

PALO VERDE ELEMENTARY SCHOOL
SCIENCE FAIR

Wednesday April 24, 2019
STUDENT HANDBOOK

Acknowledgement

Palo Verde Elementary School would like to acknowledge the Synopsys Silicon Valley Science and Technology Outreach Foundation for their generous support of the Palo Verde Science Fair. This is the twelfth year Synopsys Outreach Foundation is providing display boards and science grants to our school.

The Foundation, headquartered in Mountain View, champions activities and programs that enhance science and math education. The Foundation's science-o-rama program provides support for high school and middle school science fairs. The Foundation is also a sponsor of the regional science fair, *The Synopsys Silicon Valley Science and Technology Championship*.

<http://www.outreach-foundation.org/outreach.html>

Thank you Synopsys Outreach Foundation!

And thank you to the parents, teachers, and office staff who make this possible!

March 11, 2019

Dear Parents,

The Science Fair will take place on **April 24, 2019**. Students' science projects will be on display for students and their families to visit. In the days following the science fair, students will have the opportunity to present their projects to their teacher and classmates during class time. A volunteer parent may attend these presentations (please arrange this with the teacher).

This handbook is provided to help your child successfully complete a science fair project. Please help, encourage, and support your child's best efforts in putting together a project that is interesting and understandable to her/him. However, please do *not* do the project for your child. Everyone has a scientist inside them. This project will hopefully unleash the scientist inside your child and provide them an opportunity to learn about the scientific process. The science fair is not a competition.

Children and parents who have questions about getting started on their project can talk to their teachers and/or the science fair co-chairs Pavan Desikan (pavand@gmail.com) or Malati Raghunath(malati.raghunath@gmail.com). Once your child has identified a science fair project, you and your child's teacher will approve his or her science fair proposal. Proposal forms are included in this handbook and are due to the **classroom teacher by Friday, March 29th**. Completed projects should be brought to the MP room before school on the morning of the Science Fair(**Wednesday, April 24th**).

It has been 22 years since the first Palo Verde Science Fair, with excellent participation from all the grades each year. Every student from K through 5 is encouraged to participate in the Science Fair. Participation is mandatory to for students in grades 4 and 5. Last year our students prepared **over 200 science projects!** We look forward to even greater participation this year. Thank you in advance for your support and cooperation.

Sincerely,

Malati Raghunath &
Pavan Desikan
Co-Chairs, Palo Verde Science Fair

Hillary Miller
Principal, Palo Verde School

Palo Verde Science Fair: Important Dates

- | | |
|----------|---|
| March 18 | Parent Q&A Session @ Science Night 6:45 pm, outside the MP Room Information for parents not familiar with the Palo Verde Science Fair format |
| March 29 | Science Fair proposals due to classroom teacher BE ON TIME! Following the teacher's approval, the students will receive a poster board at school to take home for the Science Fair project. |
| April 24 | Bring projects to MP room before school between 7:45 am and 8:15 am Science Fair: 6:30 pm to 8:00 pm MP room/Library |
| April 25 | Pick up the posters from the MP room take it to the class room. 7:45 am to 8:15 am. |

Following the Science Fair, students present their projects in classroom; In some of the classrooms parent volunteers can visit and listen to the presentations. Please contact the class teacher for more details on this.

Raffle drawing winners (one winner per grade) will be announced during school hours after the Science Fair. All Science Fair participants are automatically entered in the raffle drawing.

CALL FOR VOLUNTEERS

On the morning of the Science Fair(Apr 26th), we need help in getting the projects checked in(8:00 am to 8:20 am), and attaching participation ribbons(8:20 am to 8:50 am). Please email pavand@gmail.com if you are able to help on either of these two tasks.

Steps to Participating in the Science Fair

To participate in the Science Fair, you will need to follow these steps:

- ▶ **Choose a science project.** See page 6 for Science Fair Rules. See page 7 for a list of the different types of science projects. See page 8 for ideas for a science project.

- ▶ **Fill out a science fair project proposal form.** The proposal is to be handed in to your teacher. Your teacher will return the approved proposal to you. The proposal form is to be attached to the back of your display board for the science fair. Science fair proposal forms are included at the end of this handbook.

- ▶ **Carry out a science project, at home.**

- ▶ **Create a poster, at home.** This three sided poster will describe your project, including facts you learned about your subject from books and a discussion of how you carried out your project. The poster will be available, free, from your teacher. Remember to **attach your approved project proposal form to the back of the poster.** Don't forget to have your name and grade on the front of the poster.

- ▶ **Display your poster** and other parts of your project at the Science Fair. The poster and project will be brought into the MP room before school on the day of the Fair.

- ▶ **Present your project to your teacher and classmates.** Some classes may have a visiting parent scientist during the presentation. This will take place during class time the days following the Science Fair. Please contact the room teacher for details.

Science Fair Rules

1. Each student may enter only one project.
2. More than one student may participate on a project, if your teacher permits. Children working in pairs or small groups can be classmates, siblings, or friends in the same or different classrooms or grades. Again, check with your teacher.
3. Teachers and parents may *advise*. Parents are encouraged to discuss the project and assist the student, but they should let **students drive the project and do the actual work**.
4. The three-sided display board should be free standing and not more than approximately 24 inches high and 36 inches wide when fully extended. When displayed, the board and project should not occupy more than 48 inches of table length and 16 inches of depth.
5. **The following are prohibited:** dangerous chemicals, open flames, explosives, illegal drugs, or animal experiments that involve starvation or any other form of cruelty.
6. Electrical switches and cords needed for exhibits must be in good working condition and must be approved by the teacher.
7. Expensive or fragile items should not be displayed. Valuable items essential to the project should be simulated or photographed.
8. The school and teacher assume no liability for loss or damage to the exhibit.
9. **This is not a competition. You are required to have fun preparing the project :)**

What is a Science Fair Project?

A science fair project should be selected from one of the following types of projects:

■ Experiment

In this type of project, a hypothesis (an educated guess) is made to answer a question. Then, experiments are carried out to test this hypothesis. **Example:** you might be interested in the question, “What design of paper airplane will fly the farthest?” You would research different designs of paper airplanes by going to the library and looking at books on paper airplanes. You might then develop the following hypothesis for this question, “Paper airplane design #1 will fly farther than design #2 or design #3.” You would then make the paper airplanes, fly them, and take notes on which design of airplane flew the farthest.

■ Gadget or Invention

A gadget or invention is a device or process used to improve conditions, solve problems, or to fill needs. Gadgets are existing devices, while inventions can be completely new ideas or improvements on something that already exists today. **Example:** you might decide to make an electric motor.

■ Demonstration

A demonstration is an illustration or explanation of a scientific principal. This type of experiment shows how and why something works. **Example:** you might demonstrate a principal of sound using a rubber band stretched around a box. You could show that the more tightly stretched the rubber band, the more rapidly the rubber band vibrates, and the higher the sound that is produced.

■ Model

A model is a small object usually built to scale that represents some already existing object. **Example:** you might decide to construct a model of the planet Saturn from Styrofoam and cardboard. Your poster should include facts about Saturn, a description of how you constructed the model, and a discussion about the features of your model and how these features represent the actual planet.

■ Collection

A collection is a group of objects. This group of objects must be scientifically oriented and show that you have learned something through the process of collecting and categorizing. The items should be categorized and labeled correctly. **Example:** you might have a collection of leaves separated into categories based on the type of tree on which they grew.

All projects will include a three-sided poster display that gives an overview of the science project.

How to Start your Science Fair Project

Choose an Area of Science

Choose an area of life, earth or physical science that interests you. Do a little research to be sure that this topic really interests you. Then, from that area of science, such as life science, select a general topic such as “plants”. Finally, narrow your general topic to a specific subtopic such as “plant growth”. Below is a list of general topics you can consider for your science project:

| | | | | | |
|-----------------|-------------|-------------|-------------|---------------------|----------------|
| acids and bases | airplanes | amphibians | anatomy | animal behavior | astronomy |
| atoms | birds | bones | cells | circulatory systems | colors |
| computers | crystals | digestion | dinosaurs | diseases | electricity |
| energy | engines | flowers | food chains | fossils | geology |
| gravity | heart | heat | insects | invertebrates | jet propulsion |
| learning | light | liquids | machines | magnetism | mammals |
| muscles | medicine(s) | migration | molds | nutrition | ocean life |
| parasites | planets | plants | pollution | reptiles | robots |
| rockets | rocks | seeds | senses | shells | sound |
| tides | trees | vertebrates | water | weather | yeast |

Help choosing a topic

Books. Books on science experiments and science projects are available in libraries (including the Palo Verde School Library) and bookstores.

Web Sites. There are plenty of web sites that have information on ideas to try out from science fair. Some of these include:

Science Buddies(www.sciencebuddies.org), Science Fair Adventure(www.sciencefairadventure.com/), Exploratorium(www.exploratorium.edu), Lawrence Hall of Science(www.lawrencehallofscience.org/kidsite/), National Wildlife Foundation(www.nwf.org), and National Geographic(www.nationalgeographic.com).

You can also just google “science fair project ideas” or “science demonstrations”, or search for “science experiments” on youtube and find interesting ideas for your project.

There are many examples of instructions to build interesting gadgets at www.instructables.com (Instructables) and makezine.com/blog (Make Magazine’s online blog).

Choose a Question

Choose one question that will narrow the focus of your investigation. 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?” Below is a small sample of science questions to be investigated.

Astronomy

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

Consumer Science

Which laundry detergent is best?
How does a radio work?
Provide solar power to a radio.

Electricity

What is the best conductor?
How does a switch operate?
Build an electric motor

Botany

Do large seeds grow large plants?
Can plants grow in water alone?

Chemistry

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

Earth Science

How do crystals grow?
What is the water cycle?
Grow your own crystals.

Physical Science

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

Anatomy

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

Choose the Project Form

Decide which type of project best answers your question. You can do an **experiment**, build a **gadget** or **invention**, do a **demonstration**, make a **model**, or a **collection**.

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. 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 often 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. They 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.

The Scientific Method

For Projects which Involve Experiments

Use the following five steps of the scientific method when conducting an experiment.

1. Identify the problem

Think about what area of science interests you. Narrow your focus down to a specific question.

2. Collect information

Research your topic. Take notes on information that you think will be important for your experiment.

3. Develop a hypothesis

A hypothesis is an *educated* guess. It takes into account the research you have done and also your opinion of 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" will cause the lawn to grow faster.

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. Photos or illustrations of the progress of your experiment are good ways to display what you did and what your results were.

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 plant food fed to the lawns. Make a chart of the weekly lawn growth.

5. Draw a conclusion

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 lawn fed with plant food "A" grew faster than any of the other plant foods tested. My hypothesis was not correct, even though plant food "B" cost more and promised better growth. I learned that not all plant foods are the same and that advertising is not always true.

Displaying Your Project

A very important part of your Science Fair project is your display, since it is a way of teaching others what your project is about and what you have learned.

The display board should be of sturdy material which can stand by itself. Palo Verde School will provide a display board free of charge. Please ask your teacher for the board.

Your display should include the following sections:

Project Title-Your title should include the word that describes your project's category: experiment, collection, model, display, or invention. Also, include your name, grade, teacher's name, and room # below the title. This information should be at the top and center of the center panel. Again, your name on the front of the poster is important!

Scientific Question or Hypothesis- if your project is an experiment

Procedure and Materials – text and photos, if needed

Results/Data – text, graphs, tables, photos, drawings

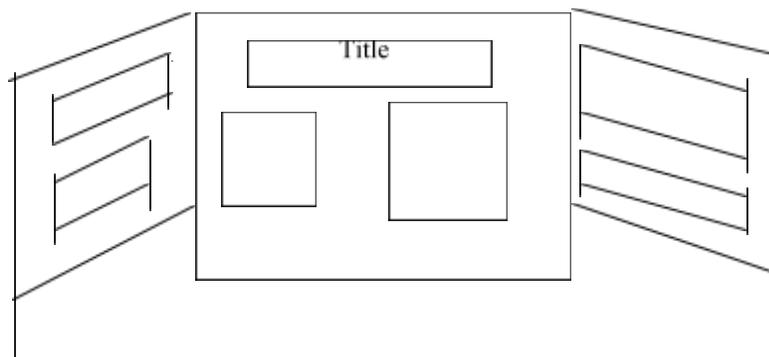
Conclusion- for experiments

Your Approved Proposal Form- taped to the back of the poster board.

Acknowledgments – please thank the people who helped you

Model, Invention, Demonstration, Collection, or Materials Used in an Experiment should be displayed in front of your poster. If it will not fit in front of the poster board, please let your teacher know in advance that you will be bringing an oversized project and we will arrange for an area in which those projects can be displayed.

Sample Display



Science Fair Project Proposal

Model or Demonstration

Name: _____

Grade: _____

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?

Parent approval: _____

Teacher Approval: _____

Science Fair Project Proposal Collection

Name: _____ Grade: _____
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?

Parent approval: _____

Teacher Approval: _____

Science Fair Project Proposal

Experiment

Name: _____ Grade: _____
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?

Parent approval: _____

Teacher Approval: _____

Science Fair Project Proposal

Gadget or Invention

Name: _____ Grade: _____
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?

Parent approval: _____

Teacher Approval: _____