



2011 SCIENCE FAIR



INFORMATIONAL BOOKLET

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2011 Harmony School of Political Science and Communication Science Fair

2010 HSPS-Austin Science Fair Timeline	
Assignment	Due Date
Science Fair Informational Booklet	Sep 7-12
Science Fair Parent Meeting	Sep 16
Topic Selection	Sep 14-19
Research Plan and PPT (grades 4-8 only)	Oct 7
Research Paper Rough Draft (grades 4-8 only)	Oct 21-24
Research Paper Final Draft (grades 4-8 only)	Nov 11
Display Board	Nov 23
Science Fair (Grades 4-8)	SATURDAY, DECEMBER 10th

***Please note that **all** students in grades 4-8 **must** complete a science fair project. All projects will be entered into the school-wide fair!

***Students in grades 4-8 may compete individually.

*** Students will be required to provide some materials as determined by the science teacher and science fair coordinator.

***6-8th grade projects receiving awards in the school-wide fair **will** be entered into regional and state-wide science fairs.

By signing below, I acknowledge that I have read and understood the above information.

Student Name

Parent Signature

Date

TOPIC SELECTION

FREQUENTLY ASKED QUESTIONS:

- **I have no idea where to start... what do I do?**
 - See the following two pages for ideas to jump-start your search. Or, just think of something that you are interested in (guitars, nature, math... any idea will do!)... find a problem you think you can solve, and follow the scientific method!
- **I have an idea, but I'm not sure if I can make a project out of it...**
 - You CAN! Do some background research! Get on the internet, go to the library... or ask your teacher if they have any ideas! There is no such thing as a bad idea!
- **Do I have to use science buddies?**
 - No... science buddies is a great resource, but it is only just the beginning. The internet, science journals, college professors, etc. can provide a wide variety of information you may not find elsewhere.
- **Do I have to pick my topic, or can one be assigned to me?**
 - We prefer that all students chose their own topic... however, if you cannot pick a topic by the assigned date, your teacher will do so for you!

Science Fair Project Ideas

- Does music affect on animal behavior?
- Does the color of food or drinks affect whether or not we like them?
- Where are the most germs in your school? ([more info.](#))
- Does music have an affect on plant growth?
- Which kind of food do dogs (or any animal) prefer best?
- What is the best way to keep an ice cube from melting?
- What level of salt works best to hatch brine shrimp?
- Can the food we eat affect our heart rate?
- How effective are child-proof containers and locks.
- Can background noise levels affect how well we concentrate?
- Does acid rain affect the growth of aquatic plants?
- What is the best way to keep cut flowers fresh the longest?
- Does the color of light used on plants affect how well they grow?
- Does the color of a room affect human behavior?
- Do athletic students have better lung capacity?
- Does the type of potting soil used in planting affect how fast the plant grows?
- What type of food allow mold to grow the fastest?
- Does having worms in soil help plants grow faster?
- Can plants grow in pots if they are sideways or upside down?
- Does the color of hair affect how much static electricity it can carry? (test with balloons)
- How much weight can the surface tension of water hold?
- Which soda decays fallen out teeth the most?
- Does the color of birdseed affect how much birds will eat it? ([more info.](#))
- Do natural or chemical fertilizers work best?
- Can mice learn? (you can pick any animal)
- Can people tell artificial smells from real ones?
- Does age affect human reaction times?
- What is the effect of salt on the boiling temperature of water?
- Does shoe design really affect an athlete's jumping height?

Study the basic theory of combinatorial games using the game of Nim as an example [S](#)

The Iterated Prisoner's Dilemma [R](#)

The Impact of a Player's Starting Location in the Game "Risk" [R](#)

Using the game Connect-Four to study artificial intelligence [R](#)

Study the Josephus game and other Combinatorial games. [S](#)

Devising an Algorithm for Solving Rubik's Cube [R](#)

Figure out how to make patterns with Rubik's Cube. [R](#)

Sudoku Solving Patterns [R](#)

Test whether winning at Bingo is random. [R](#)

Which Algorithm Is the Most Efficient in Solving Alexander's Star? [R](#)

Writing a Rubik's Cube Solver using Mathematica [R](#)

Write a JavaScript Sudoku Corrector program and test how quickly it works on Mozilla Firefox, Internet Explorer, PCs, and laptops. [R](#)

Use ratios and other various mathematical formulae to attempt to find a pattern in the Banker's offers in the game show "Deal or No Deal", and if a pattern was found, could I use it to try and determine whether or not the Banker knows what's inside the case? [R](#)

Devise an algorithm for solving Rubik's cube, using three sets of moves that each accomplish a specific function. [R](#) [R](#)

What's the Fastest Way to Solve Rubik's Cube? [R](#) [R](#)

The best property to buy in the game of Monopoly [R](#) [R](#)

See if the gaming theory invented by John von Neumann and Oskar Morgenstern help to improve your chances when you are involved in a gambling game as apposed to using more traditional factors such as luck, hunches, or counting cards. [R](#) [R](#)

Determine whether, in a two-player zero-sum contest, a player would choose a seemingly more powerful strategy, or select a less obvious strategy, recommended by game theory, in an attempt to outwit an opponent. And which strategy would prove more fruitful? [R](#) [R](#)

An Efficient Strategy for Making a Choice from a Finite Stream of Offers [R](#) [R](#)

Which chess move in response to white's 1. e4 maximizes black's outcome? [R](#) [R](#)

Rubik's cube: Determine if a relationship exists between the order of a move sequence and the cube's average variegation (degree of disorder). [R](#) [R](#)

The Effects of Alpha-Beta Pruning on the Playing Strength of a Chess Playing Algorithm

****For more information on the topics listed above, please visit the following websites:**

http://www.juliantrubin.com/fairprojects/mathematics/game_theory.html
<http://www.sciencebob.com/sciencefair/ideas.php>

RESEARCH PLAN

Some of the information below has been adopted from the Science and Engineering Fair of Houston Guidelines

FREQUENTLY ASKED QUESTIONS:

- **What is a research plan?**

- A research plan is a simple outline that gives your audience a general idea of what your project is about.

- **What do I need to include?**

- All research plans should include the following components, in the following order:

- A. Question or Problem being addressed**

- B. Hypothesis/Engineering Goals**

- C. Description in detail of method or procedures** (The following are important and key items that should be included when formulating ANY AND ALL research plans.)

- **Procedures:** Detail all procedures and experimental design to be used for data collection

- **Data Analysis:** Describe the procedures you will use to analyze the data that answer research question or hypothesis

- D. Bibliography:** List at least five (5) major references (e.g. science journal articles, books, internet sites) from your literature review. If you plan to use vertebrate animals, one of these references must be an animal care reference.

- o Choose one style and use it consistently to reference the literature used in the research plan

- See example below for information on completing an MLA Bibliography

Works Cited Example

"Battery." *Encyclopedia Britannica*. 1990.

"Best Batteries." *Consumer Reports Magazine* 32 Dec. 1994: 71-72.

Booth, Steven A. "High-Drain Alkaline AA-Batteries." *Popular Electronics* 62 Jan. 1999: 58.

Brain, Marshall. "How Batteries Work." *howstuffworks*. 1 Aug. 2006
<<http://home.howstuffworks.com/battery.htm>>.

"Cells and Batteries." *The DK Science Encyclopedia*. 1993.

Dell, R. M., and D. A. J. Rand. *Understanding Batteries*. Cambridge, UK: The Royal Society of Chemistry, 2001.

"Learning Center." *Energizer*. Eveready Battery Company, Inc. 1 Aug. 2006
<<http://www.energizer.com/learning/default.asp>>.

"Learning Centre." *Duracell*. The Gillette Company. 31 July 2006
<<http://www.duracell.com/au/main/pages/learning-centre-what-is-a-battery.asp>>.

*****Students that are interested in attending SEFH will be required to complete additional paperwork.**

PPT

FREQUENTLY ASKED QUESTIONS:

- **What is PPT?**

- PPT is a presentation software program. It allows you to create slides in an outline-type format that is easy to read and works as a great aid for oral presentations.

- **What if I don't have access to a computer at home?**

- If a student does not have access to PPT or a computer at home, special arrangements can be made at school for the assignment to be completed. Students will need to let their teachers know **immediately** that they need to have access to the computer lab after school so that proper arrangements can be made and ample time for the assignments completion can be provided.

- **What do I need to include in my PPT presentation?**

- Title Slide (name, section, and project title)
- Question (or purpose) slide
- Hypothesis and Variables/Control slide
(stated in a cause and effect statement)
- Materials slide
(all quantities must be listed)
- Safety and Methods slide
(methods must be listed in numerical order – no paragraph format, please.)
(all safety precautions must be noted)
- Data Tables slide
(data tables will not necessarily be filled in with data, but should be set up to accept your data)
- Bibliography
(MLA or APA format may be used)
(at least 3 reliable, scientific resources must be noted)

PPT GRADING RUBRIC

Name:	Section:
0 = no evidence; 1 = some evidence; 2= clearly evident	
Title	0 1 2
Question	0 1 2
Hypothesis and Variables/Control	0 1 2
Materials	0 1 2
Safety and Procedures	0 1 2
Data Tables	0 1 2
Bibliography	0 1 2
Total Points Awarded:	/14
To convert to 100pts: Total score x 7.15	

RESEARCH PAPER

All research papers should include the following information in the following order. Remember, a scientific research paper is like an extended lab report... it will not look like a research paper that you complete in your ELA class!)

- a. Background, Problem, and Hypothesis (background is intended to explain why the project was done - keep it short)*
- b. Procedure (including materials and methods used in the project)*

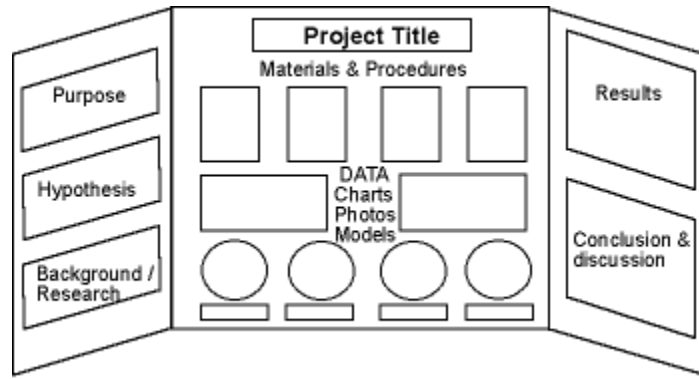
- c. Observations (any pictures you would like to include should be included here)*
- d. Results and Conclusions (a summary of results and an explanation of how it satisfies the purpose)*
- Graphs and Data Tables should be included in the results section of your paper*
- e. Acknowledgments (recognition to all who provided significant assistance)*
- f. Bibliography (MLA or APA format)*

RESEARCH PAPER GRADING RUBRIC

Name:	Section:
0 = no evidence; 1 = some evidence; 2= clearly evident	
Title	0 1 2
Background	0 1 2
Problem	0 1 2
Hypothesis	0 1 2
Procedures	0 1 2
Observations	0 1 2
Results	0 1 2
Graphs	0 1 2
Data Tables	0 1 2
Conclusions	0 1 2
Acknowledgements	0 1 2
Bibliography	0 1 2
Total Points Awarded:	/24
To convert to 100pts: Total score x 4.2	

DISPLAY BOARDS

All display boards should include the following components. Please note that your board will not necessarily look like your friends' board!!!



- Title
- Abstract
- Question
- Variables and hypothesis
- Background research
- Materials list
- Experimental procedure
- Data analysis and discussion including data chart(s) & graph(s)
- Conclusions (including ideas for future research)
- Acknowledgements
- Bibliography

DISPLAY BOARD GRADING RUBRIC



Grading Rubric: Display Board

Name:	Date:
0 = No Evidence 1 = Some Evidence 2 = Clearly Evident	
Does the display board include the following sections:	
○ Title	0 1 2
○ Abstract	0 1 2
○ Question	0 1 2
○ Variables and hypothesis	0 1 2
○ Background research	0 1 2
○ Materials list	0 1 2
○ Experimental procedure	0 1 2
○ Data analysis and discussion including data chart(s) & graph(s)	0 1 2
○ Conclusions (including ideas for future research)	0 1 2
○ Acknowledgements	0 1 2
○ Bibliography	0 1 2
Are the sections on the display board organized like a newspaper so that they are easy to follow?	0 1 2
Is the text font large enough to be read easily (at least 16 points)?	0 1 2
Does the title catch people's attention, and is the title font large enough to be read from across the room?	0 1 2
Did the student use pictures and diagrams to effectively convey information about the science fair project?	0 1 2

To convert to 100pts: Your score x 3.33

SCIENCE FAIR EXPECTATIONS

- ❖ All students in grades 4-8 are expected to complete a science fair project that will qualify for entrance into the school-wide science fair
- ❖ Students in grades 6-8 will be responsible for completing the majority of their work at home
- ❖ All science fair grades will be considered major project grades
- ❖ All students must be present on Saturday, December 10th, 2011 to receive a grade for the science fair – unexcused absences will result in a failing science fair participation grade
- ❖ Students that need additional assistance in completing science fair assignments must meet and discuss their issues with their teachers in a timely manner!!!

Any Questions?

Contact Mr. Matt

(or your child's science teacher)

iince@harmonytx.org

or visit school website at...

<http://hsपाustin.org/>