

It's time to start thinking about your project for the

WINDSOR SCIENCE and ENGINEERING FAIR

Date: Thursday, February 7th, 2019

6:00-8:00 pm

Windsor Commons



The Windsor School Science and Engineering Fair is a fun, non-competitive opportunity to show off your creative scientific and engineering problem solving abilities. It is open to **all** Windsor students - Kindergarten through 5th grade!
Plan on joining the fun!



How Can You Participate?

Students conduct their own scientific investigation at home OR try to create a solution to an engineering design problem. On the night of the fair, students share their work at school with a science fair mentor through a poster presentation, short video, or a combination of both! **Please go to Windsor PTA website for complete information and guidelines for how to create project.**

Important Dates and Information

Now: Start brainstorming on an interesting scientific question that you want to test out with an experiment or an engineering problem to solve.

Thursday Jan. 24: Deadline for Entry Form (Paper or Submit Online)

Thursday Jan. 31: Deadline to submit your video (Online)

Wednesday February 6 (3:30-4pm) OR

Thursday February 7 (8am-9am): Poster drop off-Windsor Commons

Windsor Science Fair - General Information and Overview

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I. WHAT IS THE WINDSOR SCHOOL SCIENCE FAIR?

The Science Fair is a one-evening program that allows students to share the results of experimental research that the student conducted or their solution to an engineering design problem that they investigate. The evening occurs in conjunction with the Windsor School Book Fair.

Students can present their findings in one of three ways: 1) by preparing poster board (either tri-fold or flat), 2) creating a two-minute video, or 3) a combination of a poster and short video. Posters and videos will be in the Commons on display. Students will also have an opportunity to discuss their project with a Science Fair Mentor on the evening of the fair to get feedback on their work.

II. WHY PARTICIPATE IN THE SCIENCE FAIR?

1. Students will have FUN as they experience the satisfaction from learning about something in which they are interested and can see their results in action!
2. Students will practice their presentation skills (speaking and writing).
3. Students will strengthen their scientific reasoning skills.

The Next Generation Science Standards identify eight practices of science and engineering as essential for all students to learn, beginning in kindergarten:

1. Asking questions (for science) and defining problems (for engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations (science) and designing solutions (engineering)
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

By participating in the science fair, students have the opportunity to gain experiences and sharpen their skills in these practices by answering a question that is interesting or challenging for them. This enhances the science education that the students receive in their regular science curriculum.

III. WHAT IS THE FORMAT OF THE SCIENCE FAIR?

Science Fair participants and their guests assemble at 6pm on the night of the fair. Students will present their project to a Science Fair Mentor, their parents and other guests. We will also have a short recognition ceremony for all students to honor the great work that they did!

The Science Fair Mentors are members of the South Middle School Science Olympiad team (many of whom are former Windsor students), as well as other parent volunteers. The mentors will provide positive and constructive feedback to the students regarding their experimental design and data presentations. This allows students to share their work in a low-pressure format and receive a lot of encouragement. Each student will receive a sheet of written comments from their mentor and a certificate of participation. The following day, students will have an opportunity to share their projects in their classrooms if they would like.

IV. WHAT ARE THE REQUIREMENTS OF A SCIENCE FAIR PROJECT?

Science Fair Projects should begin with “testable question” and end with an analysis of data that was collected throughout the investigation. Students must include the following elements in their presentations:

1. **Statement of the testable question/problem:** What are you trying to find out or what problem are you trying to solve? Why are you interested in this question or problem?
2. **Procedure:** What did you do to try to answer your question or to solve your problem? Write this out as numbered steps and include a list of materials used.
3. **Data:** What measurement information or other observable evidence was collected? This could be presented as tables, graphs, photos, drawings, or descriptions.
4. **Conclusion:** What does your data tell you about your question or the solution to your problem?

This year, students have three different format options for presenting this information:

1. **Poster display:** Posters are ideally constructed on tri-fold boards that stand up on their own but a flat posterboard will also be accepted. Tri-fold boards can be found at office supply stores as well as general merchandise stores such as Target, Walmart, etc. Students should make sure that each of the four elements listed above are included on their poster. Taking photos of the student and the results “in action” is a great way to enhance the poster and help the audience understand the experiment!
2. **Two-minute video:** As an alternative to the poster, students can create a **short** video (two-minutes or less) where they explain the four elements and (if possible) demonstrate their procedure. Students should speak loudly and clearly so that they can be heard well, and video should be shot as close to the student as possible so the microphone can clearly capture their voice. Students may want to consider a presentation theme such as a straight presentation like one given in front of a classroom, a news anchor reporting the news, getting a friend/parent to interview the student also like on the news, or a reality TV show format (Myth Busters, How It's Made, etc). Please see the PTA website for information about presentation themes. Details for how to submit the videos online will be emailed to you after sign-up. On the night of the fair, it may be helpful for students to have some written papers with them to share with the science fair mentors, such as data displays and their testable question so that they can share more details about their work and have a visual aid.
3. **Combination poster and short two-minute video:** Students may want to create a poster and then make a video of their presentation for their Science Fair Mentor to see rather than doing a “live” presentation on the night of the fair. The poster could be

included in the video as a visual aid. Please follow the same guidelines as described above.

On the day of the fair, students can also bring in samples of the materials they used, the data they gathered, or their design prototypes of an engineering investigation to display along with their poster or written work. The materials will be displayed with their poster or at the video viewing station.

V. WHAT CAN PARENTS DO TO HELP THE STUDENTS GET READY FOR THE SCIENCE FAIR?

1. Access resources online or at the library.
2. Give help with ideas.
3. Give lots of encouragement!
4. Help acquire needed materials.
5. Make sure that safety precautions are taken during the experiment.
6. Provide assistance and support to the extent that your child needs it during the experiment and preparation of the presentation materials (poster, video, etc.)

VI. WHERE CAN WE GO FOR IDEAS TO GET STARTED?

There are many great resources for science fair ideas. Our very own **Windsor Library** has several good books that you can check out, and the **Arlington Heights Memorial Library** is also a fantastic resource for books and ideas (<http://www.ahml.info/>).

There are many good websites online that you can look at, but here are a few to start:

1. **Science Fair Central Website:** (<https://www.sciencefaircentral.com>)

This site is perhaps the best out there for testable question ideas. At this site, you can choose whether you are doing an investigation or an invention (engineering) project and see ideas and examples for each. The ideas are also organized by the level of difficulty.

2. **Elementary School Science Fair Project Ideas at ThoughtCo**
(<https://www.thoughtco.com/elementary-school-science-fair-projects-609075>)

This site lists a wide variety of testable questions appropriate for elementary school students.

3. **Science Buddies**
(http://www.sciencebuddies.org/science-fair-projects/project_ideas.shtml)

This site has tons of topics, rated by difficulty, and a variety of resources. Some projects are more about modeling a science phenomenon instead of a “testable question,” so try to avoid these.

Guidelines for Creating a Successful Science Fair Project

(Parents and Students Read This Together!)

GETTING STARTED: DEVELOPING YOUR QUESTION OR PROBLEM STATEMENT

The most important part of your whole project is to develop a good testable question or problem statement. If you have something that you want to find out that involves testing to see the effect of something, then you are conducting a scientific investigation and need a testable question. If you have a problem that you are trying to find a good solution for in your life, then you are trying to design or invent something (engineering) and you need a problem statement. For the science fair, you only need to do ONE of these things, either a scientific investigation OR an engineering design.

FOR SCIENTIFIC INVESTIGATIONS: How to Develop a Testable Question

Almost anything you are interested in can be turned into a question that you can run tests and find an answer to. The basic format of a testable question is “How does ____ affect ____?” or alternately, “What effect does ____ have on ____?” The important thing to keep in mind is that the question should only test for one effect, and there should only be one thing changed in each trial. Here are some examples:

- Paper airplanes:
 - How does the position of a weight on a paper plane affect the distance it flies? For this question, you could use the same paper airplane design for each trial and try attaching the same amount of weight in different places on the airplane’s body and measure the distance it flies.
 - How does the design of a paper airplane affect the time it stays in the air? For this question, you would try to keep the throwing-style of the plane the same (perhaps by dropping the plane from a certain place each time) but change the design in some way and measure the amount of time it stays in the air.
- Water:
 - How does the shape of an ice cube affect how long it takes to melt? For this question, you would keep the amount of water the same but freeze it into different shaped containers and then measure the time that each takes to melt under the same conditions (same room temperature, same exposure to light or dark, etc.)
 - What effect does adding different substances to water have on the number of drops of water that a penny can hold? For this question, you could dissolve salt, soap, sugar, or other substances in water and measure the number of drops that are able to fit on one side of a penny.

Most importantly, when you are thinking of a testable question, you should choose something that you are really interested in. If your testable question is something you really want to find out, your project will be more fun!!

For an extensive list of ideas for testable questions, go to the **Science Fair Central Website** for “Scientific Ideas”: <https://www.sciencefaircentral.com/students/scientific-projects>.

This website has the questions broken down by the difficulty of the question as well as by science field (life science, earth science, or physical science). You can also try some other websites for ideas for your testable question.

FOR ENGINEERING DESIGNS: How to Write a Problem Statement

Some students may want to try to find a good solution to a problem in their lives and test to see if their idea works. The problem statement should have three parts: the problem, a question that states the problem, and a proposed solution that will be tested. Here are some examples for you to consider:

- Problem: My cookies always break in my lunch. Question: How can I pack cookies in my lunch so that they do not break? Solution I will test: I will try packing different materials around my cookies in a container.
- Problem: My dog's water dish goes empty before I am home from school to refill it. Question: How can I keep fresh water in my dog's dish all day when I am not there to fill it? Solution I will test: I will try making an automatic watering device from a two-liter bottle.

For more ideas on problems and ways to design solutions, go to the **Science Fair Central Website** for "Engineering Ideas": <https://www.sciencefaircentral.com/students/engineering-projects>

FOR ALL PROJECTS: How to Write a Procedure

Procedures should be written like a recipe, with materials listed first and then step-by step instructions on what to do. The idea is for someone else to be able to follow your directions and repeat your experiment.

FOR ALL PROJECTS: How to Present Data

There are two types of data that you might collect. Some of your data may be what you see or observe with your other senses as you run your experiment. For example, "the water feels hot" is a sensory observation. Other data might be measured as a number, such as "the water temperature is 80 degrees." Here are some suggestions for how to display each of these types of data:

- Sensory Observations (things that you see, hear, smell or feel): A short description and/or pictures work well with this kind of data. You could list them, put them into a table, or write a short paragraph. You also can take a picture or draw one. Labels such as "before" and "after" could be helpful in your data display.
- Measurement Observations: A data table is the best way to display any numbers that you are recording. Sometimes you can also create a graph from your measurement data but it is not always needed. A graph is helpful if you want to show how your data changes from trial to trial.

FOR ALL PROJECTS: How to Present Your Conclusion

The conclusion is a short paragraph where you explain what your data tells you about your question or how well the solution to your problem worked. You can also include whether or not the results were what you expected and any improvements you might make if you tried the experiment again.

WINDSOR SCIENCE and ENGINEERING FAIR ENTRY FORM

In order to prepare for the Science Fair, we need to have a sense of how many students are participating and what kinds of projects they are bringing to school. Here are some important reminders:

- As much as possible, Science Fair Projects should be completed by the student. However, parents should help insure safety, help gather resources, and provide other assistance as necessary to their student depending on their age, difficulty of the project, etc. It should be a fun and encouraging experience for the student. **Complete guidelines for Science Fair Projects are available on the PTA website.**
- Two-minute video projects must be submitted via an online “drop-box” no later than Thursday January 31 (one week prior to the fair). **See the PTA website for the link and directions.**
- All posters, written work, and supplies for display must be brought to school during one of these times: Wednesday Feb 6th in the afternoon from 3:30 – 4 PM or Thursday Feb 7th in the morning from 8:00 – 9:00 AM). Make sure everything is clearly labeled with the child’s name, teacher, and grade.
- On the night of the fair, please come to Windsor School no later than 6:00. We will start the event promptly. Students should be prepared to talk about their project with a Science Fair Mentor but will not present to the entire audience. Students can also enjoy the Book Fair, which opens at 6:30 that night.

Please use this link to complete the Entry Form ONLINE this year if possible.

ONLINE LINK: <https://goo.gl/forms/Hlh7nizL8ZBOFx0r2>

Alternately, you may complete the information below and turn in the paper form to your child’s classroom teacher by Thursday January 24, 2019.

WINDSOR SCIENCE FAIR PARTICIPATION SLIP – DUE THURSDAY January 24, 2019

Yes, I would like to participate in the Windsor Science Fair!

STUDENT NAME: _____

GRADE: _____ TEACHER: _____

PARENT/GUARDIAN EMAIL: _____

1. What is the problem for your experiment or engineering design?
2. What format will you be using for the presentation of your results? Check one.
_____ 1. Poster only _____ 2. Two-minute video submitted online only
_____ 3. Poster AND two-minute video submitted online