

Official Handbook for Flora Singer Science & Engineering Fair

Fair: Saturday, March 29, 10:00 am - 12:00 pm

Student Set Up: Friday, March 28, 7:00 pm - 8:00 pm, or
Saturday, March 29, 9:00 am - 10:00 am

Location: All Purpose Room and Gymnasium

For more Information: sciencefair@singerpta.org



General Information

- All grades (K-5) are welcome and encouraged to participate.
- Each student (or small group) chooses, organizes and completes one science or technology project at home.
- Projects should be student driven - ideas should come from the students. Parent guidance is encouraged. However, parents should use their best judgment in deciding when to get involved, such as when there is a potential safety issue. It is important that the kids be able to call the project their own.
- Students may work on their project independently, or in a small group (max 3-4 students).
- Each participant will have an opportunity to briefly present their project to an expert and receive recognition for participating.
- A display board is required to present your results. Display boards will be provided by the PTA.
- It is not a problem if your experiment or invention doesn't turn out the way you plan it. In science and technology, results are frequently different from expectations. This leads to even more discoveries.

In order to participate, registration forms need to be filled out and signed by a parent.

You can register at <https://forms.gle/tUGN9NYa36mDnSzU6>.

Project Guidelines

- Two type of projects are recommended: “**The Scientific Method**” or “**How Stuff Works**”.
- Investigations involving living creatures (pets or wild animals) will not be approved.
- No open flames, dangerous chemicals, or sharp objects are permitted for safety reasons.
- Please do not bring food samples, molds or yeasts to the fair for health reasons! Models that involve food, including candies, are allowed only if not shared with the audience and stored in well-sealed containers not to be opened.
- If you are bringing a model we suggest that you also bring a "DO NOT TOUCH" sign. We expect a big crowd so we don't want participants to lose any of their wonderful project accessories.
- If you need an electrical outlet, you will need to bring an extension cord and a surge protector and specify on the Registration Form that you will need an electrical outlet. Make sure that all electrical materials and wires are safe and insulated if used.
- If you are bringing a volcano, a bottle fountain model or any "possibly messy" models, please bring a tarp or old towel to place on the floor or around the model. No solvents are allowed inside the school.

Examples of Past Projects



From the “**Candy Corner**” category:

- How are different dyes used to make up the different colors of the outsides of M&Ms?
- How does light and temperature affect the rate of rock candy crystals?
- Ratio of 49 Jelly beans flavors in 4lb package

From the “**It’s a Snap!**” category:

- Making a battery-powered light bulb
- Snap circuits parts to build an electronic spinner
- Is it a conductor?
- Electrical city model

From the “**Newton’s Nook**” category:

- How do different environments affect the evaporation of water?
- Which objects float and which objects sink in different liquids?
- How does the Solar System work?

From the “**Brain Benders**” category:

- How old are some trees in the Forest Estates neighborhood?
- How does the behavior of a beta fish change when its environment changes?
- How did dinosaurs disappear?
- How is the rainbow made?

From the “**Rock and Roll**” category:

- How does a volcano erupt?
- Fossils and how they are formed
- How do waves build and erode the beach?

From the “**It’s Alive!**” category

- How do different moisture levels affect the rate of decomposition of animal flesh and bones?
- How does light affect spring bulbs?
- Does water make mold grow faster on bread?
- What is the best thing to start seeds in?
- DNA extraction from an onion.

The Scientific Method

Step 1: Ask a Question

Observe and ask questions such as WHY? and HOW?

Research for a possible answer (school library, web, books...)



Example: How does adding sand to potting soil affect the growth of a bean plant?

Step 2: Hypothesis

Predict and write down a possible answer to your question or problem.

Congratulations! You came up with your hypothesis!



Example: If I plant a bean seed in 100% potting soil then it will grow taller than a bean seed in 50% potting soil and 50% sand because potting soil has more nutrients.

The Scientific Method

Step 3: Materials

Make a list of the things you will need for your experiments.

Example:

- *4 cups of potting soil*
- *1 cups of sand*
- *6 bean seeds*
- *6 clear plastic 9 oz. cups*
- *water*
- *metric measuring cup*
- *spoon*

The Scientific Method

Step 4: Experiment

- Plan an experiment to test your hypothesis.
- Conduct the experiment.
- Don't forget to write down your observations and results.
- Confirm the results by repeating the experiment.



Example:

1. Label three plastic cups "Potting Soil 1", "Potting Soil 2", and "Potting Soil 3".
2. Fill each cup labeled "Potting Soil" with 1 cup of potting soil.
3. Label the other three plastic cups "Potting Soil and Sand 1," "Potting Soil and Sand 2," and "Potting Soil and Sand 3".
4. Fill each cup labeled "Potting Soil and Sand" with $\frac{1}{2}$ cup potting soil and $\frac{1}{2}$ cup sand and mix them with the spoon.
5. Dig a $\frac{1}{2}$ inch deep hole in the center of each cup.
6. Place a bean seed in each hole.
7. Spread the soil over the bean seed.
8. Water each seed with 25 ml of water.
9. Place the cups in a sunny window.
10. Repeat step 8 daily for three weeks.

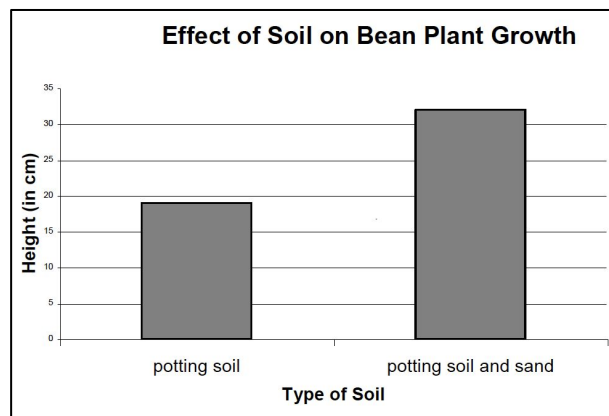
The Scientific Method

Step 5: Data Analysis

Organize and communicate your results. You can include tables, graphs, photographs, movies...

Examples:

Effect of Soil Type on Bean Plant Growth				
Type of Soil	Trial 1	Trial 2	Trial 3	Average Height in cm.
Potting Soil	20 cm	18 cm	19 cm	19 cm
Potting Soil and Sand	32 cm	33 cm	32 cm	32.33 cm



Step 6: Conclusions

- What did you learn?
- Was your hypothesis correct?
- What questions do you have now?
- What recommendations you have for further study and improvements?
- Don't get upset if your hypothesis was wrong. Be happy because you learned something new!

Example:

The bean seeds planted in 50% potting soil and 50% sand grew taller and had more leaves than the bean seeds planted in 100% potting soil.

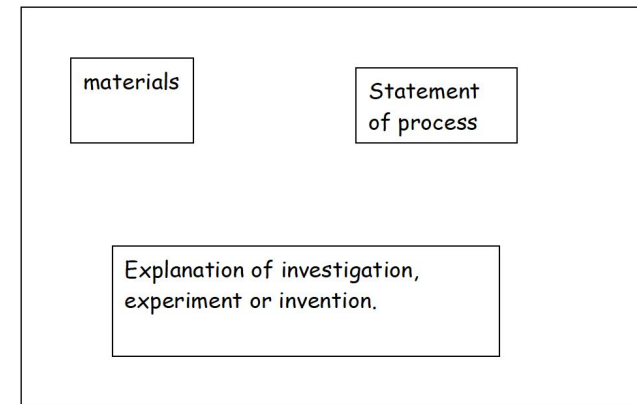
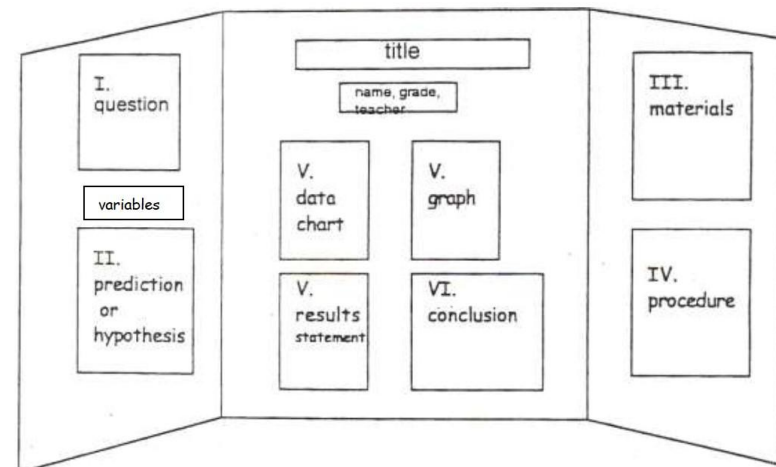
The Scientific Method

Step 7: Prepare Presentation

You can display your project on a tri-board (max 36 x 48 inches).

Make sure to include the following on your presentation:

- Title
- Name of Student
- Name of Teacher
- Hypothesis
- Methods and Materials
- Procedure
- Results
- Conclusions



Need Help Finding a Topic

- When it comes to choosing a topic, the sky is the limit. The best topics come from your own genuine curiosity about how something works or why something is the way it is.
- The Flora M. Singer ES Media Center has a vast and comprehensive collection of books for all grades (K-5) on Science and Engineering fair projects.
- Some of the books illustrate step-by-step instructions for how to conduct an experiment.
- Examples of science fair project book topics that you can find at the Media Center: Sports, Senses, Air, Energy, Propulsion, Dry Ice, Heat, Liquids, Weather Science , Plant and Animal Science, Cell and Microbe Science, Environmental Science, Light , Sound, and Waves, Forces and Motion, Water Science, Earth Science, Planet Science, Electricity and Magnetism, etc.

Web Resources

Bill Nye

From his new Netflix series to an extensive repository of at-home and fun science experiment ideas, there's something for every time frame and scientific topic. <https://www.billnye.com/>

Project Noah

Budding conservationists will love Project Noah; it's a wonderful platform for learning about wildlife and connecting with like minds. www.projectnoah.org/

Mystery Science

This website offers everything from quick answer videos to full mini-lessons appropriate for grades K-5. <https://mysteryscience.com/distance-learning>

Nova Labs

From predicting solar storms and constructing renewable energy systems to tracking cloud movement and designing RNA molecules, NOVA Labs participants can conduct investigations by visualizing, analyzing, and sharing the same data that scientists use. <https://www.pbs.org/wgbh/nova/labs/>

All Science Fair Projects

Projects for all levels. Hundreds of ideas for every science topic. <http://www.all-science-fair-projects.com>