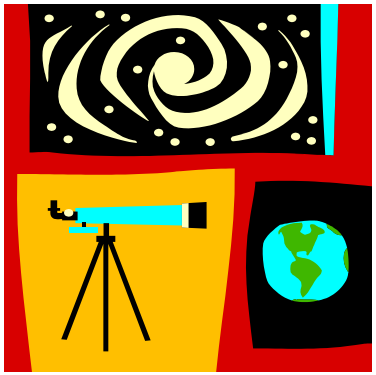
Dutchtown Middle School Science and Engineering Fair Information Night August 29, 2016

What do we need to do to have a successful Science or Engineering Fair Project?



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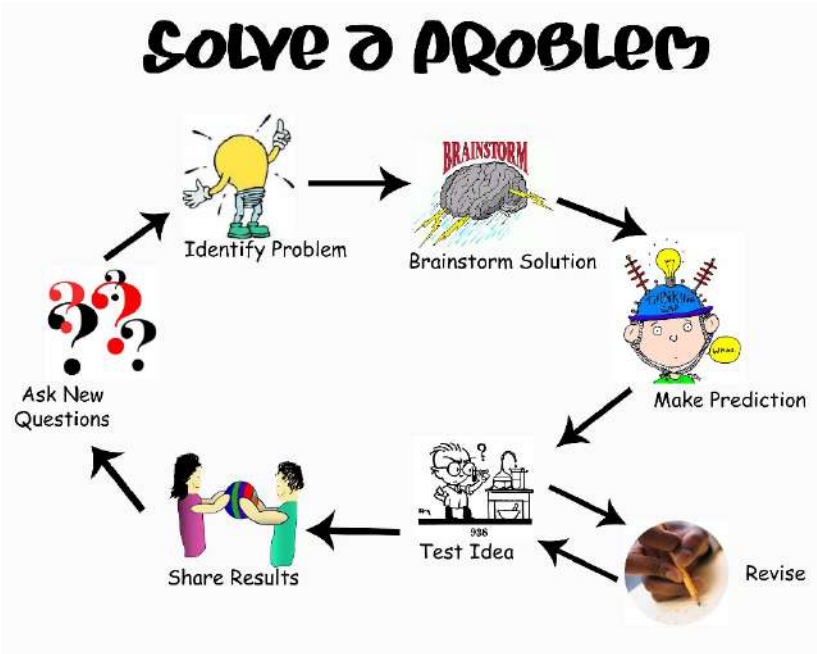
Choose a Project Type

Scientific Process

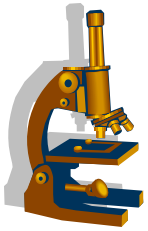
Engineering Design



Where do I begin? How do I choose a topic?

Here are some simple questions to start you off!

- Is there something in the world you would like to see made better?
- Is there something causing you concern in your life? How about around the world?
- Is there a way to make something safer?
- Is there a way to make something easier?



Scientific Process

- **Question**-what are you investigating scientifically?
- **Hypothesis**- proposed answer to the question based on research.
- **Background**- info that explains how student derived at hypothesis/Research Info listing sources
- **Materials**- list all the things you need to experiment
- **Procedures**- steps you took to find the answer and test hypothesis
- **Observations**- should be measurable
- **Results**- summarize observations
- **Conclusions**- confirms ***or*** rejects the hypothesis, supported by results.

Science Fair Topic Ideas

- Does playing video games increase heart rate?

- Do white candles burn faster than colored candles?

- Do different types of soil affect plant growth?

- Does the temperature of water alter the freezing time?

- Do different brands of popcorn leave more unpopped kernels?
- Does temperature effect the growth of mold on bread?

More Science Fair Topic Ideas…

- Do leaves from different trees decompose at different rates?

- Do different kinds of paper change the distance a paper airplane will travel?

- What kind of landscapes create the greatest amount of friction for a kickball coming to a stop after being pitched?

- Are some brands of paper towels more or less absorbent than others?

- How many drops of water will fit on the head of a penny?

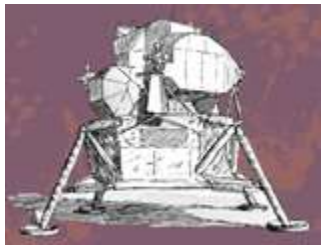
Engineering Design Process

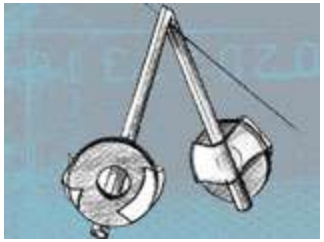
Engineering Fair Topic Ideas…

Build a better lunchbox that keeps food colder longer.

… keeps food frozen longer.

Build a better shock absorber.





Build a safer zip line for people with physical disabilities.

Build a better solar water heater.

Create a better holder for a 6 pack of cans for easy holding that won't cause harm to animals.

Ideas and images from pbskids.org

More Engineering Fair Topic Ideas…

Invent a way for someone on crutches or in a wheelchair to conveniently carry items.

Create a sound system you can hide or wear.

Invent a game with a buzzer sound to signal the player something has occurred.

Build a circuit that connects a battery and buzzer at least three feet apart using four types of materials. (How could this be applie[illegible] real world?)

Ideas and images from pbskids.org

Engineering Design Process

Ask & Research
What can I do to solve the problem or to improve the design? Research your topic.

Example:
How can I improve the structure of a bridge designed to prevent weathering?

Engineering Design Process

Imagine
develop possible solutions to your "problem".

example:
Materials that are noncorrosive in nature can be used if they are strong enough to hold the weight of bridge and vehicles/ pedestrians.

Engineering Design Process

Plan

List your steps to solve the problem or to improve the idea. The plan must be written out step by step.

Examples:

steps

1. Gather materials
2. Solder materials together
3. Etc.

Engineering Design Process

Create

build a prototype

Example:

build a bridge from the materials

you are trying to show can resist

weathering.

Engineering Design Process

Test and evaluate your prototype

- Make your prototype work.
- did it work?
  - If yes, why do you think it worked?
  - If no, why do you think it did not work?
- How can you improve your design?
- Ask yourself critical questions about your prototype and your plan!

Engineering Design Process

Improve

make adjustments to your

prototype, as needed.

Example:

your bridge collapsed before you could

test your materials. You must try another way to construct your

bridge on your second attempt.

Helpful Websites

- http://www.kids-fun-science.com/easy-science-experiments.html
- http://chemistry.about.com/od/sciencefairprojects/a/sciproelem.htm
- http://www.sciencefairsanity.com/home/sci/smartlist_9/free_elementary_science_fair_projects_3rd___5th_gr.html
- http://www.hometrainingtools.com/elementary-project-ideas/a/1308/
- http://schoolwires.henry.k12.ga.us/Page/56254
- https://student.societyforscience.org/intel-isef

Science Fair is **NOT**…

- How to build a ….
- How to show a …..
- Research Report

EXAMPLES OF "DO NOTS":

- Do not build a model volcano and explode.
- Do not write a report about an ecosystem.
- Do not show how to make a model rocket launch.

Measurable Observations:

- Bar Graph
- Chart/Table
- Line Graph
- These should be in the form of numbers! Something that SHOWS you kept a record of testing and displays the outcome

DMS Multimedia Science Fair

- This will be our second year to NOT use project boards until we gather all our information!
- We will incorporate technology to present our science fair projects to the **class**.
- If and only if you are chosen to go to the DMS Science and Engineering Fair, you will be required to create a project board. *This will be extra credit.
- You will be required to write a research paper if you are chosen to represent DMS at the Henry Regional Science and

Important Tip for Results…

- Scientists want to test ONE variable called the “INDEPENDENT VARIABLE”.
- The variable that is measured is called the “DEPENDENT VARIABLE”
- The components of the set-up that remain the same are called the “CONSTANTS”.
- This allows a truer result to occur
- Be sure to pick out your independent variable and your dependent variable in your project!!

Example:

- I am testing to see if classical music effects plant growth; music is my experimental variable. The plants I test will be the SAME size, SAME kind, in the SAME type container, SAME soil, receive the SAME amount of water/food supplements, access to the SAME amount of sunlight at the SAME time of day, etc. Only one will “hear” the classical music and the others will not.

DMS Science Fair Timeline

- Projects should be picked by Friday, 9-9-16. We will fill out most forms in class and send them home for parent signature
- Research papers will be supported by most ELA teachers. ***Most*** work will have to be done at home.
- Multimedia Presentations are due in class, along with the student's log book, on November 1st for class presentations.

Class Presentations:

- Will take place the **week of November 1, 2016**
  - Some students may finish earlier than November 1st and may present early if the teacher allows for it.

- Will determine who will represent each class in DMS Science Fair on November 17, 2016.
  - This will determine who creates a board display. *This is extra credit for any child moving on to the DMS Science and Engineering Fair.

Science Fair Forms

- http://schoolwires.henry.k12.ga.us/Page/85062
  - Science Fair Website (DMS Website/Science Tab)
- http://apps2.societyforscience.org/wizard/index.asp
  - Rules Wizard for ISEF
- https://student.societyforscience.org/overview-forms-and-dates
  - ISEF rules and forms information

Titles should be FUN!

How Sweet it is to Be Grown by You

Stay Cool!

Attention: Kernel on Deck

Thump, Thump, Thump, Thump

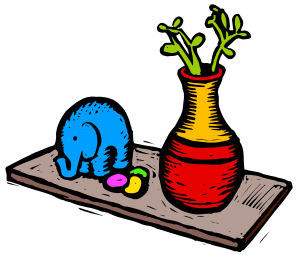
Planthoveen

When the Chips are Down

Dust in the Wind

Friendly Reminders

- If you use **live animals** as part of your research, it requires **special permission and a veterinarian's release form**.
- Photographs that show you testing the question or following your procedures are a GREAT idea, but be careful. **Do NOT show pictures of your face**. Judging has to be unbiased and you need to remain anonymous for fairness.
- **Please DO NOT PROCRASTINATE!** ☺

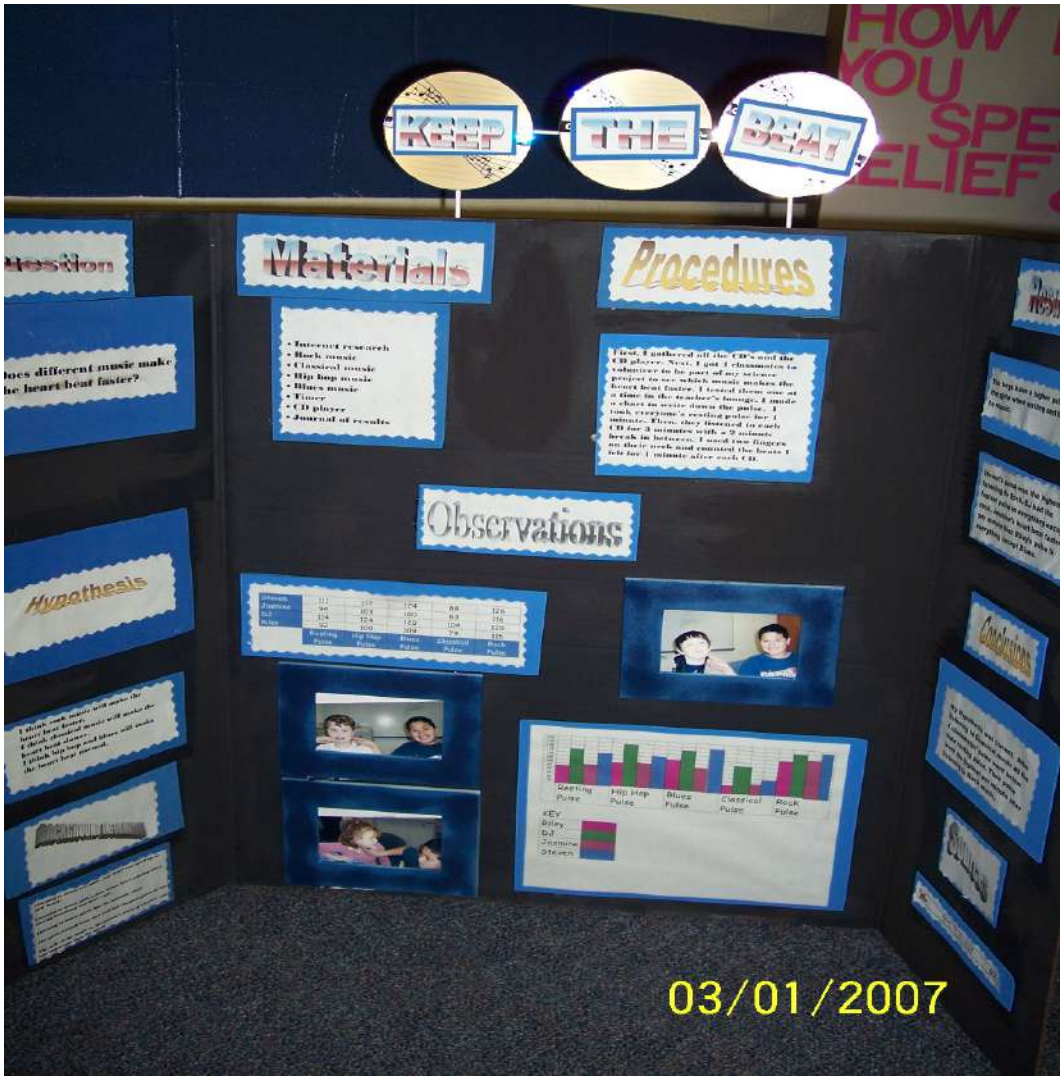


Display Ideas:

Once you get permission!

- Cover with fabric/Paint backboard
- Use foam board instead of construction paper
- Type all parts and proofread
- Add photographs of the process
- Add 3-D effects (picture frames, shelves, rods that are attached and can spin or move)
- Place title above the middle section to save room for process

Examples of Science Fair Projects:

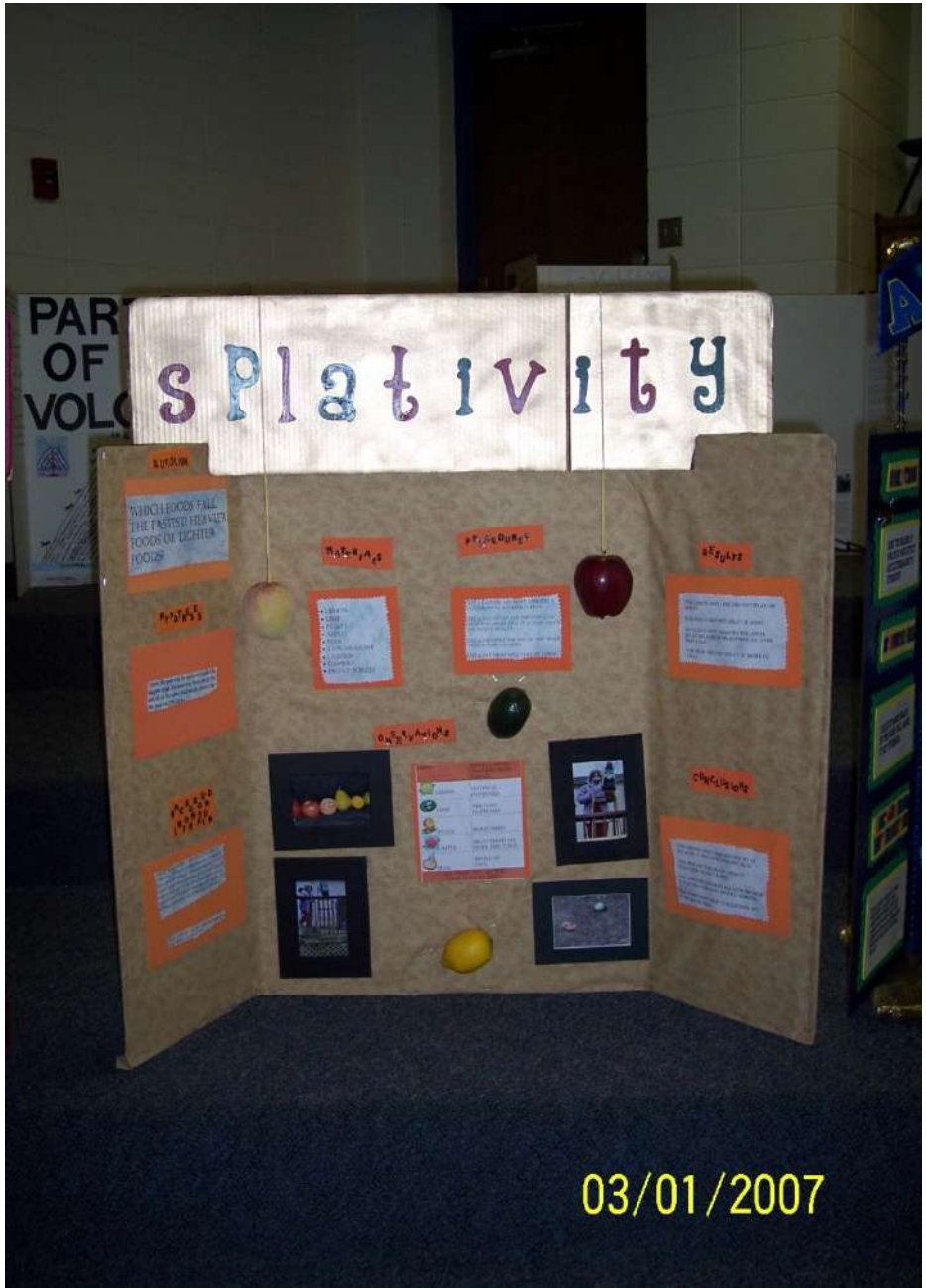


*Title on Music CDs

*Picture frames (do NOT show faces)

*Observations contain a chart and a graph

*Used WordArt for headings



*Title was “Splat + Gravity”

*3D fruit attached to board and hanging from title

*Clip Art used in observations chart

*Chose “citrus” type color scheme

*3D Title; “Pop” signs are glued to springs that bobbled and popcorn box actually contains popcorn coming out of top

*Layered foam backings (white on blue/ blue on white)

*Consistent WordArt for headings

*Kept color scheme pattern use with picture frames

Do NOT show faces

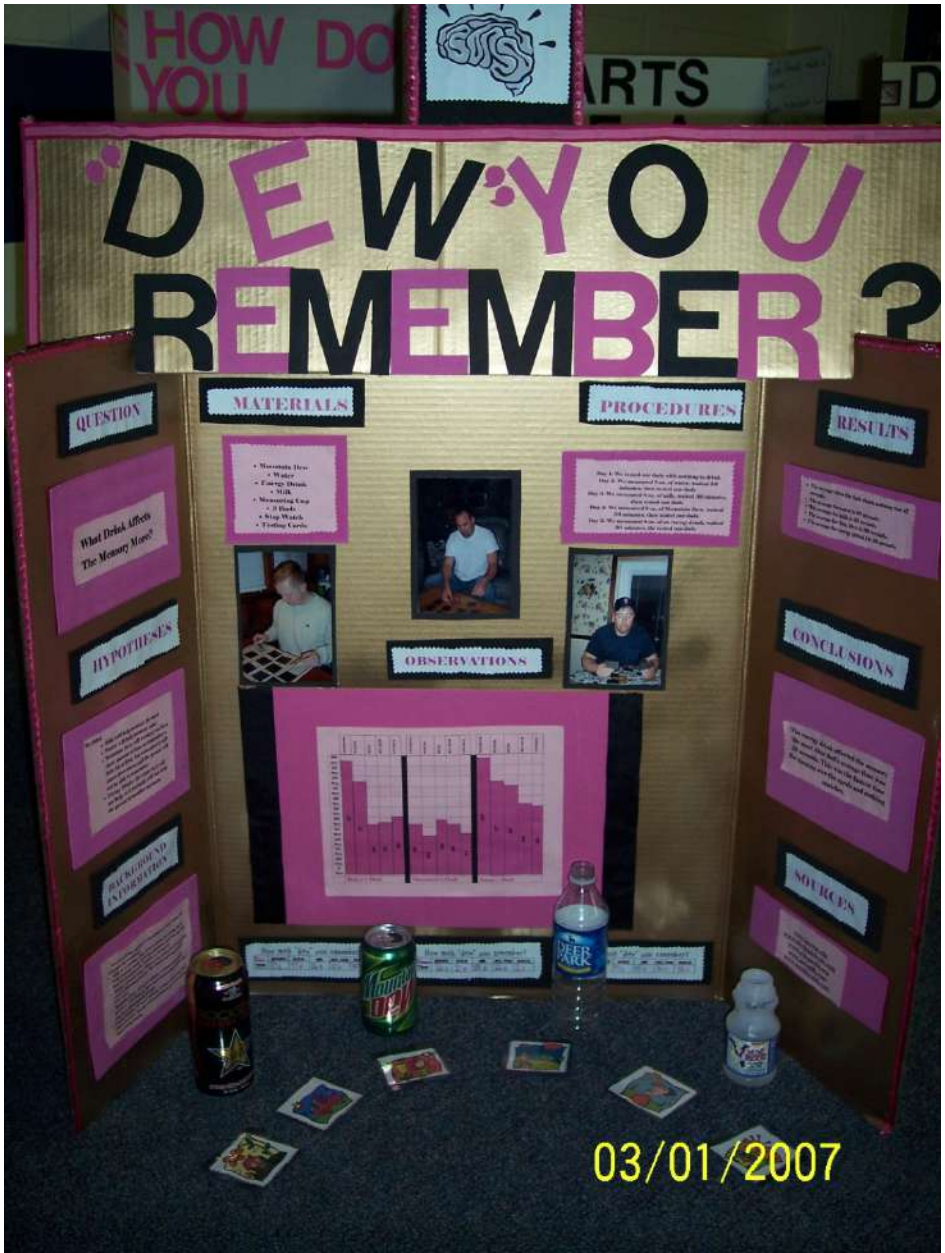
*Simple print fabric covering

*Lots of photographs

*Kept a journal of process and experimentation

*Border stapled around edges of presentation

Do NOT show faces



*Raised title and additional raised clip art sign above title

*Memory cards and tested drinks displayed

*Definite color pattern

*Nice, large data easily visible for observations

*Primary colors readily stand out

*Google eye pointers emphasize key components of presentation

*Metal coils frame pictures

*Materials used during testing displayed

*Large bar graph data

*Neat and well organized

*Decorated title board

*Use color scheme indicative of “ladybugs”

*Attached 3D ladybug to corner of observations

*Used a red/white gingham fabric covering

*Some slant to display adds visual variety

Remember…working with live animals requires additional paperwork and permission!