Coronado Science Fair

Student Guidebook

Science Fair: Wednesday, April 17th

Students setup projects before school starts
Judging to be completed during the school day
Family Science Night 6:00-7:30pm

**Guidebook adapted from Morley Elementary—Lincoln, NE**
Make sure that you:

1. **Read** through this entire booklet. If you have questions, talk with the science fair coordinator listed below, or your teacher: Heather McKay, hangel123@gmail.com, 303-549-3057

2. **Plan** out your entire project before you begin.

3. **Research** your topic. Find as many facts about your topic as possible.

4. **Make a display board** to share your discoveries. Include **photos** of you doing your project. Follow the guidelines within this booklet for the placement of items on your display board. Make certain your display is **neat** and **eye-catching**.

5. **Prepare** to share everything that you have learned and done in your project.

6. **Bring an extension cord** if you need electricity for your project.

7. **Ask Questions**! If you are not certain about what should be included in your display or how to do something....ASK!

8. **Have FUN!**
Science Fair Rules:

1. You may choose to do an Experiment or a Demonstration:

Scientific Experiment (using the Scientific Method)
You may choose to ask a science-based question and use the scientific method to conduct an experiment to determine the answer. You will develop a hypothesis and then design and complete an experiment to try to prove or disprove it by evaluating the results.

Demonstration (using the Engineering Design Process)
You may choose to demonstrate a scientific principle or how something works. You will design and create a demonstration or an invention.

2. Your project idea must be written in the form of a question.
3. Your project may not endanger humans or animals.
4. You may work individually or with a partner.
5. Your project must have a visual display—including a display board, models or other items used to complete your project.
6. You need to do research on your topic.
7. Commercial kits are not allowed.
8. DANGEROUS OR COMBUSTIBLE CHEMICALS may not be displayed at the fair. Rockets or engines MUST NOT contain fuel.
9. Open flames are not permitted.
10. Projects using electricity must conform to standard wiring practices and safety
11. Laser pointers are not allowed.
How Do I Complete an Experiment?

1. **Choose a topic** of interest.
2. Think of a **question** you would like answer on this topic.
3. Complete a registration form.
4. **Research** your topic.
5. Record your sources of information.
6. Write your **hypothesis**. What do you think will happen?
7. Plan your **procedure**.
8. Gather your materials.
9. Conduct your **experiment** as planned.
10. Record your **results**.
11. Review your results.
12. State your **conclusion**.
13. Prepare your display and bring it to the science fair.

**Steps of the Scientific Method:**

- **Make an observation**
- **Ask a question**
- **Make a hypothesis**
- **Conduct your experiment**
- **Draw conclusions**
- **Report your results**
Possible Questions for an Experiment:

Physical Sciences:
  a) Which type of water evaporates faster: salt, tap, or bottled water?
  b) How does the temperature of a tennis ball affect it’s bounce height?
  c) Which type of material will dry faster: cotton or polyester?
  d) What kind (shape) of sail will make a boat go the fastest?
  e) What type of paper airplane will fly the farthest?
  f) How does water temperature affect the time it takes to freeze?
  g) How does the size of a drum affect its pitch?
  h) Which is a better insulator: Wool, cotton, or feathers?
  i) Do different brands of batteries last longer than others?

Earth Sciences:
  a) Which will develop faster: salt crystals or sugar crystals?
  b) What type of metals are attracted to a magnet?
  d) Which rocks are attracted to a magnet?
  e) Which materials will conduct electricity?

Life Sciences:
  a) How much salt will a plant be able to tolerate and still grow?
  b) Which kind of seed will sprout more quickly?
  c) Under what color light do plants grow best?
  d) How does the amount of yeast affect how high bread rises?
  e) Which packaging method best reduces the growth of mold or fungus on food?
  f) Where are the most germs in your school?
  g) What is the best way to keep cut flowers fresh the longest?
How Do I Complete a Demonstration?

1. Choose a **topic** of interest.
2. Think of a **question** that you would like to answer on this topic.
4. **Research** your topic.
5. Record your sources of information.
6. Plan how you will **share** your information.
7. Prepare charts, tables, graphs, models, or other visual aids to help share your information.
8. Prepare a display board and bring it to the science fair along with your other visual aids.
Possible Questions for a Demonstration:

Physical Sciences:
a) How does a siphon work?
b) How does air pressure work?
c) How does sound travel?
d) How does light travel?
e) How does a camera work?
f) Why do things fall?
g) What is magnetism?
h) How does a compass work?

Life Sciences:
a) Why do living things need air, food, and water?
b) How do plant cells differ from animal cells?
c) Why are roots, stems, and leaves important to plants?
d) How do light, air, water, and temperature affect germination?
e) What are food chains?
f) What are the special adaptations of plants and animals?
g) How does the human ear work?
f) How does the human eye work?
h) How does the tongue detect tastes?
i) What foods contain high amounts of acid?

Earth Sciences:
a) What are the layers of the earth?
b) How are rocks formed?
c) How are crystals formed?
d) What causes a volcano to erupt?
e) What factors affect weathering?
f) What are fossils and how are they formed?
g) What is the water cycle?
h) What are the different kinds of clouds?
Sample Display Board Layouts:

**Experiment Display Board**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Title</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td></td>
</tr>
<tr>
<td>Sources of Information</td>
<td>Hypothesis</td>
<td>Conclusion</td>
</tr>
<tr>
<td></td>
<td>(photos of your project)</td>
<td></td>
</tr>
</tbody>
</table>

**Demonstration Display Board**

<table>
<thead>
<tr>
<th>Information</th>
<th>Title</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Student Name</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sources of Information</td>
<td></td>
</tr>
<tr>
<td>photos, charts &amp; diagrams</td>
<td></td>
<td>photos, charts &amp; diagrams</td>
</tr>
</tbody>
</table>
**This form is not required, but may be helpful in planning your science project:**

**Project Idea:** ____________________________________________________________

**Questions to help with planning a Science Experience:**

Question (what will be answered?): ____________________________________________
___________________________________________________________________________

Hypothesis (what do you think will happen?): _________________________________
___________________________________________________________________________

Procedure (what will you measure? Include a short description of the steps.): _______
___________________________________________________________________________
___________________________________________________________________________

**OR Questions to help with planning a Demonstration:**

Question (what will be answered?): ____________________________________________
___________________________________________________________________________

Plan and Create (how will you go about answering the question?): _________________
___________________________________________________________________________
# Coronado Science Fair Grading Rubric - Scientific Experiment

<table>
<thead>
<tr>
<th>Student’s Name:</th>
<th>Grade:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>4 - Awesome</th>
<th>3 - Good</th>
<th>2 - Limited</th>
<th>1 - Needs help</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem and Hypothesis</strong></td>
<td>Problem well understood, well researched, and a hypothesis presented.</td>
<td>Problem somewhat understood, some research, hypothesis presented.</td>
<td>Problem unclear, no research, no hypothesis.</td>
</tr>
<tr>
<td><strong>Procedure</strong></td>
<td>Procedure is completely appropriate to solving problem. Steps and Materials listed.</td>
<td>Procedure appropriate and steps mostly listed. Maybe lacking material list.</td>
<td>Procedure missing several steps or not fully adequate to solving problem. No materials listed.</td>
</tr>
<tr>
<td><strong>Variables and Controls</strong></td>
<td>Variables identified and isolated. A control used. More than one test is performed for each variable.</td>
<td>Variables mostly isolated. More than one test performed, control may be missing.</td>
<td>Variables somewhat isolated. No control. Only one test performed for each variable.</td>
</tr>
<tr>
<td><strong>Data Collection</strong></td>
<td>The data is collected neatly and displayed where appropriate in graphs, charts, or photos.</td>
<td>Data is collected and complete but could use additional representation on board.</td>
<td>Data is incompletely collected.</td>
</tr>
<tr>
<td><strong>Analysis</strong></td>
<td>The data is analyzed appropriately, and data supports the conclusion. Sources of error identified. Future work considered.</td>
<td>The data is analyzed appropriately, and the data supports the conclusion. May be missing sources of error or future work.</td>
<td>Data is analyzed but does not necessarily support the conclusion.</td>
</tr>
<tr>
<td><strong>Originality</strong></td>
<td>This is a very original idea from the student's own imagination.</td>
<td>This is an idea from a website or suggested by someone, but with an original twist.</td>
<td>This idea comes from a website or book, but followed, and compared to previous results.</td>
</tr>
<tr>
<td><strong>Level of Difficulty</strong></td>
<td>This problem requires the student to use creativity to solve, and the student worked above their grade level to design and perform their experiment.</td>
<td>This problem required some thought to solve, and was appropriate to their grade level.</td>
<td>This problem required little effort.</td>
</tr>
<tr>
<td><strong>Student’s Own Work</strong></td>
<td>The work of the experiment and of the display were performed almost entirely by the student.</td>
<td>Some work performed by an adult.</td>
<td>Much of the work performed by an adult.</td>
</tr>
<tr>
<td><strong>Display</strong></td>
<td>The display is easy to read, attractive, and the quality of the writing is appropriate for the child’s age.</td>
<td>The display is easy to read, and the quality of the writing is mostly appropriate for the child’s age.</td>
<td>The writing is legible. The display could be tidier.</td>
</tr>
<tr>
<td><strong>Interview</strong></td>
<td>The student is enthusiastic and informed about their problem. They can answer questions easily, and offer insights about what their results mean and what they might do differently.</td>
<td>The student is enthusiastic, and can answer questions about their problem with prompting. They have a rough idea about what their results mean or what they could do differently.</td>
<td>The student can answer some questions, but not all.</td>
</tr>
</tbody>
</table>

**Total Points:**

**Comments:**
<table>
<thead>
<tr>
<th>Demonstrated Objectives</th>
<th>Grade:</th>
<th>Knowledge of Scientific Principle</th>
<th>Procedure/Method</th>
<th>Data and Results</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives are well understood and well researched.</td>
<td>4 - Awesome</td>
<td>Demonstrates clear understanding of principle or concept involved, accurately relates concept to demonstration.</td>
<td>Procedure or method completely appropriate to complete the demonstration. Steps and Materials listed.</td>
<td>Data or results are collected neatly and displayed where appropriate in graphs, charts, or photos.</td>
<td>The data or results are analyzed appropriately, and support the conclusion. Sources of error identified. Future work considered.</td>
</tr>
<tr>
<td>Objective is somewhat understood, some research completed.</td>
<td>3 - Good</td>
<td>Exhibits only slightly limited understanding of principle demonstrated, minor inaccuracies in relating demonstration.</td>
<td>Procedure or method appropriate and steps mostly listed. May be lacking material list.</td>
<td>Data or results are collected but could use additional representation on board.</td>
<td>The data or results are analyzed appropriately, and the support the conclusion. May be missing sources of error or future work.</td>
</tr>
<tr>
<td>Objective is unclear; no research.</td>
<td>2 - Limited</td>
<td>Exhibits somewhat limited understanding of principle demonstrated; minor inaccuracies in relating demonstration.</td>
<td>Procedure or method missing several steps or not fully adequate to complete demo, no materials listed.</td>
<td>Data or results are incompletely collected.</td>
<td>Data or results are not analyzed appropriately.</td>
</tr>
<tr>
<td>No objective evident.</td>
<td>1 - Needs help</td>
<td>Lacks an understanding of the principle or concept demonstrated; inaccurately relates demonstration of principle or concept.</td>
<td>Procedure or method not appropriate to demonstration.</td>
<td>No data or results collected.</td>
<td></td>
</tr>
</tbody>
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<th>Student's Own Work</th>
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<tbody>
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<td>This is a very original idea from the student's own imagination.</td>
<td>This demo required some thought to develop, and was appropriate to their grade level.</td>
<td>The work of the demo and of the display were performed almost entirely by the student.</td>
</tr>
<tr>
<td>This idea is derived directly from a website or book, but faithfully followed, and compared to previous results.</td>
<td>This demo required little effort.</td>
<td>Some work performed by an adult.</td>
</tr>
<tr>
<td>This idea comes from a website or book, but not followed correctly.</td>
<td>This demo was too easy.</td>
<td>Much of the work performed by an adult.</td>
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<tr>
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<td>The student is enthusiastic, and can answer questions about their problem with prompting. They have a rough idea about what their results mean or what they could do differently.</td>
</tr>
<tr>
<td>The writing is legible. The display could be tidier.</td>
<td>The student can answer some questions, but not all.</td>
</tr>
<tr>
<td>The writing is not legible, or the display board is absent.</td>
<td>The student could not answer questions about their project.</td>
</tr>
</tbody>
</table>

Total Points: 

Comments: