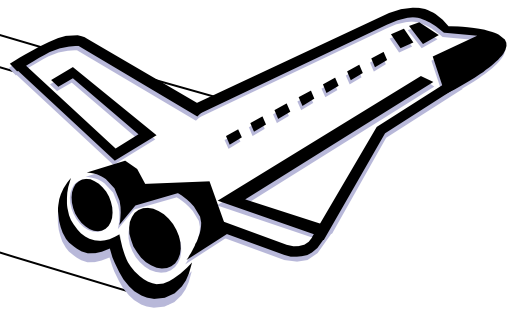


***TEACHER  
APPENDICES***





# Science Fair

## Preparation for Judging Site Fairs

### Using the Rubric

The rubrics are divided into major criteria.  
 For each criterion, there are usually 2 to 5 "critical attributes".  
 For example:

<u>CRITERION</u>	<u>CRITICAL ATTRIBUTES</u>
<b>Visual Quality of Display</b>	1) appealing and neat 2) readable at appx. 2 feet 3) organized and clear 4) understandable visuals/models 5) few language/spelling errors

Each attribute is defined for the three levels of proficiency

**1 (Partially Proficient)** ≡ major, "show stopper" flaw or omission in one or more of the critical attributes  
 Rubric wording is "... or ... or ... is missing ..."

**3 (Proficient)** ≡ minor flaw or omission in one or more of the critical attributes  
 Rubric wording is "... and ... and ... are good."

**5 (Advanced Proficient)** ≡ no flaws in the critical attributes which are thoroughly completed with excellence and creativity  
 Rubric wording is "... and ... and ... are excellent."

When judging projects, assign only scores of 1, 3, or 5. Resist the temptation to give "4" or "3.5".

After judging each criterion, make sure to double the points for the indicated **(x2)** criteria. Add the points. The total will be between 10 and 50. All judges scores for the students will be averaged. In the event of a tie, all of the judges involved will decide the winner by discussion and vote.

<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>
<b>Preliminary Research</b>
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>
<b>Procedure &amp; Materials</b>
<b>Results</b> <i>(Double Points)</i> <b>(x2)</b>
<b>Conclusions</b>
<b>Visual Quality of Display</b>

### Interviewing Students

#### Some Things to Look for When Interviewing Students:

- 1) connection of the project to the student's experiences and/or interests
- 2) that the project was a genuine learning opportunity for the student
- 3) how the research helped to form the hypothesis
- 4) how well the student connects their data to their conclusions

#### Some Things to Do to Help Students Do Their Best:

- \* Get at eye level to the student. (Chairs should be available.)
- \* Shake hands (and introduce yourself if they don't know you well).
- \* Give a quick compliment to help break the ice. **"Oh, what a great board!"**
- \* Nervous students may try to start reading their project board. To prevent this, start with something like, **"Tell me how you came up with this great idea."**
- \* SMILE! Don't let your nervousness stop you from smiling. Relaxed students will do a better job of expressing their passion, interest, and understanding.

### Logistical Arrangements

- ☑ Each teacher needs to list their projects by Name, Title, Grade Level (or Course), and Rubric Type.
- ☑ With this information, your coordinator will be able to make sure each student receives the proper rubrics.
- ☑ At the school site fair, make sure each project has a copy of the appropriate rubric and several appropriate scoring sheets.



# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_  
Kindergarten – 1<sup>st</sup> Grade **Collection**

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Purpose	1	3	5	
Problem (x2)	2	6	10	
Hypothesis (x2)	2	6	10	
Experiment (x2)	2	6	10	
Conclusions (x2)	2	6	10	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_  
Kindergarten – 1<sup>st</sup> Grade **Collection**

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Purpose	1	3	5	
Problem (x2)	2	6	10	
Hypothesis (x2)	2	6	10	
Experiment (x2)	2	6	10	
Conclusions (x2)	2	6	10	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_

Kindergarten – 2<sup>nd</sup> Grade *Experimental Project*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Problem (x2)	2	6	10	
Preliminary Research	1	3	5	
Hypothesis (x2)	2	6	10	
Procedures & Materials	1	3	5	
Results (x2)	2	6	10	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4).

Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_

Kindergarten – 2<sup>nd</sup> Grade *Experimental Project*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Problem (x2)	2	6	10	
Preliminary Research	1	3	5	
Hypothesis (x2)	2	6	10	
Procedures & Materials	1	3	5	
Results (x2)	2	6	10	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4).

Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_

3<sup>rd</sup> – 5<sup>th</sup> Grade *Experimental Project*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Problem (x2)	2	6	10	
Preliminary Research	1	3	5	
Hypothesis (x2)	2	6	10	
Procedures & Materials	1	3	5	
Results (x2)	2	6	10	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4).

Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_

3<sup>rd</sup> – 5<sup>th</sup> Grade *Experimental Project*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Problem (x2)	2	6	10	
Preliminary Research	1	3	5	
Hypothesis (x2)	2	6	10	
Procedures & Materials	1	3	5	
Results (x2)	2	6	10	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4).

Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.

# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_

3<sup>rd</sup> – 5<sup>th</sup> Grade *Invention*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Problem (x2)	2	6	10	
Research	1	3	5	
Possible Solutions (x2)	2	6	10	
How Invention Works (x2)	2	6	10	
Chart to Show How Well it Worked	1	3	5	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.

# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_

3<sup>rd</sup> – 5<sup>th</sup> Grade *Invention*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Problem (x2)	2	6	10	
Research	1	3	5	
Possible Solutions (x2)	2	6	10	
How Invention Works (x2)	2	6	10	
Chart to Show How Well it Worked	1	3	5	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.

# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_  
Kindergarten – 5<sup>th</sup> Grade *Research Project*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Purpose & Problem (x2)	2	6	10	
Hypothesis (x2)	2	6	10	
Research (x3)	3	9	15	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	
Sources	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.

# School Science Fair

## Judge's Score/Comment Sheet

for  
Name: \_\_\_\_\_ Grade: \_\_\_\_\_

Title: \_\_\_\_\_  
Kindergarten – 5<sup>th</sup> Grade *Research Project*

Circle the appropriate score and copy the points on the right.

	Partially Proficient	Proficient	Advanced Proficient	POINTS
Purpose & Problem (x2)	2	6	10	
Hypothesis (x2)	2	6	10	
Research (x3)	3	9	15	
Conclusions	1	3	5	
Visual Quality of Display	1	3	5	
Sources	1	3	5	

Score: \_\_\_\_ / 50

Comments: \_\_\_\_\_

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Judged by: \_\_\_\_\_

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.

# Science Fair RUBRICS GUIDE

TYPES OF PROJECTS ALLOWABLE FOR GRADE LEVELS							
Grade	Collection	Experiment	Research	Invention	Career Shadow	Rube Goldberg Device	Scientific Survey
K	Yes	Yes	Yes				
1 <sup>st</sup>	Yes	Yes	Yes				
2 <sup>nd</sup>		Yes	Yes				
3 <sup>rd</sup>		Yes	Yes	Yes			
4 <sup>th</sup>		Yes	Yes	Yes			
5 <sup>th</sup>		Yes	Yes	Yes			
6 <sup>th</sup>		Yes		Yes	Yes	Yes	
7 <sup>th</sup>		Yes		Yes	Yes	Yes	Yes
8 <sup>th</sup>		Yes		Yes	Yes	Yes	
9 <sup>th</sup>		Yes		Yes			
10 <sup>th</sup>		Yes		Yes			
11 <sup>th</sup>		Yes		Yes			
12 <sup>th</sup>		Yes		Yes			

Updated October 2009 for 2010 Science Fair



# Science Fair Collections (K and 1<sup>st</sup> Grade)

## Rubric for School Site Science Fair

	<b>Attempted 1</b>	<b>Proficient 3</b>	<b>Advanced Proficient 5</b>
<b>Purpose</b>	Purpose is vague or does not express what the student desires to learn.	Purpose is clear and expresses a desire to learn something new.	Purpose is clear, expresses a desire to learn something new, and explains how the student decided what to collect.
<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>	Problem does not relate to the purpose or the objects collected.	Problem is written as a question and relates to the purpose.	Problem is a well-written question that directly relates to the purpose and the objects collected.
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>	Hypothesis is vague or not in the student's own words. Or, it may be untestable, or does not address the problem.	Hypothesis is written in the student's own words, is testable, and relates to the problem.	Hypothesis is clear and written in the student's own words. It is testable, completely addresses the problem and includes some evidence to support it.
<b>Experiment</b> <i>(Double Points)</i> <b>(x2)</b>	Collection is displayed one way, without apparent organization other than appearance.	Collection is organized in one way to show relationships between the items collected in a way that allows the student to answer the hypothesis.	Collection is organized in more than one way to show relationships between the items collected in a way that allows the student to completely answer the hypothesis.
<b>Conclusions</b> <i>(Double Points)</i> <b>(x2)</b>	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the evidence collected.	Conclusion answers the problem and states if the hypothesis was supported or rejected.	Conclusion answers the problem, states if the hypothesis was supported or rejected, and explains why.
<b>Visual Quality of Display</b>	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains language or spelling errors.	Project is appealing and is readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and has correct language and spelling.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.

(Projects will receive between 10 and 50 points when all rubric criteria have been addressed.)

**Science Fair  
Collections**  
(Kindergarten and 1<sup>st</sup> Grade)  
Judge's Score Sheet for  
School Site Science Fairs

<b>Purpose</b>																			
<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Experiment</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Conclusions</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Visual Quality of Display</b>																			
<b>Total Score</b>																			

<b>Teacher:</b>	<b>Room:</b>
Student(s):	
Project:	
Student(s):	
Project:	
Student(s):	
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Student(s):	
Project:	
Student(s):	
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Project:	

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# Science Fair *Experimental Projects* (K–2<sup>nd</sup> Grade)

## Rubric for School Site Science Fair

	<b>Attempted 1</b>	<b>Proficient 3</b>	<b>Advanced Proficient 5</b>
<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>	States the problem as a question that is vague, or as a statement, or addresses an issue to which the student already knows the answer.	States problem as a question, and while there is no evidence of connection to a specific interest or experience of the student, it appears to represent a genuine learning opportunity for the student.	States problem as a question, provides evidence that it comes from the student's personal interests or experiences, and represents a genuine learning opportunity for the student.
<b>Preliminary Research</b>	Cites only one source. Or, the description of the research is incomplete, or has little or no connection to the problem, or is not written in the student's own words.	Cites two or more sources from one or more types of resources (e.g., text, encyclopedia, businesses, magazines, catalogs, internet, or interviews). The student generally connects the research to their problem in their own words.	Cites two or more sources. Different types of sources are cited. The student clearly connects the research to their problem in their own words.
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>	Hypothesis is either not testable or does not connect to the stated problem, or shows no connection to the research.	Hypothesis is complete (in one sentence), testable, addresses the stated problem, and shows some connection to the research.	Hypothesis is complete (in one sentence), testable, and clearly addresses the stated problem. Student shows a direct connection to their research.
<b>Procedure &amp; Materials</b>	Experimental design is not relevant to the hypothesis or the procedures outlined are seriously incomplete or not sequential, or materials list is missing or incomplete.	Experimental design is adequate to test the hypothesis, but may leave some unanswered questions. Procedures are outlined in a step-by-step fashion, but there may be 1 or 2 gaps that require explanation. Major materials are listed.	Experimental design is a well-constructed test of the stated hypothesis. Procedures are outlined in a step-by-step fashion that could be followed by anyone without additional explanations. All relevant materials are listed.
<b>Results</b> <i>(Double Points)</i> <b>(x2)</b>	Performed experiment only once and data are not summarized clearly.	Performed experiment one or more times. Summarizes the data in a way that describes what was discovered using graphs and charts with few errors or omissions.	Performed experiment several times. Summarizes the data in a way that describes what was discovered using accurate graphs and charts.
<b>Conclusions</b>	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the results.	Conclusion addresses the problem, states if the hypothesis was supported or rejected, and attempts to explain why.	Conclusion completely answers all aspects of the problem, states if the hypothesis was supported or rejected, and clearly cites evidence to explain why.
<b>Visual Quality of Display</b>	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.

(Projects will receive between 10 and 50 points when all rubric criteria have been addressed.)

# Science Fair

## Experimental Projects

(Kindergarten through 2<sup>nd</sup> Grade)  
Judge's Score Sheet for  
School Site Science Fairs

<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Preliminary Research</b>																			
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Procedure &amp; Materials</b>																			
<b>Results</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Conclusions</b>																			
<b>Visual Quality of Display</b>																			
<b>Total Score</b>																			

<b>Teacher:</b>	<b>Room:</b>
Student(s):	
Project:	
Student(s):	
Project:	
Student(s):	
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Project:	

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# Science Fair *Experimental Projects* (3<sup>rd</sup> – 5<sup>th</sup> Grade)

## Rubric for School Site Science Fair

	<b>Attempted 1</b>	<b>Proficient 3</b>	<b>Advanced Proficient 5</b>
<b>Problem</b>  <i>(Double Points)</i> <b>(x2)</b>	States the problem as a question that is vague, or as a statement, or addresses an issue to which the student already knows the answer.	States problem as a question, and while there is no evidence of connection to a specific interest or experience of the student, it appears to represent a genuine learning opportunity for the student.	States problem as a question, provides evidence that it comes from the student's personal interests or experiences, and represents a genuine learning opportunity for the student.
<b>Preliminary Research</b>	Cites only one source. Or, the description of the research is incomplete, or has little or no connection to the problem, or is not written in the student's own words.	Cites two or more sources from one or more types of resources (e.g., text, encyclopedia, businesses, magazines, catalogs, internet, or interviews). The student generally connects the research to their problem in their own words.	Cites two or more sources. Different types of sources are cited. The student clearly connects the research to their problem in their own words.
<b>Hypothesis</b>  <i>(Double Points)</i> <b>(x2)</b>	Hypothesis is either not testable or does not connect to the stated problem, or shows no connection to the research.	Hypothesis is brief and complete, testable, addresses the stated problem, and shows some connection to the research.	Hypothesis is brief and complete, testable, and clearly addresses the stated problem. Student shows a direct connection to their research.
<b>Procedure &amp; Materials</b>	Experimental design is not relevant to the hypothesis or the procedures outlined are seriously incomplete or not sequential, or materials list is missing or incomplete.	Experimental design is adequate to test the hypothesis, but may leave some unanswered questions. Procedures are outlined in a step-by-step fashion, but there may be 1 or 2 gaps that require explanation. Major materials are listed.	Experimental design is a well-constructed test of the stated hypothesis. Procedures are outlined in a step-by-step fashion that could be followed by anyone without additional explanations. All relevant materials are listed.
<b>Results</b>  <i>(Double Points)</i> <b>(x2)</b>	Performed experiment only once and data are not summarized clearly. Or, does not discuss any relationship between variables or note any pattern or trend.	Performed experiment one or more times. Summarizes the data in a way that describes what was discovered using graphs and charts with few errors or omissions. Mentions at least one relationship between variables or points out a pattern.	Performed experiment several times. Summarizes the data in a way that describes what was discovered using graphs and charts with no errors or omissions. Discusses connections between variables or points out any patterns.
<b>Conclusions</b>	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the evidence collected.	Conclusion answers the problem, states if the hypothesis was supported or rejected, and attempts to explain why.	Conclusion completely answers all aspects of the problem, states if the hypothesis was supported or rejected, and clearly cites evidence to explain why.
<b>Visual Quality of Display</b>	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.

(Projects will receive between 10 and 50 points when all rubric criteria have been addressed.)

# Science Fair

## Experimental Projects

(3<sup>rd</sup> through 5<sup>th</sup> Grade)

Judge's Score Sheet for

School Site Science Fairs

Teacher:

Room:

Student(s):

Project:

Student(s):

Project:

Student(s):

Project:

Student(s):

Project:

Student(s):

Project:

Student(s):

Project:

Student(s):

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<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Preliminary Research</b>																			
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Procedure &amp; Materials</b>																			
<b>Results</b> <i>(Double Points)</i> <b>(x2)</b>																			
<b>Conclusions</b>																			
<b>Visual Quality of Display</b>																			
<b>Total Score</b>																			

**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.

# Science Fair ~~Inventions~~: ~~Engineering~~ ~~New~~ ~~Ideas~~ (3<sup>rd</sup>-5<sup>th</sup> Grade)



## Rubric for School Site Science Fair

	<b>Attempted 1</b>	<b>Proficient 3</b>	<b>Advanced Proficient 5</b>
<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>	Addresses a practical need to which there is already a common solution.	Addresses a somewhat practical need some people have.	Creatively addresses a practical need some people have.
<b>Research</b>	Cites only one or no information resource (e.g., text, encyclopedia, businesses, magazines, catalogs, internet, or interviews). Fails to mention a known similar idea in common use, or material is copied rather than written in the student's own words.	Cites few information resources. Mentions known similar ideas with some elaboration. Makes a general connection to a similar idea in the student's own words.	Student cites at least four types of resources Makes a clear and well-elaborated connection with a known similar idea in the student's own words.
<b>Possible Solutions</b> <i>(Double Points)</i> <b>(x2)</b>	Proposes three or fewer solutions, some of which may be fanciful. Solution description is limited.	Proposes at least three practical solutions with limited description.	Proposes three or more practical solutions. One or more are very creative. Provides sufficient description for reader to understand.
<b>How Invention Works</b> <i>(Double Points)</i> <b>(x2)</b>	Student provides few details, leaving the reader unclear about how the invention works.	Student provides adequate details, giving the reader a general understanding of how the invention works.	Student explains the invention, addressing all details and giving the reader a clear understanding of how the invention works.
<b>Chart to Show How Well It Worked</b>	Student-developed criteria may be generic and do not apply specifically to the problem. Or, criteria may not be student-developed.	Criteria are student-developed. Some criteria apply to how the invention addresses the problem.	Criteria are student-developed specifically for the project and apply directly to how the invention addresses the problem.
<b>Obstacles</b>	Fails to analyze obstacles related to the practical design and function of the invention (i.e., may list obstacles that refer only to shopping for materials or cosmetic issues).	Provides some analysis of the obstacles related to the practical design and function of the invention (i.e., may discuss durability, strength, ease of use, etc.).	Demonstrates in-depth analysis of the obstacles related to the practical design and function of the invention.
<b>Display Presentation</b>	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.

(Projects will receive between 10 and 50 points when all rubric criteria have been addressed.)

# Science Fair Inventions

(3<sup>rd</sup> through 5<sup>th</sup> Grade)  
Judge's Score Sheet for  
School Site Science Fairs

Teacher: \_\_\_\_\_ Room: \_\_\_\_\_

<b>Problem</b> <i>(Double Points)</i> <b>(x2)</b>																				
<b>Research</b>																				
<b>Possible Solutions</b> <i>(Double Points)</i> <b>(x2)</b>																				
<b>How Invention Works</b> <i>(Double Points)</i> <b>(x2)</b>																				
<b>Evaluation Chart</b>																				
<b>Obstacles</b>																				
<b>Display Presentation</b>																				
<b>Total Score</b>																				
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**NOTES TO TEACHER:** For grading purposes, 5-10 pts = Not Proficient (1), 11-24 pts = Partially Proficient (2), 25-39 pts = Proficient (3), 40-50 pts = Advanced Proficient (4). Complete grading should also include other details not included here as Judging Criteria: for instance, written report details, completion of deadline tasks, display guidelines, model quality, etc.



# Science Fair Research Projects (K – 5<sup>th</sup> Grade)

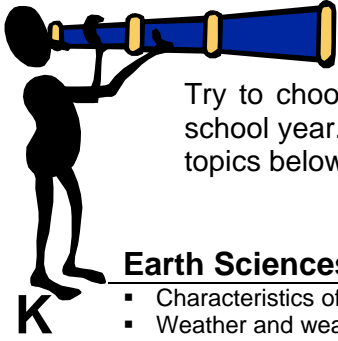
## Rubric for School Site Science Fair

	<b>Attempted 1</b>	<b>Proficient 3</b>	<b>Advanced Proficient 5</b>
<b>Purpose and Problem</b> <i>(Double Points)</i> <b>(x2)</b>	The Purpose and Problem are vague, or have no apparent connection to the student's interest or experience, or address an issue to which the student already knows the answer.	States the Purpose and Problem clearly, showing some connection to a valid scientific or mathematical concept. May give evidence of connection to a specific interest or experience of the student, and appears to represent a genuine learning opportunity for the student.	States the Purpose and Problem clearly, addressing a valid scientific or mathematical concept. Provides evidence that they come from the student's personal interests or experiences, and represent a genuine learning opportunity for the student.
<b>Hypothesis</b> <i>(Double Points)</i> <b>(x2)</b>	Hypothesis is either incomplete, not testable, or does not connect to the stated problem.	Hypothesis is complete (in one sentence), testable, and addresses the stated problem without reflecting prior knowledge.	Hypothesis is complete (in one sentence), testable, directly addressing the stated problem, and reflects prior knowledge.
<b>Research</b> <i>(Triple Points)</i> <b>(x3)</b>	Cites only one source. Or, the description of the research is incomplete, or has little or no connection to the problem or hypothesis, or is not written in the student's own words.	Cites two or more sources from one or more types of resources (e.g., text, encyclopedia, businesses, magazines, catalogs, internet, or interviews). The student adequately connects the research to their problem and hypothesis in their own words.	Cites four or more sources. There are at least three different types of resources. The student makes clear, in-depth connections between the research and their problem and hypothesis in their own words.
<b>Conclusions</b>	Conclusion does not answer the problem, or does not refer back to the hypothesis, or contradicts the evidence found in the research.	Conclusion answers the problem, states if the hypothesis was supported or rejected, and attempts to explain why.	Conclusion completely answers all aspects of the problem, states if the hypothesis was supported or rejected, and clearly cites evidence to explain why.
<b>Visual Quality of Display</b>	Project has limited eye appeal or is not easily readable at approximately two feet distance. The project has limited organization, or contains confusing visuals, or contains major language or spelling errors.	Project is appealing and readable at approximately 2 feet distance. It is organized and clear, uses understandable visuals and/or models, and contains few language and spelling errors.	Project is appealing and neat, and is readable at approximately 2 feet distance. It is well organized and clear, makes striking use of inventive or amusing visuals and/or models, and uses language and spelling flawlessly.
<b>Sources</b> <i>(at the end of the written report)</i>	Sources at the end of the written report are listed by title only, or represent an incomplete list.	All sources are listed with most of the information given, i.e., name, title, web address, date (as shown on pp. 19 and 20 in the Elementary Sci. Fair Handbook). However, some useful information may be missing.	All sources are listed with complete information given, i.e., name, title, web address, date (as shown on pp. 19 and 20 in the Elementary Sci. Fair Handbook). One could easily find any of the sources as listed.

(Projects will receive between 10 and 50 points when all rubric criteria have been addressed.)



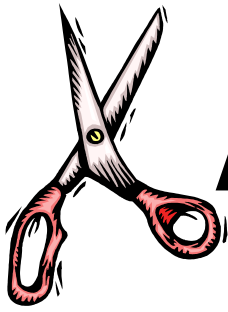
# SCIENCE TOPICS FOR GRADES K-5



This page is also included in Student Appendices.

Try to choose a science project that lines up with a science topic covered during your current school year. Or, you might choose to do a science project from next year's topics. Use the list of topics below to help you think of project ideas if you are not sure how to start.

	Earth Sciences	Life Sciences	Physical Sciences
<b>K</b>	<ul style="list-style-type: none"> <li>Characteristics of mountains</li> <li>Weather and weather changes</li> <li>Conservation of Earth's resources</li> </ul>	<ul style="list-style-type: none"> <li>Animals and plants alike and different</li> <li>Structures of common plants and animals</li> </ul>	<ul style="list-style-type: none"> <li>Observing and comparing objects</li> <li>Water as solid and liquid</li> <li>Evaporation</li> </ul>
<b>1<sup>st</sup></b>	<ul style="list-style-type: none"> <li>Measuring and charting weather</li> <li>Weather changes and trends</li> <li>The sun is our heat source</li> </ul>	<ul style="list-style-type: none"> <li>Animal habitation and plant environments</li> <li>Life cycles of plants and animals</li> <li>Interdependency of plants and animals</li> </ul>	<ul style="list-style-type: none"> <li>Properties of solids, liquids and gases</li> <li>Changing states of matter</li> </ul>
<b>2<sup>nd</sup></b>	<ul style="list-style-type: none"> <li>Rocks, minerals and soil</li> <li>Weathering and rocks</li> <li>Fossils</li> <li>Use of Earth's resources</li> </ul>	<ul style="list-style-type: none"> <li>Organisms reproduce offspring of their own kind</li> <li>Life cycles are different for different animals</li> <li>Characteristics of an organism are inherited from parents and/or influenced by the environment</li> <li>Variation among individuals</li> </ul>	<ul style="list-style-type: none"> <li>Motion and forces</li> <li>Use of machines to make things move</li> <li>Gravity</li> <li>Sound energy</li> </ul>
<b>3<sup>rd</sup></b>	<ul style="list-style-type: none"> <li>Solar system</li> <li>Constellations</li> <li>Earth, moon and sun</li> <li>Lunar cycle</li> </ul>	<ul style="list-style-type: none"> <li>Animal adaptation</li> <li>Plant adaptation</li> <li>Biodiversity</li> <li>Cycles in ecosystems</li> <li>Extinction and survival</li> </ul>	<ul style="list-style-type: none"> <li>Energy from the sun as light</li> <li>Forms of stored energy</li> <li>Energy conversion and movement</li> <li>Properties of matter</li> <li>Matter as solid, liquid and gas</li> <li>Atoms on the Periodic Table of the Elements</li> <li>Light</li> </ul>
<b>4<sup>th</sup></b>	<ul style="list-style-type: none"> <li>Basic rock and mineral identification</li> <li>Rock cycle and natural processes</li> <li>Erosion vs. landslides, volcanic eruptions and earthquakes</li> <li>Effects of natural processes (freezing, thawing, root growth, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>Energy and matter for life and growth</li> <li>Decomposers</li> <li>Interdependency of living organisms on one another</li> <li>Ecosystems and survival</li> </ul>	<ul style="list-style-type: none"> <li>Electricity and magnetism</li> <li>Electromagnets</li> <li>Electrical energy conversion to heat, light and motion</li> </ul>
<b>5<sup>th</sup></b>	<ul style="list-style-type: none"> <li>Evaporation and condensation in weather and water cycles</li> <li>Water conservation</li> <li>Origin of water used in local community</li> <li>Weather patterns</li> <li>Severe weather</li> <li>Weather maps and data to predict local weather</li> <li>Atmospheric pressure</li> <li>Solar system</li> <li>Sun's composition</li> <li>Orbits and gravitational attraction</li> </ul>	<ul style="list-style-type: none"> <li>Multicellular organisms have specialized structures to support transport of materials</li> <li>Blood circulation</li> <li>Carbon dioxide and oxygen exchange</li> <li>Digestion</li> <li>Waste disposal</li> <li>How plants release oxygen</li> <li>Water respiration</li> </ul>	<ul style="list-style-type: none"> <li>Atoms and elements</li> <li>The Periodic Table of the Elements</li> <li>Combinations of atoms</li> <li>Metals</li> <li>Instruments that show atoms and molecules occurring in well-ordered arrays</li> </ul>



## SCIENCE FAIR

# *MATERIALS SOURCES*



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### **Alin Party Company**

4139 Woodruff Ave., Lakewood  
(562) 420-2489

### **CM School Supplies**

5440 E. Del Amo, Long Beach  
(562) 429-2425

### **Home Depot**

2450 Cherry Ave., Signal Hill  
(562) 595-9200  
751 Spring St., Signal Hill  
(562) 426-4667  
5000 Hardwick St., Lakewood  
(562) 529-3500  
[www.homedepot.com](http://www.homedepot.com)

### **Lowe's**

7300 E. Carson St., Long Beach  
(562) 421-9996  
2840 Bellflower Blvd., Long Beach  
(562) 496-8120  
[www.lowes.com](http://www.lowes.com)

### **Lyon's Art Supply**

420 E. 4th Street  
Long Beach, CA  
(562) 435-5383

### **Michael's Crafts**

4000 Hardwick St., Lakewood  
(562) 633-1913  
7320 Carson St., Long Beach  
(562) 377-0669

### **Office Depot**

2301 E. Willow, Signal Hill  
(562) 427-6333

### **Radio Shack**

For a location near you, call  
(800) 843-7422

### **Staples**

3515 Atlantic Avenue, Long Beach  
(562) 427-6477  
4600 Pacific Coast Highway, LB  
(562) 597-1922  
7400 E. Carson St., Long Beach  
(562) 377-0403  
[www.staples.com](http://www.staples.com)  
1-800-378-3-2753



# COMMUNITY RESOURCES

## Airports

If your project deals with aeronautics, then an airport would be a good place to locate information. Airports often employ meteorologists who may help you with a project dealing with weather.

## Animal Hospitals and Wildlife Rescue Centers

Often veterinarians are willing to help students with science projects. If you need an appointment, call about a week in advance.

## Botanical Gardens and Commercial Nurseries

Plant specialists can be found at local botanical gardens and nurseries. Sometimes they will donate materials if you explain your project to them.

## Colleges and Universities

Local college and university libraries offer you a wider selection of references than your local library. Scientists on the faculty may help you and even allow you to use their laboratory facilities.

## Government Agencies

Look in your telephone book for government agencies. Agencies are listed under Federal, State, and Municipal categories. The California Department of Fish and Game in Long Beach is a good source.

## GPO

Send a letter to the address below indicating what topic area you are interested in and they will send you a catalog of available books and pamphlets.

U.S. Government Printing Office  
Superintendent of Documents  
Washington, D.C. 20402

## Hospitals and Medical and Dental Offices

Many hospitals have an education department that you can contact. They also have libraries with up-to-date information. Perhaps your family physician or dentist can give you some assistance.

## Industries

Major industries have specialists that may be willing to help. Locate them with your telephone book or magazine advertisements. When writing to corporations, include "Public Relations Department," in the address on the envelope and in the letter.

## Nature Centers, Parks, and Marine Reserves

Naturalists work at nature centers. They will be able to give you information if your project involves natural environments and ecosystems.

## Telephone Books

The Yellow Pages of your telephone book, especially a commercial telephone directory, will give you names, addresses, and general product information. When calling anyone, remember to be polite. Give your name and tell exactly why you are calling.

## Zoos and Aquariums

The L.A. and San Diego zoos, Sea World, the Cabrillo Marine Aquarium in San Pedro, and the Long Beach Aquarium of the Pacific have education departments that are often willing to help. They may be able to arrange a meeting for you with an animal keeper or zoologist.



# ***INTERNET REFERENCES***

## **Internet use and web sites:**

- You may get ideas and material from the internet.
- You are not allowed to copy a science project from the internet. You must modify it to contain both a control and a variable
- Parents must oversee the web sites that their child visits; many have pop-ups and links that are not for elementary school age students.
- Using information from the web is just like a book, word for word is plagiarism and you need to include it in your bibliography.
- To use copyright protected pictures and text from a web site; you must get permission from the author. This usually takes a long time.
- Include a print out of permission (email is OK) in the bibliography.
- Refer to the Web Site list in this handout.



## **WARNING!**

- Anyone can create a Web site; this does not mean its information is correct!
- Make sure the web site is run by a large, recognized group such as a college or organization.
- DOT “org” or “edu” are generally trustworthy for accuracy of content.

## **Web site samples that can be used for research:**

<b>Description</b>	<b>URL</b>
Internet Public Library	<a href="http://www.ipl.org">http://www.ipl.org</a>
Within the library, Kid friendly	<a href="http://www.ipl.org/div/kidspace/projectguide/">http://www.ipl.org/div/kidspace/projectguide/</a>
National Oceanic & Atmosphere Administration	<a href="http://www.noaa.gov/">http://www.noaa.gov/</a>
Weather and ocean related phenomena	<a href="http://www.education.noaa.gov/">http://www.education.noaa.gov/</a>
US Government web site for kids	<a href="http://www.kids.gov/">http://www.kids.gov/</a>
US Geological Survey (USGS)	<a href="http://www.usgs.gov/">http://www.usgs.gov/</a>
Earthquake section of USGS	<a href="http://earthquake.usgs.gov/4kids/">http://earthquake.usgs.gov/4kids/</a>
Geology section of USGS	<a href="http://geology.usgs.gov/index.shtml">http://geology.usgs.gov/index.shtml</a>
Fish and Wildlife (Department of the Interior)	<a href="http://www.fws.gov/">http://www.fws.gov/</a>
Discovery Channel Science Fair	<a href="http://school.discovery.com/sciencefaircentral/">http://school.discovery.com/sciencefaircentral/</a>
Jet Propulsion Laboratory	<a href="http://jpl.nasa.gov/kids/">http://jpl.nasa.gov/kids/</a>
How Stuff Works	<a href="http://www.howstuffworks.com">http://www.howstuffworks.com</a>
Science page of How Stuff Works	<a href="http://www.science.howstuffworks.com">http://www.science.howstuffworks.com</a>

# ***LIBRARY REFERENCES***

## **150 PSYCHOLOGY & SOCIAL SCIENCES**

### **510 MATHEMATICS**

Number System  
Arithmetic  
Geometry

### **520 ASTRONOMY**

Universe  
Solar System  
Moon  
Planets  
Meteors  
Black Hole  
Comets  
Sun  
Constellations  
Telescope  
Map Making

### **530 PHYSICS**

Mechanics  
Matter  
Gravity  
Simple Machines  
Energy and Force  
Solar  
Coal  
Gas  
Nuclear  
Sound  
Light  
Optics  
Color  
Prisms  
Heat  
Electricity  
Magnetism  
Atomic Energy and Force

### **540 CHEMISTRY AND ALLIED SCIENCE**

Crystallography  
Mineralogy



**550 SCIENCES OF EARTH AND OTHER WORLDS**

Geology (Earth Science)  
Structure of the Earth  
Volcanoes  
Geysers  
Floods (Erosions)  
Caves  
Earthquakes  
Oceanography  
Meteorology  
Climatology and Weather  
Economic Geology  
Metals and Iron  
Water  
Gems

**560 PALEONTOLOGY (Prehistoric Life)**

Fossils  
Dinosaurs  
Prehistoric Caves  
Cave Men  
Cave Art

**570 LIFE SCIENCES**

Human Races  
Anthropology  
Primitive Societies  
Physical Anthropology  
Primitive Man  
Heredity  
Prehistoric Man  
Biology  
Evolution  
Microbes (Viruses)  
Microscopes

**580 BOTANY**

Propagation  
Seeds, Flowers, Bulbs  
Types of Plants  
Wild Flowers  
Trees  
Vegetables  
Vines

