JSMS

Annual Science & Engineering Fair 2018

Name _____

Teacher's Name _____ Grade _____

Name _____ per. _____ Date _____

Project Component Due Dates

Due Date	Component	✓ Completed
January 19	Registration Form with Parent Signature	
January 26	Question	
February 9	Background Research	
February 9	Experimental Design Rough Draft	
February 9	Materials & Procedures Rough Draft	
March 8	Data table & Observation Notes	
March 8	Results & Conclusion Rough Draft	
March 8	Post-Experiment Research	
March 15	Register no later than today for the Washington State Science & Engieering Fair (WSSEF) at http://wssef.org/registration/	
March 16	Presentation Note Card	
March 16	Final Presentation Board	

Step 1: Coming up with a Good Question...

Now that you have picked out a topic that you like and that you are interested in, it's time to write a question or identify a problem within that topic. To give you an idea of what we mean you can start off by filling in the question blanks with the following list of words:

The Effect Question:

What is the effect of _____ on _____?

sunlight	on the growth of plants
eye color	pupil dialation
brands of soda	a piece of meat
temperature	the size of a balloon
oil	a ramp

The How Does Affect Question:

How does the _____ affect _____?

color of light	the growth of plants
humidity	the growth of fungi
color of a material	its absorption of heat

The Which/What and Verb Question

Which/What _____ (verb) _____?

paper towel	is	most absorbent
foods	do	meal worms prefer
detergent	makes	the most bubbles
paper towel	is	strongest
peanut butter	tastes	the best

Now its your turn:

Create your Science Fair question using either the "Effect Question", the "How does Affect Question" or the "Which/What and Verb Question":

_____

_____

_____

Name_____ Period _____ Date_____

Science Fair Research Page 1

Electronic Source #1

Author's last name:	Author's first name:
Title of Website:	Title of webpage:
Date published or last revised:	Date retrieved:
Publisher/Web site sponsor:	
URL (the ENTIRE http . . .)	
Pertinent facts in your own words: **(Do not describe what the article was about, list FACTS with bullets!)**	

I consider this a credible source because:

Electronic Source #2

Author's last name:	Author's first name:
Title of Website:	Title of webpage:
Date published or last revised:	Date retrieved:
Publisher/Web site sponsor:	
URL (the ENTIRE http . . .)	
Pertinent facts in your own words: **(Do not describe what the article was about, list FACTS with bullets!)**	

I consider this a credible source because:

Name_____ Period_____ Date_____

Science Fair Research Page 2

Other Source #1 (Can be a book, article, journal, letter and response from an expert, etc. CANNOT be another typical internet source.)

Author's last name:	Author's first name:
Title of Website:	Title of webpage:
Date published or last revised:	Date retrieved:
Publisher/Web site sponsor:	
URL (the ENTIRE http . . .)	
Pertinent facts in your own words: **(Do not describe what the article was about, list FACTS with bullets!)**	

I consider this a credible source because:

Other Source #2 (Can be a book, article, journal, letter and response from an expert, etc. CANNOT be another typical internet source.)

Author's last name:	Author's first name:
Title of Website:	Title of webpage:
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Pertinent facts in your own words: **(Do not describe what the article was about, list FACTS with bullets!)**	

I consider this a credible source because:

The Parts of a Scientific Method

Read and use this information to complete the next assignment.

Independent Variable

-The independent variable is the ONE thing in the experiment you are going to change.
-You are allowed to have several "levels" of the independent variable.
-List your levels in a logical order. The first one listed will be your control.

Examples:

A. kind of dog treat
   homemade←----------control
   Bow-Wow brand
   Gaines Burgers
   Puppy Chow

B. height of marble
   0 cm←----------control
   5 cm
   10 cm
   15 cm

-The control is the one thing in your experiment you are not going to test so you can determine whether or not your experiment made any difference.

-If there is no "logical order" for your independent variable, simply choose one level. If you think you don't have a control, think again. Judges will want to see a control.

Dependent Variable

-The dependent variable is the result of the independent variable.
-It must be measurable.
-It will often be represented by a number or a measurement. (Remember to use SI units.)

Examples:

A. which dog treat the Terrier chose

B. crater diameter in mm

Hypothesis

-The hypothesis is a statement that can be tested.
-It is written as "If_____, then_____."
-The independent variable goes in the first blank and your prediction of the dependent variable results will go in the second blank.
-You may NOT use any names or personal pronouns (I, you, he, she, it, me, my, mine, you, yours, his, her, hers, we, they, us, them, our, ours, your, yours, their, theirs.)
-Consider using the words "increase" and/or "decrease."

Examples:

A. If a Terrier is given a choice of dog treats, then the Terrier will choose the homemade dog treat over manufactured dog treats.

B. If a marble is dropped into flour, then the marble dropped from 15cm will make the largest diameter crater.

C. If the refrigerator temperature increases, then the amount of spoiled food will increase.

Constants

-The constants are all the things in your experiment that you will try to keep **fair.**
-There are many constants for each experiment.

Examples:

A. giving the dog treats at the same time of day, always putting the treat in the same hand, testing the same dog or dogs, same location, and etc.

B. using the same brand of flour, same amount of flour, same tray for holding the flour, same environmental conditions, same measuring device, and etc.

C. same refrigerator, same kind of food, same amount of food, same location of food in the refrigerator

Sample Experimental Design

Use this as a help as you complete your own experimental design diagram on the next page.

Independent Variable: soil type	**Dependent Variable:** height
List the levels of the Independent Variable: -potting soil ←control -soil from yard -compost	**Measured in:** cm

Hypothesis: If aloe plants are grown in different types of soil,

(I.V.)

then compost will produce the tallest plants.

(D.V.)

Title: Effect of Soil Type on Aloe Plant Height

(I.V. on D.V.—capitalize all big/important words and the last word)

Constants: **(List all the things you will keep "fair.")**

-same type and size pots
-same amount of soil
-same type of plants
-same size of plants
-same location
-same amount of light
-same amount of water

Name_____ Period_____ Date _____

Experimental Design **Rough Draft**

Independent Variable:	**Dependent Variable:**
List the levels of the Independent Variable: ←control	**Measured in:**

Hypothesis:

If _____,

(I.V.)

then _____.

(D.V.)

Title: Effect of _____

(I.V. on D.V.—capitalize all big/important words and the last word)

Constants: **(List all the things you will keep "fair.")**

Name_____ Period _____ Date_____

Experimental Design Diagram **Rough #2**

Recopy the previous page NEATLY, making all corrections noted, and putting things in the correct location.

Title: Effect of _____

(I.V. on D.V.—capitalize all big/important words and the last word)

Hypothesis:

If _____,

(I.V.)

then _____.

(D.V.)

Constants: (List all the things you will keep "fair.")

Independent Variable:	**Dependent Variable:**
List the levels of the Independent Variable: ←control	**Measured in:**

Sample Materials and Procedures

Use this as an example to complete your own material and procedures on the next page.

Materials:

- 9 identical flower pots
- 9 aloe plants
- 1 bag potting soil
- 1 bag compost
- Shovel
- Bucket
- scoop
- Graduated cylinder
- Tap water

Procedure:

1. Use shovel to dig some soil from backyard and place in bucket.
2. Fill 3 pots with compost, 3 with potting soil, and 3 with soil from backyard. Make sure pots are filled to same level.
3. Label each plant with type of soil and A, B, or C
4. Plant one aloe plant in each pot.
5. Water plants with the same amount of tap water.
6. Record date planted and amount of water given.
7. Place plants in sunny window.
8. Water as needed (use same amount of water for each) and measure and record height each Saturday.

Name_____ Period _____Date_____

Materials and Procedures—Rough Draft

List your materials and procedures below OR create it in a word document and bring in a printed copy for a grade. Use the previous page as an example. Add more paper if you need to.

Name_____ period _____ Date_____

Record your results! **Rough Draft**

Every experiment is different. Think about your particular experiment and the best way to record your results. In the space below, design a table to keep track of your data. If you have access to a computer, use the computer to design and print your data table.

Name_____ per._____ Date_____

Please do not answer any questions until you have read through the ENTIRE three page assignment!

Explaining the Results

1. Write one or two sentences telling what happened in your experiment.

   Example: The grass watered by Diet Mountain Dew grew taller than the grass watered with other liquids.

_____

_____

_____

2. Think about what happened in your experiment. Circle the correct words from those that are underlined:

The results supported/partially supported/did not support the hypothesis.

3. Write one or two sentences answering the following questions: Were your results what you expected? Why or why not?

_____

_____

_____

_____

_____

_____

Drawing Conclusions—Rough Draft

1. Write a complete sentence explaining your answer to the following question: Each time you did your experiment, did you always get the same results?

2. Write a complete sentence or two explaining your answer to the following question: Is there anything else you can think of that could have affected your results? Examples: I didn't think about location and one plant received more sunlight than the others. OR One of my subjects didn't follow directions and this affected the results.

3. Write a complete sentence or two explaining how you would correct the problems you mentioned in question 2. Examples: Next time, I would I would make sure all 3 plants were put in the same windowsill OR Next time, I would print out directions and have each participant sign them first to make sure they clearly understood.

4. Write a complete sentence or two answering the following question: If you could do this experiment again, what would you do differently?

5. Now that your experiment is finished, write at least 3 related questions.

Examples:

Was it the caffeine in the Diet Mountain Dew that affected the growth of the plants?

Since coffee has a lot of caffeine, how would plants do if they are watered with coffee?

What would happen if I compared plants grown with Diet Coke and Caffeine Free Diet Coke?

1.

2.

3.

Name_____ per. _____ Date_____

Post-Experiment Research

The purpose of this source is to determine WHY your experiment turned out the way it did. Becoming knowledgeable in this area will help you convince the judge that you cared enough to find out why you got the results you did. You may talk to an expert in the subject area, look in an encyclopedia or other book, or look up on-line.

Author's last name:	Author's first name:
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I consider this a credible source because:

Name_____ per. _____ Date _____

Prepare your Note Card!

- Make a note card following this exact format!
- You may choose the size of note card.
- Fill in your information where needed.
- You do not need complete sentences, just key words listed in the same order as the sample below!
- (Look back in your binder to find all of this information!)

Name:
Topic:
I chose this topic because:
Hypothesis:
To do my experiment, I: (This should take the longest amount of time. Go slowly, be thorough. Really make sure your audience can understand what you did.)

Independent Variable:
Dependent Variable:
Control:
Constants:
My results (supported, partially supported or did not support) my hypothesis.
In conclusion, I learned:
From my research, I learned this probably happened because:
(Show your research to the judge.)
If I could do this again:

- Now it is time to practice, practice, practice.
- Stand beside your display so you can point out information as it comes up.
- Have the research page in your binder marked with a tab or sticky note so you will be able to point it out to the judges.
- Memorize your note card. Just have it by your side for emergencies.
- Look at the person you are presenting to.

Check off the following as you complete them and have your parents sign that you completed all of the steps.

_____I practiced in front of the mirror 5 times.

_____I practiced in front of my parents 2 times.

_____I practiced in front of someone else at least 1 time.

_____ _____ Parent/Guardian signature due: _____

(Parent/Guardian Signature) (Date)

SCIENCE FAIR CENTRAL

SCIENTIFIC INVESTIGATION PROCESS

Students who want to find out things as a scientist, will want to conduct a hands-on investigation. While scientists study a whole area of science, each investigation is focused on learning just one thing at a time. This is essential if the results are to be trusted by the entire science community.

Hypothesis

After gathering background research, the next step is to formulate a hypothesis. More than a random guess, a hypothesis is a testable statement based on background knowledge, research, or scientific reason. A hypothesis states the anticipated cause and effect that may be observed during the investigation.

Consider the following hypothesis:

> If ice is placed in a Styrofoam container, it will take longer to melt than if placed in a plastic or glass container. I think this is true because my research shows that a lot of people purchase Styrofoam coolers to keep drinks cool.
>
> The time it takes for ice to melt (dependent variable) depends on the type of container used (independent variable.). A hypothesis shows the relationship among variables in the investigation and often (but not always) uses the words if and then.

Design Experiment

Once a hypothesis has been formulated, it is time to design a procedure to test it. A well-designed investigation contains procedures that take into account all of the factors that could impact the results of the investigation. These factors are called variables.

There are three types of variables to consider when designing the investigation procedure.

- The independent variable is the one variable the investigator chooses to change.
- Controlled variables are variables that are kept the same each time.
- The dependent variable is the variable that changes as a result of /or in response to the independent variable.

Steps to design an experiment

Step A – Clarify Variable
Clarify the variables involved in the investigation by developing a table such as the one below.

Testable Question	**What is changed?** (independent variable)	**What stays the same?** (controlled variables)	**What is changed?** (dependent variable)
What detergent removes stains the best?	Type of detergent, type of stain	Type of cloth, physical process of stain removal	Stain fading over time for combinations of detergents and stains

Step B – List Materials
Make a list of materials that will be used in the investigation.

Step C – List Steps
List the steps needed to carry out the investigation.

Step D – Estimate Time
Estimate the time it will take to complete the investigation. Will the data be gathered in one sitting or over the course of several weeks?

Step E – Check Work
Check the work. Ask someone else to read the procedure to make sure the steps are clear. Are there any steps missing? Double check the materials list to be sure all to the necessary materials are included.

Data Collection

After designing the experiment and gathering the materials, it is time to set up and to carry out the investigation.

When setting up the investigation, consider . . .

Location	Choose a low traffic area to reduce the risk of someone accidentally tampering with the investigation results—especially if the investigation lasts for several weeks.
Safety	Avoid harmful accidents by using safe practices. • The use of construction tools or potentially harmful chemicals will require adult supervision. • Locate the nearest sink or fire extinguisher as a safety precaution. • Determine how to dispose of materials. For example, some chemicals should not be mixed together or put down a sink drain. • Wear protective clothing such as goggles and gloves. Tie back loose hair so that it does not get caught on any of the equipment.
Documentation	Making a rough sketch or recording notes of the investigation set up is helpful if the experiment is to be repeated in the future.

Carrying out the investigation involves data collection. There are two types of data that may be collected—quantitative data and qualitative data.

Quantitative Data

1. Uses numbers to describe the amount of something.
2. Involves tools such as rulers, timers, graduated cylinders, etc.
3. Uses standard metric units (For instance, meters and centimeters for length, grams for mass, and degrees Celsius for volume.
4. May involve the use of a scale such as in the example below.

Qualitative Data

- Uses words to describe the data
- Describes physical properties such as how something looks, feels, smells, tastes, or sounds.

As data is collected it can be organized into lists and tables. Organizing data will be helpful for identifying relationships later when making an analysis. Using technology, such as spreadsheets, to

organize the data can make it easily accessible to add to and edit.

Analyze Data

After data has been collected, the next step is to analyze it. The goal of data analysis is to determine if there is a relationship between the independent and dependent variables. In student terms, this is called "looking for patterns in the data." Did the change I made have an effect that can be measured?

Recording data on a table or chart makes it much easier to observe relationships and trends. There are many observations that can be made when looking at a data table. Comparing mean average or median numbers of objects, observing trends of increasing or decreasing numbers, comparing modes or numbers of items that occur most frequently are just a few examples of quantitative analysis.

Besides analyzing data on tables or charts, graphs can be used to make a picture of the data. Graphing the data can often help make those relationships and trends easier to see. Graphs are called "pictures of data." The important thing is that appropriate graphs are selected for the type of data. For example, bar graphs, pictographs, or circle graphs should be used to represent categorical data (sometimes called "side by side" data). Line plots are used to show numerical data. Line graphs should be used to show how data changes over time. Graphs can be drawn by hand using graph paper or generated on the computer from spreadsheets for students who are technically able.

These questions can help with analyzing data:

- What can be learned from looking at the data?
- How does the data relate to the student's original hypothesis?
- Did what you changed (independent variable) cause changes in the results (dependent variable)?

Draw Conclusions

After analyzing the data, the next step is to draw conclusions. Do not change the hypothesis if it does not match the findings. The accuracy of a hypothesis is NOT what constitutes a successful science fair investigation. Rather, Science Fair judges will want to see that the conclusions stated match the data that was collected.

Application of the Results: Students may want to include an application as part of their conclusion. For example, after investigating the effectiveness of different stain removers, a student might conclude

that vinegar is just as effective at removing stains as are some commercial stain removers. As a result, the student might recommend that people use vinegar as a stain remover since it may be the eco-friendlier product.

In short, conclusions are written to answer the original testable question proposed at the beginning of the investigation. They also explain how the student used science process to develop an accurate answer.

SCIENCE FAIR CENTRAL

ENGINEERING DESIGN CHALLENGE

Engineering is the application of science and technology to solving a problem. Engineers look for problems they want to solve or how to improve a process or physical design. Creating an invention is an example of an engineering a solution.

Ask

As with investigations, the key to defining the project is by posing the right question. Students can ask themselves, "What bothers me?" "What have I heard other people complaining about?" Is it something that could be fixed or improved on. Find a local problem or something that needs to be improved.

Imagine

Brainstorm several ideas and consider many different solutions. Then, research your idea to find out what others know. This might include looking at other products or solutions that exist already.

Plan

Select one solution and make a plan! Design the solution and the method for testing to see if it works.

Create

Create a solution and explain why it should work. Build a prototype using a physical model or Computer-Aided-Design Software.

Test

Test the solution and collect data to be sure your solution made a change. Make sense of the data – how do you know it worked, or didn't work? Did it solve the identified problem?

Improve

How could you improve your solution? Make revisions based on your test results and observations. Draw new designs to continue to improve your idea.

Chapter 4: Present It!

Presenting your project at the Science Fair is the final step in the process. To encourage more students to develop science and engineering projects, Science Fairs have evolved into competitions. These competitions are between students within a category and for the Science Fair overall. Judges are used for the competitions that perform a process similar to peer review based on verbal presentations and visual displays. **Communication is the purpose of the verbal presentation and visual displays.** To communicate effectively, it is important that you understand the expectations of the judges. The following sections will help you to prepare your visual display, verbal presentation, and provide some insight as to what you can expect in the judging process.

Visual Display

You want to attract and inform. Make it easy for interested spectators and judges to assess your project and the results you have obtained. You want to 'catch the eye' of the judges and convince them that the research is of sufficient quality to deserve closer scrutiny.[106]

You should take pride in the assembly of the board and it should reflect your work, as you want it represented. Neatness, completeness, and clarity are very important. The board and visual display should help you to present your project logically and serve as a prop for you to illustrate what you have done.[107]

The primary focus of the WSSEF judges will be your research, not the display. Do not spend an excessive amount of time or money on the board that would be better spent on the quality and quantity of information presented for the research project. You are being judged on the science not the show![108]

Parts of the display board:

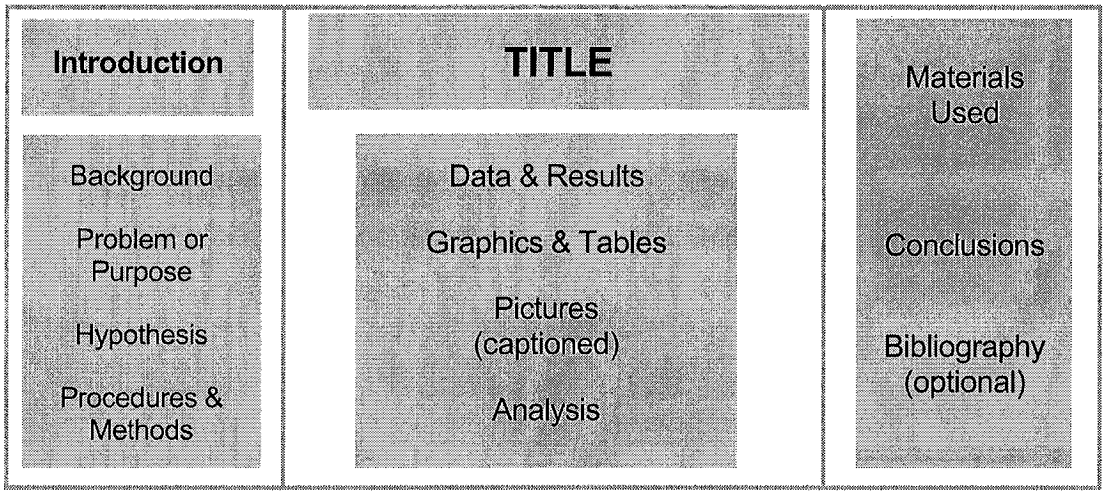
- ☐ Title - an attention grabber to make someone want to know more about the project
- ☐ Introduction or background search/literature review
- ☐ Problem or Purpose
- ☐ Hypothesis
- ☐ Procedure and Methods
- ☐ Materials Used
- ☐ Data & Results (charts, diagrams, graphs, pictures of the results, etc.)
- ☐ Analysis
- ☐ Conclusions

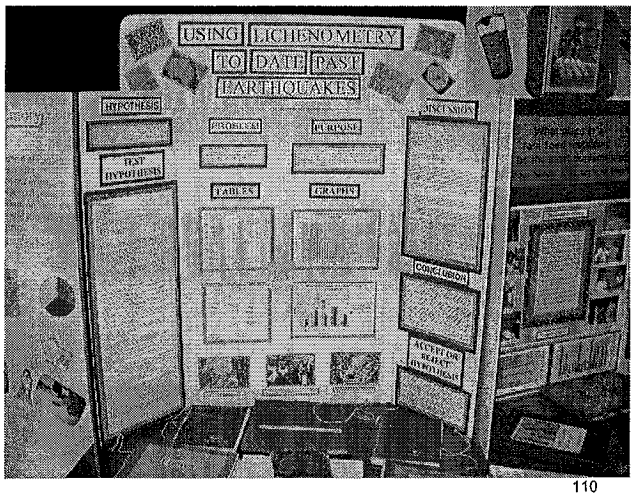
- ☐ Bibliography (Optionally our bibliography may be placed in the notebook instead)

Sample Visual Display Boards

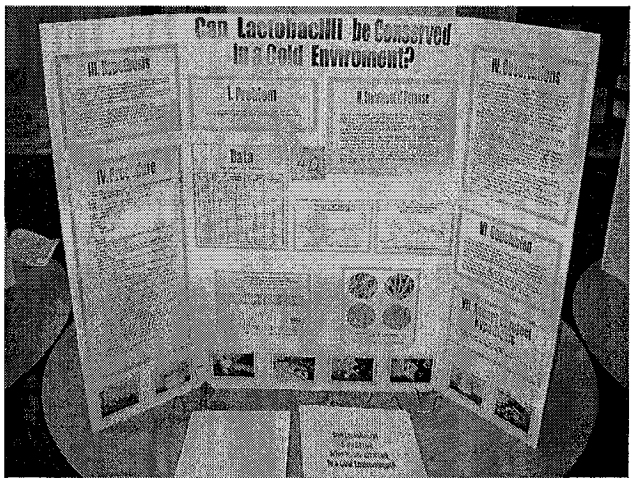
Most displays or boards have three sections and are free standing. For the most part, the displays are put on a table. Many judges get a chance to look at the display boards before the interviews. Make the most of your space using clear and concise displays. **You never get a second chance to make a first impression!**[109]

The board can be organized like a book to read the left panel first, then the center and finally the right panel, but always top to bottom. This approach generally has data such as photographs, charts, and graphs in the center panel.

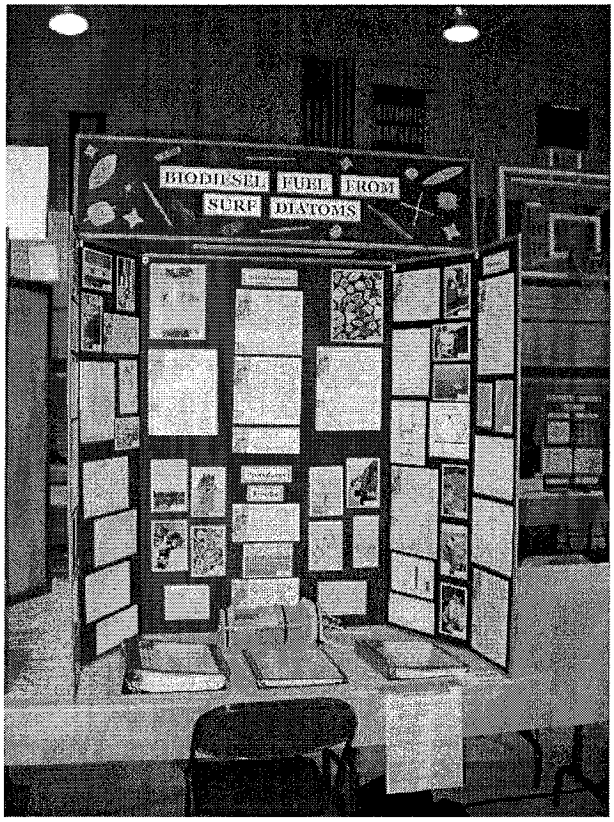


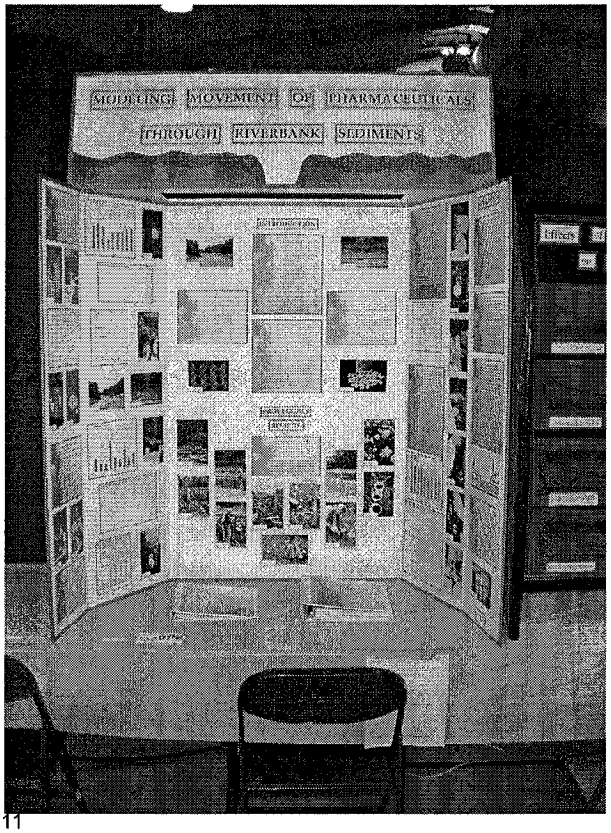


110



A more popular approach is to put the information you want to be read first in the upper center panel, then the next most important in the left panel, with the remainder in the right panel, also presented top to bottom. This approach is typically used on more complex projects that use data from several different experiments to investigate a hypothesis.





111

Display Tabletop

1. All exhibit materials should fit within a tabletop area that is 48 inches wide by 30 inches deep. The total height of the display cannot exceed 108 inches from the floor (including 30 inches from floor to tabletop).
2. Although exhibits can be displayed directly on the floor, it is recommended that they be placed on the tabletop.
3. The tabletop provided by the Science Fair may or may not have tablecloths. Each entrant can optionally provide a tablecloth in a color that accentuates the theme colors of the display board.
4. The tabletop should have at least one display board, a log or journal of the project listing activities and a copy of a research paper with reference materials included or separately.

5. Other items that pertain to the project maybe displayed on the tabletop provided they do not detract from the overall presentation of the project or violate the WSSEF [112] or ISEF[113] rules and safety regulations.

Helpful hints for displays:

Only material from this year's project can be placed on your board. If your project is a continuation project, a short background statement (1 to 2 paragraphs) can summarize the preceding year's work as background only.[114] Prior year's data books are permitted at your project.[115]

Read the rules[116] that govern visual displays exhibited at WSSEF before you begin. Be sure to adhere to the size limitations and safety rules when preparing your display. Also, be sure to review the Display and Safety Regulations of the most current ISEF Rules and Regulations.[117,118]

Your project title and section headings on your board should be large enough to be easily read from six feet away.[119] Your title is an extremely important attention grabber. A good title should simply and accurately present your research and depict the nature of the project. The title should make the casual observer want to know more.[120]

The regular text displayed on your board should be readable from a distance of three to four feet. Although you may be tempted to make your board larger, remember that your board should not be mostly empty space. A smaller size board that is nicely laid out and tells the story is far more attractive than a large one that is not filled.[121]

Be creative. Make your display stand out. Use color combinations that are pleasing to the eye. Arrange the board in several ways before attaching all of your materials. Keep background spaces to a minimum. However, do not crowd tightly so that everything seems too packed. Keep it simple. Make it easy for the judges and others to assess what you have done. Anyone should be able to understand the visuals without further explanation just by looking at your display board.[122, 123]

Carefully check for safety and size before you cut your board to size. Make sure your display is sturdy, as it will need to remain intact for quite a while. Poster board may need to be reinforced so it can stand-alone. Mat-board, and foam-core boards are easy to work with and are lightweight.[124]

Make sure your display follows a sequence and is logically presented and easy to read. Reach out to the 'skim-reader'. A glance should permit anyone (particularly the judges) to locate quickly the title, hypothesis or goal, experiments, results and conclusions. When you arrange your display, imagine that you are seeing it for the first time. Highlight your results using key graphs that show the relationships of the two variables tested. Use the graphs to give a 'picture' of the data for your viewers. These graphs will provide an easier method of viewing the data rather that just seeing the recorded quantitative data.[125]

Use neat, colorful headings, charts, and graphs to present your project. Correctly and clearly, label graphs, diagrams, and tables. Pay special attention to the labeling on graphs, charts, diagrams, photographs, and tables to ensure that each has a title and

appropriate label describing what is being demonstrated. Make certain that the graphs are titled and have both axes labeled clearly and accurately.[126]

Use photographs to validate and help explain parts of the project that would be difficult to explain, or that would require time to explain. Many projects involve elements that may not be safely exhibited at the Fair, but are an important part of the project. You might want to take photographs of important parts/phases of your experiment to use in your display. Captions should be clear and indicate the point being made by the photo or image. **Photo or image credit lines must be used, and should be of the form: "Photograph taken by..." or "Image taken from...")**[127]

Photographs or other visual images of human test subjects must have informed consent (Please see the current ISEF Rules[128] for display and safety regulations). Decide if photographs of this type would be better placed in your notebook or a photo album rather than on your board. In addition, you must have permission to use pictures from books or other sources.[129]

Presentation

What do Science Fair Judges want to know?

Science Fair judges are volunteers that have set aside a portion of their time to communicate with you about your project, and rank it with respect to all the other projects that have entered the Science Fair in your category or that meet specific special awards criteria. It is important for you to remember, that these judges may be experts in the field of study that includes your project, or they may be scientists, educators, and engineers that have an interest in that field. **All of them have an interest in communicating with you about your project, and are responsible for ranking your project for recognition and awards based on what they consider good science or engineering.**

WSSEF Judging Criteria

The major judging criteria[130] used at WSSEF include the following:

1. Knowledge of the Project Topic
2. Knowledge of Scientific Principals or Engineering Goals
3. Journal and Records
4. Creativity and Originality
5. Visual Display

Each of these major criteria are judged based on points to indicate its importance in the overall ranking process, but judges are allowed to consider this criteria as a guideline and are given freedom interpreting and applying them to your project.

SCIENCE FAIR CENTRAL

HELPFUL HINTS

How to Create a Winning Display

Treat the center panel of the tri-fold board as center stage. This is where the story of the experiment or investigation should be chronicled in precise steps.

Before you shop for supplies or pick up a single marker or piece of construction paper, review the official guidelines for your science fair. Some guidelines specify exact dimensions of display boards or require certain category headings; others are less strict.

Read these Helpful Hints for tips on getting started. Learn how to edit your text down to the essentials, pick and choose the best photos and graphics, and display them all in the most clear and compelling way possible. Through creative use of color, type, and graphic elements, you can make your ideas pop and bring your project to life.

Helpful Hints for Science Fair Project Displays

Preparation

- **Leave yourself plenty of time**: two weeks between collecting data and the presentation.
- **Consult a book or website about graphic design.** See how professionals use a grid format with columns and rows for effective layouts.Evaluate how their design allows for beautiful and functional transmission of light
- **Study examples of winning displays** in science fair books for ideas.

Getting Started

- **For any drawings or written text,** start with pencil, not pen.Consult a book or website about graphic

design. See how professionals use a grid format with columns and rows for effective layouts.Evaluate how their design allows for beautiful and functional transmission of light

- **Sketch a rough layout** on a piece of paper before pasting up your display.
- **Gather all of your material and organize it** into categories.
- **Include photographs if you can.** If you forgot to take pictures, restage the project and take them now.
- **Come up with a catchy title** and display it prominently.
- **Include all required categories** and content on your display.
- **Keep things on the board in a logical sequence** – the order in which you did them – to tell the story of your project.

Making the Display

- **Space elements evenly across your layout,** to achieve a balanced, consistent look.
- **Draw attention to the most interesting parts** of your project with color and graphics.
- **Use no more than two or three complimentary colors** for background and text.
- **Use black or dark colors for type.**
- **Make type large enough to read from four feet away:** As a general rule, use 24 pt type for headings, 16 pt type for text blocks.
- **The title should be the largest text on the board.** Don't be afraid to make it big and bold!
- **Choose a simple font that is easy to read.** Easy to read fonts include: Arial, Comic Sans, Tahoma, Verdana
- **Use subheads and bullet points rather than long paragraphs** of dense text.
- **Mount black-and-white text blocks on colored construction paper** for contrast. It's like framing a picture.
- **Avoid using white school glue to stick thin paper to your board.** It can easily wrinkle.
- **Use Scotch Removable Tape and Restickable Glue Sticks** to paste items on your display and play around with the layout. You'll have greater artistic freedom and avoid frustration!
- **Label all graphs, charts and tables.** On graphs, make sure you label the x and y axes.
- **Be sure every photo has a caption beneath it.** Write descriptive captions for photos.
- **Proofread**, spell-check all text before sticking it on your display board.
- **Print on thick paper**, like cover stock, if possible.
- **Use a ruler, yardstick or T-square** to measure and cut evenly.
- **Avoid writing or drawing directly on the board.** There is no way to cleanly erase it.

- **Leave some "white space"** between text boxes and graphics.
- **For any 3-D objects: wait until you transport the board to the fair** and glue them on there.
- **If you need electricity for your project** (such as a light for plants), ask for it ahead of time.

At the Science Fair

- **Pack a box of supplies** to keep handy for last-minute repairs at the fair.
- **Dress neatly** – what's called "business casual." You're not expected to wear a three-piece suit, but shoot for neat and conservative to be safe.
- **Avoid eating or chewing anything.** A bottle of water is o.k.
- **If you have a cell phone, leave it at home or in your locker.**
- **Smile, look visitors and judges in the eye,** be polite, and thank the judges for their time.

Tips for a Successful Science & Engineering Fair Presentation

Look like a professional!

This is your chance to tell the judges about your project. You will stand next to your project and the judges will come over to you.

Do not wait for the judge to ask you about your project!

- Be assertive.
- This means you stand up when you see a judge coming.
- Catch the judge's eye before he/she catches yours.
- Stand straight and tall.
- Extend your hand and introduce yourself.
- Then proceed to tell the judge about your project.
- Proceed through the information on your note card, but do not read directly off the card. Try to do it from memory. (Keep the note card handy only in case you get flustered.)
- Point out the information on the board as you refer to it.
- Act like an expert because you are one. No one knows more about your project than you do!
- Ask the judge if he/she has any questions.
- Answer the judge's questions by carrying on a conversation with him/her just like you would with a teacher. It is okay to ask for clarification, such as, "Do you have any ideas I could use to improve my project for next year?" Or if the judge gives a suggestion, say something like, "How would I go about doing that?"
- Thank the judge for coming and donating his/her time.

When the judges are judging other students' projects, you will observe the following rules:

1. You will wait quietly IN YOUR SEAT!

2. You will not leave your seat for any reason except a fire or a restroom break.

3. If you need to use the restroom, ask a teacher. Make sure no judges are around before you leave, then hurry back. Students have lost the science fair because they were at the restroom when the judges came around!

4. You will not talk to your neighbors.

5. Take a book to read or a book of puzzles or Sudokos with you. If all else fails, sit silently and meditate on the mysteries of the Rosary!

6. Remember, you receive a participation grade based on your professional conduct.

Your Science Fair Oral Presentation

A lot of kids are scared of speaking in public or to a teacher/judge. Just imagine they are a fellow scientist who just wants you to share what you learned.

Relax, smile, and have fun. Remember, you are the expert and you had fun doing the project. But if you are a little nervous, we listed some things that you need to do during the presentation.

Helpful Hints:

- Look sharp, feel sharp, and you will be sharp. Dress nice that day, be polite, and speak clearly. You will show that you have confidence. Don't forget to look at your audience.
- Introduce yourself. Point to the title of your display. Tell your audience why you chose to study this.
- State your problem that you studied (your question.) Tell them about your hypothesis (what you thought might happen.)
- Talk about what you learned while researching your topic.
- Talk about the sources (books, websites, and interviews) that helped you understand your topic.
- Tell about your project and explain the steps you took to conduct your experiment. Be sure to mention all the materials involved and point out the pictures that you may have taken.
- If it applies, be sure to show them that you tested your experiment at least 3 times.
- Show them all of the cool graphic organizers that you made, like your tables and charts. Remember to point out the labeled parts of your graph or table to show that you know what it represents.
- Be sure to explain what your data means. Make sure you can read your graphs and tables. Let them know if you were surprised by the results, or if you know what would happen because you studied about it.
- Make sure you sound like an expert on your topic. Always use the appropriate vocabulary especially by using words from the Scientific Method, like: Problem, Hypothesis, Procedure, Results, and Conclusions.

JSMS ANNUAL SCIENCE & ENGINEERING FAIR REGISTRATION FORM

Due no later than Friday, January 19, 2018

Please return this form to your teacher on January 19, 2018 or sooner.
Your project is a class requirement and part of your graded work.

GRADE LEVEL _____

SCIENCE TEACHER _____

STUDENT NAME _____

PROJECT TITLE _____

Description of project:

_____

_____

_____

_____

_____

I NEED AN ELECTRICAL OUTLET (circle one): *yes* *no*

All parents must sign and approve their student's Science & Engineering Fair project.

I acknowledge that I have received and reviewed the materials for the Science and Engineering Fair and I am aware that my student is required to complete a project.

I will offer support for the project, but not DO the project for my child.

Student's Signature _____ Date _____

Parent's Signature _____ Date _____