

Budget

Olentangy Local (046763) - Delaware County - 2014 - Straight A Fund - Rev 0 - Straight A Fund - Application Number (419)

U.S.A.S. Fund #:

Plus/Minus Sheet (opens new window)

Purpose Code	Object Code	Salaries 100	Retirement Fringe Benefits 200	Purchased Services 400	Supplies 500	Capital Outlay 600	Other 800	Total
Instruction		0.00	0.00	0.00	0.00	211,387.00	0.00	211,387.00
Support Services		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Governance/Admin		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prof Development		0.00	0.00	100,000.00	0.00	0.00	0.00	100,000.00
Family/Community		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safety		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Facilities		2,560.00	0.00	5,000.00	0.00	399,700.00	0.00	407,260.00
Transportation		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		2,560.00	0.00	105,000.00	0.00	611,087.00	0.00	718,647.00
Adjusted Allocation								0.00
Remaining								-718,647.00

Application

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Applicants shall respond to the prompts or questions in the areas listed below in a narrative form.

A) APPLICANT INFORMATION - General Information, Experience and Capacity

1. Project Title:Olentangy STEM Center and Fab Lab

2.Executive summary: Provide an executive summary of your project proposal and which goal(s) in question 9 you seek to achieve. Please limit your responses to no more than three sentences.

The proposed Olentangy STEM Center and Fab Lab will provide a site where area students and community members can collaborate to solve relevant academic, local and global problems; design solutions to problems and make innovative products; and participate in the sharing of knowledge and learning with post-secondary and professional mentors in STEM fields. The reconfiguration of existing spaces and retraining of currently employed teachers in STEM areas will lead to significant cost savings for Olentangy Local Schools in the near term, and the re-imagination and redeployment of existing infrastructure and resources will more efficiently and effectively support classroom learning for years to come. Most importantly, the Olentangy STEM Center and Fab Lab will be a resource for learners - and teachers - to develop the 21st century skills of critical thinking, communication, collaboration, and creativity that will accelerate achievement and college and career readiness now, and will prepare the thinkers and doers of the future.

1150 3. Total Students Impacted:

4. Lead applicant primary contact: - Provide the following information:

First Name, last Name of contact for lead applicant: Jack Fette

Organizational name of lead applicant: Olentangy Local Schools

Unique Identifier (IRN/Fed Tax ID): 046763

Address of lead applicant: 814 Shanahan Road, Lewis Center, Ohio 43035

Phone Number of lead applicant: (740) 657-4013

Email Address of lead applicant: jack_fette@olsd.us

5. Secondary applicant contact: - Provide the following information, if applicable:

First Name, last Name of contact for secondary applicant: Josh McDaniels

Organizational name of secondary applicant: Olentangy Shanahan Middle School

Unique Identifier (IRN/Fed Tax ID): 043281

Address of secondary applicant: 814 Shanahan Road, Lewis Center, Ohio 43035

Phone number of secondary applicant: (740) 657-4300

Email address of secondary applicant: josh_mcdaniels@olsd.us

6. List all other participating entities by name: Provide the following information for each additional participating entity, if applicable: Mention First Name, Last Name, Organizational Name, Unique Identifier (IRN/Fed Tax ID), Address, Phone Number, Email Address of Contact for All Secondary Applicants in the box below.

None.

7. Partnership and consortia agreements and letters of support: - (Click on the link below to upload necessary documents).

* Letters of support are for districts in academic or fiscal distress only. If school or district is in academic or fiscal distress and has a commission assigned, please include a resolution from the commission in support of the project.

* If a partnership or consortium will be established, please include the signed Straight A Description of Nature of Partnership or Description of Nature of Consortium Agreement.

[UploadGrantApplicationAttachment.aspx](#)

8. Please provide a brief description of the team or individuals responsible for the implementation of this project including relevant experience in other innovative projects. You should also include descriptions and experiences of partnering entities.

The core team leading the Olentangy STEM Center and Fab Lab initiative is: Curriculum Director, OLSL, Jack Fette - As curriculum leader for a district that includes 23 schools and more than 18,000 students, Mr. Fette directs efforts to develop and implement flexible post-secondary enrollment options for students. He oversees innovative learning programs at every level in K-12, and develops the district's strategic plan based on the needs of the 21st century learning landscape of Delaware County and surrounding areas. Instructional Technology Supervisor, OLSL, Jessica Fields - Mrs. Fields connects teachers and other instructional leaders with technical and pedagogical experts to support the use of technology in classroom instruction. She manages the integration of all systems that support learning in OLSL classrooms. Director of Secondary Curriculum, OLSL, Vince DeTillio - Mr. DeTillio brings extensive experience as an instructional leader and coach of inquiry-based teaching and curriculum development to Olentangy. He is responsible for curriculum and instruction in OLSL's middle and high schools, and will directly support the development of STEM instructional programming. Director of Business Management, OLSL, Jeff Gordon - Among his duties, Mr. Gordon manages the creation of learning spaces and all construction projects in the district. Principal of Olentangy Shanahan Middle School, Josh McDaniels - Mr. McDaniels has been in a leadership role at Shanahan for seven years, three as principal. He oversees a variety of innovative programs, including a flipped classroom model in its second year of implementation in 6th grade math; blended learning initiatives in 6th, 7th and 8th grade core academic subjects; an award-winning cross-curricular greenhouse and wellness program; and a project-based learning pilot funded by TRECA involving a 7th grade teaching team with 100+ students. Under Mr. McDaniels' leadership, Shanahan earned an "A" on the recently published state report card. STEM program director, Judy Jones: Mrs. Jones is the gifted services coordinator at Shanahan. She develops programs - curricular and extracurricular - that help middle school students identify and develop individual talents. Prior to her career in education, she was a national team leader for Steelcase Inc. and is experienced in guiding transformational organizational change in private industry and in K-8 educational settings. School counselor, Trevor Glew: Mr. Glew gained experience in data collection and representation in a variety of education research projects while a research assistant at Ohio University. In his role as school counselor, he works with students and families to match aptitudes and interests with curricular options, and is proficient in progress measure reporting for teachers and administrators.

B) PROJECT DESCRIPTION - Overall description of project and alignment with Outcomes

9. Which of the stated Straight A Fund goals does the proposal aim to achieve? - (Check all that apply)

- Student achievement
- Spending reductions in the five-year fiscal forecast
- Utilization of a greater share of resources in the classroom

10. Which of the following best describes the proposed project? - (Select one:)

- New - never before implemented
- Existing and researched-based - never implemented in your district or community school but proven successful in other educational environments
- Mixed Concept - incorporates new and existing elements
- Enhancing/Scale Up - elevating or expanding an effective program that is already implemented in your district, school, or consortia partnership

11. Describe the innovative project.

The problem: While Olentangy Local Schools' students achieve proficiency in many areas of science and math as measured by standardized tests (OAA, OGT, ACT QualityCore), the number of students achieving College and Career Readiness benchmarks in these areas is below expectations. (see fig.2) This proposal is designed to address this skill and knowledge deficit to improve and accelerate the achievement of our students in grades 7-12 in STEM areas, and by extension increase the number of our high school graduates who select college majors in STEM fields. To affect these changes, we present two integrated components: The first part is a funding request to establish and outfit a digital fabrication lab, or Fab Lab, based on the Massachusetts Institute of Technology's concept, design and specifications. The second part of this proposal is a request for funding to retrofit and furnish an existing and relatively unused area in Olentangy Shanahan Middle School to support learning spaces for the 2014 roll-out of the Olentangy STEM Center. The Fab Lab will provide Olentangy students and teachers - along with K-12 students from other districts, specialized programs, and post-secondary institutions

- with the opportunity to use state-of-the-art "maker space" technology and machines to test theories, make prototypes, and use an engineering design process in inquiry-based and problem-based learning frameworks. The Fab Lab will be the centerpiece of Olentangy Local Schools' first science, technology, engineering, and math focused program. The Lab will be situated at Shanahan Middle School, in the heart of the district, in Lewis Center. Tentatively called the Olentangy STEM Center and Fab Lab, this "school-within-a-school" will offer a STEM-focused curriculum delivered through project- and problem-based teaching models. The Olentangy STEM Center and Fab Lab will serve 100+ of Shanahan's 8th graders in the 2014-2015 school year with extension into 7th grade and possibly a district-wide lottery admission process in the 2015-2016 school year to accommodate more students. The retrofit of Shanahan's existing east cafeteria space and two classrooms (see fig. 5) will allow for considerable growth in student access to STEM programming within the footprint of our existing school building.

12. Describe how it will meet the goal(s) selected above. - If school/district receives school improvement funds/support, include a brief explanation of how this project will advance the improvement plan.

The Olentangy Local School District does not receive school improvement funds. The goals of the Straight A Fund align closely with Olentangy Local Schools' own academic, operational, and financial objectives that have been established to guide our activities for the next five years. Student achievement will increase the number of students who are accelerated or advanced in STEM curricular areas, using state and standardized testing as a measure of progress when appropriate, and performance-based assessments as they are developed. Another important measure of student growth in the STEM areas will be annual monitoring of student performance as compared to ACT's College and Career Readiness benchmarks (see fig. 2). Measurable increases in achievement will be accomplished by expanding opportunities for students to learn from STEM professionals while working side-by-side on genuine problems that emerge naturally from inquiry in the disciplines. A significant upgrade of lab facilities and inquiry-based professional development for STEM teachers are other key components to accelerated growth in achievement measures. Another important measure of success will be an increase in the number of OLSD's graduating seniors who commit to STEM majors in college. Spending reductions in the five-year fiscal forecast is the district and its stakeholders' stated goal to reduce or maintain current spending on "brick and mortar" and self-limiting solutions to our continuing increases in student enrollment. Olentangy has been Ohio's fastest growing district for more than a decade and the trends indicate nearly 5,000 students will be served in the five middle schools alone by 2018. Shanahan Middle School is projected to jump to 1,200 students next year. Carving out new classrooms and furnishing them will be a necessity, so this grant provides an opportunity for the district to transform the planned traditional classrooms to a 21st century innovative learning center. The cost of retrofitting the school's original cafeteria and study hall room will be a direct savings on the five-year forecast, along with the furnishings involved. In addition, the cost of rental space will be a significant savings as the district's alternative high school program relocation can be avoided. Utilization of a greater share of resources in the classroom. The redesign and retrofit of existing areas in Olentangy Shanahan Middle School that are not currently used as learning spaces would - itself alone - redistribute a greater share of district resources to the classroom if the construction or purchase of a new building can be avoided by making the most of current facilities. The task before us to strategically reallocate space, funding, and staff to meet the demands of more students is daunting. To meet these imperatives through child-centered, best-practice infused learning environments is the complex challenge we address in this proposal. The ratio of one student to one desk is no longer the model that supports optimal learning in all subject areas. Changes in instructional practice must keep pace with upgrades to space and equipment. The cost of retraining and offering professional development in STEM areas to current (and proven) teachers eliminates funds, time and administrative resources devoted to hiring new teachers with a new skill set. But the economic impact affects students and families beyond the Olentangy district. Our broader regional goal is to contribute to the educational "infrastructure" of this area by sharing resources, such as the Fab Lab and Olentangy STEM Center, with nearby school districts, educational institutions that are post-secondary and that serve unique populations, and universities. The Fab Lab would be a costly but abundantly useful resource for Kindergarten through college teachers and students throughout the north-central region of Ohio.

C) SUSTAINABILITY - Planning for ongoing funding of the project, cost breakdown

13. Financial Documentation - All applicants must enter or upload the following supporting information. Responses should refer to specific information in the financial documents when applicable:

a. Enter a project budget

b. Upload the Straight A Financial Impact Template forecasting the expected changes to the five-year forecast resulting from implementation of this project. If applying as a consortia or partnership, please include the five-year forecasts of each school district, community school or STEM school member for review.

c. If subsection (b) is not applicable, please explain why, in addition to how the project will demonstrate sustainability and impact.

N/A

14. What is the total cost for implementing the innovative project?

718,647.00 * Total project cost

* Provide a brief narrative explanation of the overall budget. The narrative should include the source and amount of other funds that may be used to support this concept (e.g., Title I funding, RttT money, local funding, foundation support, etc.), and provide details on the cost of items included in the budget (i.e. staff counts and salary/benefits, equipment to be purchased and cost, etc.).

Line item #1: \$158,901. Procurement costs for Fab Lab equipment and professional development for Fab Lab gurus. Price quotes are provided by Teaching Fab Team Project Support | TIES Teaching Institute for Excellence in STEM, the organization that provides support for schools that incorporate MIT's Fab Lab into their facility and culture. Orders for Lab equipment will be placed with assistance from TIES along with installation and other start-up, maintenance and training during the first year of the program. The costs quoted include equipment for the Fab Lab and materials for approximately one year of typical use; also shipping, installation, and technical training. While existing Olentangy teachers will be Fab Lab gurus, the cost of training five individuals to share this responsibility, at \$3,750 each, is \$18,750. These OLSD teachers will be experienced in technology and STEM education fields and will allow for flexibility in covering the Lab during after-school and summer hours to accommodate community groups and collaboration and training with teachers. (Costs outlined in TIES proposal of October 21, 2013). Line item #2: \$100,000. In addition to Fab Lab training, TIES will provide "wrap-around" services to support the development of integrated STEM curricula and will facilitate the process that will move Shanahan from the "Current School landscape" to STEM Transformation School described below (see fig. 4) through professional development and consultation during year one of the grant. Because the combination of science and engineering training is uncommon in the experience of middle school technology teachers, the five-month, part-time training with Fab Ed to develop competent and effective gurus who can facilitate many students through the lab and the engineering design process will be extended to teachers, also. Line item #3: \$399,700. The estimated costs to retrofit Shanahan's existing east cafeteria space and kitchen area to create learning spaces for the Olentangy STEM Center and Fab Lab were compiled by Bruce T. Runyon, AIA, LEED AP and Executive Director/Principal of Fanning Howey Architects (see fig.5). The space is currently used for study halls during the school day and athletic activities after school. The old kitchen space (marked "Fab Lab" on the plan) is now a storage space and will cost approximately \$155,000 to convert into a space to accommodate the Fab Lab. Details of Mr. Runyon's plan (of Oct. 18, 2013) are available, but can be generally described to include the installation of flexible walls, a lowered ceiling, energy-saving lighting, carpeting, and noise-reducing wall tiles. In the two STEM classroom spaces on the left side of the drawing, what is currently one large classroom will be re-purposed into two, each with a SmartBoard and projector (no other technology is included in this line item). The estimated cost to turn these two areas into four flexible learning spaces/classrooms is \$244,700. Line item #4: \$23,812. Furnishings for Olentangy STEM Center and Fab Lab. Prices quoted on items are from Olentangy's furniture suppliers and Steelcase Inc. Furnishings will accommodate 130+ students and five teachers in addition to small meeting spaces. Line item #5: \$7,560. Custodial staff (@ \$40 per hour) and operational costs on weekends (electricity, water, heating, and cooling) are based on estimates of these costs based on last summer's utility expenditures and union guidelines that dictate salaries for custodians. Line items #6 and #7: \$24,076. Two Chrome laptop carts (30 laptops each) and four teacher laptops and \$3,900 for three Mimeo and projector combinations. The costs of the Chrome laptops and Mimeo/Projector combinations (one for the Fab Lab; two each in Flex spaces A and B) is based on Shanahan's purchase of these items in September of 2013. Two charging stations that can be used with a variety of devices will be an additional \$300. Two ceiling mount brackets total \$39

15. What new/recurring costs of your innovative project will continue once the grant has expired? If there are no new/recurring costs, please explain why.

0.00 * Specific amount of new/recurring cost (annual cost after project is implemented)

* Narrative explanation/rationale: Provide details on the cost of items included in the budget (i.e. staff counts and salary/benefits, equipment to be purchased and cost, etc.). If there are no new/recurring costs, please explain why.

This proposal for the Olentangy STEM Center and Fab Lab is intentionally designed to assure long-term financial sustainability through minimal expenditures beyond the first year of the grant. The major expenditures of year one are the purchase of Fab Lab equipment, construction costs to retrofit the space, the cost of furnishings suitable for flexible learning spaces and support from Teaching Fab Team Project Support | TIES Teaching Institute for Excellence in STE. It is the district's intention to submit a Straight A Fund grant proposal for the 2015-2016 school year to elaborate on possible extensions of the program both intra-district and in inter-district partnerships. Line item #5 (see fig.3) is the one anticipated recurring cost beyond year one of the Straight A Fund grant. The building costs of heating, cooling, water, electricity and custodial assistance will be commensurate with user fees charged to the non-Olentangy Local Schools entities that use the Fab Lab during after-school hours and on weekends. The Olentangy Local School Board dictates the usage fees of district facilities. Because the Fab Lab will be a new addition with unique usage, upon award of this grant discussions with the Board will commence to agree on a formula that will mitigate these operational costs. Despite the fact that expensive technical equipment is an important part of this project, product warranties are expected to cover breakdowns or maintenance beyond year one. This is why TIES program support and training of the Fab Lab gurus - and by extension of everyone who uses the Lab - is so essential to ensure proper use and maintenance of the equipment.

16. Are there expected savings that may result from the implementation of the innovative project?

258,512.00 * Specific amount of expected savings (annual)

* Narrative explanation/rationale: Provide details on the anticipated savings (i.e. staff counts and salary/benefits, equipment to be purchased and cost, etc.).

Renovation of the existing area within Shanahan to outfit learning spaces for more than 100 students in the STEM center would prevent the necessity for relocation of Olentangy's alternative high school program, OASIS, to a new - and as yet unsecured - leased space elsewhere in Delaware County. The STEM center is currently planned to take over the OASIS building next summer in time for the 2014 roll-out of the program (OASIS is located in a structure on Shanahan property). In addition, Shanahan anticipates increased enrollment from 1,038 (currently) to nearly 1,200 next year. That increase will create a need for at least four additional classrooms that will be built out from the same space that is redesigned as the Olentangy STEM Center in this proposal (see fig. 6). With the award of this grant, the cost of constructing traditional classroom spaces will be saved, equaling \$234,700. Finally, the expense of furnishings to accommodate the influx of new students at Shanahan Middle School will be saved (\$23,812) with the award of this grant. With this award, the total savings in Olentangy's 5-year forecast will equal \$258,512. This significant savings will be earmarked to provide additional 21st century learning environments in existing traditional classrooms, including but not limited to instructional materials, technology, professional development of teachers and lab equipment for STEM curricular areas.

17. Provide a brief explanation of how the project is self-sustaining. If there are ongoing costs associated with the project after the term of the grant, this explanation should provide details on the cost reductions that will be made that are at least equal to the amount of new/recurring costs detailed above. If there are no new/recurring costs, explain in detail how this project will sustain itself beyond the life of the grant.

The Olentangy STEM Center and Fab Lab proposal is a self-sustaining project beyond year 1 of the Straight A Fund grant award. There are two factors that ensure this aspect of our proposal. They are:

Olentangy's leadership planned to roll-out the STEM program within projected staffing levels and cost increases relative to an anticipated increase in student enrollment - despite the lack of additional funds budgeted to support it. In other words, the Olentangy STEM Center plans have been in process for the past year - with the exception of the Fab Lab which substantially increases the impact of STEM in the district and the surrounding area. Award of the grant would allow the district to greatly enhance the STEM program. All costs (see fig. 3) for the project will be incurred during year 1. Beyond the heavily weighted first year of construction, installation and implementation, the 21st century learning spaces and digital fabrication lab will belong to the students and citizens of our district. It will not be necessary to contract more support from beyond the district to support the auditing or expansion of this project, due to the high-quality professional development available from MIT's sub-contracted entities (Fab Ed and the Fab Foundation) and other front-loaded services detailed in the project budget in fig. 3.

D) IMPLEMENTATION - Timeline, communication and contingency planning

18. Fill in the appropriate dates and an explanation of the timeline for the successful implementation of this project. In each explanation, be sure to briefly describe the largest barriers that could derail your concept or timeline for implementation and your plan to proactively mitigate such barriers. In addition, the narrative should list the stakeholders that will be engaged during that stage of the project and describe the communication that occurred as the application was developed.

Describe the ongoing communication plan with the stakeholders as the project is implemented. (Stakeholders can include parents, community leaders, foundation support and businesses, as well as educational personnel in the affected entities.)

* Proposal Timeline Dates

Plan (MM/DD/YYYY): See figure 6 in attachment.

* Narrative explanation

See figure 6 in attachment.

Implement (MM/DD/YYYY): N/A

* Narrative explanation

N/A

Summative evaluation (MM/DD/YYYY): N/A

* Narrative explanation

N/A

19. Describe the expected changes to the instructional and/or organizational practices in your institution.

The Olentangy Local Schools has been Ohio's fastest growing school district for the past decade. During this period of remarkable growth, resources have been dedicated to building instructional programs that focus on student achievement, and on the construction of traditional school buildings to house nearly 1,000 new students a year. In this project we reach a critical mass of shared understanding and commitment to evaluate current practices and transform them to ready our students for the new realities of college preparation and the workplace. STEM programming will increase students' engagement with learning through inquiry and relevant problem-based methods; to forge a new sense of community by establishing cooperative relationships with STEM and faculty in post-secondary institutions; and at Shanahan, to focus on better preparation of students for high school, college, the digital world and the workplace. This innovative practice must be grounded within the framework of the deeper learning necessary to address Common Core State Standards and to meet ACT's College and Career Readiness benchmarks. While Olentangy students are successful by many measures, Shanahan teachers observed the following: Among high-ability students in 7th/8th grade, students manifest dissatisfaction and express resentment when tasked with work they consider disconnected from their lives and futures. Too often, direct instruction is the teachers' primary mode of instructional delivery, despite extensive professional training in other proven methods. Reasons cited include space and schedule constraints along with the demands of recent curriculum shifts. Some Shanahan students demonstrate social isolation and don't seem to see the school as a community. With a 1000+ student body, teachers ask how they can make a big school feel small to keep students connected and involved, and to give them a voice and more choice in their own learning. These observations lay the groundwork for change. Goals tied to improved instructional and organizational practices are: Expand the annual Science Fair to a community-based "Science Day" that includes Invention Convention projects, traditional Science Fair investigations, Christopher Columbus Awards local problem-solving teams, and a collaborative project among 8th graders focused on the dilemma of global industrialization. Invite parents and community members who work in STEM fields to mentor students. Create a STEM program at Shanahan that can be replicated at the district's other four middle schools and ultimately extended to include new opportunities for high school students. Build ease of scalability into the model so the planning, implementation and summative phases can be helpful to other schools and districts considering STEM. Provide the only fully-outfitted digital fabrication lab in north central Ohio. Outreach efforts have already begun to invite nearby districts to use this resource and to train and collaborate with Olentangy teachers. Build a 7-12 program in Olentangy that feeds into Ohio's STEM pipeline and connects students to resources and mentors at nearby universities, including The Ohio State University. Connecting high school students to post-secondary opportunities is a critical initiative in OLSD. Retrain district teachers who demonstrate a passion for STEM and inquiry teaching. Until this project, these instructional leaders have functioned in silos of influence for the benefit only of their immediate colleagues and students. With an opportunity to train five Fab Lab gurus from around the district, a framework will be provided to support expanded use of the Fab Lab over the next five years. Tie-ins to the national and global network of Fab Labs present a host of possibilities to improve practice and global understandings. These five teachers will continue to teach courses but part of their weekly schedules will involve work in the Fab Lab.

E) SUBSTANTIAL IMPACT AND LASTING VALUE - Impact, evaluation and replication

20. Describe the rationale, research or past success that supports the innovative project and its impact on student achievement, spending reduction in the five-year fiscal forecast or utilization of a greater share of resources in the classroom.

STEM isn't just about making robots - it is a way of viewing and thinking about the world. Marcela Hernandez, the Grad/STEM Diversity Director of the College of Arts and Sciences at The Ohio State University, works to support and retain OSU students, especially females, who select STEM majors. She is a key player in the Shanahan teachers' personal learning network and has provided essential support as they delve into the voluminous research and literature available on the efficacy of STEM curricula and inquiry learning. She recommends Georgetown University's Center on Education and the Workforce report titled, "STEM," as a seminal study that has become part of the theoretical underpinning for our STEM initiative. Georgetown University's report examines trends in STEM education and employment nationally through 2018. It is evident that key STEM competencies must be cultivated in students at early stages to increase the number of students and ultimately workers in the STEM pipeline (see figs. 7 and 8) Ultimately, the pipeline produces young people ready for challenging and well-compensated work in a variety of professions, from health services to manufacturing and many hitherto unimagined professions. Research points us toward an inevitable shift to a more relevant and needs-based educational approach. Richard Larson is an MIT professor in engineering systems. He describes the impact of STEM education: "A person has STEM literacy if she can understand the world around her in a logical way guided by the principals of scientific thought. A STEM-literate person can think for herself. She asks critical questions. She can form hypotheses and seek data to confirm or deny them. She sees the beauty and complexity in nature and seeks to understand. She sees the modern world that mankind has created and hopes to use her STEM-related skills and knowledge to improve it." The University of Virginia has the integration of Fab Lab technology on the fast-track in their teacher education program and model projects in local schools. The collaboration of students, teachers and university professors has created innovative programs to boost the engineering in STEM programs. Glen Bull, a professor of instructional technology at the University of Virginia's Curry School of Education has been a transformative figure in moving STEM from a familiar acronym to a dynamic curriculum that energizes teachers. "The next-generation science standards call for making science and engineering equal, but there are no science teachers today trained to teach science and engineering... We wanted to change this." To address the engineering know-how deficit among current Olentangy teachers, the professional development offered by Teaching Fab Team Project Support | TIES Teaching Institute for Excellence in STEM becomes critical to building a STEM program with digital fabrication capabilities that is securely anchored in sound content knowledge and an extensive network of resources to help teachers. TIES support during year one also will assure the program has measurable components that can be isolated, assessed and altered in light of future student performance and satisfaction surveys. Analysis of research into the "diversion" of students, especially women, from STEM majors after their declaration in the sophomore year of college is often rooted in cultural factors. When academically driven young women earn a "B" in chemistry, they're more likely to view that as failing while a more confident male student can perceive himself as "coasting". The stiff grading practices in college science and math courses are also identified as a factor in the diversion of STEM majors, along with the perception of liberal arts courses as more fun and personally fulfilling. Making STEM fun and satisfying for 13-year-olds is a piece of this cultural puzzle. At Shanahan, talented students will have the opportunity to accelerate their science and math coursework.

21. Is this project able to be replicated in other districts in Ohio?

Yes

No

22. If so, how?

An important goal of the Olentangy STEM Center and Fab Lab project is to develop a model that can be replicated in other existing schools who wish to create a STEM option for students. The immediate impact of this model will be seen in the other four middle schools in our district who will have a step-by-step guide (outlined in this proposal) to create their own "school-within-a-school" program. By 2018, our district is projected to have more than 5,000 students in middle school so with broader adoption many more students will have positive exposure to the benefits of STEM education just within the 95 square miles of this district. This proposal outlines specific steps to build productive collaboration and networking between our STEM teachers and interested educators in other districts, primarily through the Fab Lab gurus' activities that will build community locally, nationally and globally through shared learning experiences among teachers and students, e.g., shared investigations led by mentor scientists, information gathering through video-conference with Fab Labs in other parts of the U.S. and the world, Google Science Fair project collaborations between students around the world united in their efforts by a line of scientific inquiry to address relevant problems. Our teachers and administrators have been welcomed by colleagues during on-site visits to innovative schools in Reynoldsburg City, Worthington City and at the Metro School, and have been encouraged and supported through countless conversations with members of the Ohio STEM Network (central Ohio hub). We enthusiastically join in these circles of support, shared ideas and resources. The site visits have been particularly helpful as we shaped our vision of a model that would work best for Shanahan - and by extension Olentangy students and the region as a whole. It is our intention to "pay it forward" and provide the same assistance to other districts who seek to build a similar program. While our STEM center may be most helpful as a resource to other districts situated outside of metropolitan areas and at a distance from instructional resources, our individualized approach to building a unique STEM center suited to the particular needs of our district can be easily scaled down or otherwise modified to help other districts put their own stamp on this popular but challenging types of educational programming.

23. Describe the substantial value and lasting impact that the project hopes to achieve.

This proposal stems from Olentangy Local Schools' vision statement that describes the essential exchange of skills and knowledge at the core of learning as the goal of our efforts and expenditures on behalf of the young people in our community. As stated in the district's Continuous Improvement Plan: The staff will focus on quality classroom practices including a rigorous curriculum, aligned assessments and focused instruction to achieve maximum learning in every environment. Substantial value: In the near-term, enhanced student achievement as measured by state and national standardized tests is expected to rise to meet the benchmarks of ACT's College and Career Readiness in STEM areas. Student engagement and teacher satisfaction surveys will demonstrate improved student engagement with genuine and meaningful learning experiences in partnership with true practitioners of STEM domains; the savings to the 5-year forecast that is outlined in the proposal will allow the district to redistribute funding to purchase STEM curriculum resources and lab equipment to add to existing traditional classrooms and to enhance professional development for teachers in the STEM areas. Lasting impact: Develop the first steps in the STEM pipeline that will begin at the middle school level and expand to opportunities for post-secondary enrollment and beyond. Enhanced cross-district cooperation and rich partnerships with area colleges and private industry will dramatically impact the nature of the educational landscape in north central Ohio and will produce new opportunities for our students. Linkages to state and regional STEM hubs will be established; Fab Lab gurus will work with others to create STEM instructional programs at the regional hub and state level.

24. What are the specific benchmarks related to the fund goals identified in question 9 that the project aims to achieve in five years? Include any other anticipated outcomes of the project that you hope to achieve that may not be easily benchmarked.

The success of the Olentangy STEM Center and Fab Lab program will be evaluated in light of the Straight A Fund's stated goals and additional benchmarks established for Shanahan students and district-wide. Multiple methods will be used to measure both short-term and long-term progress. Annual results will be compiled in a yearly Executive Summary for stakeholders; a report to the Superintendent and the School Board; and made available to the Ohio STEM Link Network. Student achievement Assessment tools: OAAs and OGT Goal: Increase percentage of students achieving at proficient, advanced and advanced plus levels by 10% within three years (2018) on Math and Science OAAs at the 8th grade level and on the OGT at the 10th grade level. Measure: ACT QualityCore test Goal: Increase number of students achieving ACT's College and Career Readiness benchmarks to at least 50 percent of students in STEM areas. (see fig. 11) Measure: Enrollment figures in high level STEM courses district-wide (three high schools) Goal: Increase the number of students taking high level science, technology and math classes (AP and Honors) over and above state-requirements for graduation. An increase of at least 10% in the raw number of students taking these courses will be reported by 2018. Measure: Self-reported data from colleges that reflect the number of Olentangy high school graduates who declare a STEM major. This measure is problematic because its validity relies on colleges voluntarily reporting to the National Student Clearinghouse. It is hit-or-miss in terms of which colleges participate and which do not. Nevertheless, there are detectable trends (see fig. 12) that demonstrate a low proportion of Olentangy high school graduates are selecting STEM majors (16.4%) when compared to students who select a non-STEM major (83.6%) Goal: Overall, increase the number of OLSD graduates who are reported as selecting a STEM major. Spending reductions in the five-year fiscal forecast Measure: Savings to Olentangy Local Schools' 5-year forecast. Goal: Save the cost of moving OASIS to a comparable space to make room for the Olentangy STEM Center next summer. Projected rental cost for year 1: \$37,000. Measure: Savings to Olentangy Local Schools' 5-year forecast. Goal: Save the cost of renovating the original cafeteria space and study hall classroom to become a learning space for 100+ students in the Olentangy STEM Center. Savings: \$234,700. Measure: Savings to Olentangy Local Schools' 5-year forecast. Goal: Save the cost of furnishings for four classroom spaces which would have been necessary regardless of the launch of the STEM program, due to increased enrollment at Shanahan. Savings: \$23,812. Utilization of a greater share of resources in the classroom. Measure: A savings of \$258,512 in Olentangy's five-year forecast. Goal: Use savings in the five-year forecast to provide additional 21st century learning environments to existing traditional classrooms, including but not limited to instructional materials, technology, professional development of teachers and lab equipment for STEM curricular areas.

25. Describe the plan to evaluate the impact of the concept, strategy or approaches used.

* Include the method by which progress toward short- and long-term objectives will be measured. (This section should include the types of data to be collected, the formative outputs and outcomes and the systems in place to track the program's progress).

* Include the method, process and/or procedure by which the program will modify or change the program plan if measured progress is insufficient to meet program objectives.

August-October of 2014 FORMATIVE Finalize the plan for progress monitoring measures that will be used year-long to determine student engagement (pre- and post-program surveys); mastery of skills and content in Common Core State Standards (performance-based assessment, metacognitive reflections, unit tests and projects); and development of personal academic goals (using inventories and instruction based on Habits of Mind) that focus on strengthening academic independence and resilience. Specific instructional supports such as Achieve3000 (to develop nonfiction literacy skills) and Membean or vocabulary.com (to build academic vocabulary) will be used to individualize instruction for learners and to track progress in skill and concept attainment. Spring-Summer of 2015 SUMMATIVE Develop student and cohort achievement data profiles. Use state and national standardized tests (OAAs, ACT QualityCore, Terra Nova) to build a profile of each student enrolled in year 1 of the STEM program to track progress as a cohort against past student achievement and College and Career Readiness benchmarks, and for three years hence (school years 2014-2018). Pre- and post-program student engagement and satisfaction surveys will continue, and monitoring of quarterly grades. Growth measures for the individualized instruction programs will be included. Teacher satisfaction surveys will be administered and OTES data voluntarily collected, when possible, to gain insight into teacher efficacy. Areas of strength and deficit in the program will be identified, isolated and either maintained, improved, overhauled for greater effectiveness, or discarded based on the summative data. Student attendance trends will be tracked for years 1 - 4 of the program (2014-2018 academic years) to supplement analysis of student engagement with learning. Determine increased inter-connectedness of school community and strength of relationships with other educational institutions. The calendar of activities hosted in the Fab Lab will be classified by school, STEM area, nature of activity, interaction with Fab Lab guru, and a satisfaction survey reflecting the services offered by the Lab. The Fab Lab would be a costly but abundantly useful resource for Kindergarten through college teachers and students throughout the north-central region of Ohio. If the Fab Lab is easy to access and offers sound instructional programs, it is a cost savings and instructional benefit for the entire educational community in the region. In addition, a growing list of volunteer mentors from Olentangy families, local post-secondary institutions and private industry will be assessed as this is a critical part of a successful STEM program. Focus groups consisting of STEM program stakeholders will be held during the planning phase (January of 2014) and again in January 2015 so feedback can be gathered. This timing of the second focus group will allow for immediate program changes if necessary. Summative reports will be consolidated into an Executive Summary for presentation to Olentangy's district leadership team, School Board and made available to other organizations in the Ohio STEM Link Network and as a benefit to other districts that work to develop a STEM programming. This system of data collection, analysis, adjustments to curriculum and other STEM program components, and public reporting will continue for the following school years: 2015-2016; 2016-2017; and 2017-2018. Collection of testing data will continue as students in the year 1 cohort will remain a test group through 12th grade. New students in the STEM program will also be tracked as individuals and a cohort through 12th grade to gain insight into the program's impact. OAA and ACT Quality Core subjects will continue to be monitored and analyzed, along with STEM course selection in high school and the declaration of a major in college.

By virtue of applying for the Straight A Fund, all applicants agree to participate in the overall evaluation of the Straight A Fund for the duration of the evaluation timeframe. The Governing Board of the Straight A Fund reserves the right to conduct evaluation of the plan and request additional information in the form of data, surveys, interviews, focus groups, and any other related data to the legislature, governor, and other interested parties for an overall evaluation of the Straight A Fund.

PROGRAM ASSURANCES: I agree, on behalf of this applicant agency and/or all identified partners to abide by all assurances outlined in the Assurance section of the CCIP. In the box below, enter "I Accept" and indicate your name, title, agency/organization and today's date.

I Accept Jack Fette, Curriculum Director, Olentangy Local Schools, 10/25/2013