



# 2016 CTCS Science Fair

Science Projects are DUE Thursday January 19

## *General Assignment Descriptions*

The entire project is worth a large portion of your 2<sup>rd</sup> quarter grade.

The project must utilize the scientific method including quantitative analysis.

Students must use measurements in forming their conclusions.

Project details, analysis, and conclusions must be compiled on a tri-fold board for presentation.

- Students are encouraged and required to conduct an experiment in the area of life science (6&7), or physical science (8)
- The project must use the Scientific Method: State the Question, Research, Hypothesis, Experiment, Analyze results, Communicate results.
- There must be a change that is measurable. This is called the responding (or dependent) variable. Students must measure their results quantitatively.
- Students must perform several trials (10 or more trials - helps ensure accuracy and also helps prove results are reproducible) and calculate the average and uncertainty.
- Students must use data evidence to formulate conclusions.
- Plagiarism and Fabrication will not be tolerated. The result of a plagiarized or fabricated project will be a zero for the entire project.

## **Supplies needed for this project:**

- ▶ 1 - 1" 3-ring binder
- ▶ 1 –spiral bound notebook (for keeping notes on your project from September- January)
- ▶ 1 – Tri-Fold Display board (Not due until the end of the project – should be new)
- ▶ Any and all materials needed for the experiment. Please note that the experiment does not need to be complicated, extravagant, or – understandably – expensive. Creativity, imagination, and accurate analysis and record keeping are more important. You may, however, wish to invest a bit of money in “building” the manipulative portion of the experiment (see notes on page 3 about this).

If you have any questions, please contact me at: [kristen.lucas@citytree.org](mailto:kristen.lucas@citytree.org)

You alone are the Lord;  
You have made heaven, the heaven of heavens, with all their host,  
the earth and all things on it, the seas and all that is in them, and you preserve them all...  
*Nehemiah 9:6*

# City Tree Middle School Science Fair Due Dates

These dates apply to all 6<sup>th</sup>-8<sup>th</sup> Middle School Students, in Earth and Physical Sciences.

Due Date	Points	Project Components
Thu. Oct. 1	10	<b>Testable Question and Hypothesis (Hand Written)</b> - Students must turn in an APPROVED testable question and formulated a hypothesis.
Thu. Oct.18	10	<b>Science Project Proposal (Hand Written)</b> – Students must complete the project proposal form. The proposal form requires students to come up with a testable question and their plan to carry-out testing of their hypothesis.
Thu. Oct. 27	20	<b>Experiment Details and Materials and Procedures (Typed)</b> – This is an important section that is part of your final science project paper. Be sure your procedures are very detailed and include the materials you used..
Thu. Nov. 8	40	<b>Background Research and Works Cited (Typed)</b> – This is a <u>five paragraph research paper</u> (must include a bibliography) and is part of your final project paper. Please use MLA format. ( <u>6<sup>th</sup> grade- 5 resources, 7<sup>th</sup> and 8<sup>th</sup> grade- 10 resources</u> )
Thu. Nov. 17	20	<b>Experiment Results (Data Tables &amp; Graphical Representation of Data) (Typed)</b> – You will turn in the data you collected from 10 or more trials (in the form of a table) and at least one graph showing the best values.
Tue. Dec. 6	20	<b>Data Analysis, Conclusion, and Abstract (Typed)</b> – These are two more sections I want to grade and provide feedback before your final project is due. Only print these sections. Staple together and make sure your name is on the front.
Tue. Jan. 3-5	30	<b>Challenges/Technical Issues, Recommendations, Acknowledgements, Experiment Notes(Typed)</b>
Tue. Jan. 17	1000	<b>Final Project Display and Notebook-</b> On Tuesday, Jan. 26, bring your display board, and completed notebook to Mrs. Lucas’ room <b>BEFORE</b> school begins. All projects <b>MUST</b> be submitted by today. Early submissions are accepted. <b><u>NO LATE PROJECTS WILL BE ACCEPTED.</u></b> (Please do not bring your manipulative until Science Fair day).
Thu. Jan. 19		<b>City Tree Science Fair-</b> Bring your manipulative to the Science Fair today.
TBD	None	Screening TBD. Projects that have been selected from City Tree will be judged for the possibility of moving on to the Greater San Diego County Science and Engineering Fair at Balboa Park.

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Parent Signature

\_\_\_\_\_  
Date

# 2016 Science Fair Project

## Manipulative Requirement Details

All 7<sup>th</sup> and 8<sup>th</sup> grade science fair projects must have a manipulative component to their project display.

Manipulative means: a device, object, or mechanism that actually *does something* – it performs a function, models a concept, or replicates an action.

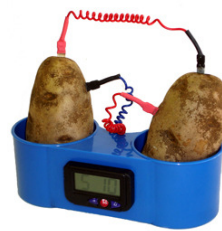
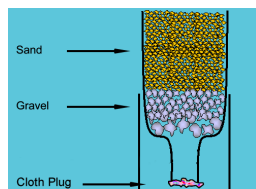
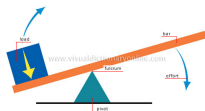
*Some Examples:*

Performs a function: When you pull a lever, a weight is released that tests the durability of a substance.

Models a concept: Water is poured into a tube and different substances will filter out impurities.

Replicates an action: An earthquake is simulated by shaking a model and measuring the range, or distance of sway, on the top, the middle, and the bottom of the model.

*Here are some visual examples:*



- Simplicity & Elegance count! Don't go too overboard with what you buy, build, or create!
- Keep your Project Manipulative SAFE and SIMPLE!
- Your Project Manipulative does not need to model or illustrate the entire focus of your project; it can only show a portion of it.

# Testable Question and Hypothesis

*Due Date: Oct. 1*

## Testable Question and Hypothesis (10 points)

Your Testable Question:

Your Hypothesis

“Approval Rating”:

**Project Approved!**

Begin work on  
project proposal  
Nice Job!!

**Please revise and resubmit.**

See Notes Below  
No credit yet.

**Please choose another idea**

Write another testable question.  
No credit yet.

Comments:

# Science Project Proposal

***Due Date: October 18***

Name \_\_\_\_\_ Period: \_\_\_\_\_

## Science Fair Project PROPOSAL (10 Points)

FINAL Testable Question

Final Hypothesis

Explain how you are going to test your question. How are you going to obtain quantitative data (what tool/instrument will you use to make measurements)? Summarize your procedures. Attach another piece of paper if necessary.

Notes and Details...

Use a drawing to show how you will test your questions (draw your experiment).

How many trials will you need to perform your experiment? (How many times will you repeat your experiment to get an accurate "best value.")

Is your experiment a fair test? Explain.

Circle if any of these apply to your experiment:

<ul style="list-style-type: none"><li>I will be experimenting on humans</li></ul>	<ul style="list-style-type: none"><li>I will be experimenting on animals</li></ul>	<ul style="list-style-type: none"><li>I will be using blood, teeth, or tissue of any animal in my experiment</li></ul>	<ul style="list-style-type: none"><li>I will be using bacteria, chemicals, toxic or harmful agents, or potentially hazardous devices</li></ul>
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**Teacher Only:**

**Approval:**

Project Approved!

Please revise and resubmit.  
No credit yet.

Please choose another idea  
and write another proposal.  
No credit yet.

**Teacher Circled Comments:**

**Other Comments:**

Amazing project idea! I can't wait to see how it turns out.

Your project has great potential. See me to make it great!

Your project has more than one independent variable.

Your project is collecting qualitative data (not quantitative).

Your project needs to be more advanced (middle school level).

This project could be dangerous, have a parent help you.

This project violates one or more science fair rules.

Data Collection Page

<b>Variable Value</b>						
<b>Trial 1</b>						
<b>Trial 2</b>						
<b>Trial 3</b>						
<b>Trial 4</b>						
<b>Trial 5</b>						
<b>Trial 6</b>						
<b>Trial 7</b>						
<b>Trial 8</b>						
<b>Trial 9</b>						
<b>Trial 10</b>						
<b>Trial 11</b>						
<b>Trial 12</b>						
<b>Trial 13</b>						
<b>Trial 14</b>						
<b>Trial 15</b>						
<b>Average</b>						
<b>Uncertainty</b>						

**Project Display Board Template:**

Although the board does not have to look exactly like this, this template does a good job of navigating a reader through your project in the proper sequence.

<p>Testable Question</p>	<p><b>TITLE</b></p>	<p>Data Analysis</p>
<p>Hypothesis</p>	<p><u>Data/Results</u></p> <ul style="list-style-type: none"><li>• Graphs</li><li>• Data tables</li><li>• Pictures (Must have labels or captions)</li></ul>	<p>Conclusion</p>
<p>Materials Used (Must be in Metric or SI units)</p>		
<p>Procedure</p>		

The Biblical Application must be displayed on the table in front of the board at the CTCS Science Fair. A foldable on a stand would be an excellent way to display the Biblical Application!



# Science Fair Notebook

- The rest of the pages (10-24) in this packet are a template and guidelines of what your finished notebook should look like.
- The final notebook contents should all be in your 3-ring binder organized neatly.
- Be sure to jazz up your final notebook and include:
  - Color photos with neatly printed labels
  - Page protectors
  - Page numbers (**NO** page numbers on cover or table of contents - **Abstract is Page 1**)
  - 3-hole punched notes, sketches, and ideas you've saved all along (put them in your spiral notebook or at the end of your notebook).

Here is an example of a notebook cover page:



# Project Title

## Name

(You may insert a photo of your experiment)

Your Name, Grade  
City Tree Christian School  
Mrs. Lucas  
January 19, 2016

# Table of Contents

(Create your own table of contents that will help others know where to find your information)

**THIS IS ONLY A SAMPLE!**

<i>Abstract</i>	.....	-- 1 --
<i>Background Research</i>	.....	-- --
<i>Works Cited</i>	.....	-- --
<i>Experiment Details</i>	.....	-- --
<i>Materials and Procedures</i>	.....	-- --
<i>Experiment Results</i>	.....	-- --
<i>Data Analysis &amp; Discussion</i>	.....	-- --
<i>Conclusion</i>	.....	-- --
<i>Challenges and Technical Issues</i>	.....	-- --
<i>Recommendations</i>	.....	-- --
<i>Acknowledgements</i>	.....	-- --
<i>Experiment Notes</i> (Could be in a spiral notebook)	.....	-- --

## ***Abstract***

***Due Date: Dec. 6***

When scientists successfully answer their experimental question, they publish their results in a scientific journal. Such papers can earn the scientist recognition.

An abstract is a short and concise summary of your project and is typically 4-5 sentences total. It should be about 200 words

1. The first sentence should state what you set out to do. State your testable question and your hypothesis.
2. In the next sentence, explain how you are going to test your experiment (briefly explain your procedures). What tools will you use to measure your experiment?
3. The next one-two sentences should explain the “take-home message” or what you found out.
4. The last one to two sentences should state why your results are important.

## ***Background Research***

***Due Date: Nov. 8***

When scientists develop an idea, they first perform research to determine what is already known about their idea. Background research enables a scientist to be knowledgeable before beginning their experiment. Your background research paper is part of your required science project. It will also help you focus on your topic and better prepare you for experimentation. After formulating a question, research is the next phase in the scientific method.

**Papers must be typed in 12 point Times Roman font, with 1" margins and double-spaced.** Be sure to save and make back-up copies of your report just-in-case.

The Background Research section must include at least 5 paragraphs: introduction, body paragraphs about your topic, and a concluding paragraph. Use the following guide to help you.

### ***Introduction***

Topic 1 / Paragraph 1: Explain what your science project is about? Your explanation should include:

- Your testable question
- Your Hypothesis
- Why you chose this topic
- What do you hope to learn by doing this project?

***Body( All of these are suggestions, if you are unable to find answers to these questions then feel free to choose other body paragraph topics)***

Topic 2 / Paragraph 2: Scientific Background. After researching your topic, explain what is already known about your topic. What have scientists already discovered about your topic?

Topic 3 / Paragraph 3: Discovery. Who discovered my topic? When, where, and how did they make this discovery? Why was this discovery important? Is there more to discover in this area?

Topic 4 / Paragraph 4: Application. How is this topic used in the world today? Do we use this technology in our daily life? How may we be able to use this technology in the future?

### ***Conclusion***

Topic 5 / Paragraph 5: What do I hope to learn from my science project? How will I advance my own understanding of this topic by doing this project?

*(Place your resources for this paper in the Works Cited page of your binder.)*

**Experiment Question**

A good experiment question should fit into one of these formats.

- What is the effect of \_\_\_\_\_ on \_\_\_\_\_?
- How does the \_\_\_\_\_ affect \_\_\_\_\_?
- Which \_\_\_\_\_ verb \_\_\_\_\_?

**Experiment Hypothesis**

A good hypothesis will:

1. Answer the testable question
2. Give a testable reason

**Experiment Variables**

Independent Variable	What is the variable that you purposely changed in your experiment? For example, the length of the pendulum.
Dependent Variable	How did you measure the response of the manipulated variable? For example, the time it takes for the pendulum to make 10 back-n-forth swings.
Controlled Variables	List all of the variables you kept the same in the experiment. For example, the type of string, washers, angle of pendulum drop, 10 swings, used a digital clock to measure time. <b>TIP: BUILD OR FIND A MACHINE TO ELIMINATE HUMAN VARIABLES</b>

## ***Materials and Procedures***

***Due Date: Oct. 27***

### ***Materials Used***

Provide a list of all the materials you used in your experiment.

(ALL MEASUREMENTS MUST BE IN METRIC UNITS)

Example:

- One Large Circular Ceramic Magnet (5cm diameter, 1.5 cm height)
- One Medium Circular Ceramic Magnet (3cm diameter, 1.5 cm height)
- One Small Circular Ceramic Magnet (1.5cm diameter, 1.5 cm height)
- Ten Standard Sized Paper Clips
- Metric Ruler
- Non-magnetic Table Surface

### ***Procedures***

Provide detailed procedures for conducting your experiment. It is important that these are specific and well detailed. You should include drawings, diagrams, and/or photos to help show how you conducted your experiment.

STEP 1:

STEP2:

STEP 3:

(and so on...as many steps as you have)

## ***Experiment Results***

***Due Date: Nov. 17***

At least 1 Paragraph + Charts/Tables/Graphs/Logs

Discuss the results from your experiments including the average and uncertainty from your trials (You must perform at least 10 trials). If there were outliers (measurements that do not fit the pattern – this might be due to poor measurement) in your experiment, explain what went wrong and what you decided to do with that measurement.

Include one or more charts, tables, graphs, or a log. These should be created using the computer.



## ***Data Analysis and Discussion***

***Due Date: Dec. 6***

At least 2 Paragraphs

First paragraph: This is where you need to explain WHY you received the results from your experiment. Take a close look at your results and discuss what they mean. Discuss your reasons for the data you received. Use data (evidence) to explain your reasons (This is VERY important).

Second Paragraph: How do your results answer your original question? Looking at your data, does it support or disprove your hypothesis? Why or why not?

## **FOR 7<sup>TH</sup> AND 8<sup>TH</sup> Grade:**

At least 3 Paragraphs

Paragraph 1:

- Explain the results that you received and give evidence. Refer to the data tables and graphs.
- Explain what your calculated graph means. Again refer to the data table and graphs.

Paragraph 2: In this paragraph, you need to use your background research to explain WHY you received the results from your experiment. Discuss your reasons for the data you received. **(This section is super important. This section tells me how much you have learned about your project).**

Paragraph 3: How do your results answer your original question? Looking at your data, does it support or disprove your hypothesis? Why or why not?

## ***Conclusion***

***Due Date- January 3***

1 Concise Paragraph

Based on your data and analysis written above, answer your testable question. Be sure to include **ALL** evidence (data) in your conclusion!

## ***Challenges and Technical Issues***

***Due Date: January 3***

1-2 Paragraphs

Every experiment experiences technical challenges. What challenges did you have while conducting your experiments? Was it difficult to obtain accurate measurements? Were you able to get the same result during each trial? Did you have to change or modify different parts of your experiment? What other problems did you solve?

## ***Recommendations***

***Due Date: January 3***

1-2 Paragraphs

Based on your conclusions, what do you recommend to future researchers in your field of study? Do you have recommendations for industry, policy makers, consumers, or the public? What recommendations do you have for another student who also does an experiment in this area?

## ***Acknowledgements***

***Due Date: January 5***

At least 1 Paragraph

Scientists usually receive help and assistance from many others. Thank all that helped you put your project together.

## ***Works Cited***

***Due Date: Nov.8***

A works cited is a list of the sources of information used for reference. Use MLA format, citing sources in alphabetical order. You will be getting support from your English teacher for this part.

Mrs. Decker and Mrs. Henzel will assist you with this portion of your Science Fair Project. They will provide guidance and instruction, however the Works Cited is a part of your Science Fair grade – Mrs. Decker and Mrs. Henzel may choose to grade you for your work on the writing components of your project.

\*6<sup>th</sup> grade is required to have 5 sources

\*7<sup>th</sup> and 8<sup>th</sup> grade are required to have 10 sources

## ***Experiment Notes:***

***Due Date: January 17***

Include all of your experiment notes in this section. You should be keeping these notes from September to February. This is what you will use your spiral notebook for.

Items that **MUST** be in here are:

- Any handwritten notes (this includes when you do your experiment and you hand write your results. This is called raw data).
- Science Fair Proposal
- All of your background research articles
- All of the pictures you have taken during your experiment. Even the ones you do not put on your board.
- First drafts of any sections in your notebook

Items that you may want to include if it is necessary for the project:

- Journals (especially if your project takes several weeks)
- Observation notes from your experiment

## Science Fair Notebook Rubric

\* Instructions on how to write each one of these sections are in the Notebook Template. Please follow the guidelines:

<b>Abstract</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>5 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>10points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>20 points</b>
<b>Background Research</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>50 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>75 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>100 points</b>
<b>Experiment Details</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>15 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>30 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>45 points</b>
<b>Materials and Procedures</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>15 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>30 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>60 points</b>
<b>Challenges and Technical Issues</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>5 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>10 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>15 points</b>
<b>Experiment Results</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>5 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>10 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>20 points</b>
<b>Data Analysis/ Discussion</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>50 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>75 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>100 points</b>
<b>Conclusion</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>5 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>10 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>20 points</b>
<b>Recommendation</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>5 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>10 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>15 points</b>
<b>Acknowledgements</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>5 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>10 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>15 points</b>
<b>Works Cited</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>15 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>30 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>45 points</b>
<b>Experiment Notes</b>	Missing <b>0 points</b>	Follows <b>LITTLE</b> of the guidelines in the notebook template <b>15 points</b>	Follows <b>SOME</b> of the guidelines in the notebook template <b>300 points</b>	Follows <b>ALL</b> of the guidelines in notebook template <b>45 points</b>

Notebook Overall Score: \_\_\_\_\_ / 500



## Science Fair Display Rubric

<b>Testable Question</b>	Missing <b>0 Points</b>	The student asks a question that is not testable or does not make sense <b>5 Points</b>	The student asks a question that is testable, but it is not specific or quantifiable <b>15 Points</b>	The student asks a question that is testable and measured quantitatively <b>30 Points</b>
<b>Hypothesis</b>	Missing <b>0 Points</b>	The student has a hypothesis, but it does not answer the "testable question" <b>5 Points</b>	The student has a hypothesis that answers "the question", but it is not quantitatively measurable <b>15 Points</b>	The student has a hypothesis that is quantitatively measurable and answers "the question" <b>30 Points</b>
<b>Materials</b>	Missing <b>0 Points</b>	The materials used for the project is not listed <b>10 Points</b>	Some, but not ALL materials used for the project are listed <b>25 Points</b>	ALL the materials used for the project are listed <b>50 Points</b>
<b>Procedure</b>	Missing <b>0 Points</b>	The audience is not able to reproduce the project <b>25 Points</b>	The audience is able to reproduce the project somewhat, but only with help <b>50 Points</b>	The audience is able to follow the direction and reproduce the project himself <b>75 Points</b>
<b>Experiment Results</b>	Missing <b>0 Points</b>	The data tables/graphs are qualitative or incomplete <b>10 Points</b>	Uses quantitative data tables/graphs but are not complete <b>20 Points</b>	The data tables/graphs are quantitative and answers "the question". Tables and charts include appropriate titles and labels. <b>40 Points</b>
<b>Data Analysis/ Discussion</b>	Missing <b>0 Points</b>	The student explains what happened, but not <b>WHY</b> it happened <b>25 Points</b>	The student attempts to explain Why but does not connect their data with their explanation <b>50 Points</b>	Student clearly interprets results through logical discussion of results. The student uses data to explain <b>WHY!</b> <b>75 Points</b>
<b>Conclusion</b>	Missing <b>0 Points</b>	Attempts to answer the "testable question", but lacks clarity and evidence <b>5 Points</b>	Conclusion answers the "testable question", but does not use evidence from the results <b>15 Points</b>	Conclusion answers the "testable question" using evidence from results <b>25 Points</b>

<b>Visuals/pictures (Photos must be original)</b>	Missing <b>0 Points</b>	Has pictures, but does not represent the process of the experiment. <b>10 Points</b>	Has pictures that represent the process of the experiment but does not have captions <b>25 Points</b>	The pictures represent the process of the experiment (construction, experimentation, results) and has captions <b>45 Points</b>
<b>Organization/ Neatness</b>	Missing <b>0 Points</b>	The project is a mess. Sections are not labeled and out of order <b>10 Points</b>	Most of the parts of the display are labeled and somewhat easy to follow <b>15 Points</b>	All parts of the display are labeled and it is easy to follow <b>30 Points</b>
<b>Experimental Design</b>	Missing <b>0 Points</b>	There are too many undefined variables <b>15 Points</b>	There is more than one manipulated variable <b>30 Points</b>	All variables are considered and constant except for the CLEAR manipulated variable <b>50 Points</b>
<b>Validity</b>	Missing <b>0 Points</b>	Performs only one or too few trials <b>15 Points</b>	Performs more than one trial but not enough to be a valid project <b>30 Points</b>	Performs multiple trials (# of trials depends on type of project), but is usually 10 or more. <b>50 Points</b>

**Science Fair Display Overall Score \_\_\_\_\_/500**

**Overall Project Score \_\_\_\_\_/1000**  
(Notebook and Display)