

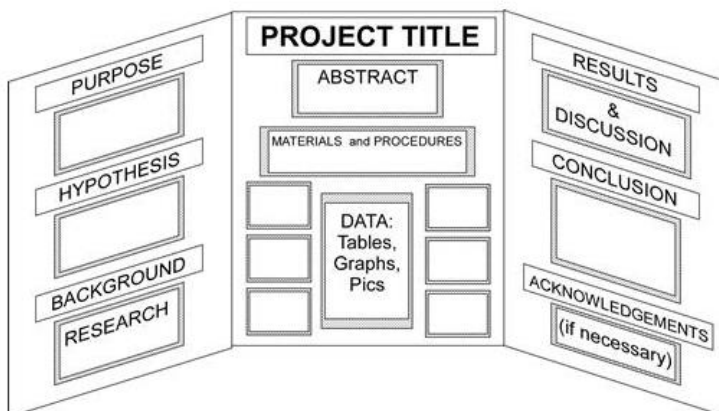
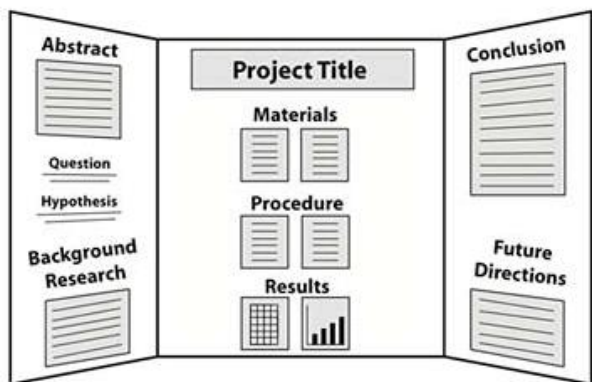
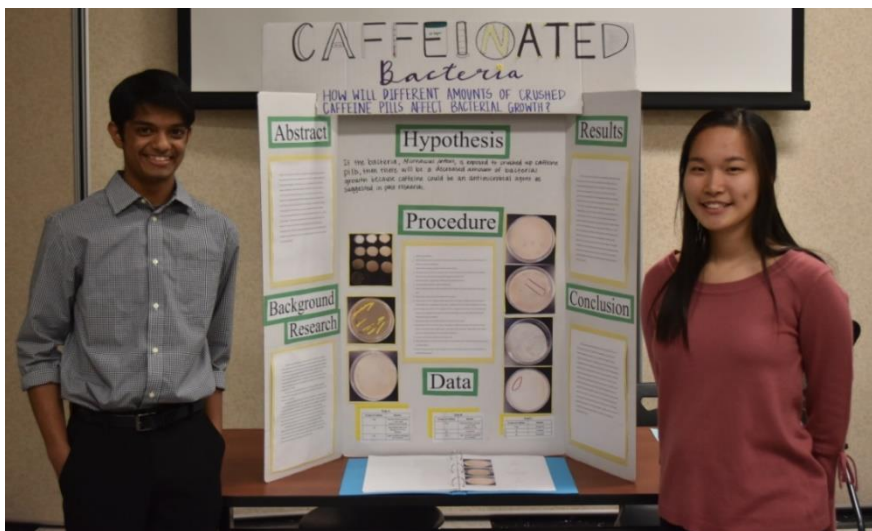


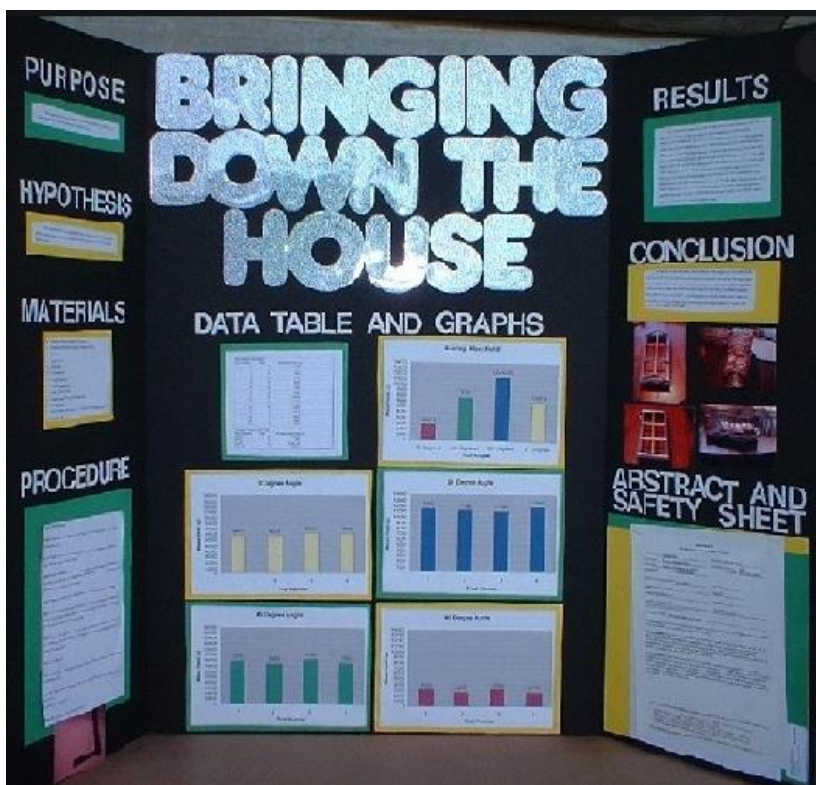
Each project has four deliverables at the LSEF event – the project abstract (full report is now optional), the project notebook, the poster display, and the oral presentation. We discussed the project notebook in Step 5, and we will discuss the project abstract, report, and presentation in future weeks. This step will focus on how to create a poster display.

While your project notebook contains all your raw data, and your project abstract/report will contain a neat summary of all the work you did, your poster display is your opportunity to make your project visually interesting. It is the first impression people get of your project, and it is important to make a good first impression! You will start with a standing trifold posterboard (which we can provide) and add headings, pictures, charts and graphs, and concise key informational highlights about your project.

**TRIFOLDS** – Students working on a project for the LSEF can get a free trifold poster board from us for your display. We have a variety of colors available. Please email us to pick one up. You are also welcome to purchase your own if you prefer. You are not required to use a trifold, but a standing board is easier to display than one that lies flat.

**FORMAT** – You can arrange your trifold display any way you want – there is no required layout. We have included some standard layouts that you can use as a guide. You are welcome to be creative, but make sure you include your essential project information, like your project title, your hypothesis or design criteria, your procedure (how you did your experiment/build,) your results, and the conclusions you drew from your results. Here are some suggested formats:

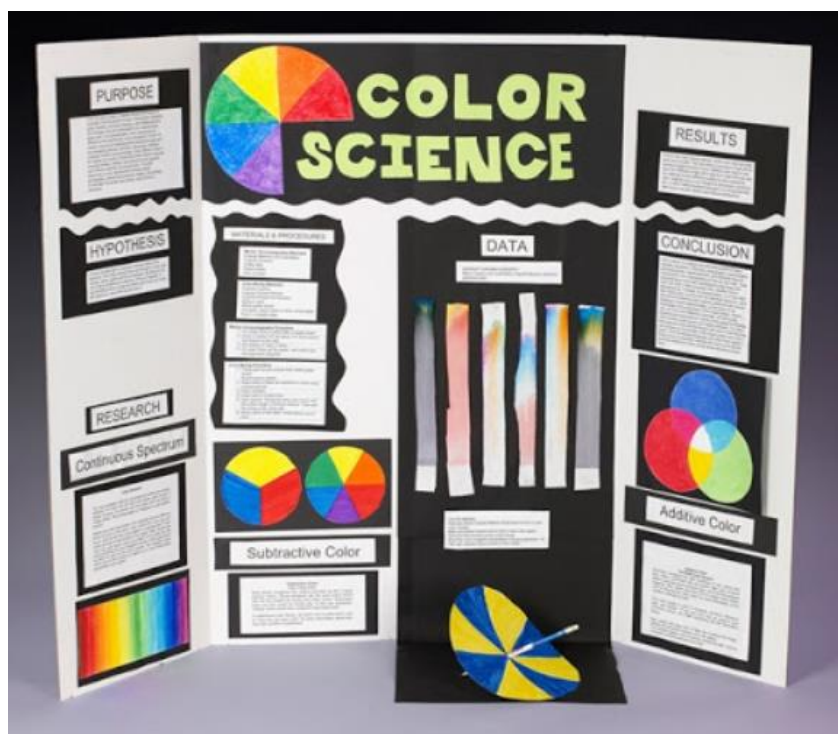




## TIPS FOR A GREAT DISPLAY

- Your display should summarize your project. Someone should be able to read your display and get a good general understanding of what you did and how it turned out.
- Plan and organize your display. Sketch out where you want each section of information to go, then position the pieces in place before you start gluing. Generally, they read from left to right, with things like Purpose and Hypothesis on the left and Conclusion and Results on the right.
- Use your display space. Leave small spaces between display sections, but don't leave large gaps.
- Keep it simple – you don't need to include every detail. You can include more detail in a project report if you choose to do one.

- Make it neat. While content is more important than appearance, having a neat display will give an overall better impression. Typed words and electronically created charts and graphs usually appear neater than hand-written ones. Cut paper neatly, and glue things to your trifold so that they are straight.
- Make it visually interesting using color, pictures, charts, and graphs! You can use photographs of your project as it was in-process to show how it progressed at different stages, or you can use pictures of other things to illustrate points you want to make about your project. If you have data you want to share, make colorful charts or graphs. Make sure all components of a chart or graph are clearly labeled.
- You can include 3-D objects in your display – they can be placed on the table in front of or next to your trifold. Alternately, you can photograph things and insert the pictures into your display.



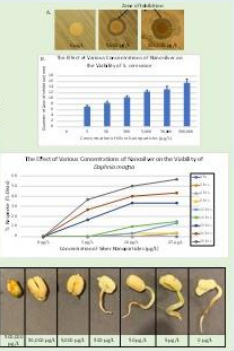
QUAD BOARDS – Students moving on to the district fair at UC will be required to upload their display information electronically in a “quad” format when they register. They will not accept a photograph of your trifold for this. The four sections of the quad usually are:

1. Introduction/Rationale/Purpose
2. Design Framework/Procedure
3. Data Analysis/Results
4. Discussion/Conclusion

For our Lakota fair, nothing is required in this format. But if you create the materials for your display electronically as much as possible, you can cut and paste them into a quad format if you compete in the regional event. You can do this in a PowerPoint slide or other program. You can insert photographs and charts into your quad board as needed to illustrate your points.

QUAD BOARD EXAMPLE:

### The Effect of Silver Nanoparticles on the Viability of Bacteria, Fungi, Aquatic Organisms, and Plants

PURPOSE	PROCEDURE
<p><b>PURPOSE</b></p> <ul style="list-style-type: none"> <li>• Many consumer products contain <b>silver nanoparticles</b> which are advertised to have antibacterial properties that prevent bacteria from growing in everyday items that we use.</li> <li>• When silver nanoparticles in personal care products wash off of the skin, they enter the environment with unknown effects. The same antibacterial and antifungal characteristics that allow nanoparticles to be valuable also give them the potential to cause unpredictable consequences for ecological health.</li> <li>• <b>Testable Question:</b> What concentration of silver nanoparticles has a cytotoxic effect on the bacteria <i>Escherichia coli</i>, the fungi <i>Saccharomyces cerevisiae</i>, the aquatic organism <i>Daphnia magna</i> (water flea) and the plant <i>Vigna radiata</i> (mung bean)?</li> </ul>	<p><b>PROCEDURE</b></p> <ul style="list-style-type: none"> <li>• <b><i>E. coli</i> and <i>S. cerevisiae</i>:</b> Soak 6-mm filter disks in increasing concentrations of silver nanoparticles, place disks on bacteria culture nutrient agar plate or yeast culture YED plate and measure diameter (mm) of the zone of inhibition of growth using the Kirby-Bauer testing method. Also, examine antibacterial and antifungal effects of different nanosilver-containing consumer products.</li> <li>• <b><i>Daphnia magna</i>:</b> Incubate 10 <i>Daphnia magna</i> (water fleas) with increasing concentrations of nanosilver in pond water and count number of live (moving/heartbeat) or dead water fleas over time under 10x magnification.</li> <li>• <b><i>Vigna radiata</i>:</b> Incubate 6 mung bean seeds in increasing concentrations of silver nanoparticles and observe seed germination and seedling formation over a six-day exposure period.</li> </ul>
<p><b>RESULTS</b></p> <ul style="list-style-type: none"> <li>• For <i>E. coli</i> and <i>S. cerevisiae</i> experiments, there was a linear relationship between nanosilver concentration and cell death. Consumer products containing nanosilver particles all showed varying degrees of antibacterial and antifungal activity.</li> <li>• There was more <i>Daphnia magna</i> death at higher nanosilver concentrations (25 µg/L) and longer nanosilver treatment/exposure times (28 hours).</li> <li>• High concentrations of silver nanoparticles (&gt;5,000 µg/L) were more detrimental to <i>Vigna radiata</i> seed germination and seedling formation.</li> </ul> 	<p><b>CONCLUSIONS</b></p> <p>The results from these experiments treating <i>E. coli</i>, <i>S. cerevisiae</i>, <i>Daphnia magna</i>, and <i>Vigna radiata</i> with increasing concentrations of silver nanoparticles <b>supported the hypothesis</b> that higher concentrations of silver nanoparticles cause more cell death because higher concentrations of nanosilver are more cytotoxic.</p> <p>In addition to confirming the antibacterial and antifungal properties of silver nanoparticles, these studies provided important information on the harmful environmental effects of silver nanoparticles on plants and aquatic organisms. Therefore, the potential negative environmental effects of silver nanoparticles should be carefully studied and weighed against their environmental impact to control hazards associated with widespread use.</p>

For State Science Day, where students who receive a Superior rating at the UC event represent our district, the event is fully online, so the only display the judges will see will be your quad board.



**Lakota LEADS**  
Lakota's Enrichment and Academic  
Development of Students

Want a free trifold to begin creating your display? E-mail us! Questions? E-mail us at [LakotaScienceFair@gmail.com](mailto:LakotaScienceFair@gmail.com)!

NEXT STEP: 8 - Writing Your Project Report