

## It's Science Fair time!

The Healdsburg Area Science Fair is coming up this March and all local students from Kindergarten through 12<sup>th</sup> grade are encouraged to join in. We have activities for all interests from building zany contraptions to helping you solve questions you have about the world around you. Read on! This information packet is also available on line at: [healdsburgsciencefair.com](http://healdsburgsciencefair.com). Need ADDITIONAL HELP or have concerns? Please email Shaun McCaffery ([help@healdsburgsciencefair.com](mailto:help@healdsburgsciencefair.com))

## THREE WAYS TO PARTICIPATE

### 1. Technology Project (Grades 6-8)

For 2019, the technology project consists of building a Rube Goldberg machine for fun and competition. If you enjoy making things and want a chance to learn more about simple machine physics as you design and build an imaginative and fun contraption! The competition is at the Healdsburg Technology Day on Saturday, March 2<sup>nd</sup>, 2019 at the Healdsburg Junior High.

*The Healdsburg Technology Day will include exhibits and activities for students of all ages in addition to the Rube Goldberg competition. Check the website for more details!*

### 2. Science Experimental Project (Life or Physical)

A science experimental project is an investigation that explores how the world works using the scientific method. Have you ever wondered what bugs fly the fastest, what soil makes the reddest radishes, or how video games might dull pain? If so, an experimental project is right up your alley!

### 3. Creative STEAM (Science, Technology, Engineering, Art and Math) Project

Introducing the creative STEAM project! These projects bring together many areas of study in a project of your choice that is more flexible. Do you like coding, building models, or communicating complex information? ... then the STEAM projects will help you sharpen your skills.

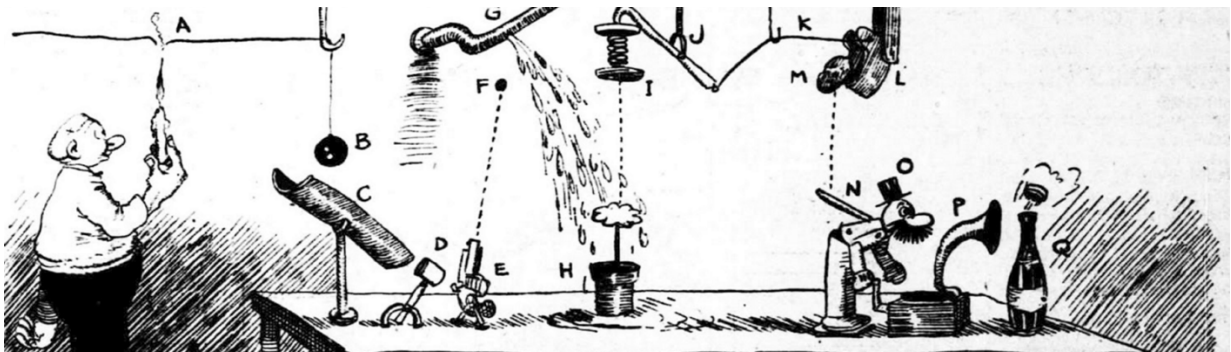
## CALENDAR OF EVENTS

<b>Information Session @ Kick-Off Night (@ The Healdsburg School)</b>	<b>January 22<sup>nd</sup>, 2019</b>
Learn About the Entire Week of Science Fun!	5:00 PM – 6:00 PM
<b>Technology Day @ HJH (Rube Goldberg Projects)</b>	<b>March 2<sup>nd</sup>, 2019</b>
Fun for the Entire Family! (check website for details)	10 AM – 1 PM
Project Registration and Setup	10 AM
Rube Goldberg Competition	11 AM – 1 PM
<b>Registration @ Villa (Project Drop Off)</b>	<b>March 3<sup>rd</sup> – March 4<sup>th</sup>, 2019</b>
Sunday Afternoon / Evening Drop Off	3 PM – 7 PM
Monday Morning Drop Off	7 AM – 9 AM
<b>Public Viewing @ Villa (Come See the Projects!)</b>	<b>March 6<sup>th</sup> – March 7<sup>th</sup>, 2019</b>
Wednesday	9 AM – 6 PM
Thursday	9 AM – 6 PM
<b>Awards Night @ Villa</b>	<b>March 7<sup>th</sup>, 2019</b>
Collect your Prizes and Projects*	7 PM – 8 PM

\* Projects left after 8 PM are unfortunately discarded

## TECHNOLOGY PROJECTS (RUBE GOLDBERG COMPETITION)

A Rube Goldberg machine is a fun and challenging building project where you accomplish a simple task in a complex way. Named after a world renowned cartoonist with relatives here in Healdsburg, check our website for fun videos and Rube Goldberg history! We assign you the task but from there you're free to build the zaniest contraption possible to perform the trivial task assigned. Bring your completed machine to Healdsburg Junior High, 315 Grant Street, Healdsburg on **Saturday, March 2<sup>nd</sup> at 10 AM**. Registration and set up at 10am. Show time: 11 AM – 1 PM. For questions call Mike Miller at 433-7530 or mikemi@calpine.com. **Please no early registrations!**



### Basic Requirements and Rules (see website for complete rules)

1. Teams are limited to four (4) students.
2. The contraption must complete the assigned task in the prescribed number of total steps (or more) and include the prescribed minimum number of the six "simple machines" which are: **1-Incline, 2-Wedge, 3-Screw, 4-Lever, 5-Axle and Wheel, 6-Pulley**. These six "simple machines" are described in full detail in the Rube Goldberg packets available on the website at [www.healdsburgsciencefair.com](http://www.healdsburgsciencefair.com)
3. Pretty much anything goes, the only restrictions are that no flammable or toxic substances or animals (dead or alive) may be used. Maximum voltage is 12V.
4. At the competition students must set up their own machines without the help of parents.
5. At registration each team must submit 3 copies of a clear and concise step-by-step description of the machine.
6. The machine must complete a full cycle, be reset and complete a second full cycle within the specified time. Each team may claim one free restart without penalty if within the time limit. Judges will add points for creativity, innovation and additional steps.
7. To be eligible for awards, contestants must remain on-site to run the machines and/or answer questions until the judging for their level is complete.

Grades	Task	Total Steps	Simple Machines	Time Limit	Size (LxWxH)
6-8	Place a Golf Ball on a Tee	10	3	10 min	4'x6'x6'

### Keys to Success

1. Decide on a theme first, that way the steps you decide to use can be adapted to that theme.
2. Make a list of the essential "simple machines" to include and plan those first.
3. Start early in rounding up scrap mechanisms for your contraption. The recycle center at the dump is always a good place to start. Another good place is the Salvation Army Store on Lytton Springs Road.

- Avoid buying brand new components; the judges delight in seeing an old lawnmower wheel used instead of a new pulley from the hardware store – remember this contest is about your creativity and resourcefulness as well as your understanding of the simple machines.

## SCIENCE EXPERIMENTAL PROJECTS

### Registration

- Bring your project to the Villa Chanticleer at 1248 N. Fitch Mountain Rd.
- Sunday, March 3<sup>rd</sup> 3 PM – 7 PM and Monday, March 4<sup>th</sup>, 7 AM – 9 AM
- Register online at the website in advance or on provided computers at the Villa.

### Categories

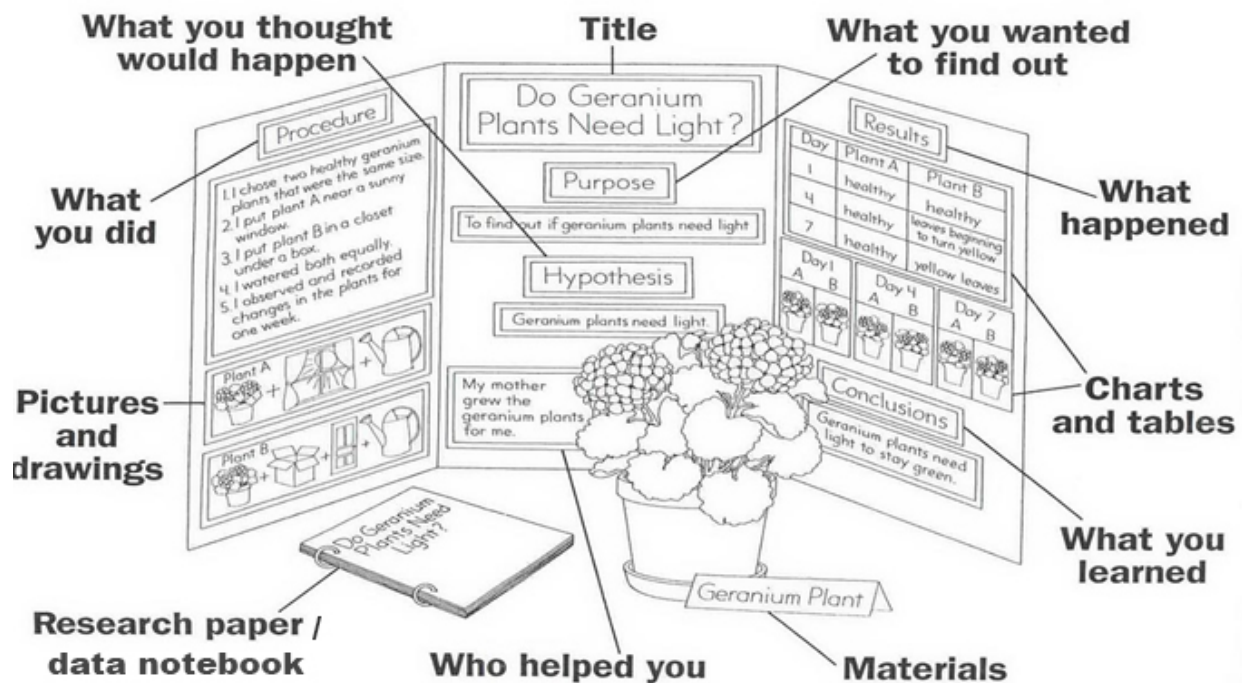
Projects are placed and judged in one of the following:

- LIFE SCIENCE:** Plants, Animals, Human or Animal Behavior, etc.
- PHYSICAL/EARTH SCIENCE:** Chemistry, Physics, Geology, Astronomy, Computer Science, Mathematics, etc.

Remember: The projects should involve students doing actual research into a question to which they do not know the answer. Investigations that involve observations and data gathering but not experiments are also appropriate. *While collections, demonstrations of known information, models, etc., are good things to do, they are not appropriate for our Science Fair.* The old baking soda and vinegar volcano demonstration or an insect collection would, therefore, not be appropriate.

### Display

Following is a diagram of one way to present a project.



**Note:** Many people will view your project and be interested in your work and handle parts of it. Adults are on duty while the Fair is open to the Public, but the **Science Fair Committee cannot be responsible for loss or damage to your project or equipment.**

## SCIENCE EXPERIMENTAL PROJECTS (cont.)

### Rules

- A. **Projects are to be submitted Sunday, March 3<sup>rd</sup> 3 PM – 7 PM and Monday, March 4<sup>th</sup>, 7 AM – 9 AM. Late projects are not accepted.**
- B. You may get advice from your parents, teachers, and friends, but **YOU MUST DO YOUR OWN WORK.**
- C. You may work by yourself or with one other partner. Group projects are judged in the grade category corresponding to the highest grade of the students (e.g., a 5<sup>th</sup> and 6<sup>th</sup> grade student work on a project together, the project is judged in the 6<sup>th</sup> grade group). The science fair is a competition, and comparing a single student to a group of 3, 4 or even more students is not fair, therefore, no more than two students may work together on a project. Class projects are only eligible for class recognition awards.
- D. Your project may be up to 36" wide and no taller than 48". It must be able to stand on the table by itself.
- E. You may not display a project that the Science Fair Committee believes to be unsafe. Electrical outlets will not be available for any demonstration. A maximum of 12v supply voltage of electrical power (battery) is permitted in active demonstrations. Dangerous chemicals or drugs, open flames, sharp objects, explosives or apparatuses' with fast moving parts which may pose a safety hazard may not be exhibited. The Science Fair Committee reserves the right to disallow a demonstration that they feel compromises the safety of people or property.
- F. Live animals are not allowed at the fair, nor may animals be harmed in conducting experiments.
- G. Projects involving illegal substances or ingestion of alcohol are not acceptable.
- H. **Do not put your name or your picture on the project where the judges can see it; place name on the bottom of the back side of exhibit.**

### Judging

A major goal of the Science Fair is to encourage use of the scientific method. Therefore, your project must contain the following:

- QUESTION - About something in which you are interested
- HYPOTHESIS - Use if...Then statements
- EXPERIMENT - Test your hypothesis. Use a control. Repeat or do multiple tests at the same time
- OBSERVATION AND ANALYSIS - Results and Data
- CONCLUSION - Examine results. Remember it is ok if your data does not match your hypothesis.

The *judging criteria* are explained briefly below. More information at [healdsburgsciencefair.com](http://healdsburgsciencefair.com).

### Points

- |           |  |
|-----------|--|
| 5         | QUESTION and HYPOTHESIS - Does the project ask or pose a clear question and/or hypothesis?   |
| 15        | EXPERIMENTAL PROCEDURES - Does the project show the steps followed, the materials used, and how data was collected?  |
| 20        | OBSERVATIONS & ANALYSIS - Does the project show what information was collected, and observations made? Were written records kept? How is the information used to answer the original question (purpose)? |
| 15        | CONCLUSION - Does the student clearly state what he/she learned? Is there discussion of why things may or may not have happened as expected? How might it be done differently next time?                 |
| 20        | CREATIVITY & ORIGINALITY - Does the work show originality of approach and handling?  |
| 5         | CLARITY - Will the average person understand what the project was about?   |
| 10        | WORKMANSHIP - Is care evident in the preparation, mounting, labeling, use of data, etc.? Does the Project attract the viewer?  |
| <u>10</u> | EFFORT - How much thought or work was put into the project? How hard did the person try?   |

## SCIENCE EXPERIMENTAL PROJECTS (cont.)

### Judges

The judges are local people involved in science and engineering. They work hard and study your projects thoroughly. Your project is anonymous until the preliminary judging is finished.

### Awards

- **Everyone who does a Science Project is a Winner!** You will have accomplished something, seen it through and learned from your results. **Everyone** who enters receives a participation ribbon and a treat!
- First place winners will be asked to meet a team of judges on Wednesday, March 6<sup>th</sup> between 3:30 p.m. and 5:30 p.m. to review their project for “BEST OF GROUP” and “BEST OF SHOW” Awards.

Best of Group	First Place	Second Place	Third Place
K - 5: \$100.00	K - 5: \$50.00	K - 5: \$40.00	K - 5: \$30.00
6 - 12: \$150.00	6 - 12: \$75.00	6 - 12: \$50.00	6 - 12: \$40.00

**Dean Darby Award** (Best of Show Runner-Up) \$100.00

**John Max Award** (Best of Show) \$200.00

**Mycology/Botany Award** Cash Prize

Sonoma County Mycological Association awards a cash prize for outstanding projects in the fields of Mycology (Mushrooms & Fungi) and Botany.

### Awards Ceremony

Award winners will be presented at the Awards ceremony, 7:00 pm, Thursday, March 7<sup>th</sup> at the Villa. Your project must be picked up between 4 - 8 p.m. Thursday at the Villa, or they will be discarded.

### Keys to Success

1. Ask yourself. “Can I test my hypothesis by doing experiments that I can manage myself?” If “yes” then you should be able to complete a good project. If not then you may become frustrated by confusing results. If you are inexperienced test a simpler hypothesis – simple experiments becomes intriguing once you start observing the details.
2. Ask yourself “Is my topic something I am truly interested in”? If yes then your project will probably stand out.
3. Start early – even if all you do is choose your project in January you’ll be in good shape.
4. Get help. Our goal is for you to grasp the scientific method. We can help you come up with a project which is just right for you. The best way to get help from us is to come to the clinics or ask your librarian. Dates for clinics are on the first page.
5. Science fair projects are experiments, not demonstrations. A demonstration lacks sufficient experimental methods. Adding Mentos to Dr Pepper does demonstrate a reaction but it falls short of science because you have not altered a variable and observed the result.
6. Visit our website: [healdsburgsciencefair.com](http://healdsburgsciencefair.com) for links to project ideas.



## STEAM PROJECTS

STEAM means... Science, Technology, Engineering, Art, and Math.

STEAM projects are being introduced this year in addition to the Rube Goldberg machines and the traditional research science projects. While a traditional science project focuses on crafting a testable question, devising a method to examine the question, and then analyzing and communicating the findings, a STEAM project can involve things like identifying and solving a design problem, creating a piece of software that meets a social need, or communicating complex information in a creative and memorable way. The sky's the limit!

**This means that your project could be creating a video, an app, a poster, or a model. All we ask is that it is displayed to the judges for them to review and provide feedback.**

Given the complexity of trying to judge a communicative poster against a robotic hand, these projects will not be in competition against each other. However, all the projects will be evaluated by our judges and feedback will be given based on the criteria listed below.

The following is a list of Science and Engineering Practices that could be parts of your project:

- Asking questions and defining problems
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and computational thinking
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

**Remember these practices are part of your science curriculum and you have been working on them all year. Be sure to ask your science teacher about the practices in your class.**

### Rules

- A. Projects are to be submitted Sunday, March 3<sup>rd</sup> @ 3 PM – 7 PM and Monday, March 4<sup>th</sup>, 7 AM – 9 AM. Late projects are not accepted.**
- B. You may do both a STEAM project and a traditional science project if you wish.
- C. You may get advice from your parents, teachers, and friends, but **YOU MUST DO YOUR OWN WORK.**
- D. You may work by yourself or in a group up to three people.
- E. Your project may be up to 36" wide and no taller than 48". It must be able to stand on the table by itself.
- F. You may not display a project that the Science Fair Committee believes to be unsafe. Electrical outlets will not be available for any demonstration. A maximum of 12v supply voltage of electrical power (battery) is permitted in active demonstrations. Dangerous chemicals or drugs, open flames, sharp objects, etc. which may pose a safety hazard may not be exhibited.
- G. Live animals are not allowed at the fair; nor may animals be harmed in conducting experiments.
- H. Projects involving illegal substances or ingestion of alcohol are not acceptable.
- I. The projects are typically displayed at the Villa from registration (Sunday or Monday morning) through Thursday afternoon. There are a stream of visitors and hundreds of small children during those days. The Science Fair Committee is not responsible for the loss of any items used in your display. You may choose to drop off items of higher value during judging night and pick them up immediately after to minimize the chance of loss. If you wish to do this, check with the registration staff to determine the time for drop-off and pick-up. If your project includes items just during judging (such as a computer or tablet) please also include some graphical still to illustrate your project for those who visit after judging.

- J. Unfortunately, we cannot accommodate in-person presentations.
- K. **Do not put your name or your picture on the project where the judges can see it; place name on the bottom of the back side of exhibit.**

### **Criteria**

- Purpose – Is there a clear purpose to the project and is it communicated in a clear manner.
- Integration – We encourage students to combine multiple areas of Science, Technology, Engineering, Art and Math
- Progress – The project provides clear examples of documentation, organization, reflection and incorporation of feedback.
- Content Mastery – The project demonstrates clear understanding of the concepts presented, relevant curricular content and has been articulated well.
- Exhibition – The project is exhibited in a clear and detailed way to ensure viewers have a clear understanding of all aspects of the project.

### **Tips to Make a Good STEAM Project**

- Asks a clear question about a real-world problem.
- Provides a thorough description of the project, its goals, and the benefits the solution would provide.
- Identifies criteria and constraints
- Is well researched and provides multiple well-documented sources.
- Shows the progression of the project and the thought process using something like a journal.
- Demonstrates intentional planning, organization, problem-solving, critical thinking, interpretation of data and reasoned conclusions based on evidence.
- Shows that feedback was gathered and incorporated in the project to refine the idea.
- Presents the solution and describes how it might be refined with further time and / or resources

We will be expanding our website with examples of STEAM projects at <http://www.healdsburgsciencefair.com>. Check back there for more great ideas!