

These exemplars do not necessarily address each bullet point in the grant application because the application process has recently been updated. When you write your grant, be sure that you explicitly address each bullet point listed in the application.

Grant A

Statement of Purpose—

- **Describe your goals and the overall intent of the project in terms of, but not limited to, improvement of skills, enrichment, and/or the development of concepts on the part of students.**
- **Be sure your goals include actions that are measurable.**
- **At the completion of the grant, you will need to assess your students to see if these goals have been achieved.**
- **Use at least one piece of data that provides evidence of a need at your school that you intend for the funding and implementation of this grant to address. (3 points maximum)**

I want to develop a more hands-on approach to teaching geometry. Today's students are not abstract learners; these students are kinesthetic learners. Students learn better when they have physical models to develop concepts as an active participant. I plan to use interactive notebooks and patty paper activities to address the tactile needs of students. I plan to use manipulatives which will be created using a laser cutter. Many of these manipulatives are not available commercially so I will make use of a laser cutter to produce them.

Description of Project—

- **Explain what you intend to do and how you intend to do it.**
- **If you are requesting materials, prepare a detailed listing of activities and/or topics to be addressed either in the classroom or in extracurricular projects.**
- **For each Standard and Math Practice you clicked above, explicitly describe how this project will support those ideas. (This part is new, so not explicitly reflected in this exemplar.)**
- **Citing specific research related to your project is not necessary but could strengthen your proposal.**
- **Finally, tell how long the project will take in terms of weeks or months.**
- **(5 points maximum)**

I have returned to teaching high school after 18 years teaching college. I am teaching geometry for the first time in about 30 years. I have been attempting to incorporate hands-on activities into my geometry course, and next year I plan to bring in even more activities and manipulatives. I plan a year-long approach to making geometry a more active experience for students.

My first approach is to use interactive notebooks with my geometry students. These will consist of a composition notebook (which we have on hand) where students will glue foldables, write definitions, draw diagrams, and interact with the geometry. Students will be able to highlight important information, take notes, and use their creative side to decorate the pages. These interactive notebooks will provide students with an organization system. The foldables will provide students with tactile experiences that will activate multiple areas of their brains. The more areas of the brain used in learning geometry the better students will retain the concepts.

I will utilize patty paper activities to teach geometric transformations. I will use Michael Serra's *Discovering Geometry* textbook and his associated workbook for patty paper activities. The tactile experience with patty paper will allow students to create more connections with the concept of transformations.

Another aspect to my project is to create and produce manipulatives from thin plywood and acrylic using a laser cutter. I have made connections with Lauren Siegel from Math Happens. Lauren has created many wooden models and will share her files with me. I have also connected with a group from a makerspace in St. Louis who will help me learn how to use the laser cutter.

In the mid 1990's I used a set of manipulatives called Dr. Super's Trigrams consisting of a set of 9 right triangles. This set is no longer available commercially. Lauren and I designed the set using CorelDraw and cut out 3 sets in under 30 minutes. I use Trigrams to teach similarity and introduce trigonometry relationships. With a laser cutter I will be able to cut a classroom set of trigrams. I will follow up this activity with wooden unit circles and special triangles. A laser cutter will enable me to cut a classroom set of unit circles and special triangles also. Additionally, I plan to cut classroom sets of shapes so that each student can create tessellations. I will be creating a set of quadrilaterals including a general quadrilateral, kite, and non-isosceles trapezoid. These hands-on experiences will help students to remember concepts long term.

Activities:

- Geometry Interactive Notebook Bundle: A set of geometry activities and foldables.
- Trigrams: Special 30-60-90 triangles, Similar Triangles, and Introduction to trigonometry ratios

- Unit circles with 45-45-90 triangle and 30-60-90 triangles: Use to develop the relationship between triangles and the unit circle.
- Tessellation shapes: Students will use sets of tessellation shapes to create tessellations and describe rotation and translation.
- Patty Paper activities: To teach transformations.
- Quadrilateral Family Tree: Have students create a “family tree” showing the interrelationships between special quadrilaterals.

Assessment –

- **The assessment of your project must be clearly stated and related to your goals and description (4 points maximum).**
- **Your assessment should include data that support how your project met its goals, or how it did not.**
- **Examples of assessment might include student attitude surveys and data from formative or summative assessments created by the applicant that directly address the goals of the project.**
- **For each assessment, what rate of success do you expect students to achieve so you know that your project has met its intended goals?**

I will assess student attitudes toward geometry with a pre- and post- attitude survey using a Lichert scale. I plan to assess the success of the patty paper transformation activities using a pre- and post- test covering the concepts of transformations. I also plan to have students rate how the use of interactive notebooks and manipulatives impacted their ability to understand certain geometric concepts. I will always be informally assessing the goals of this project to have anecdotal evidence to share and to use for improvements the following year.

Budget –

- **The maximum amount of the grant is \$2000.**
- **A detailed list of expenses, which may include supplementary texts, manipulatives, software, shipping or other supplies, must be provided with the application.**
- **No funds are allowed for Teachers Pay Teachers materials (or similar sites), refreshments, substitute teachers, speaking honoraria, or secretarial help.**
- **All applicants must file a financial report at the end of their grant or by July 1 of the current year. Include links to all items. (4 points maximum).**
- **You may link a google sheet of your budget below if that is easier.**

Below is a partial budget for this grant but notice how specific the applicant has been. At the end of the budget list, the total amount is always included.

- Discovering Geometry (textbook - for reference) - \$20.00

- Paper Paper Geometry by Michael Serra (Workbook) - \$15.75
- Patty Paper - 5@\$8 each - \$40.00
- Geometry Interactive Notebook Activities - \$159.25
- Colored paper (for interactive activities) - 4@\$18.00=\$72.00
- Safety Glasses - 6@\$15.00 = \$90.00

Grant B

Statement of Purpose—

- Describe your goals and the overall intent of the project in terms of, but not limited to, improvement of skills, enrichment, and/or the development of concepts on the part of students.
- Be sure your goals include actions that are measurable.
- At the completion of the grant, you will need to assess your students to see if these goals have been achieved.
- Use at least one piece of data that provides evidence of a need at your school that you intend for the funding and implementation of this grant to address. (3 points maximum)

Creating thinking spaces would give students vertical non-permanent surfaces (VNPSs) to present their thoughts and ideas in different manners than currently available. Students will relearn how to communicate through visual and verbal means in order to demonstrate their thinking. One of the most positive and profound effects from the research in “Building Thinking Classrooms in Mathematics” by Peter Liljedahl is the use of wall-mounted whiteboards when working through thinking tasks which helps promote longer thinking, more discussion on mathematics, and persistence when the tasks are hard. The project creates ten VNPSs for each classroom within the math department.

Description of Project—

- Explain what you intend to do and how you intend to do it.
- If you are requesting materials, prepare a detailed listing of activities and/or topics to be addressed either in the classroom or in extracurricular projects.

- **For each Standard and Math Practice you clicked above, explicitly describe how this project will support those ideas. (This part is new, so not explicitly reflected in this exemplar.)**
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- **Finally, tell how long the project will take in terms of weeks or months.**
- **(5 points maximum)**

Goals and objectives - Students will be able to express their thinking through visual representations and verbal expression with other students. The goal would be that when students are allowed to stand at the VNPS in groups of three their thinking times would become longer and mathematical and more persistence when the tasks are hard. The students would then transfer these characteristics over to individual work.

Specifics -In the aftermath of COVID and integration of technology into the students daily lives it has been noticed that students are unable to hold critical thinking discussions with others. This project would help create students that are able to work with others in groups of three in a manner that is prompting thinking through a process of visual representations and organized questioning. By using the surfaces it would allow the utilization of the benefits of VNPS and standing.

Benefits of Utilizing Vertical Surfaces: Students must stand. Vertical surfaces give teachers the ability to see everything that is happening in the classroom. This enhances a teacher's ability to know at all times where a group's thinking is, how far they have progressed on the task, and when and where it is necessary to provide hints and extensions. It aids teachers in their continual formative assessment and ability to provide and solicit feedback.

Benefits of Non-Permanent Surfaces: Students can quickly erase any errors which reduces the risk of trying something.

Benefits of Standing: From a physiological perspective, standing is better than sitting. Standing necessitates better posture which has been linked to improvements in mood and increased energy. From a psychological perspective, sitting at a desk is powerfully associated with direct instruction, passive learning, and non-thinking behavior. When sitting, students feel anonymous and are more likely to disengage. Standing immediately takes away the sense of anonymity and the conscious and unconscious pull away from the task at hand. When standing, students do not feel unsafe. They just do not feel safe to get off task. Cell phone usage dropped from 50% to 10% while standing. Standing allows for greater non-verbal communication (gestures, facial expressions, tone of voice, and body language). Standing also increased knowledge mobility which increased students' reliance on each other—both within and between groups—while decreasing reliance on the teacher as the only source of knowledge in the room.

The math department will be doing a book study over the summer on "Building Thinking Classrooms" which was presented in a PD session during the 2023 school year. This sparked interest in many of the practices put in place within the book. The department wants to dive a little deeper into all of the research supporting these practices and then try to implement those practices into the classrooms as much as possible. In addition to the VNPS the department will

also start to address the concept of standard-based grading and looking into how we handle this as a department.

Assessment –

- **The assessment of your project must be clearly stated and related to your goals and description (4 points maximum).**
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Teachers will be able to measure whether these tools are effective by monitoring how students work together to solve problems and the questions that students ask within the groups. When the students work together at the boards they will be placed in groups of 3. The research shows that groups of 3 work the best for high school students because it allows each person to have a role. Students would be learning how to formulate thinking questions that would then translate into their work in the spaces. Secondly, the department can look at the EOC scores of Algebra 1 students in the classrooms where critical thinking spaces are available to see if there is an improvement from the previous year to the year of implementation and then onto future years. Lastly, teachers would be surveyed for their thoughts on whether or not the critical thinking skills and questioning techniques have improved through the use of the thinking spaces.

Budget –

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Wipeboards would cost \$149.99/package of 10 from wipebook.com.

Dry erase markers are \$12.10 for a 12 pack so 4 packs would need to be purchased for a total of \$48.40.