

2018 Science and Engineering Project WIN Meeting 1

1/25-grade 8; 1/26-grade 7

Agenda

- Attendance
- Meeting Dates
- Science and Engineering Project Website

[http://douglasms.ss13.sharpschool.com/staff_directory/
mrs_graveson_payne_s_website/science_and_engineering_project/](http://douglasms.ss13.sharpschool.com/staff_directory/mrs_graveson_payne_s_website/science_and_engineering_project/)

- Project Guidelines
- Setting up a Logbook
- Choosing a Project
- Writing A Question or Goal
- Identifying Variables
- Finding Sources
- Writing a Hypothesis

Meeting Dates

	8 th Grade (usually day 4)	7 th Grade (usually day 2)
1 st Meeting	Thursday, 1/25 (day 1)	Friday, 1/26 (day 2)
2	Wednesday, 1/31 (day 1)	Thursday, 2/1 (day 2)
3	Tuesday, 2/5 (day 4)	Thursday, 2/7 (day 2)
4	Friday, 2/9 (day 4)	Tuesday, 2/13 (day 2)
5	Thursday, 2/15 (day 4)	Thursday, 2/15 (day 4)
6	Wednesday, 2/28 (day 4)	Monday, 2/26 (day 2)
7	Tuesday, 3/6 (day 4)	Friday, 3/2, (day 2)
8	Monday, 3/12 (day 4)	Thursday, 3/8, (day 2)
9	Friday, 3/16 (day 4)	Wednesday, 3/14 (day 2)
10	Thursday, 3/22, (day 4)	Tuesday, 3/20 (day 2)
11	Wednesday, 3/28 (day 4)	Monday, 3/26 (day 2)
	Science Fair 5:30-7:00PM	Thursday, March 29, 2018

You already should have:

- Turned in your green form.
- Chosen partners.
- Started a logbook.
- Decided on a topic.
- Completed the 2018 Science/Engineering Project Proposal Form.

Project Guidelines

- You are choosing to participate-please take it seriously and do your best work. Cite sources where you use them and be meticulous and honest in your collection of data.
- You may work alone, in pairs, or in groups of 3, with grade-level peers. If you work in a group, it is your choice to do so, and all group members are responsible for completing the project. Choose partners carefully!
- Projects must be completed in time for the Fair. The Fair will be held on March 29, 2018. That's only 2.5 months away!

Project Guidelines

- Projects **must not** involve:
 - blood, tissue, teeth, or bodily fluids
 - non-human vertebrates or their parts (except eggs)
 - **ingestion or inhalation of anything** (nothing in mouth)
 - **pathogenic agents** (bacteria, viruses, **mold**, fungi, etc.)
 - recombinant DNA
 - carcinogenic or mutagenic chemicals
 - compressed gas
 - controlled substances (including Rx, alcohol, tobacco)
 - explosive or **toxic chemicals**
 - **hazardous** substances or **devices** (ie. air soft guns)
 - high voltage equipment
 - lasers (except infrared thermometers)
 - xrays or nuclear energy
 - radioactive materials

Setting Up a Logbook

- Start now! Use a pen.
- Write your name on the front cover.
- Write “Science and Engineering Project 2018” underneath.
- Begin numbering the pages in the bottom outside corner. (You can finish this later.)
- Label the 1st page “Table of Contents”
- Your table of contents should include the following sections:
 - Project Ideas
 - Research
 - Experiment Design
 - Daily Log
 - Conclusions
 - Sources
- Label the next page “Project Ideas”

Logbook Sections

- Project Ideas
 - This is where you write your initial ideas. You might list your interests, several possible questions, concerns about the questions, ways you might test things, other people's input, etc...
- Research
 - This is where you'll take the notes for the research paper and background for your trifold. Start a new page for each resource you use and label it. Make a list of your sources in the last section using MLA format (like your History Research Paper).
- Experiment Design
 - Once your topic has been approved, this is where you will work out your Question, Hypothesis, Materials, Procedure, and Data Table. This will be your "Rough Draft" and you should record any changes your teacher suggests.
- Daily Log
 - Each day you do something related to your project, create a dated journal entry and explain what you did.
- Conclusions
 - After you carry out your experiment, write what you learned and any new questions you have.
- Sources
 - Use MLA format to cite all of your sources. They will appear chronologically (in the order you find them) here, you will list them alphabetically in your research paper/lab report.

Setting Up a Logbook

- General guidelines:
 - Write in your logbook in pen whenever you do something related to your project.
 - Date every entry.
 - Never erase or cover what you think are “mistakes”. Simply draw a single horizontal line through it and continue.
 - Write it like a journal and include pictures, photos, relevant materials-for example, this might be an entry in the Daily Log section:
1/30/18
Today, I went to Grocerymart to purchase the paper towels for my experiment. I was surprised by the price difference for the different brands. SuperSorb is twice as expensive as EconoWipe (\$2.96 versus \$1.48 per roll)! I wonder if it is twice as absorbent. The receipt is attached.

Choosing a Project

- What are you interested in?
- What do you want to find out?
- Do you have a way to test it?
- Is it safe?
 - Anything involving exercise, power tools, flames, etc. will require adult supervision and completion of Form D
- Will the materials be affordable/obtainable?
- Do you have enough time?
- Do you plan on using human participants?
 - Participants must sign a Form C (and have a parent/guardian sign if they are under 18) BEFORE participating in your project.

Write your project ideas in your Logbook!

Using People in Your Project

Projects involving people can be very interesting and worthwhile, but they require some special considerations:

- Will you be able to recruit enough participants? (10 is the minimum, 20 would be better)
- Will your participants be responsible about returning the required paperwork, signed by a parent/guardian (if under 18)? (Form C)
- Will you have the space and time to administer your experiment to all of the participants at once? If not, can you control the conditions enough to administer it at separate times and/or locations?
- Will your participants take their participation seriously?

Choosing a Project

- Science Buddies: Science Fair Project Ideas
 - This is meant to spark your own creativity. If you find a project that interests you, think about ways to make it your own.
<https://www.sciencebuddies.org/science-fair-projects/project-ideas>
- Steve Spangler Science
 - A lot of these are instructions for creating things-your job will be to figure out which variable you want to change and write your own procedure.
<https://www.stevespanglerscience.com/lab/experiments/>
- ipl2 for Kids: Science Fair Project Resource Guide
 - This site is no longer updated, so there may be some broken links, but several of the links are still active and helpful.
<http://www.ipl.org/div/projectguide/choosingatopic.html>
- Brain Games
 - This series is also available on Netflix. Check out some of the episodes for ideas about things you can test (and perhaps try to change).
<http://channel.nationalgeographic.com/brain-games/>

Writing a Question

- How does _____ affect _____?
- What is the effect of _____ on _____?
- Which _____ is the best for _____?
(Make sure you can define “best”.)

200 Potential Questions

<http://www.winter.k12.wi.us/community/sciencefair/sciencefairideas.pdf>

Your question should be **clear, testable, safe and interesting!**

Identifying Variables

When you think you know what question you will ask, identify your independent and dependent variable.

It is important that you only change one factor, otherwise you will not know which variable might be causing your results!

- Independent variable: the thing you will choose to change as the experimenter
- Dependent variable: the thing you will measure or observe to see if your independent variable affects it

Variable Examples

Can you identify them?

Independent variable: the thing you will choose to change as the experimenter

Dependent variable: the thing you will measure or observe to see if your independent variable affects it

- How does light color affect the height of plants?
- Does exercise improve performance on math tests?
- Will spelling scores improve if students rewrite the words 5 times or spell them aloud 5 times?
- Which material is the best insulator (slows temperature change the most)?

Variable Examples

Independent variable: the thing you will choose to change as the experimenter

Dependent variable: the thing you will measure or observe to see if your independent variable affects it

- How does light color affect the *height of plants*?
- Does exercise improve *performance on math tests*?
- Will *spelling scores* improve if students rewrite the words 5 times or spell them aloud 5 times?
- Which material is the best insulator (slows *temperature change* the most)?

Controlling Variables

When you have decided what you will change and what you will measure, you need to make sure that you control as many other outside factors as possible.

- temperature
- lighting conditions
- background noise
- directions for participants
- time of day
- amounts

Finding Sources for Background Information

- You need **at least 3**.
- Books or journal articles from a bookstore or library would be GREAT!
- But since you'll most likely use the internet:
 - sites where anyone can update information or answer a question, like wikipedia, ask.com, or yahoo answers are NOT good sources for your project. (However, wikipedia might lead you to good sources.)
 - Google is not a source-it's a search engine.
- Online encyclopedias, journal articles, or websites for universities or national organizations are usually the best sources to use.
- As you find sources, list the website/article title and complete URL in the "Sources" section of your logbook.
- As you read the research, take notes in the "Research" section of your logbook. (Make sure you organize it by listing the title, then taking your notes.) You will use this information to write the "Background" section of your project and to form your hypothesis before doing your experiment.

Writing a Hypothesis

- It is an objective statement. Write it like it is a fact. (No “I think...”)
- It should state who the participants are (if there are any), what changes during the testing, and what the effect of the changes will be.
- It should be informed by your research.
- Teachers and judges should be able to guess your question after reading a well-written hypothesis.

Hypothesis Examples

- How does light color affect the *height of plants*?
 - Pea plants grown under white light will grow taller than pea plants grown under green, red, or blue light.
- Does exercise improve *performance on math tests*?
 - 8th grade students who exercise for 15 minutes before they take a math test will get lower scores than students who do not exercise before taking the test.
- Will *spelling scores* improve if students rewrite the words 5 times or spell them aloud 5 times?
 - 3rd grade students who rewrite their spelling words 5 times will correctly spell more words than students who spell them aloud 5 times.
- Which material is the best insulator (slows *temperature change* the most)?
 - The temperature of hot water will decrease slower in a foam cup than it will in a plastic or paper cup.

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What's Next?

- Refine your question.
- **1 person from each group should complete the 2018 Science/Engineering Question Proposal Form by Monday, 1/29. This is where you should state the final question you have decided on.**

<https://goo.gl/forms/WWarnvrlDo2VKGqi1>

- Research topics related to your question.
- Keep a list of all resources you find that explain some aspect of your project.
- **Submit your resources to Mrs. GravesonPayne by Monday, 1/29.**

<https://goo.gl/forms/Zd2b066XhZAV2Jlr1>

- **Take notes from your resources in your logbook** and begin writing about your background information.
- **Develop your hypothesis!**