Your Question
- > Engineering & Invention Project Template

question word table



network plan

Do Background Research

Learn from the experience of others.

identify key words bibliography

So that you can design an experiment, you need to research what techniques and equipment might be best for investigating your topic. Rather than starting from scratch, savvy investigators want to use their **library and Internet** research to help them find the best way to do things.

- > Background Research Plan
- > Finding Information
- > Bibliography
- > Research Paper

measure photos notebook



Test with an Experiment

Your experiment tests how accurate your hypothesis is. It is important for your experiment to be a **fair test**. You conduct a fair test by making sure that you change only one factor at a time while keeping all other conditions the same.

careful accurate consistent

You should also repeat your experiment several times to make sure that the first results weren't just an accident.

Your experimental procedure is like a step-by-step recipe for your science experiment

- > Experimental Procedure
- > Materials List
- > Conducting an Experiment
- > Laboratory Notebook

review data

Look at the results of your experiment with a critical eye.

variables

Analyze Data

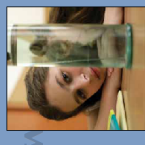
Once your experiment is complete, collect your measurements and analyze them to see if your hypothesis is **supported or not**.

Revise & Re-test

Scientists often find that their hypothesis was not fully supported by the data, and, if so, they will construct a new one for additional experimentation. Even if the hypothesis was supported by the data, they may want to test it in a new way.

conclusions average

- > Data Analysis & Graphs
- > Summarizing Your Data
- > Sample Spreadsheet
- > Conclusions



label graphs

If Supported

Analyze Data

If Not (or Partially) Supported

To complete your science project, you will communicate your results to others in a **final report and/or a display board**.

Professional scientists do almost exactly the same thing by publishing their final journal or by presenting their results on a poster at a scientific meeting.

be positive be confident

- > Final Report
- > Science Fair Project Abstract
- > Display Board Design, Tips, and Samples
- > Science Fair Judging

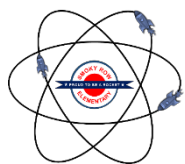


THE SCIENTIFIC METHOD



Elmer's Project Solution Products are available at:

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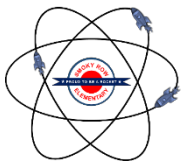
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RESEARCH GUIDELINES

- Before you begin, you **MUST** submit a short project proposal at <https://goo.gl/forms/NuTd7dOlzUZAD3Gb2> and receive approval for your project before the registration deadline.
- Please check to make sure your project does not include any **PROHIBITED** materials (Last page of this packet).
- Maintain a **LOGBOOK** with a dated account of everything that concerns your project.
 - Please keep detailed notes and record original observations and data from the experiment in your logbook.
- Team Projects are allowed. Only 2 members per team. **Both team members must be from the SAME GRADE.**
 - Each team members' name must be entered into the registration system.

Project Requirements

- Each project should demonstrate a scientific principle, or use the scientific method to answer scientific questions or solve a scientific problem.
- Each project should include the following elements: Purpose, problem, hypothesis, variables, data/results, procedure, materials, and conclusion.



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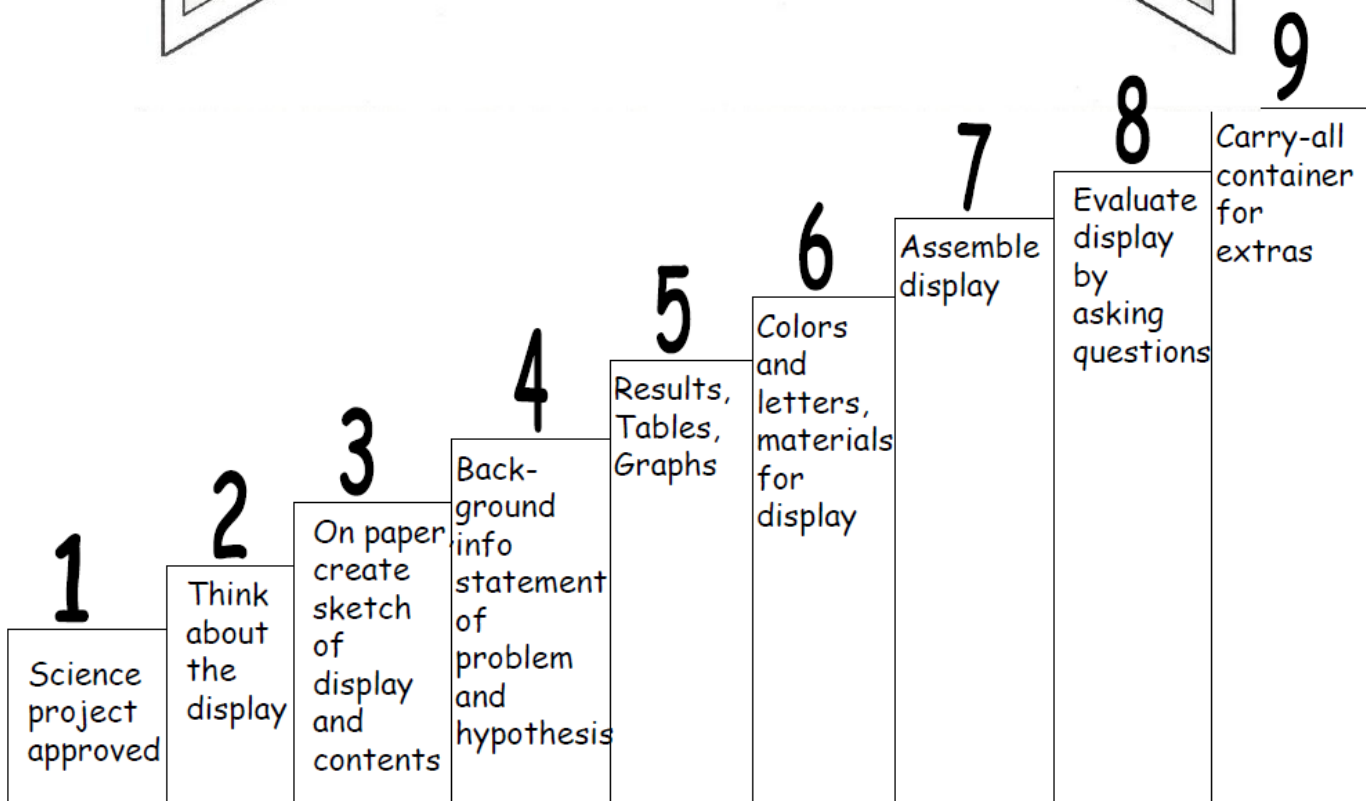
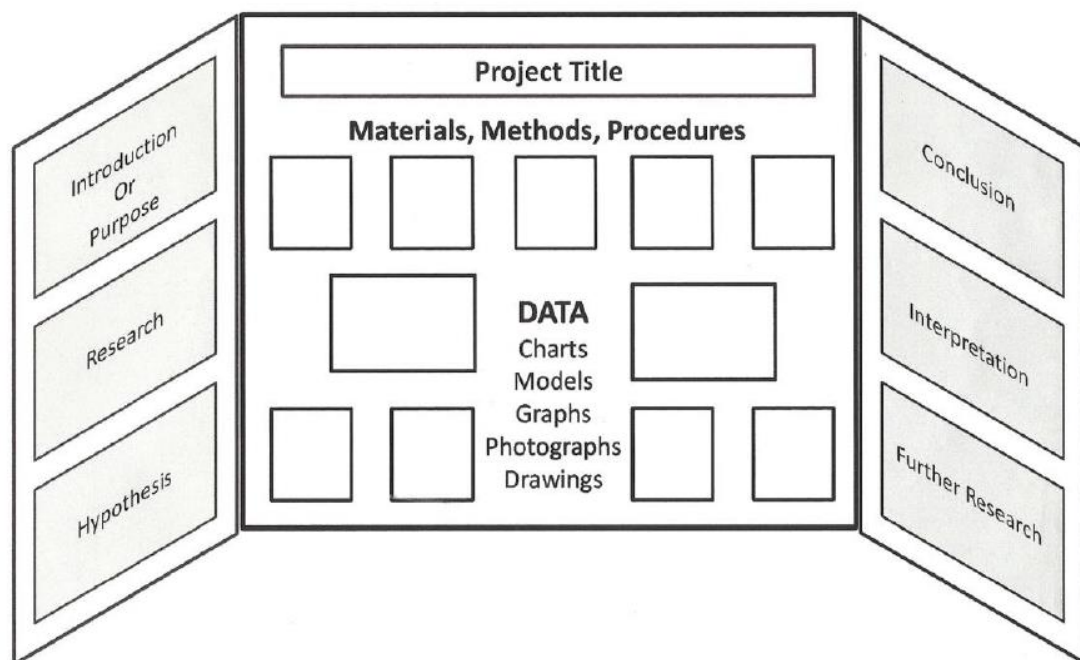
DISPLAY GUIDELINES

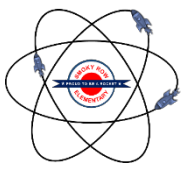
- Purchase a tri-fold project board (36"x48") at any area retailer
 - Use a coupon at a craft store (Michael's, Hobby Lobby)
 - Or get at Target, Meijer or Walmart (~\$3 for Elmer's brand white cardboard one)
- Title
 - Choose a catchy, short title related to your work
 - Can add a longer subtitle
- Student information
 - Make sure your name is on the front
 - Teacher/grade on the back
- Goal: your board should tell your story for you!
 - Include all components of scientific method
 - Use photos of your work (leave your experimental stuff at home, bring only the board to the fair!)
 - Graphs and charts to show data
 - Keep words to a minimum (bullet points are great)
- Be neat! Computer printouts or neat hand-writing and/or drawings



NINE STEPS TO DEVELOP A SCIENCE FAIR DISPLAY

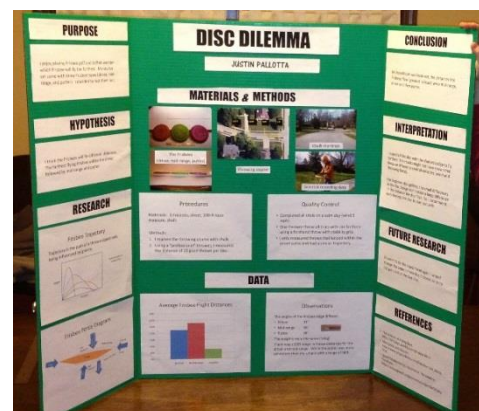
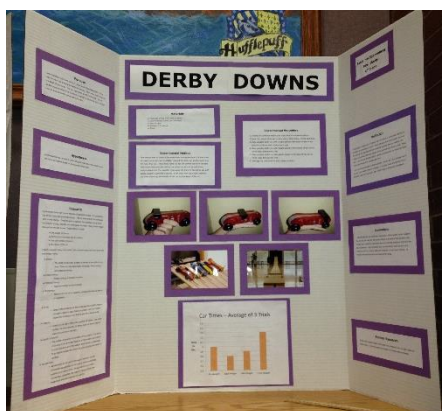
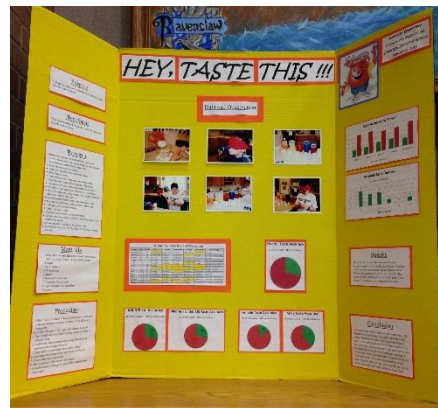
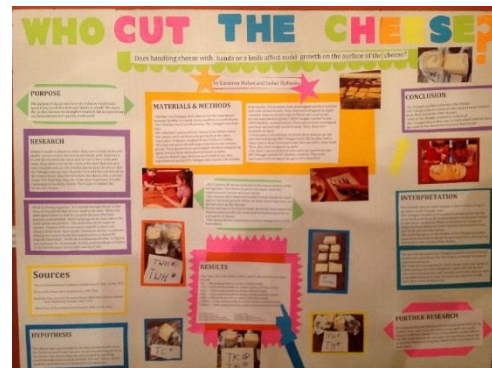
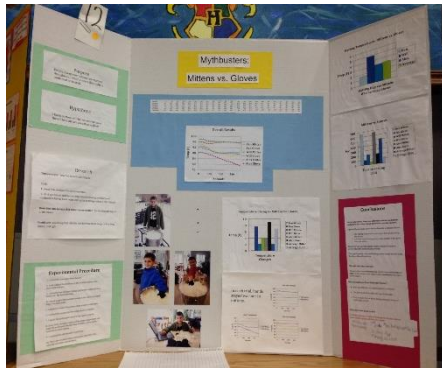
Material normally included on a typical project display board
(example only, make it your own!)

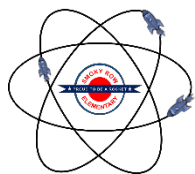




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DISPLAY EXAMPLES





SMOKY ROW SCIENCE FAIR

JUDGING RUBRIC

GRADES 4-5

Table Number

Project Number

Example Fair Judging Rubric

Project Title

Judge Name

SCORING RANGE
1-5
for each criterion
listed below

1 = Doesn't meet requirements
2 = Meets at a minimum
3 = Easily meets to slightly exceeds
4 = Exceeds requirements
5 = Outstanding, remarkable

PROJECT ELEMENTS	DESCRIPTION OF CRITERIA	SCORE
Overall		
Creativity/Innovation	Original idea. Student demonstrates an understanding of the subject matter or innovative/creative way of approaching their project.	
Physical Display	Tells the story of the project. Appealing and neat. Shows all proper components.	
Oral Presentation	Gives clear explanations. Questions answered honestly and accurately.	
Application of Scientific Method		
Testable Question	Asks a specific, measurable, cause & effect question or clear purpose of project given.	
Background/Research	Describe why this project was selected and describe research from multiple sources. Shows evidence student understands topic.	
Hypothesis	Predicts a reasonable outcome as a result of a specific change.	
Procedure	Describe experimental process. High score would indicate that the project can be repeated after reading.	
Constant Conditions	Identify independent variable, dependent variable and constant conditions.	
Data and Identification	<ul style="list-style-type: none"> At least 3 trials or samples are shown OR 3 observations made. Use photos/charts/graphs/illustrations to show data. All data clearly labeled. High score would show steps in the process throughout experiment or observation. 	
Conclusion & Reflection	Reflects what the student has learned and how it relates to hypothesis. Were there any surprises? What would you do differently or to continue the project?	
TOTAL SCORE		

2019 Regional Science Fair Rules

Prohibited Exhibit Items

- **Water or other liquids**, even in a sealed container **CANNOT be part of the exhibit**, however, the student can use water or liquids for experiments and should consider **photographs, drawings, diagrams, or text** to describe the project in the display, not the prohibited materials themselves.
 - Using photographs and drawings, instead of using living or prohibited items will **NOT** affect the judging of their project.

Prohibited Project Items

- The following list of **PROHIBITED** items **cannot** be part of any Regional Science Fair:
 - Projects **CANNOT** involve unnecessary pain or discomfort to any vertebrate animals (e.g. mammals, birds, reptiles, amphibians, or fish). These are strictly prohibited! Conduct projects in a humane manner.
 - **Living or formerly living materials including:**
 - Microbes (bacteria, molds, or algae)
 - Spoiled food or other decomposing organic matter
 - Microbial cultures
 - Soil or waste samples
 - Preserved plant or animal material including: dried plant material and taxidermy specimens or parts
 - Human or animal parts (exceptions: hair, teeth, nails, bones, histological sections and wet-mount tissue slides)
 - Human or animal food
 - Radioactive Substances
 - Sharp items
 - Flames or highly flammable materials
 - Tanks with any substance under pressure
 - Batteries with open-top cells
 - Hazardous Chemicals
 - Poisons, drugs, or controlled substances
 - Dry ice or other sublimating solids
 - Moving parts with unprotected belts and/or pulleys
 - Class III and IV lasers
 - Other items which in the judgment of the Safety Committee of the Regional Science Fair pose a threat to the health or safety of participants, judges, or spectators

Exhibit Requirements

- Exhibits will be confined to table space measuring 24" front to back, 48" side to side, and 72" tall.
- Students must stay with their project for the duration of the judging process
- **ALL** switches and cords must be equipped for maximum 110 volt/500 watt operation, and must be UL-approved. All electrical contacts and connections must be covered in a code approved manner.
- A need for electricity **MUST** be indicated on the entry form or the exhibit will be placed at a table without electrical service.
- Exhibits must remain on the exhibit floor until the end of the dinner break.