



San Antonio STEM Fair:

Science Demonstration Guide

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What is a Science Demonstration Project?

A Science Demonstration Project shows how something works in the world. These projects do not change one thing to see how it changes the results - they do not measure a specific variable. They do not design something to solve a problem. They DO ask and answer a question. Science Demonstration Projects include demonstrations, models, collections, and explanations of inventions.

Examples of Science Demonstration Projects:

- "How a Starfish Moves Model"
- "My Bug Collection"
- "Volcano Model"
- "The Solar System"
- "Lemon Battery"

Writing a Good Science Question

Now that you have picked out a topic that you like and that you are interested in, it's time to write a question. The question is the focus of your project and possibly the title on your display board. Questions that can be answered with a "yes" or "no" should be avoided!!!

To give you an idea of what we mean, you can start off by filling in the question blanks with the following list of words:

The "Type" Question:

What are the different types of _____?

Rocks

Bugs

Clouds

The "How Does: Questions:

How does a _____ work?

volcano

solar car

cloud

Doing the Research

So you've picked your category and you've chosen a topic. You even wrote a question - now it is time to research your question as much as possible. Becoming an expert at your topic is what real scientists and engineers do!

So how do you become an expert????

YOU READ!!!!

READ about your topic. READ encyclopedias. READ magazine articles and books from the library. READ articles from the internet. Take note of any new science or engineering words you learn and use them. It makes you sound more like a real scientist. Keep track of all the books and articles you read.

You will need to create a bibliography for your project board - this is a list of all the books and resources you used in your research. You can use the [Calvin Library](https://www.calvin.edu/library/knightcite/) (<https://www.calvin.edu/library/knightcite/>) site to help you create your bibliography. It is okay for young students to cite in resources in age appropriate ways, for example "I talked to a scientist/my mom/an expert..." or "I read a book that said...."

You can also talk about your project. Talk about it with your parents. Talk about it with your teachers. Talk about it with experts like Veterinarians, Doctors, Weathermen or others who work with the things you are studying. Sometimes websites will give you e-mail addresses to experts who can answer questions.... But, do not write to anyone on the internet without letting an adult supervise it.

Timeline for Complete Your Project

*This is a suggested timeline to help you pace yourself in completing your STEM Fair project. All project ideas **MUST** be submitted to the SASM STEM Fair Committee (using the Google Form) by November 4th. This is to ensure projects that require prior approval by the Central NM Regional STEM Research Challenge have time to submit the necessary paperwork.*

Project Part	Suggested Timeline
<u>Question</u> : Decide on your science question	Early October Submit your project idea to the SASM STEM Fair Committee *MUST BE SUBMITTED BY November 4th
<u>Background Research</u> : Research your topic! What have others done related to this topic? Edit your question if you need to.	Early October
<u>Research, continued</u> : Continue your research. Start thinking about how you will categorize a collection or how you will create a demonstration or model or your demonstration question.	Mid -October
<u>Create your Demonstration or Model</u> : Build your model or create your demonstration pieces. If you are sharing a collection, organize and label your collection.	Late October
<u>Improve</u> : Identify challenges with your demonstration, go back and edit if needed.	Early November
<u>Conclusion & Next Steps</u> : Review your project. Think about what makes your project matter to others and consider how you will share that with the judges.	Late November
<u>Create Final Product</u> Display your work and findings on your presentation board	Early December
<u>Drop off Presentation Board at school</u>	December 8
<u>STEM Fair Presentation</u> : Create your STEM Fair Board and practice your verbal presentation you will make to the judges	December 9

Template for Your STEM Fair Board

After you are finished your demonstration, it is time to put it all together in a STEM Fair Board. This is a visual presentation of what you did and should include your research and all the parts of your demonstration. Your poster should be easy to read, interesting and also tell the most important parts of your project to the judges. You should include photos of your process and graphs to share your data (if applicable). If you want a Google Slides template, please email the STEM Fair Committee at sasmstemfair@gmail.com. Additionally, there is a great online course, “Student Researcher Training Modules” through UNM STEM-H Learning Lab (they also put on our regional STEM Fair), which can be found here: <https://hsc.unm.edu/stem-h/programs/learning-lab/>.

Here is a brief overview of what your board should include:

Introduction	Project Title By:	
	Materials	Procedures
Background Research		Conclusion
	Pictures and Drawings of my Procedure	
References		Further Research

Preparing for Your STEM Fair Presentation

Presenting to the judges is an important part of your project. You should take some time to practice how you will talk to the judges about your STEM Fair project.

- Practice talking about your STEM Fair project ahead of time. You can practice speaking out loud to yourself in front of a mirror, to your grown up, a friend, or a sibling.
- On the day of the STEM Fair, wear nice clothes.
- Use good manners and introduce yourself to the judges.
- Don't be afraid to say "I don't know." or "I haven't thought about that yet."
- Include graphs, photos and models (if appropriate) with your STEM Fair Board. Use these to help you explain your project.
- Relax, smile and have fun! The judges are very excited to hear about your project!

Here are some questions the judges might ask you. You should think about these questions to help you prepare for your presentation.

- Where did you get this idea?
- What made you choose this project?
- What would you do differently next time?
- What was the hardest part for you?
- What research did you do for this project?
- Why are your findings important?
- Why should this project/topic matter to other people? What impact does this have on others?
- What is the most important thing you learned from this project?
- Who helped you? (This sounds like a trick question because you were supposed to do your own project - BUT no scientist or engineer works in isolation. Acknowledge your parents, teachers, friends, and anyone else that gave you advice, equipment, helped you find materials, or other help.)

Rubric

A rubric is the guidelines by which your project will be judged. As you go through your project, read the rubric to make sure that you have included all the necessary parts and judge yourself to see how well you think you would do. This is a good way to reflect on your board and presentation to see how you might improve.

SCIENCE DEMONSTRATION RUBRIC

	1 (Developing)	2 (Approaching)	3 (Meeting)	4 (Exceeding)
Demonstration Question Clearly states the what the student is demonstrating	States an incomplete or vague question or demonstration idea.	States a research question that is clear and focused but overly broad.	States a question with a clear and focused purpose that is specific enough to demonstrate depth of knowledge.	States a complete, well written question that demonstrates critical thinking skills , and represents a learning opportunity.
Design & Methodology The student explains the <u>scientific concept</u> behind their collection or demonstration. The student describes <u>what they learned</u> by doing the collection or demonstration	At least 2 of the design elements: introduction, research, materials, procedure, are not present. The remaining elements are vague or unclear. Background research is lacking AND uses opinion based sources.	One design element: introduction, research, materials, procedure is not present OR is vague or unclear. At least 3 of the 4 are complete and related to the research question. Background research is lacking OR uses opinion based sources.	All 4 design elements are present. Materials are complete and procedure is listed step by step. At least two valid sources are used for background research (these may be cited in an age appropriate way).	All 4 design elements are present. Materials and procedures are outlined in a step-by-step fashion that could be easily replicated . Background research is thorough and includes three or more valid sources (cited in an age appropriate way).

Execution The student demonstrates knowledge of a basic science OR engineering concept in relation to the steps they took or model they created.	Insufficient research or modeling. Poor or no use of photos, charts, or graphs to display research. Conclusion may not be present.	Research is present but is not complete. Data and graphs or photos are attempted for information. A model might be included, but is not fully realized. Conclusion is attempted but vague or incomplete.	Adequate data or written observations are displayed. Good use of photos, charts, or graphs. A model might be included and is a useful tool to demonstrate the concept explored. Conclusion is sound based on background research.	Substantial data or written observations collected. Outstanding use of photos, charts, or graphs to display information in a meaningful way. A model might be included and is expertly demonstrates the concept explored. Conclusion expertly interprets the background research.
Creativity Demonstrating imagination and inventiveness and/or offering different perspectives that open up new possibilities for experimentation.	Does not demonstrate creativity in any of the above 3 criteria	Demonstrates creativity in 1 of the above 3 criteria	Demonstrates creativity in 2 of the above 3 criteria.	Demonstrates creativity in all 3 of the above criteria
Presentation (Board) How readable, logical, and appealing is the board	Display board has limited eye appeal or is not easily readable. Display has limited organization, or has confusing visuals. Contains multiple spelling and grammatical errors that are not grade-appropriate.	Display board has a combination of confusing AND readable parts. Some visuals are confusing and others are helpful. A few spelling and grammatical errors that are not grade-appropriate.	Display board is appealing, neat, and readable. It is organized and clear, uses understandable visuals. Spelling and grammar are grade appropriate.	Display board is logical, neat, attractive, and creative. Makes striking use of inventive and eye catching visuals. Supporting documentation displayed. Spelling and grammar are grade-appropriate.

Presentation (Interview) How thoroughly does the presenter understand their project and can they discuss their project.	Student partially answered questions. Does not demonstrate independence in understanding the project. Poor understanding of the project and no mention of how their project impacts others.	Student can answer some questions regarding the project. Limited degree of independence in conducting the project. Cannot speak about the project beyond what is presented on the board and does not mention how their project impacts others.	Student can answer most questions. Satisfactory degree of independence in conducting the project. Able to provide some information and answer some questions that are not already represented on the board. Briefly or superficially mentions why their research is important beyond STEM Fair.	Student demonstrated clear, concise, thoughtful responses to questions. High degree of independence in conducting project. Excellent understanding of the project and quality ideas for further research. Can thoroughly answer questions that are not represented on the board as well as how their project impacts others and why the demonstration or research is meaningful.
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