

POWERS AND DUTIES OF THE BOARD OF EDUCATION

01.45 AP.2

Request to Place an Item on the Agenda

Name: Gindy Mathews Math Teacher, TCMS

Address: 515 W. Main St.

Telephone number: 270-265-2511

Name of school children attend, if applicable: \_\_\_\_\_

Group represented: Todd County Middle School STEM/STLP

Check if request was submitted to: ☒ Superintendent ☐ Board Chairperson

Conferred with following administrators (names): David Carmichael, principal TCMS

Description of Issue: We are using a 3D printer at TCMS that we have thanks to a grant through WKU. This is a year-long grant, and we were fortunate to have it renewed. With our students in the RTI Math classes, STLP club, and newly added STEM classes needing more "hands-on" activities, this is a natural connection to the content that our students are latching on to - however, our resources are tied to just one printer, at the moment... and it could be non-renewed at the end of this school year.

Specific Action Requested: I am asking for permission to apply for the KySTE grant to help purchase a 3D printer and supplies for our school. My proposal is attached.

Check if you are: ☐ Board Member ☒ District Employee ☐ Community Member

All requests for items to be placed on the agenda must be submitted to the Superintendent prior to the Board meeting as specified in Board Policy 01.45. Items submitted shall require prior approval of the Superintendent.

Review/Revised: 3/13/06

## KySTE 2018-2019 Outreach Application

Grants can be used for any grade level. Grants that are innovative will be given priority. Please refer to the grant scoring rubric for details. You **MUST** be a member of KySTE to apply.

Funding cannot be used for classroom equipment not directly related to the project/program, transportation, stipends, subs or paid positions. All grant funds must be expended within one year of the date of award.

This application must be completed all at one time. To download a copy of the questions, visit <http://bit.ly/kysteoutreach18-19>. If you have any questions about the grant process, email [kysteoutreach@gmail.com](mailto:kysteoutreach@gmail.com).

The maximum amount that can be requested is \$10,000.

\* Required

### 1. Email address \*

## General Application Information

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### 2. KySTE Membership Number \*

(KySTE Memberships run from July 1st - June 30th. Membership must be active for the '18-19 school year.

### 3. Primary Applicant's Name \*

(This person will be considered the contact person for the grant.)

### 4. Address (Street, City, State, Zip) \*

### 5. Phone Number \*

### 6. Email \*

**7. Position or Grade(s) Taught \*****8. Co-Applicant Name (if any)****9. Co-Applicant Address (Street, City, State, Zip)****10. Co-Applicant Phone Number****11. Co-Applicant Email****12. Co-Applicant Position or Grade(s) Taught****13. Name of School \*****14. School Phone # \*****15. School District \*****16. School Address \*****17. Please list any teachers, other than applicant (and co-applicant), who are participating in the project/program.**

(Include name and position or Grade(s) taught

**Project Application**

**18. Title of Project \*****19. One paragraph summary of the project/program \***  
(600 characters or less including spaces)**20. Address the following: What is/are the goal(s) of the project/program? Why do you think there is a need for it? How will this project impact student learning? \***  
Be as specific as possible and clearly state your expected outcomes. SMART goals are encouraged.  
(1700 characters or less including spaces)**21. Describe your program design and implementation including alignment to KySTE's mission, improving effectiveness, integrating technology in the curriculum, professional development and coordination as referenced in the KySTE Outreach Rubric. \***  
(6500 characters or less including spaces)**22. Give a time schedule of events. \***  
(700 characters or less including spaces)**23. Approximately how many students will be impacted by this project/program? \***

**24. Approximately what percentage of the student population does this represent? \***

**25. Approximately how many teachers will be impacted by this project/program? \***

**26. Approximately what percentage of the teachers will be impacted by this program/program? \***

**27. This Initiative supports the following population(s): \***

*Check all that apply.*

- ☐ Statewide
- ☐ Region
- ☐ District
- ☐ School
- ☐ Classroom

**28. Is this project scalable to include others in future years? \***

*Mark only one oval.*

- ☐ Yes
- ☐ No

**29. Will this project be ongoing, continuing to be implemented in future years? \***

*Mark only one oval.*

- ☐ Yes
- ☐ No

**30. If YES, explain your plan to continue project/program. If NO, explain why not. \***  
(600 characters or less including spaces)

**31. Describe how you will assess your project/program outcome. \***

Make sure the evaluation matches the stated goals. (600 characters or less including spaces)

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**Proposed Budget**

List in detail the amount of expenditures requested from KySTE Outreach Grants. Funding cannot be used for classroom equipment not directly related to the project/program, transportation, furniture, indirect costs, electrical wiring/drops, or stipends, subs or paid positions.

**32. Item #1 Description \***

.....

**33. Item #1 Amount \***

(Enter amount as 4500.50 not \$4,500.50)

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**34. Item #1 Justification \***

Briefly explain how it would be used. (100 characters or less including spaces)

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**35. Item #2 Description**

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**36. Item #2 Amount**

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**37. Item #2 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**38. Item #3 Description**

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**39. Item #3 Amount**

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**40. Item #3 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**41. Item #4 Description**

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**42. Item #4 Amount**

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**43. Item #4 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**44. Item #5 Description**

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**45. Item #5 Amount**

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**46. Item #5 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**47. Item #6 Description**

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**48. Item #6 Amount**

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**49. Item #6 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**50. Item #7 Description**

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**51. Item #7 Amount**

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**52. Item #7 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**53. Item #8 Description**

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**54. Item #8 Amount**

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**55. Item #8 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**56. Item #9 Description**

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**57. Item #9 Amount**

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**58. Item #9 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**59. Item #10 Description**

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**60. Item #10 Amount**

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**61. Item #10 Justification**

Briefly explain how it would be used. (100 characters or less including spaces)

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**Match/In-Kind**

You are encouraged to match the KySTE grant, either with funds from another source or with in-kind items. If you plan to provide a match, please complete the questions below as needed to describe the items, indicate whether they are matching funds or in-kind items, describe how they would be used in conjunction with your grant, what the funding source is (examples: PTA, KETS, school activity funds), and how much the item is worth.



**62. Item #1 - Match or In-Kind?***Mark only one oval.*☐ Match☐ In-Kind**63. Item #1 -Describe the item and how it would be used to support your grant.**

(100 characters or less including spaces)

**64. Item #1 - What is the funding source of this item?****65. Item #1 - What is the amount or value of this item?****66. Item #2 - Match or In-Kind?***Mark only one oval.*☐ Match☐ In-Kind**67. Item #2 -Describe the item and how it would be used to support your grant.**

(100 characters or less including spaces)

**68. Item #2 - What is the funding source of this item?****69. Item #2 - What is the amount or value of this item?****70. Item #3 - Match or In-Kind?***Mark only one oval.*☐ Match☐ In-Kind

- 71. Item #3 -Describe the item and how it would be used to support your grant.**  
(100 characters or less including spaces)

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- 72. Item #3 - What is the funding source of this item?**

.....

- 73. Item #3 - What is the amount or value of this item?**

.....

## Final Overview

- 74. What is the total amount being requested from KySTE Outreach Grants? (Can not exceed \$10,000.) \***  
(Enter amount as 4500.50 not \$4,500.50)

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- 75. What is the applicant funding commitment amount from in-kind and/or matching funds? \***  
(Enter amount as 4500.50 not \$4,500.50)

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- 76. What is the total cost of the project/program (amount requested + applicant funding commitment)? \***  
(Enter amount as 4500.50 not \$4,500.50)

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- 77. We MUST have a one to two sentence summation of the grant. This information will be used for publicity and for reporting. \***  
(350 characters or less including spaces)

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**78. If your project is awarded, would you be willing to create a 1-2 minute video to highlight your project once implemented. This video could be used for promotion at the KySTE conference, on the KySTE website and through social media. \***

*Mark only one oval.*

- ☐ Yes
- ☐ No
- ☐ Maybe

## Submission

**79. I certify that submission of this application constitutes approval by the Superintendent or Finance Officer of my district. Please type his/her name below as an electronic signature. \***

**80. What is the job title of the person listed above? \***

*Mark only one oval.*

- ☐ Superintendent
- ☐ Finance Officer
- ☐ Other:

A copy of your responses will be emailed to the address you provided

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Kentucky Outreach Rubric			
Criteria	Distinguished (10-8)	Proficient (7-6)	Novice (3-0)
Alignment to KYSTE's mission	Project supports all 3 of the following aspects of KYSTE's mission: (1) infuse technology as an integral part of the educational process, (2) promoting educational excellence, and (3)	Project supports 2 of the following aspects of KYSTE's mission: (1) infuse technology as an integral part of the educational process, (2) promoting educational excellence, and (3) technology-based innovation.	Project supports 1 of the following aspects of KYSTE's mission: (1) infuse technology as an integral part of the educational process, (2) promoting educational excellence, and (3) technology-based innovation.
Improving Effectiveness	All instructional strategies are described in detail and they are likely to promote educational effectiveness.	One or more strategies are described in detail and they are likely to promote educational effectiveness.	None of the strategies are described in sufficient detail or they are not likely to promote educational effectiveness.
Integration of Technology with Curriculum and Instruction	All or most instructional strategies are likely to effectively integrate technology into curricula and instruction. The plan describes how the applicant will provide ongoing, sustained professional development to further the effective use of technology. Professional development is aligned with state standards.	Some instructional strategies are likely to effectively integrate technology into curricula and instruction. The plan describes how the applicant will provide ongoing, sustained professional development aligned with state standards, assessment, and the local curriculum. The professional development shows no	The strategies are not likely to effectively integrate technology into curricula and instruction, or there isn't sufficient detail to determine if they would. The plan does not describe how the applicant will provide ongoing, sustained professional development.
Professional Development	The plan describes how the project will coordinate activities funded through the grant with related projects supported from other sources.	Few sources for coordinated activities shown to correlate with the grant funds.	The plan does not describe how the project will coordinate activities funded through the grant with related projects supported from other sources.
Coordination			
Timeline	There is a detailed timeline focused on when key instructional activities will be implemented.	The timeline is not sufficiently detailed or there is not enough information about when instructional activities will be implemented.	If a timeline is provided, it is not detailed enough and there is insufficient information about when instructional activities will be implemented.
Program Evaluation - Tools	Multiple qualitative and quantitative evaluation tools are used and they are appropriately matched to project goals. The tools would clearly measure whether the project is successful.	Evaluation tools are (1) only qualitative or quantitative, or (2) are not all appropriately matched to project goals, or (3) would not clearly measure whether the project is successful.	Evaluation tools consist primarily of counts or checklists, are not matched to project goals, and would not clearly measure whether the project is successful.
Program Evaluation - Achievement	Evaluation would clearly measure whether student achievement occurs and whether technology integration seems to have enabled higher achievement.	Evaluation would not clearly measure whether student achievement occurs OR it would be unclear what role technology may have played in achievement.	Evaluation would not clearly measure whether student achievement occurs AND it would be unclear what role technology may have played in achievement.
Program Evaluation - Project Sustainability	The proposed project is sustainable and/or has a long term effect without grant funds.	Some portions of the proposed project may be sustainable and/or have a long term effect.	The application is not sustainable and would not have a long term effect.
IMPACT 10%			
Impact of program	Application supports a state-wide K-12 initiative	Application supports a regional K-12 initiative	Application supports a school or district K-12 initiative
Financial Commitment/ Match	Substantial matching funds or in-kind match are committed and it is clear what they are for and how they would support the project.	Some matching funds or in-kind match are committed but it is not clear what they are for or how they would support the project.	The application shows little or no evidence of matching funds or in-kind match.
Budget 10%			
Use of Funds	The budget is very detailed and all items are justified.	The budget is somewhat detailed and all items are justified.	The budget lacks detail. There is insufficient justification for some or all items. There are items that are not allowed by grant guidelines.

\*\* Grant amount maximums will be published each grant session.  
Grants must receive a minimum score.

## KySTE 2018-19 Outreach Application

By: Cindy Matthews

**\*\*Form is to be completed online only**

1. [cindy.matthews@todd.kyschools.us](mailto:cindy.matthews@todd.kyschools.us)
2. Member number: 441494036
3. Cindy Matthews
4. 1594 Lost City Rd Russellville, KY 42276
5. 270-847-5459
6. [cindy.matthews@todd.kyschools.us](mailto:cindy.matthews@todd.kyschools.us)
7. 6<sup>th</sup> – 8<sup>th</sup> grade Math
8. (Co-Applicant Info) None
9. None
10. None
11. None
12. None
13. Todd County Middle School
14. 270-265-2511
15. Todd County School District
16. 515 W. Main St. Elkton, KY 42220
17. Amy Porter, 6<sup>th</sup> – 8<sup>th</sup> grade STEM
18. Applying Middle School Math and STEM Concepts through 3D Printing
19. (600 Characters) Students in RTI Math and STEM classes will use Fusion Software to create original works with specific parameters depending on the assigned project. Projects that meet the minimum criteria will be printed using a 3D printer. Students will complete a minimum of 2 projects per year. Students may keep their projects. The STLP club will develop original works of art to sell to the community to raise funds for the different plastics and/or supplies. Besides financial support for the technology committee, the STLP will present their work at the STLP Regional Showcase.
20. (1700 Characters) I notice two things when working with middle school level students. First, students have difficulty making connections to math content standards. Research suggest that students demonstrate motivation to learn math when they see a connection to real life applications. A curriculum program that includes 3D printing will open multiple levels of math discussion between teacher and students as they attempt to bring their designs to life. In addition, projects in 3D allow for engineering applications as students analyze and critique their own designs.  
  
Second, middle school students are not academically proficient in the use of technology. The academic setting has a different set of skills required for success than the entertainment setting. Students need to be prepared to take online, dual credit/college level classes or even enter a job that requires computer skills. A project based in 3D technology will assist student in applying their mathematical skills while giving students access to digital tools.  
  
As a bonus, 3D printing may be used to develop artistic skills and demonstrate scientific concepts. Therefore, the 3D program has many applications for the school besides just the RTI Math or STEM classrooms. Success of the 3D project may be determined in two ways. By the

end of the 2018-19 school year, at least 85% of RTI math and STEM students will become proficient using a computer aided drawing software system. Evidence of this goal includes student work, a teacher made rubric, lesson plans and classroom observations. In addition, all students will make real world connections to mathematical content as evidence by growth on the STAR Math Assessment.

21. (6500 Characters) Our 3D program at the middle school started in the 2017-18 school year made available to us by a research grant through Western Kentucky University. Dr. Symanski gave Todd County Middle School access to a 3D printer, supplies and professional development necessary to implement the technology into the classroom. Our technology department was very efficient at getting the software loaded onto the computers. We had sufficient technology available for the project. Throughout the year, Dr. Symanski worked closely with us to answer questions we may have had along the way. The research grant requires that multiple schools in the region participate in the research. Therefore, use of the 3D printer is temporary for Todd County Middle School. Yet, Todd County Middle School has seen an enormous positive response to the implementation of this technology. I would like for the program to be a sustainable and integral part of the curriculum for RTI Math and STEM courses. My desire is for students to want and expect technology instruction at the middle school level. In the RTI Math class, students used and will continue to use technology at least one day per week to complete projects throughout the year. Typically, students took 6 weeks to complete a project. Since many students reach the RTI classroom feeling depressed about their math abilities, the program stresses a positive connection to math. The STEM course is new for Todd County Middle School this year. As a result, the curriculum is still being established. Therefore, this is the best time to implement the 3D program. In the STEM course, 3D printing will be used as a series of units. Students will work with technology every day for 2-3 weeks at a time. Each project will have different topics and criteria for success. Students will be required to know computer skills, technical language pertinent to the software, and content with applicable standards. The program will also require a regular source of funding throughout the years for plastic and repairs. The STLP club will create original works of art to sell to the community. Funds will be used to purchase needed supplies and the community will get an opportunity to see the program in action. In addition, the STLP club will present their work at the regional showcase. Last year, Todd County was the only 3D printing project to pass our Regional Showcase and move to the STATE level of competition. Our students wish to continue this success. In each area of the program, the instructional strategy is use project based learning. Students are working together in groups and working in connection with the teacher. Middle school students are forming positive relationships with others. Relationships are paramount for building our school culture. Ultimately, middle school students will not learn from people they do not trust. In order for students to improve in their academic learning, in any content area, students must respect their authority figures. Without a foundation of mutual respect, students will be less likely to value academic content presented by their teachers and therefore, dismiss academic learning as unnecessary. A barrier raises between the students and teachers that very few instructional strategies are likely to tear down. 3D printing projects can allow students and teachers to learn together. The teacher will get students started on basic steps, but students can create their masterpiece.

I was fortunate to have Dr. Symanski instruct me on the use of Fusion software and on the 3D printer (same one I wish to use for the program). Throughout the year, I gained additional experience through implementing her research grant. As I move forward with establishing this program, Dr. Symanski has offered professional development services. My experiences last year has also taught me where to look for online technical assistance. As a result, I am willing to share that knowledge with others. I am prepared to train other teachers in my building and district on the use of the Fusion software and the 3D printer. Naturally, I would take a leadership role in the professional development of the learning community. For example, in preparation for this program, I met with the STEM teacher to show her some of the core concepts to the software and 3D printer. During this time, we also planned out how instruction would be implemented in her classroom. As we progress through the year, I will assist the STEM teacher with how to collect and analyze data for our SMART goal. The STEM teacher has not implemented STAR assessments before. Therefore, we will also discuss STAR testing in the learning community. I will attempt to demonstrate to other teachers how the 3D printer can enrich their instruction. As other teachers are interested in the program, I will add them to the learning community. As teachers implement the program, I would be a practical resource for various problems such as technical issues or classroom management.

This past summer, I had the privilege of working with elementary school students from a different district (Bowling Green Schools) in a Math Camp. I implemented a similar 3D program with a few variations. First, the camp was only 2 weeks in length. Second, I used a different software program, TinkerCad, because it was more age appropriate for students. Students were able to product 2 small projects. At the beginning of each lesson, I had a 5 minute, connection to math content "mini-lesson". As students finished with their projects and waited for them to print, students would work with hands on activities and worksheets that related to the math content skills. I used the 3D that Dr. Symanski allowed us to use at Todd County. However, access to that printer is not guaranteed since it needs to circulate to other districts and schools. I am hopeful that I will be able to participate in the Bowling Green Math Camp again this coming summer and be able to bring the resources that I have gained this year.

## 22. (700 Characters)

### **2018**

**August** – STAR test math students.

**September** – STLP fundraiser approved. Students fill orders thru April.

**September – December** – RTI and STEM students complete 1<sup>st</sup> project. Print projects with Dr. Symanski's printer.

**December** – STLP presents at Regional Showcase.

### **2019**

**January – March** – RTI and STEM students complete 2<sup>nd</sup> project.

**March 6-8, Spring Conference** – required presentation ready to present.

**March** – purchase 3D printer, supplies for TCMS! Setup/test printer.

**April** – Dr. Symanski's printer given back to WKU. STAR test Math students.

**May** – analyze data. Discuss changes for implementation.

**August** - Purchase spools of plastic. Submit fundraiser request.

**October** – complete survey.

23. 180 students
24. 40%
25. 2
26. 7% - initially, with the hope that more teachers will include lessons on 3D printing in their instruction as project demonstrates sustainability
27. (supports) School – eventually, I would like to be able to recommend students to a new high school computer assisted drawing career pathway such as AutoCAD or SolidWorks. Graduating students could be certified in one of these programs.
28. (scalable) Yes
29. (future years) Yes
30. (600 Characters) The STEM course is new for TCMS, so the program can easily be incorporated. RTI Math classes began a “trial run” of this project in 18-19 through the use of loaned equipment. Students are eager to implement it again this year. I would provide professional development to teachers, who wish to include the program in their instruction. Classes will be able to continue the program as long as there is money available for plastics and repairs. Last year, the STLP held a “trial run” for the fundraiser project. This year, the goal is to reach \$500. Estimated cost, after start up, is \$400.
31. (600 Characters) Teachers will keep a spreadsheet of all projects completed by students. At the end of the year, this spreadsheet will be analyzed to see if at least 85% of students completed 2 or more projects to proficiency. Teachers will submit pictures of multiple levels of student work. Teacher will create and use a teacher made rubric for analyzing projects. Teachers will submit lesson plans of program activities. Teachers will record, with permission, students participating effectively in the program. Lastly, students will be analyzed for growth based on the August and April STAR assessments.
32. Ultimaker 3D Extended
33. 5000.00
34. (100 Characters) This item is the actual 3D printer. It will run using a free software program.
35. Print Cores
36. 250.00
37. (100 Characters) This item allows for filament control on complex objects. Print cores are different sizes and are interchangeable in pairs only. I am asking for only 1 additional set of print cores. Item 32 will provide 1 set of print cores.
38. Maintenance Kit
39. 250.00
40. (100 Characters) This item gives the user all equipment necessary for regular maintenance on the printer.
41. Glass Plates
42. 100.00
43. (100 Characters) This item gives the plastic something to “stick to” and is necessary for correct functioning. I would like to order two glass plates. I noticed that I could be more efficient in printing if I had one plate on a current job while I was working with a previous print job (removing print, cleaning off the plate of used material, etc.).
44. This is a section for additional requested items.
45. This is a section for additional requested items.



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61. This is a section for additional requested items.
62. In-Kind
63. (100 Character) This item is PLA colored plastic material and is consumable.
64. Todd County Middle School
65. 1000.00
66. In-Kind
67. This item is PVA support plastic material and is consumable.
68. Todd County Middle School
69. 1000.00
70. Match
71. Todd County Middle School STLP club
72. This item is money raised from STLP club fundraiser and is designated for consumable items.
73. 400.00 – Students will raise additional money each year for consumable items.
74. 5600.00
75. 2400.00
76. (total cost) 8000.00
77. (350 Characters) This project uses the 3D printer to provide motivation and application to middle school mathematics. This project encourages STEM connections at a technology level that middle school students can appreciate.
78. (Willing to create video?) Yes
79. (Superintendent or Finance Officer signature)
80. (Job title of person above)