Supplemental Materials

Sharing Your Findings: PowerPoints and Posters

SUMMARY

Having your students communicate their findings is a critical part of their science education. Both state standards and The Next Generation Science Standards 8 Practices emphasize the communication of information through graphs, diagrams, models, etc., orally and through writing. Student presentation of their research projects through posters, oral presentations, science fairs, or other community events is an important part of the Clean Air and Healthy Homes Program.

This set of materials will help your students prepare to present their research findings. It includes:

- how to make graphs in Excel (p. 2-6)
- tips for creating a strong PowerPoint/presentation (p. 7)
- example PowerPoint (p. 8-9)
- tips for creating a strong poster (p. 10-11)
- Poster template (p. 12)
- the rubrics used for the judging of presentations and posters at the CAHHP annual symposium (p. 13-16)
Making Graphs in Microsoft Excel

Creating graphs in Microsoft Excel is surprisingly easy. All it takes is some data and a few clicks of the mouse. Here are the steps:

1. Input your data into an Excel spreadsheet. Each column of data will represent a line on your graph. If you are using the Dylos or the carbon monoxide logger, instructions on how to do this are found in the equipment protocol. If you have been using the radon detector, you will need to enter data by hand.

2. Highlight your data by clicking and dragging the mouse across the cells containing your data, then click on the “Insert” tab in your menu bar.
3. Next, select the type of graph you would like to generate (line, bar, etc.). Click on it and choose the specific style for your graph.

4. The type of graph you selected will appear on your spreadsheet.
5. Now label each axis using the options that appear in the "Chart Tools" by clicking on "Axis Titles". If you do not see the tools circled in red below, simply click anywhere on your graph and they will appear.

You have multiple options for how each axis title will appear:
6. You can add a title to your graph here by selecting “Chart Title”.

7. Click on the ‘Design’ tab in the “Chart Tools” menu to change a number of features on your graph, such as the color of your lines:
You can also change the style of your graph:

8. Be sure to save your document after any changes. There is no direct way to export a graph from Excel. The easiest way to save it as a picture file (such as jpeg) is to hover your arrow over the border of the graph and right click. A menu will pop up with ‘Copy’ as an option. Select this. Then open the program such as PowerPoint, Word, or “Paint” from the main Windows menu of the computer. You can then paste the graph there and save it.
PowerPoint/Presentation Tips

There are a number of important ideas to keep in mind when designing your PowerPoint presentation. Read through the following tips and guidelines to be sure you create a successful, engaging presentation.

**Design/Formatting**

- **Keep it simple!** Though it is tempting to add a lot of flash to your presentation, this is not always beneficial. For example, animated transitions may seem like a good idea, but often take too long, interrupt the flow of your presentation and begin to feel redundant.

- **Fonts** Use fonts that are easy for the audience to read. Sans serif, Arial, and Calibri are all good fonts for presentations. Only use fancy fonts in headings and only if they are easy to read!

- **Slide background** The simpler the background, the easier it is to see the information on your slides. Light colored backgrounds are generally better than dark colored backgrounds. If using a dark colored background, be sure to use a light font that the audience can see.

- **Don't overcrowd slides!** Your slides should support key ideas in clear, concise ways. They should not have long sentences and paragraphs. You should not be reading straight from slides during your presentation. Type full sentences only when necessary. Include useful images such as graphed data, etc. and use those as talking points during your presentation. See the PowerPoint on the following pages for a great example of this.

**Content**

Your presentation should be clear, concise, and interesting. The following are key pieces of information you should address, and include in your presentation:

- Research question
- Background information (keep your audience in mind; only share background info that they likely do not already know)
- Hypothesis
- Methods (What was your procedure for testing your hypothesis?)
- Results and discussion of them
- Conclusion (establish accuracy of the hypothesis and answer the big ‘so what?’)
- References/bibliography

- **Be sure your first slide contains:**
  1. project title
  2. your name(s)
  3. name of high school
  4. title of class
  5. name of teacher
  6. date

**The Act of Presenting**

- Practice, practice, practice. You should be very comfortable with what you are going to say, as well as when and how to say it.
- Make eye contact with your audience. This shows that you are confident and helps connect you to them.
- It is easy to speak too quickly when nervous. Remember to speak slowly enough and clearly.
- Don't forget to smile!
DIFFERENCES IN INDOOR RADON LEVELS IN KOOTENAI VALLEY HOMES WITH RESPECT TO SOIL TYPE

Students' Names
Libby High School
Mr. Gene Rockin

Soil Types
- 102
  - Glacial terrace
  - Clay
  - Compact, less permeable / porous
- 103
  - Valley Floor
  - River cobble, sand, and gravel
  - More permeable

USFS Soil Map of Libby
103
102

Hypothesis
- We predicted that houses built on soil type 103 would have radon levels higher than houses on soil type 102 because the type 103 is more permeable, allowing radon to enter the house easier than type 102.

Question
- Does the type of soil that a house is built upon have an appreciable effect on the radon level that accumulates in the home?
- Would the results support advising homeowners on either soil type to get their house tested?

Method
- Identified houses with basements and crawl spaces
- Tested houses for one week
- Homeowners kept to normal routine
- Tested all houses during the winter for consistent weather conditions and ground frost/snow cover

Stack Effect
Worm air rises out of the home
Cool air enters home with radon from the soil
Radon Concentrates in House
Results

<table>
<thead>
<tr>
<th>Soil Type</th>
<th># of Tests</th>
<th>Minimum Value</th>
<th>Maximum Value</th>
<th>Average Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>102</td>
<td>8</td>
<td>1.3</td>
<td>4.4</td>
<td>2.7</td>
</tr>
<tr>
<td>103</td>
<td>14</td>
<td>2.2</td>
<td>9.3</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Radon Levels

Conclusions

- The data supports our hypothesis that levels would be higher in houses residing on more porous soil type 103 than in houses on more compact soil type 102.

- Implications: Because 103's levels were consistently 4-5 times the EPA's recommendation we would advise homeowners on soil type 103 to get their homes tested.

Statistical Test

- Probability Value from t-Test: .028

- Because the p-value is less than .05, the test shows a non-random relationship between the soil types.

- 97.2% confidence level

Sources of Error

- The House
- Construction of the House
- Source of heat and ventilation
- Homeowner's routine
- Generalized Soil Survey Map

Recommendations

- More tests
- Determine the soil characteristics at each home
- Examine air pressure differences
- Possible difference between basements and crawlspaces

References

Poster Tips

Posters are a great way to present scientific information. They can be used as a visual reference for the presenter, or be used to present work in the absence of the researcher. All posters should incorporate the facets of a good poster: a strong research project, required content, and a professional-looking product. Remember, your poster should be easy to read from a few feet away.

When to use a poster

- Creating a poster based on research that you have conducted is a good way to share your findings at:
  - scientific and academic conferences and science fairs.
  - events when the student will not be present (i.e., on display at the City Library, County Health Department, etc.).

Content

- Be sure to read the scoring rubric and/or refer to the requirements for the specific academic conference or science fair you will be attending. This will help guide what is included on the poster and any special formatting requirements.

- Typical scientific research posters include the following information:
  - Introduction/research question
    - This is your purpose, stated as a question. For example, “How does activity level at an indoor swimming pool effect PM$_{2.5}$ levels” or “How does soil type effect radon levels?”
    - Include information about why this was an interesting or important topic.
  - Background information
    - This should provide viewers with an understanding of what is known about your topic. Consider mentioning health effects following exposure to your specific pollutant, etc.
  - Hypothesis
    - What did you predict the outcome of your experiment would be? Hypotheses are often stated as “If _______, then ________.”
  - Methods
    - Include list of materials, the steps you followed, and your control variables.
  - Results
    - Describe what you observed (include photos if available).
    - Include your graphs here. They should be clear, simple and easy to read.
    - Describe any statistical analysis you performed.
  - Conclusions
    - Wrap things up in a brief summary. For example, "Overall we found that the PM$_{2.5}$ levels were significantly higher during high activity times at indoor pools".
    - Review your hypothesis - was it supported? Give a scientific explanation of why you think it may or may not have been? How can you explain your data? Give more than one possible explanation, if possible.
    - Review errors that occurred in your experiment. If you had more than one variable, discuss how the other variable(s) may have influenced your data.
    - Give suggestions for what you would do differently if you could do this again. Be thoughtful, creative and innovative.
  - References
    - Cite any sources you took information from.
Here is a common layout for scientific posters:

- Be sure to proofread your poster and correct any spelling and grammar mistakes.
- Be prepared to answer questions related to different portions of the poster.

Another, detailed poster example is available on the next page. Read all sections for special tips on formatting a successful poster. Note that it also includes an abstract, which is a short summary of all aspects of your poster. This is often included in scientific posters.
Clean Air and Health Homes: Sharing Findings

Abstract

Background Studies

Hypotheses

Methods

Results

Conclusions

References
**Symposium PowerPoint Presentation Judging Sheet (60 points possible)**

<table>
<thead>
<tr>
<th>PowerPoint name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Student’s names:</td>
<td></td>
</tr>
<tr>
<td>School:</td>
<td></td>
</tr>
</tbody>
</table>

### The Research Project (20 points)

**Time commitment to this research project:**
- **(Little to none)**
  - 0 1 2 3 4 5 6 7 8 9 10
- **(Extensive time)**

**Accuracy of the scientific process:**
- **(Weak idea, poorly carried out)**
  - 0 1 2 3 4 5 6 7 8 9 10
- **(Great experiment)**

**Comments:**

### PowerPoint Content (20 points)

**Graph/graphics** - Excellent layout, perfectly labeled, and includes units.
- **(Missing major parts)**
  - 0 1 2 3 4 5 6 7 8 9 10
- **(All information included)**

**PowerPoint layout** - Includes all required information, is easy to read, and has no typos.
- **(Poorly put together)**
  - 0 1 2 3 4 5 6 7 8 9 10
- **(Excellent look and layout)**

**Comments:**

### Delivery to the Audience (20 points)

**Presentation** - Well rehearsed and interesting.
- **(Poorly presented)**
  - 0 1 2 3 4 5 6 7 8 9 10
- **(Excellent delivery)**

**Speaking skills** - Makes eye contact, speaks loud enough, and answers judge’s questions thoughtfully.
- **(Weak stage presence)**
  - 0 1 2 3 4 5 6 7 8 9 10
- **(Strong stage presence)**

**Comments:**

**Total Points**

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## Symposium Poster Judging Sheet (60 points possible)

<table>
<thead>
<tr>
<th>Poster Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Student's names:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>School:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

### The Research Project (20 points)

**Time commitment to this research project:**

- (Little to none) 0 1 2 3 4 5 6 7 8 9 10
- (Extensive time)

**Accuracy of the scientific process:**

- (Weak idea, poorly carried out) 0 1 2 3 4 5 6 7 8 9 10
- (Great experiment)

**Comments:**

### Poster Content (20 points)

**Background information (not copied and pasted)**

- (Little to none) 0 1 2 3 4 5 6 7 8 9 10
- (Extensive and supports their research)

**Poster layout - Includes all required information, is easy to read, and contains no typos.**

- (Poorly put together) 0 1 2 3 4 5 6 7 8 9 10
- (Excellent look and layout)

**Comments:**

### Use of Graphics (20 points)

**Graphs - Excellent layout and perfectly labeled.**

- (Missing major parts) 0 1 2 3 4 5 6 7 8 9 10
- (All information included)

**Graphics - Use of interesting graphics to support the poster presentation.**

- (None) 0 1 2 3 4 5 6 7 8 9 10
- (Great graphics)

**Comments:**

```
Total Points
```
### CAHHP Symposium PowerPoint Presentation Rubric

<table>
<thead>
<tr>
<th>POINTS</th>
<th>THE RESEARCH PROJECT</th>
<th>POWER POINT PRESENTATION</th>
<th>DELIVERY TO THE AUDIENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>9–10</td>
<td>outstanding</td>
<td>All of the required content is included and is accurate. The project clearly indicates researcher(s)' time investment and adherence to the scientific process.</td>
<td>All of the required content is included. Presentation contains outstanding data/tables/charts. Text is easy to read and understand. There are no spelling or grammatical errors. Presentation is thorough and contains all required information (as listed below).</td>
</tr>
<tr>
<td>6–8</td>
<td>above average</td>
<td>All of the required content is included, but contains a few minor inaccuracies. Project indicates researcher(s)' time investment and understanding of the scientific process.</td>
<td>Most of the required content is included. Presentation contains above average data/tables/charts. Text is easy to read and understand. There are few spelling or grammatical errors. Presentation is fairly thorough and contains most of the required information (listed below).</td>
</tr>
<tr>
<td>3–5</td>
<td>average</td>
<td>Most/all of the required content is included, but contains several inaccuracies. Does not appear that researcher(s) spent an abundance of time on project or has a clear understanding of scientific process.</td>
<td>Some of the required information is included. Presentation contains average data/tables/charts. Most text is easy to read and understand. There are several spelling or grammatical errors. Presentation is somewhat thorough and contains part of the required information (listed below).</td>
</tr>
<tr>
<td>0–2</td>
<td>below average</td>
<td>Some of the required content is missing. Project contains numerous inaccuracies. Project clearly indicates minimal amount of time commitment. Researcher(s)' lacks</td>
<td>The presentation is missing most of the required information. Presentation contains below average data/tables/charts. Text is not easy to read and understand. There are numerous spelling and</td>
</tr>
<tr>
<td>POINTS</td>
<td>THE RESEARCH PROJECT</td>
<td>POSTER CONTENT</td>
<td>USE OF GRAPHICS</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------</td>
<td>----------------</td>
<td>-----------------</td>
</tr>
<tr>
<td><strong>9–10</strong> outstanding</td>
<td>Poster clearly indicates researcher(s)’ time investment and adherence to the scientific process: question, hypothesis, procedure, results, conclusion.</td>
<td>Poster contains outstanding background information regarding air quality and its effects on human health. Text is very understandable and easy to read from a distance. There are no spelling or grammatical errors. Poster contains all of the required information (listed below).</td>
<td>Poster contains outstanding data/tables/charts/graphs that are titled, easy to read, and well labeled.</td>
</tr>
<tr>
<td>6–8 above average</td>
<td>Poster indicates researcher(s)’ time investment and understanding of the scientific process but contains a few minor inaccuracies.</td>
<td>Poster contains above average background information regarding air quality and its effects on human health. Text is understandable and easy to read from a distance. There are a few spelling or grammatical errors. Poster contains most of the required information (listed below).</td>
<td>Poster contains above average data/tables/charts/graphs that are titled, easy to read, and well labeled.</td>
</tr>
<tr>
<td>3–5 average</td>
<td>Does not appear that researcher(s) spent an abundance of time on project or that there is a clear understanding of scientific process. Poster contains several inaccuracies.</td>
<td>Poster contains average background information regarding air quality and its effects on human health. Text is mostly understandable and fairly easy to read from a distance. There are several spelling or grammatical errors. Poster contains part of the required information (listed below).</td>
<td>Poster contains average data/tables/charts/graphs that are titled, fairly readable, and mostly labeled.</td>
</tr>
<tr>
<td><strong>0–2</strong> below average</td>
<td>Poster clearly indicates minimal amount of time commitment. Researcher(s)’ lacks understanding of scientific process. Project contains numerous inaccuracies.</td>
<td>Poster contains hardly any background information regarding air quality and its effects on human health. Text is not easy to understand or to read from a distance. There are numerous spelling and grammatical errors. Poster does not contain required information (listed below).</td>
<td>Poster contains below average data/tables/charts/graphs that are mostly untitled and unlabeled.</td>
</tr>
</tbody>
</table>

**REQUIRED CONTENT for Research Poster**
1) question/purpose, 2) hypothesis, 3) procedure, 4) results, 5) conclusion

**REQUIRED INFORMATION for Poster:**
1) project title, 2) students’ names, 3) name of high school, 4) teacher