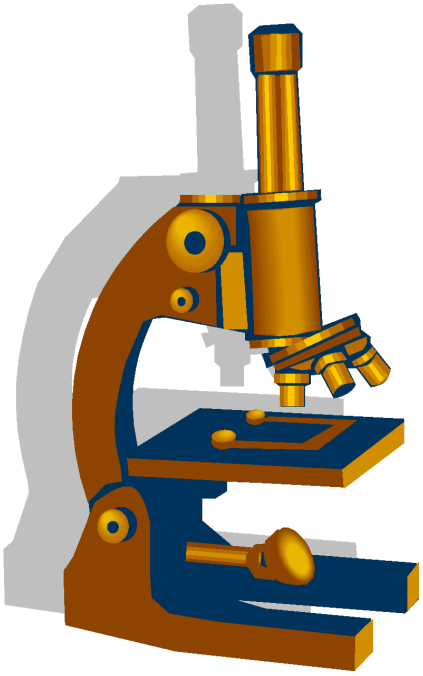
JLS Science Fair



http://jlswp.paloaltopta.org/index.php/science-fair-mar-2018/

bit.ly/JLSScienceFair2018

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Dear Students and Parents,

The JLS Science Fair is a school wide participatory event that is typically held in the fall. Each class participates on one of the two evenings; the final schedule depends on teacher schedules. All JLS students and their families are invited to attend. The Fair has traditionally been a huge success with over 400 JLS students participating.

The Science Fair at JLS is a noncompetitive event where each student presents his/her project to a reviewer. All reviewers are parent and community volunteers. All participants receive an award packet including feedback from the reviewer and a participation certificate. They are also entered in a prize drawing.

Although the Science Fair is voluntary, there are specific requirements**.** 6th grade science teachers strongly encourage participation in the science fair. 7th and 8th graders work on a Home Science Experiment (HSE) with a written report as part of their curriculum. This project is graded by the teacher and can be easily transferred to a poster for presentation at the Science Fair. Although 7th and 8th grade students are not required to participate in the Science Fair, it is a valuable experience to be able to present their work and to get feedback from the Science Fair reviewers.

Getting Started

The best way to start your project is to study something you are interested in.

- Use a resource you are comfortable with to select a project. This should be done as soon as possible.
- Register online for the science fair at the JLS Science Fair tab of the PTA web site. Deadlines are posted on this site: bit.ly/JLSScienceFair2018

Parents, please review the information in this booklet with your child to help select a project of interest that will be appropriate in terms of complexity and available resources. Please consider materials, information, time, cost and space. Once a student has identified a project, his/her science teacher must approve the project proposal**.** We have provided forms at the end of the Handbook that can be used by students to organize their project on paper before going to the online registration. All participants must register online.

Any projects involving live animals, humans, potentially dangerous chemicals or equipment will be reviewed to assure the ethics and safety of the proposed work. **Projects must comply with safety and ethics rules stated in this Handbook and be approved by your teacher or they will not be permitted at the Fair.**

Parental Assistance

We encourage students to receive ***help at home*** in preparing a project. Please feel free to help, encourage and support your child's best efforts in putting together an interesting and understandable project. **However, let your student to do the actual work by him/herself**. Do ***not*** do the project for your child. Students will learn more and have more fun if parents limit their involvement to encouragement, support and guidance. Teachers

are also available to provide guidance on the projects.

Acknowledgements
The Synopsys Outreach Foundation, a non-profit organization promoting science education and the JLS PTA are sponsors of the JLS Science Fair. The Foundation's program for middle schools is called Science-O-Rama and involves thousands of students throughout Silicon Valley. **JLS appreciates the generous support for JLS Science Fair by Synopsys Outreach Foundation and the PTA.**

We would also like to thank Principal Lisa Hickey and the JLS science teachers for their enthusiastic support of the JLS Science Fair.

Sincerely,
JLS Science Fair Committee

JLS Science Fair Calendar - 2018

Thursday, March 15	Registration deadline	
Tuesday, March 20	7:45 - 8:15 a.m.	Drop off posters in Cafetorium
	7:00 - 8:15 p.m.	Science Fair Poster Presentation
	8:15 - 8:30 p.m.	Prize Drawing

Science Fair Rules

1. Each project will be classified by grade and then subdivided into one of the following disciplines: life sciences, physical sciences, engineering, mathematics, and miscellaneous.

2. Each student may enter only one project.

3. Seventh grade and eighth grade students are required to work on the project by him/herself. If sixth graders want to work with partners, they should get permission from their science teacher.

4. Students must register online and print the application page to turn into their teacher. Teachers may have additional paperwork they require. Register by the deadline to have your poster placed with your class.

5. Teachers, parents and other responsible adults may *advise.* Parents should allow students to do the actual work. The best projects are the simple ones where students can demonstrate command of the subject matter and the experiment. Projects are set apart by how children personalize the experiment and bring their energy, enthusiasm and insights to the problem.

6. The three-sided display board will be provided ***free***, thanks to a generous grant to our school from the Synopsys Outreach Foundation. The boards will be given to each student or team when she or he turns in a proposal form and has this proposal form approved by his or her teacher. Please use only the board provided. Use of larger boards will not permit room for all the exhibits and homemade boards will not stand well.

7. Electrical switches and cords needed for exhibits must be in good working condition. Indicate in the comment section of the registration if you will need access to an outlet.

8. **Expensive or fragile items should not be displayed**. Valuable items essential to the project should be simulated or photographed.

9. The school and teachers assume no liability for loss or damage to exhibits. All students must agree to be careful and respectful of the work of student scientists when viewing the Fair exhibits.

10. Research involving the use of chemicals or equipment that might be dangerous,and any animal or human research requires a separate review for safety or ethics as well as supervision by a responsible adult and permission from your parent and your teacher. Please describe these aspects of your research on the safety review form provided.

11. The following are **prohibited** in Fair research: dangerous or potentially dangerous chemicals used without supervision by responsible adults, explosives, drugs or

medicines of any kind, alcohol, and tobacco products. In addition, animal or human experiments that involve any harm or potential harm including starvation or any other form of cruelty are strictly prohibited.

12. **Safe use of chemicals, equipment and open flames:** Any experiments that involve the mixing of chemicals that may be dangerous, potentially dangerous equipment or open flames for building or experimentation must be approved in a separate safety review of your proposal. If your experiment involves *any potentially dangerous materials or procedures,* you must describe in detail how you will handle these materials safely on the **safety review** form. Your parent must sign and agree that they will supervise this part of your research. You may not begin this research until you receive safety review approval for the research and the methods from your teacher. No open flames, dangerous equipment or dangerous chemicals may be brought to the fair. If their use is approved for your research, you may bring photographs or illustrations of your experiments and results with your display board, but not the actual chemicals or flames.

    Example: If you are going to build a working model of a volcano and want to use baking soda and vinegar to simulate an explosion, you must describe the risks of your proposal and show that you know how to work with these chemicals safely. You would write:

    Risks: "Vinegar is an acid. It is dangerous to the eyes."
    How will you use this material or procedure safely? "I will practice this part of my model only with the supervision of my parents, away from small children and pets, and I will wear safety glasses to protect my eyes when working with vinegar." You and your parent would sign this form and you would begin your research after your teacher approved the safety review form.

13. **Animal or human research** that is **NOT ALLOWED:**
    - Any projects that **would or might** starve, dehydrate, harm or kill animals.
    - Any human experiments, which **would** *or* **might** harm a person physically or psychologically.
    - Any experiments with humans without their informed, written consent.
    - Any experiments with children less than 10 years of age or 1 year younger than the oldest member of your team.
    - Any projects using over-the-counter medicine, prescription or illegal drugs, tobacco products or alcohol.

14. **Animal or Human Research** that is **permitted**:
    Live animals, including humans, may be the subjects of your experiments. However, all animal and human research projects must be approved by an ethics committee after you complete the **ethics review** form. You may not conduct research that may harm or does harm any animal or human. If you do experiments with humans, you must explain your experiment to them in writing and you must obtain their written consent to participate. This is called informed consent. If your research involves only observing humans and not changing their behaviors, you do not need their consent

(e.g., observing the behavior of drivers at a stop sign in the presence or absence of a stroller parked on the sidewalk corner).

Allowed Animal Research- Example: Testing whether your dog prefers gourmet dog food or his regular warehouse brand dog food.

Proposed experiment: I will alternate days that I feed my dog each food for 16 days and record how much food and how quickly he eats within 30 minutes of putting his food bowl out for him.

Precautions for humane treatment: "I will read the label and make sure that each food I offer my dog has the same amount of calories and nutrients as he normally eats. I will leave the food out for 30 minutes at his regular mealtime and note how much food he eats and how quickly he eats it. If he does not eat the food within 30 minutes, I will remove the new food and give him a bowl of his regular food. I will do this feeding in the presence of a parent to make sure that my dog is getting enough food. I will stop my research if I or my parent notices that my dog has any health problems during the experiment."

Allowed Human Research - example:

Proposed experiment: "My partner and I will eat identical lunches and breakfasts each day. We will then vary the snacks that we eat after school and keep track of when we first feel hungry for dinner. We will compare the calories and content of each snack and we will determine what makes the most nutritious and long-lasting snack. We will then test the best and the worst snacks on 10 of our friends and see if they find them satisfying or not."

*Describe how you will obtain informed consent: "*We will describe the entire experiment to our friends in writing. We will tell them that they are trying out two snacks for two days each and we need them to write down the time that they ate them and the time they first felt hungry for dinner. Each subject friend and a parent will get a copy of our experiment and sign it without any pressure from us. The snacks will be approved by our parents and the subject parents and will be ordinary fresh or prepared foods."

Suggestions on Choosing Your Science Fair Project

Key:
Choose a topic that you find interesting! If you are not excited about your project, the judges will not be either!!!

Choose an Area of Science

Start with your hobbies or a problem that you have been wondering about. Why don't your ice skates work well right after they are sharpened. Why does the tone change when the bridge on my violin is not straight? What is the environmental effect of invasive plants (French Broom, Yellow Star Thistle)?

Choose a Question

Choose one question that will narrow the focus of your investigation. This will be the question that you are trying to answer with your project. For example, using the subtopic "plant growth", one question could be "How does sunlight affect plant growth?" Another question could be "Which plant food works the best?" You can choose from many questions in any subtopic. Below is a small sample of science questions to be investigated.

Astronomy
Why does the earth have seasons?
How are tides created?

Chemistry
How can you tell if a substance is an acid or a base?
What is a chemical reaction?

Consumer Science
Which laundry detergent is best?
How does a camera work?

Earth Science
How do crystals grow?
What is the water cycle?

Electricity
What is the best conductor?
How does a switch operate?

Physical Science
How does an airplane fly?
How does an electromagnet work?

Botany
What color light is best for plant growth?
Can plants grow in water alone?

Anatomy
How does blood get from the toes to the heart?
How do muscles and bones work together in movement?

Science and Current Events
How is science (e.g., the field of forensics) being used to help the victims of crimes? What new inventions might be useful in the future (e.g., vaccines to anthrax or other forms of bioterrorism)? These projects would likely take the form of models, demonstrations or inventions. *Be sure to read the science fair rules regarding projects that are prohibited.*

Help choosing a topic
If you are having difficulty defining a question on your own, there are books in the library that will help you choose a topic or show you how to do an experiment. You can find good ideas for interesting projects by going to the JLS library or community library or bookstores and looking at science books. Here are some website suggestions to start with:

Science fair ideas	http://www.faculty.washington.edu/chudler/fair.html
	http://www.eskimo.com/~billb/scifair/physics.html
	http://www.sciencebuddies.org/
Amateur Scientist	http://www.amasci.com/amasci.html
Exploratorium	http://www.exploratorium.edu/snacks

Choose the Project Form
Decide which type of project would best show your audience the answer to your question. You can do an ***experiment*** or a ***demonstration***, or make a ***model***, a ***collection*** or an ***invention***. Note: your science teacher may specify the type of project you are to do. All 7th and 8th grade IRPs are experiments.

In general, you are encouraged to choose projects that will help you learn the scientific method of investigating a question. For more on the scientific method, see the **Getting Started** section of the science fair web site. Its okay to pick a project that has been done before but do try to personalize it in some way.

Research
You are now ready to begin planning your project by researching your question. You can get information from books, encyclopedias, pamphlets, television, field trips, interviews or the Internet. At least one reference must be from a book. Look for information from several different sources. Become an expert on your topic!

Plan Ahead
Sometimes science experiments don't work. If you plan and conduct your experiment well in advance of the science fair and your experiment does not work, you will have an opportunity to retry or change your experiment.

What if my experiment fails?
This happens sometimes, but ***don't worry,*** you should still present your work. Present what you did in your poster. In the conclusion section of your presentation, suggest ways to investigate *why* your experiment did not work. Experimental failure is common for scientists who usually repeat the experiment and if the experiment still does not work, they ask their question in a different way or redesign the way the experiment was conducted.

Displaying the Project

Your project board display is a very important part of your project since it explains others what you have done and learned. The quality of your work will be judged on your written display as well as your ability to explain your ideas, methods and what you have learned.

Suggested section headings for Science Fair Poster:

Clearly label the display board so that judges and visitors can see what you have done.

- **Identification**
  - Project Title
  - Name (A number of students forget to put their name on their project!)
  - Grade
  - Science teacher's name.
- **Project Title** or Scientific Question
- **Hypothesis** (required for experiments)
- **Methods or Procedures and Materials** – use both text and photos, if needed
- **Results/ Data** – text, tables, graphs, photos, drawings
- **Conclusion** – refer back to your hypothesis if this is an experiment. If your experiment failed and you cannot draw a conclusion, use this section to describe what you think went wrong and your ideas about improving the methods
- **References** – use at least two references, one of which must be a book
- **Acknowledgments** – thank the people who helped you

It is a good idea to ask a friend or parent to read over your poster before you have permanently mounted each section to make sure that it reads easily to someone less familiar with the project.

Displaying materials in front of your poster board

If you have made an invention, a model, a demonstration or a collection, these should be displayed in front of your poster board, unless they are fragile or valuable. In those cases, please mount photographs of your model, invention, demonstration or collection on your board. There may be a chance for you to bring fragile or valuable items to the Fair at a time when you will not leave your project unattended. If your project does not fit in front of your poster board, please let your teacher know in advance and he/she will be able to arrange a place for its display at the Fair.

The Scientific Method for Experiments

Use the following five steps of the scientific method in designing your experiment:

1. **Identify the problem**
   Think about what area of science interests you. Narrow your focus down to a specific question or hypothesis.
   Example: I like plants. I want to know what makes them grow best. I'll study which grass food is the best.

2. **Collect information**
   Research your topic. Take notes on information that you think will be important for your experiment. Use at least two references and cite them in your display.

3. **Develop a hypothesis**
   A hypothesis is an *educated* guess. It takes into account the research you have done and a logical expectation as to what you think will happen. What do you think will happen when you perform your experiment? The hypothesis answers your question.

   Example: Plant food "B", the premium food, will cause the lawn to grow faster because it has the most nutrients.

4. **Plan and Conduct an Experiment**
   First, make a plan for how you will do your experiment and a list of all the materials you will need. Conduct your experiment and observe what happens. In your experiment, make sure that you are only changing one variable at a time. This means that everything should be the same among the tested items (conditions remain constant). The only difference (variable) would be the procedure or item being tested in that part of the experiment. Keep a journal to record what you did and your observations - changes, growth or other results of your experiment.

   Example: All lawns being tested should be treated the same (conditions remain constant): same type of grass, soil, temperature, sunlight, water, feeding times, etc. The only difference (variable) would be the different plant foods fed to the lawns. Make a chart of the weekly lawn growth.

5. **Describe your results and draw a conclusion**
   Tables, graphs, photos or illustrations of the result of your experiment are good ways to display what you did and what your results were. Analyze the results of your experiment. Draw a conclusion based on your results. Was your hypothesis correct? Why or why not? Your conclusion should tell what you learned by conducting the experiment. Remember, an experiment is *not* a failure if the hypothesis is proven wrong!

Example: The part of the lawn fed with plant food “A” grew faster than the part of the lawn fed with any of the other plant foods tested. I knew this because the grass clippings from the lawn fed with plant food A weighed 6 pounds more than grass clippings from the areas fed with other foods. My hypothesis was not correct, even though plant food “B” cost more, has higher amounts of some of the ingredients and promised better growth, it did not promote the biggest growth. I learned that not all plant foods are the same and that advertising is not always true.

Science Fair Project Proposal: Model or Demonstration

Name:_____ Grade: _____

Science Teacher: _____ Room: _____

A model is a small object usually built to scale that represents some already existing object. A demonstration is an illustration or explanation of a scientific principle that shows how and why something works.

Project: What scientific question are you trying to demonstrate or model?

_____

_____

Materials*:* What materials will you need?

_____

Procedure: Write a description of what you plan to do. How will it be displayed?

_____

_____

Results*:* What do you hope to teach others with your demonstration or model?

_____

_____

Will this model or demonstration require the use of any potentially dangerous chemicals, procedures, equipment or use human or animal subjects?
Yes_____ No_____
If yes, please fill out and attach the appropriate safety or ethics form.

Parent approval: _____
Teacher approval: _____

Science Fair Project Proposal: Collection

Name:_____ Grade: _____

Science Teacher: _____ Room: _____

A collection is a grouping or gathering of various objects which must be scientifically related and demonstrate that you have learned something through the process of collecting and categorizing. Items should be categorized and labeled correctly, using scientific names when available.

***Project: What will you collect*?** What scientific question will your collection illustrate?

_____

_____

***Materials**:* How will you obtain the items for your collection?

_____

_____

***Procedure**:* How will you organize and label your collection? How will your display illustrate your research and collection?

_____

_____

***Results**:* What do you hope to learn and teach others with your collection?

_____

_____

Will this collection require the use of any potentially dangerous chemicals or procedures, open flames or use human or animal subjects? Yes_____ No_____
If yes, please fill out and attach the appropriate safety or ethics form.

Parent approval: _____

Teacher approval: _____

Science Fair Project Proposal: Experiment

Name:_____ Grade: _____
Science Teacher: _____ Room: _____

An experiment can be a test made to demonstrate a known scientific fact, it can also be a test to determine if a hypothesis (your educated guess of what will happen) is accurate.

Project/Problem*: What* scientific question will you be attempting to answer?

_____

_____

Hypothesis: What do you think will happen (answers the above question)?

_____

_____

Procedure: How will you find out what will happen? Write a brief description of how you plan to test your hypothesis. How will you record and display your experiment and data?

_____

_____

Materials: What materials will you need*?*

_____

Will this experiment require the use of any potentially dangerous chemicals, procedures, equipment or use human or animal subjects? Yes_____ No_____
If yes, please fill out and attach the appropriate safety or ethics form.

Parent approval: _____

Teacher approval: _____

Science Fair Project Proposal: Invention

Name:_____ Grade: _____

Science Teacher:_____ Room : _____

An invention is a new device or process used to improve conditions, solve problems, or to fill needs. Inventions can be completely new ideas or improvements on something that already exists.

Project: What will you invent? What scientific question will your invention answer?

_____

_____

Materials: What will you need to construct your invention?

_____

Procedure: How will you construct your invention? How will your display illustrate the operations of your invention?

_____

_____

Results: What is the benefit of this idea? _____

_____

_____

Will this invention require the use of any potentially dangerous chemicals, procedures, equipment or use human or animal subjects? Yes_____ No_____
If yes, please fill out and attach the appropriate safety or ethics form.

Parent approval: _____

Teacher approval: _____

Science Fair Safety Review Form

Please fill out this form if you will be using any potentially dangerous chemicals, equipment or energy sources in your project. If you are unsure about whether something is potentially dangerous or if you cannot determine from your reading that what you are doing is safe, please fill out this form. The purpose of this form is to help you conduct your project safely. ***These materials may not be brought to the Fair.***

Name:_____ **Grade:** _____

Science Teacher: _____ **Room Number:**_____

Project title:_____

Potentially dangerous chemicals, equipment or procedures that you will use:_____

_____

_____

Describe how you will handle these materials or do this project safely:_____

_____

_____

_____

_____

Your signature: _____

Your parent's signature & phone number: _____

Signature of other responsible adult who will supervise you in this part of the work and phone number:

_____

SAFETY REVIEW DECISION

_____

_____

APPROVAL:

_____

_____

REVISIONS NECESSARY:

_____

_____

Do not conduct this research until you have resubmitted this form to your teacher with your signature, your parent's signature and the signature of any other responsible adults supervising you.

DISAPPROVAL:

_____

IF THIS LINE IS SIGNED, YOU MAY *NOT* CONDUCT THIS RESEARCH FOR THE SCIENCE FAIR

Science Fair Ethics Review Form – Animal Projects

Please fill out this form if you will be using animals in your project. No science fair research will be permitted that causes or might cause any physical or psychological harm to animals. The purpose of this form is to help you plan an experiment that is safe, ethical and humane.

Name:_____ **Grade:** _____

Science Teacher: _____ **Room Number:**_____

Project title:_____

Describe how animals will be used in your research:_____

_____

_____

Research with animals - Describe how you will care for the animals in your experiment and how you will ensure that your project will not harm them:_____

_____

_____

Your signature: _____

Your parent's signature & phone number: _____

Signature of other responsible adult who will supervise you in this part of the work and phone number:

_____

ETHICS REVIEW DECISION

_____

_____

APPROVAL:

_____

REVISIONS NECESSARY:

_____

_____

Do not conduct this research until you have resubmitted this form to your teacher with your signature, your parent's signature and the signature of any other responsible adults supervising you.

_____

_____

_____

_____

DISAPPROVAL:

_____

IF THIS LINE IS SIGNED, YOU MAY *<u>NOT</u>* CONDUCT THIS RESEARCH FOR THE SCIENCE FAIR

Science Fair Ethics Review Form – Human Projects

Please fill out this form if you will be using humans in your project. No science fair research will be permitted that causes or might cause any physical or psychological harm to humans. The purpose of this form is to help you plan and conduct an experiment that is safe, ethical and humane.

Name:_____ **Grade:** _____

Science Teacher: _____ **Room Number:**_____

Project title:_____

Describe how humans will be used in your research, include the ages and gender of the humans you will study:

_____

_____

Attach a copy of the description of your research that you will give to each human subject to ask him or her to participate in your research. Be sure to describe your experiment to them. Be clear about what they will do or have done to them and include a clear statement that the person is not obligated to participate and can stop participation at any time.

_____

_____

Describe the precautions that you will take to ensure that there will be no harm done to the humans in your experiment:

_____

_____

Your signature:

_____

Your parent's signature & phone number:

_____

Signature of other responsible adult who will supervise you in this part of the work and phone number :

_____

ETHICS REVIEW DECISION

_____

_____

APPROVAL:

_____

DISAPPROVAL:

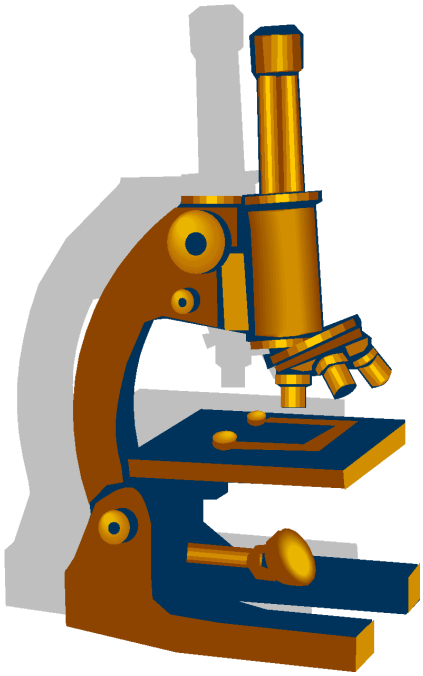
_____

IF THIS LINE IS SIGNED, YOU MAY *NOT* CONDUCT THIS RESEARCH FOR THE SCIENCE FAIR

REVISIONS NECESSARY: _____

_____

Do not conduct this research until you have resubmitted this form to the committee with your signature, your parent's signature and the signature of any other responsible adults supervising you.



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