

**Manufacturing, Engineering,
Construction and STEAM in
Junction City**

**College and Career Readiness for
All Students:
Weaving Together
Academics and CTE
Through Collaboration**

**CTE Revitalization Grant
Project Proposal**

October 24, 2013

APPLICATION COVER PAGE

Project Name: Manufacturing, Engineering, Construction and STEAM in Junction City: College and Career Readiness for All Students
Amount Requested: \$495,280.00

Project Director: Mike King		
District, School or ESD: Junction City High School		
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	Participating High School or Middle School Name <small>(add additional rows as needed)</small>	Lead Contact Name	Grade Levels	Student Enrollment
1.	Junction City High School	Mike King	9-12	555
2.	Oaklea Middle School	Brian Young	5-8	495
3.	Laurel Elementary School	Kevin Gordon	1-4	520

Please check all that apply:

This project directly involves Career and Technical Student Organizations
Please note page of proposal that describes this relationship. Page: 33-34

This project has a clear connection to STEM
Please note page of proposal that describes this relationship. Page: 2, 4, 6, 7, 9, 10, 13, 16, 18, 22, 38

Project Purpose and Scope

To prepare all students for college and careers after high school, Junction City School District is expanding its Engineering and Construction programs of study (POS), and developing a new Manufacturing program of study. To substantially increase the value of these programs for students, we will work on many levels to create a program that integrates increased access, experiential learning opportunities for all students, post-secondary alignment and articulation, industry participation and experience, and K-12 Career and Technical Education (CTE) that is directly connected to academic subjects and diploma requirements.

Many partnerships have been created to further these goals. Academic teachers, career counselors, post-secondary program directors, educators and student groups, as well as industry leaders in Manufacturing, Construction, Engineering and Architecture have been working together to reinvent our Industrial CTE programs. The implementation of this project will move us to a whole new level.

Many more students will be able to participate in expanded manufacturing facilities. With more workspace, new technology and new industry standard machines and tools, we will substantially increase the Industrial CTE footprint (and student interest) at the high school. Students from the high, middle and elementary schools will be engaged in problem-based learning and real-world projects in many CTE and academic subjects, developed through a STEAM (Science, Technology, Engineering, Art, & Math) workgroup dedicated to solidifying STEAM/CTE connections in school. Industry and post-secondary professionals will help develop curriculum and directly engage students in the classroom and the workplace. CTE students will add value to their education through student leadership and entrepreneurial opportunities. We are upgrading!

Innovation:

The application of these grant monies will substantially change the Industrial CTE programs at Junction City High School on many levels. The activities and purchases specified in this project are focused on maximizing the potential for students to succeed in their secondary education and to give them the best opportunities for post-secondary education and high-wage, high-demand careers.

The post-secondary partners involved in this grant are going to add great depth of relevance and rigor to our programs. LCC's Advanced Manufacturing department is fully on board with the implementation of our new Manufacturing program. Two OSU professors and a department head will be working with us to enhance our Engineering Technology POS and help us develop our drafting and engineering lab to its fullest. We will make a marked increase in College Now credits available, in old and new areas.

Industry will be involved in our programs as never before. Several local businesses in many fields are teaming up to be directly involved on all levels of our programs. They have been and will be helping us develop facilities, technology, and curriculum that align with industry needs and standards.

Many more students will be aware of and involved in our programs through outreach, connections with core classes and other schools in our district. More students will be able to take CTE classes with the larger student labs and more equipment and technology. The upgrade of our facilities will create a strong program with more value, especially in experiential learning.

A new synthesis of evidence-based cross-curricular projects will combine the best of embedding techniques, bringing CTE and Academics together in a new way.

Integration

The many facets of our project and all of the education and industry professionals will work together to create a unified transformation in the JCHS Industrial CTE program.

We will create the best pathway to success for the most students by:

1. Bringing together instructors and professionals from all levels and many fields in a STEAM workgroup to develop curriculum, presentations, teacher training and experiential learning projects that weave academics and CTE together.
2. Upgrading our facilities to teach more technical, academic and high-wage, high-demand career skills through building expansion, and equipment and technology upgrades. Teachers in many subjects and programs will become connected to our CTE program through tool and technology training. They will transfer this knowledge to students through authentic projects in the labs and classroom.
3. Increasing college dual credit and class offerings to give students more motivation and opportunities for post-secondary education.

Our Industrial CTE program will be directly experienced by academic teachers, making more students interested and involved. Our facilities will be expanded and upgraded, so that more students can be involved in real-world experiences. Teachers will synthesize CTE and STEAM so that more students will succeed in high school and beyond. With industry and post-secondary partners involved, student interest will increase and students will be better prepared for and be more successful in post-secondary education and careers. With the focus on Engineering, Construction and Manufacturing, we are addressing a substantial number of high-wage, high-demand careers.

CTE Expansion and Growth

Our project includes a complete makeover of the manufacturing and engineering facilities at our school. The metals program will be moved into a space more than double the size of the existing facility. Manufacturing and construction will be in the same building, creating a collaborative learning environment. The drafting, architecture and engineering lab will be transformed into a state of the art facility aligned to post-secondary and industry needs. New technology and machinery in a larger facility will give students a far wider variety of real world experiences in the classroom and labs.

More students will be enrolled in manufacturing, construction and engineering programs of study, due to facility expansion and increased student familiarity. Staff will learn and collaborate in many new ways.

The processes and curriculum developed through this grant will be documented and published for use by other districts in the region and state. Students will be directly involved in the creation and documentation of successes, through data collection, media, and student organizations. The administration in Junction City School District is dedicated to following through and expanding upon this project in the future. Our successes (and learning opportunities!) will be transferable to any school wishing to integrate CTE and Core Subjects, and looking to increase relevance and rigor in CTE.

Being a small, semi-rural school district, a transformation of this size and its effects upon the local community and industry could be used as evidence and motivation for other, similar school districts who struggle to keep CTE relevant to industry. Districts want new ideas to keep and enhance their CTE programs. Transformational success stories could go very far towards changing public views and policy involving the value of CTE to our communities, families and economy.

Authentic Learning

Our project will provide a substantial increase in authentic, experiential learning opportunities for students in Industrial CTE and academic classes at the high school and at the middle and elementary schools. Out-of-school-time robotics programs and CTE student leadership organizations (Skills USA and a student-run business) will be enhanced by the connections between school departments, post-secondary institutions and industry.

The STEAM workgroup developed for this project is comprised of teachers in Math, Science, Art, Robotics and CTE from the elementary, middle and high schools. Instructors will become familiar and experienced with Industrial CTE facilities (and other classrooms) in order to create authentic experiential learning projects for all levels of students. Core subjects will also be integrated into CTE lessons. Across the district, teachers and students will be using the CTE facilities and projects to enhance learning.

Teachers in these programs will learn about industrial processes, and will receive hands-on training and experience in real-world projects. Their classroom instruction will include the addition of experience and training in manufacturing, engineering and construction. Curriculum developed for this project will emphasize student-led problem solving.

Industry and post-secondary advisors will be helping to develop a state of the art facility and will help create and participate in authentic learning opportunities for students. College student group presentations, guest lectures, industry tours, job shadows, advisors in the classroom and development of actual industry and post-secondary projects into high school learning projects are all strong elements of this project.

GRANT NARRATIVE

PROJECT DESCRIPTION

A. Project Outcomes and Progress Markers

1. **Improved and sustainable partnerships with business, industry, labor and educational providers**

1-a. Industry partners will be involved in the design, development and implementation of the project, and will be involved after the grant timeline.

Outcome 1-a Progress Markers	#
Number of new industry partners	7
Time spent by industry partners in design and development of the project	30 hrs.
Time to be spent by industry partners on implementation of the project	150 hrs.
Number of new industry partners committed to tours, guest lectures and student project development	4
Estimated annual time spent by industry partners supporting program beyond the life of the grant	40 hrs.

1-b. Post-secondary partners will be involved in the design, development and implementation of the project, and will be involved after the grant timeline.

Outcome 1-b Progress Markers	#
Number of new post-secondary partners	10
Time spent by post-secondary partners in design and development of the project	21 hrs.
Estimated time to be spent by post-secondary partners on implementation of the project	110 hrs.
Number of new post-secondary partners committed to guest lectures, tours, student presentations and CTE/STEM curriculum development	8
Estimated annual time spent by post-secondary partners supporting program beyond the life of the grant	50 hrs.

2. **Improved student access to CTE programs of study**

2-a. More students will have an increased number of opportunities to engage in learning at an industry standard level, through programs of study (POS).

(Note: some students enrolled in multiple programs of study due to overlap)

Outcome 2-a Progress Markers	#	+%
Increase in number of students who will be enrolled in existing Programs of Study	59	34
Number of students who will be enrolled in new Manufacturing Program of Study during 2014-15 school year	215	--
Increase in enrollment cap for each Metals class	12	57
Increase in nontraditional (girls) student POS participation	12	66

2-b. JCHS' Industrial CTE programs of study will be developed with industry and post-secondary approval, with the ongoing assistance and implementation of an Industry Advisory group. Programs developed with this grant will be a reflection of industry needs and post-secondary articulation.

Outcome 2-b Progress Markers	#	+%
Number of new Programs of Study	1	50
Number of enhanced Programs of Study	2	100
Number of new industry partners in advisory group	5	--
Number of new post-secondary partners in advisory group	3	--

2-c. Modernization, expansion and consolidation of lab and classroom areas will allow more students increased access to a wider variety of industry standard equipment, tools and technology in JCHS Programs of Study.

Outcome 2-c Progress Markers	#	+%
Square footage increase of student classroom/shop area	1457	96
Square footage increase of new storage/outdoor work area	1200	--
Number of new, industry standard tools	41	
Number of new, industry standard computers w/state of the art software and monitors for Drafting, Architecture, Engineering	30	
Number of student computers available in shop areas for Student project design, presentations, training and CNC projects	10	

2-d. Increased involvement from Science, Math, Art and Robotics teachers, and from career counselor, will help students understand the value of CTE, and increase interest in CTE.

Outcome 2-d Progress Markers	#
Number of students who will take CTE awareness survey each year to gauge effectiveness of cross-curricular training	200
Number of students who will have increased awareness of CTE and desire to take CTE classes in the future	100
Increase in number of students per year who will get concrete examples of CTE-related projects and careers in Science, Math and Art classes	300
Increase in number of students per year who will work on CTE-related projects in robotics programs at high, middle and elementary schools due to teacher engagement in CTE	30

3. Increased rigor in technical and academic content aligned to diploma requirements, industry recognized technical standards and employability skills

3-a. Technical Content of CTE courses will be aligned to Diploma requirements

Outcome 3-a Progress Markers	#
Number of new CTE lessons which will embed Essential skills (reading, apply math, use technology)	6
Number of students who will have the opportunity to be involved in new Career-Related Learning Experiences	120
Number of students who will have the opportunity to be involved in new Extended Applications	50

3-b. Technical Content aligned to industry recognized technical standards

Outcome 3-b Progress Markers	#
Number of Oregon Skill Sets addressed for the first time or with more rigor with new curriculum, facilities, machinery and technology (see Appendix B)	55
Number of new students taking Industry recognized Technical Skill Assessment (TSA)	15

3-c. Academic content aligned to Diploma requirements

Outcome 3-c Progress Markers	#
Number of Science, Math and Art teachers who will be using CTE-based lesson plans to increase student engagement, give students a	6

look at potential career interests, and give students a chance to apply knowledge and skills	
Number of students who will be given opportunities to participate in Career Related Learning Experiences and Extended Application through Core Classes	150

3-d. Academic content aligned to industry recognized technical standards

Outcome 3-d Progress Markers	#
Number of Science, Math and Art teachers who will be using CTE-based lesson plans that will address Oregon Skill Sets	6
Number of students who will understand and meet Oregon Skill Sets through Math, Science and Art classes	250
Number of Oregon Skill Sets introduced and met through Math, Science and Art classes due to STEAM workgroup	6

4. Increased career opportunities for students, including access to career and technical student organizations

4-a. Students will have opportunities to participate in job shadows, tours and guest presentations with industry partners

Outcome 4-a Progress Markers	#
Number of Industry partners offering job shadows, tours and presentations	6
Number of post-secondary partners offering tours and presentations	6
Number of students who will participate in job shadows, tours and presentations by industry partners	200

4-b. Students will work on projects designed by industry advisors

Outcome 4-b Progress Marker	#
Number of Industry partners bringing real problem-based projects to students	5

4-c. Students will be involved in new chapter of Skills USA, and related contest

Outcome 4-c Progress Markers	#
Number of students in new Skills USA chapter	15
Number of competition categories students will be entering into that would not be possible without new equipment, curriculum and technology	4
Number of Skills USA student members who will meet Career Related Learning Experience and Extended Application	15

requirements through Skills USA membership activities	
Number of new CTE students involved in Linn-Benton Community College skills event	10
Number of new areas available to JCHS students at LBCC skills event through new curriculum, technology and equipment	4

5. Improved ability to meet workforce needs in the region

5-a. More students will learn valuable technical career skills essential to local high wage, high demand careers

Outcome 5-a Progress Markers	#
Increase in number of students involved in Manufacturing, Engineering and Construction programs of study during 2014-15 school year (see note above on overlap)	274
Number of additional high-wage, high demand careers whose necessary skills will be addressed in enhanced ways by new program, technology and tooling (see Appendix C), brought out by new advisory committee	21

5-b. Industry and post-secondary advisors will increase teacher knowledge of career skill priorities

Outcome 5-b Progress Marker	#
Number of Industry and post secondary advisors on advisory committee	8
Number of meetings of advisory committee, 2014-2015 school year and beyond	4

5-c. Students will be connected with local high wage, high demand industries

Outcome 5-c Progress Markers	#
Number of industry, post-secondary instructor and student presentations to students at JCHS during 2014-15 school year	4
Number of students attending at least one presentation listed above	200
Number of students going on industry tours	40
Number of students doing job shadows at advisor industries	4

B. CTE Program of Study (POS) Design

This project will create a new Program of Study, Manufacturing Technology. It will also enhance and expand two existing Programs of Study, Construction Technology and

Engineering Technology. Professional development time written into the grant will be used to write and develop programs of study with industry and post-secondary partners.

Enhanced Construction Technology and Manufacturing Technology POS:

1. Standards and Content: Content of these POS will be made more relevant and rigorous through professional development and new curriculum, equipment and technology. Students will be ready for post-secondary education and careers through the aligning of secondary and post-secondary content. More students will be ready for Technical Skill Assessments. This program will help students in these POS to meet diploma, post-secondary and certificate requirements. Students will gain skills aligned with industry standards through new, authentic experiences.
2. Alignment and Articulation: Partners will help to improve the content of our programs, making them more unified, cohesive and non-duplicative. Post-secondary partners will work with CTE teacher to increase curriculum alignment related to professional development, equipment and technology in this project. Existing articulation agreements will be expanded to include more college dual credit opportunities for more students, due to expanded facilities and training.
3. Accountability and Assessment: Greatly expanded Advisory Committee will be involved in program evaluation (vision, goals, priorities, meeting industry standards). Committee will meet regularly to work on curriculum, authentic projects, instructor appraisal and faculty professional development.
4. Student Support Services: Professional Development for teachers and career counselor, and Partner involvement, will help students understand programs of study, and to transition to post-secondary education and career training. Students

will be more ready to identify and take ownership of education and career options. Access for all students will be enhanced through teacher professional development and new technology.

5. Professional Development: Academic content and industry-based technical standards will be integrated through the establishment of a STEAM workgroup (see Project Overview above). This high quality, interdepartmental professional development will incorporate the experience of teachers who were involved in embedding workshops (Math in CTE, Literacy in CTE, Non-Traditional Careers, Rogue Community College Technical Math) and will continue on a regular basis.¹ Training with new equipment and technology will expand teachers' abilities to help students improve knowledge and skills, especially students of special and underserved populations.

New Manufacturing Technology POS: The new Program of Study will fulfill all of the goals for the expanded POS's above, with these additions:

1. Standards and Content: "Welding" classes will be changed into "Metals" classes, expanded to include manufacturing curriculum, designed with Industry and post-secondary partners. STEAM workgroup will work to embed this curriculum into academic classes. Equipment and technology purchased through this grant, along with expansion of curriculum, will allow for sufficient size, scope and sequence of student learning. This will support student mastery of academic and technical knowledge and skills for diploma requirements, post-secondary education and high wage, high demand careers. Completers of this POS will demonstrate skills through a proficiency-based Technical Skill Assessment, developed with industry involvement.

2. Alignment and Articulation: Curriculum will be developed with manufacturing partners and manufacturing faculty at Lane Community College to ensure a non-duplicative, cohesive sequence. Alignment and articulation agreements will be created for this new POS with Lane Community College, to expand students' access to post-secondary education credit.
3. Accountability and Assessment: The Advisory Committee will set the direction, goals, and priorities of this program of study. This POS will meet post-secondary and industry needs through this grant by including curriculum and training developed with partners and through the full implementation of new, industry-standard equipment and technology. Performance data, including Technical Skill Assessments and improvement in math, reading and writing, will be reviewed in Advisory Committee meetings to develop and continuously improve the program of study. New curriculum and tools will allow students to demonstrate skills in meaningful ways, and to monitor and adapt their program to meet personal goals.
4. Student Support Services: Career counselor, CTE and academic teachers will understand the program of study and related career pathways, allowing them to advise and assist students in their progression to careers and post-secondary education planning. Students will gain direct knowledge of manufacturing education and careers through the expanded facility and technology, through teacher knowledge and practice, and from industry and post-secondary partners providing guest presenters, site tours, and job shadows. Technology in this program will enhance learning opportunities for students with special needs, and allow for more learning styles to be accommodated. Professional and curriculum development will include finding better ways to support students with disabilities,

ELL and non-traditional students. A Skills USA chapter will be introduced as part of this project/POS, either offered as a class or an after school program. The goals of Skills USA will be addressed as explained in the CTSO section of this proposal (**Bonus Section A**).

5. Professional Development: See above. CTE teacher will complete two 1-week workshops (see **Budget Narrative**). Also, some of the tool and technology training will be with the assistance of LCC instructors.

C. Underserved Students

An increased number of College Now credits and guest presentations offered to more CTE students will result in more students following pathways to careers and post-secondary education, especially first-time college and economically disadvantaged students, who will have additional motivation through a jump start on college and concrete examples of high wage, high demand careers. Appropriate technology with proper professional development will increase success for English Language Learners and students with disabilities.

Other ongoing professional development by 3 teachers at JCHS (CTE, Math and Science), working to increase non-traditional participation in engineering, will be incorporated into STEAM professional development.

A large focus of this project is serving the needs of the so called “forgotten half,”² those who graduate (or don’t) from high school with virtually no employability skills and with no intention to go on for more education. We will meet the needs of those at risk of dropping out by adding relevance to their education, through a revitalized CTE program.³ We believe that these students are one of the largest and most underserved of all populations. The expansion of our program will meet the career needs of many more

students, bringing more qualified workers into the diminished skilled labor pool and bringing career success to many more families.⁴

D. Diploma Connections

Students will have more opportunities to meet their diploma requirements through:

- Enhanced, STEM articulated curriculum to help meet core academic credit requirements, especially in math.
- An increased number of opportunities for Career Related Learning Experiences, through industry and post-secondary advisors helping create real world projects, guest lectures, career fairs, college student presentations, site tours, job shadows, and problem-based learning.
- Increased awareness of career-related skills, potential career paths and post-secondary education options, and more options to explore their potential strengths, likes and dislikes in the field of CTE.
- Student Leadership opportunities will be available through the creation of a new Skills USA chapter.
- New student-led school business will incorporate new curriculum, technology and equipment to produce valuable projects for sale, developing strong business and leadership opportunities and in-depth career exploration.

E. Sustainability and Communication

Junction City School District has been and will be very supportive of Career and Technical Education. CTE teacher salary, benefits and program budgets are in place already with a commitment into the future. We are very much in support of continuing CTE programs, and plan to increase the effectiveness of our programs. A letter of

support from the district, detailing all of the ways in which we plan to continue support of CTE during and after the life of the grant, is included with the other partner letters.

CTE, district and academic leaders will all be working together within the school to erase the all-too-typical division between CTE and academic classes. One of the main goals of this project is to increase connections between departments.

The Skills USA chapter written into this grant will play an essential role in bringing CTE into the mainstream of school culture and the community. They will be helping to develop a school-based business that will bring awareness to the value of the things we do. They will be doing service learning and community projects, contacting school and community media, and participating in skill events. All of these actions will build our reputation within the school and community. Successes here will also be noticed by other school districts as they look for innovative ways to improve their programs. The District is also committed to assisting in media and public relations to build the program's profile.

The school district, teacher, counselors and student leaders will all be collecting data to prove the effectiveness of our program changes. This broad based level of support will show the success and validity of our project.

Our program is being supported not only by this grant, but also by facility improvement monies from the district. We are allowing the program to take over a large, currently unused student work area for the manufacturing program, and we will use district grants, bonds (contingent on voters) and funds to improve the area. The program will be sustained after the life of the grant by the district's commitment to continuing the teacher's salary and benefits, program budgets, transportation to contests, technology support, and use of facilities indefinitely. Our district sees the full potential of this project,

and desires it to be used as a launching pad for a top of the line CTE program, thriving long into the future.

F. Activities and Timeline

STEAM Workgroup (STEM Connections): January – May 2014: Meetings of

STEAM workgroup; a collection of CTE, Science, Math, Art and Robotics instructors from the elementary, middle and high schools in Junction City. Once a month, the group will meet with the overall goal of connecting STEAM and CTE education, through embedding CTE into core classes, and embedding STEAM curriculum, concepts and lessons into CTE. This will have the function of helping students with diploma requirements, and enhance popularity for Industrial CTE at JCHS. An increase of relevance and rigor will be added to academic and CTE classes.

June -August 2014: Professional development for members of STEAM workgroup.

CTE and academic teachers will be trained in the use of new equipment by CTE teacher and LCC instructors, helping them bring this experience into the classroom. Erasing the “separateness” of Industrial CTE will bring new relevance and popularity to the program. More CTE participation will increase graduation rates and substantially enhance student college and career readiness.

September 2014: STEAM workgroup will meet to solidify lessons developed in the previous spring, work on more lessons, and develop a survey for students to gauge understanding of value of CTE. Data collected from survey will guide future program decisions and quantify effectiveness of overall project.

October 2014 –April 2015: Teachers from STEAM workgroup will teach curriculum from lesson planning sessions in the spring. Industrial CTE program will use new lessons, incorporated with new state of the art equipment and technology to enhance

student job skills, college and career readiness and meet diploma requirements. STEAM teachers will use CTE projects and examples to enhance the relevance and rigor of their curriculum. Teachers will reflect on lessons, assessing student understanding and engagement, while observing effect on CTE image.

Facility Improvements: January – August 2014: Planning, bids, and permitting on building improvements; construction.

- Metals manufacturing program will be moved into vacant half of building with construction program, greatly expanding and consolidating manufacturing and construction programs of study. Focus of improvements is to increase program visibility, develop skills and interest in high-wage high-demand careers, increase the number of Oregon Skill Sets and diploma requirements being met, and develop relevance and rigor through industry and post-secondary partnerships.
- Improvements were designed and developed through partnerships with industry and post-secondary partners to develop JCHS' Industrial CTE program to meet local workforce and industry needs.
- Covered concrete slab outdoor work/storage area will be added to south side of building to expand program facilities and capacity, giving more opportunities to more students on more and larger projects. Painting and refinishing will increase appeal and professional appearance, increasing enrollment in Industrial CTE programs, especially by non-traditional students.
- Computers and networking will be added to each classroom for project design, engineering, communication, research, and connection to CNC and rapid prototyping equipment. Partners stressed the importance of preparing students and future employees for industry and university standard technology.

- Lighting and heating will be upgraded with other grant/bond money to make the Industrial CTE building more energy efficient and more appealing to learn and work in.
- Windows and doors will be added between rooms to increase access and visibility between classrooms and work areas. Cohesion of project development and labs will enhance students' ability to transfer knowledge across subjects, allowing for flexibility and problem solving abilities to be exercised. Partners agreed that working through the whole process and transferring knowledge were vital to success in a career.

Equipment and Technology Expansion and upgrades: February-April 2014: Final equipment and technology research and purchases.

- A large expansion in quality and quantity of technology and tooling in our Manufacturing, Engineering and Construction Technology programs of study was agreed upon by partners to be crucial to student success in gaining college and career readiness. More students will gain more skills that will prepare them for college and careers in high-wage, high-demand careers.
- More students will enroll in programs of study because of the allure of new, state of the art equipment and projects, the increased visibility of the program through student leadership organization and student-run school business, and the awareness of appealing careers and the advantages of CTE program of study participation.
- New equipment and technology will allow students to develop a substantial number of new skill sets, working on more authentic, complex projects.
- Student run school business and Skills USA participants will be able to greatly enhance projects and contest skills, creating many new items for sale and being able to enter many more skill events with skills learned on new equipment.

- Out-of-school time high, middle and elementary school robotics programs will be able to greatly enhance their understanding of engineering and manufacturing through the use of parts and assemblies created with new technology and equipment. Robotics instructors will be trained on new technology and equipment so they can use the tools to further their students' knowledge, engagement and success.

Industry and Post-Secondary Involvement: January - March 2014: Organize and schedule tours, guest lectures, student presentations.

- Direct contact with industry representatives and facilities, as well as Post-Secondary educators and students will greatly increase relevance for students. With a direct contact to industry and education, students will have a concrete image of potential future careers and education.
- Industry and post-secondary partners will have first-hand experience with high school facilities and students, giving them a better idea of how they can help guide students and enhance programs of study.
- Industry and post-secondary partners will share the value of academic subjects in their industries, helping students to understand relevance of academic education.
- Student groups will share their experiences with students, giving them a better idea of career and education options, and help them make decisions for their own future.

January-May 2014, September 2014-May 2015: Partner Advisory meetings.

- Advisory group will meet every 2-4 months— see **Partnerships** section.

September 2013 – May 2015: Non-traditional workshop lessons, developed with a woman engineer, will be used in combination with grant project to develop access for underserved students and young women.

Technology Professional Development: June – August 2014: CTE teacher will engage in professional development concentrating on how technology is being used, especially in 3D modeling, to increase engagement of students with disabilities, particularly those in the autism spectrum. Research has shown great success for students with autism through engagement with computer aided drafting, especially programs such as Sketchup.⁵ This professional development will be focused on developing lessons that based in problem-based learning and that can be used with our new technology.

CTSO's: May 2014 – February 2015: Recruitment and incorporation of Skills USA chapter at JCHS. Students will be encouraged to join Skills USA to fulfill Skills USA Major Goals and to enhance skills to compete in state skills event in April, through recruitment events in May and September 2014. See **CTSO, Bonus Section A.**

Out of School Time and Middle School Components: September 2014-April 2015: Robotics groups at high, middle and elementary schools will take advantage of teacher professional development, STEAM workgroup curriculum, and new technology and equipment to enhance student learning in these programs.

- Students will have greater knowledge of engineering practices through STEAM workgroup lesson planning.
- Students will have greater knowledge and skills related to manufacturing processes through teacher professional development and training, and through access to project technology and equipment.

Sustainability and communication: May 2014-May 2015: JCSD involved in reaching out to community through local media to let community know about program and new opportunities for students.

September 2014, May 2015: Survey of student knowledge and engagement in CTE.

May 2014, May 2015: Preliminary and final progress reports. Data collection and analysis on student numbers in CTE, student College Now credits and CTE student graduation rates, pre and post assessments in core classes, complete summary of partner activity, summaries and feedback on guest lectures and presentations.

G. Evaluation

Industry and post-secondary partners: Partners and Project Director will keep track of time spent in project development and implementation, and number of partners involved. Final data will be collected and compared to progress markers. Further involvement beyond the life of the grant will be tracked by Project Director.

Student Access: Student enrollment (male, female, nontraditional, disabled) data, Advisory group minutes, grant money purchases and facility improvements will be collected and compared by Project Director to progress markers. Care will be used in following guidelines of project. Program of Study Approval by ODE will be tracked. Pre- and post- surveys and assessments will be compared and analyzed to gauge success of professional development. Enrollment and success of robotics programs will be compared to previous numbers to gauge effectiveness of program. Building plans and tool and technology inventory will be kept for assessment of project budget.

Increased Rigor: STEAM meeting in Spring 2015 will allow involved teachers to present an overview of lessons and show their effectiveness through pre- and post-surveys and assessment data. Specific records of standards and skills sets met will be written into lessons and presented. Teachers will also keep and present records of Career Related Learning Experiences and Extended Applications developed through the project. Project Director will compile sample lesson plans, observations, data and analyses for final

report. Post-project analysis will guide future workgroup goals and direction. CTE program of study concentrators (≥1 credit) will take Technical Skills Assessment, and student data will be compiled and compared to previous years.

Increased Career Opportunities: Project Director, Advisory TEAM teacher and Career Counselor will keep records on number of authentic projects, job shadows, tours and presentations, and will compile student, teacher and industry impressions. Skills USA student leaders, along with Project Director, will collect data and compile results of CTSO portion of project. This will involve gauging student involvement, interest, contest results, and meeting of Skills USA goals. Student leaders will use project analysis, contest data and student business records to determine success of these progress markers.

Meeting Workforce Needs: Enrollment records and presentation, job shadow and tour attendance will be collected and compared to progress markers by Project Director. Student and partner surveys related to presentations, job shadows and tours will be compiled and summarized by Project Director. Industry and post-secondary leaders will meet with Project Director to look through Skill sets and compare with project goals. Partners will give feedback on project success.

PARTNERSHIPS

Role of partners in development of proposal

Many of our partners were involved in the design and development of our proposal. Lane Community College instructors from the Advanced Technology and Drafting departments have been involved with our program for many years, with alignment and articulation agreements, and regular meetings which have helped guide our program. Through these connections, we have given many students relevant

training and college dual credit that enhances students' high school education and prepares them for post-secondary education and careers. In addition to our previous contacts, we now have an active relationship with the LCC Manufacturing department through which many of our project ideas were filtered and guided.

Input has also come from our relationship with two professors in the OSU Mechanical, Industrial and Manufacturing Engineering department (MIME), who have stepped up to help guide curriculum and technology upgrades and plan guest presentations by both student groups and professors. We have come up with plans for increasing student familiarity and interest with this program, especially for women, while giving MIME student groups a chance to build their presentation skills.

Several industry partners have been helping to decide how to make this project work to the greatest benefit of students and businesses. Owners, managers and professionals from several industries in the fields of manufacturing, architecture, construction and engineering have helped decide priorities in what students should learn, how they should learn it, and how we should upgrade our facilities to provide the most authentic learning environment. Knudtson Manufacturing and Pre-Tec, local engineering/manufacturing/robotics firms are very willing to increase the potential of our program, and have been giving advice on how to design our project. Bulk Handling Systems has several people on board that have been and will be working with us. The owner of Northwest Stamping has been invaluable in his design and curriculum ideas. gLAs Architecture has been helping us to design our Engineering/Architecture lab.

Role of Partners in implementing the project

Industry and post-secondary partners will be involved in implementation of the project in the following ways: Facilities planning, including tool and technology

decisions, safety, workflow and industry authenticity. Facilities upgrade design, planning, submittals and bidding. Curriculum design, critique and planning for authenticity and articulation. Training teachers on new equipment and technology. Guest lectures and presentations. Planning and implementing job shadows and tours. Advisory committee to meet regularly to provide input on program vision, goals, successes, challenges, instructor appraisal, project ideas, equipment and technology, curriculum, teacher training, and the future of the program. Provide real-world projects for students to work on.

Ongoing role of partners beyond the life of the grant

Several industry partners have committed to continue their engagement with our program, through ongoing advisory committee participation, guest lectures, job shadows, tours, and technology/tool assistance. Post-secondary partners will continue to provide guest lectures and presentations, facility advice, real-world projects, equipment maintenance and training, alignment and articulation of programs of study.

Correlation of partners to high-wage, high-demand jobs

All of our partners are involved in high-wage, high-demand careers, either working in them or training students for them. Referring to Worksource Oregon's Region 5 High-Wage, High-Demand, High-Skill Occupations chart, our partners are working directly within at least 20 careers on the list, with median openings (65) and wage (\$23.64) well above the limits in the high wage, high demand category (see Appendix B).

Bonus Sections

A. Career Technical Student Organizations (CTSO)

This project will establish a new chapter of Skills USA. Students will gain technical skills which will provide rigor in their CTE work and level of success. Skills USA leaders will be involved in CTE courses and they will have responsibilities in classes that correspond to their leadership and organizational work in Skills USA.

With more technology and tools available, more students will be able to achieve success in more aspects of the Skills USA Program of Work, which addresses the following subjects: Professional Development, Community Service, Ways and Means, Skills USA Championships, Employment and Public Relations.

More students will be able to participate in skill events because of the expanded programs of study and facilities. The Ways and Means goal of Skills USA will be more fully realized due to availability of materials and technology to create items for fundraisers.

Increased connections with industry and post-secondary partners will enable success in the Skills USA Goals of Professional Development (guest presentations), Community Service learning projects (partners helping design community projects), Skills USA Championships (training and team funding), and Employment (participation and help with JCHS Career Day).

Recruitment activities are planned for Spring and Fall 2014, with fun, engaging activities. An industry partner with previous involvement in Skills USA will help increase student interest. Skills USA members will do presentations at the middle school to develop interest before high school.

Through Skills USA, students will enhance their career and leadership opportunities, in conjunction with their participation in CTE programs of study.

B. Middle School Component

The middle school and elementary schools of our district both have robotics programs during out-of-school time programming. Both instructors will be involved with the STEAM workgroup, creating curriculum with CTE skills involved, and being trained on new equipment and technology. Students from these programs will be brought to the high school for tours and to work with older students on robotics program. High School robotics students will go to middle school to mentor students. This will create interest in CTE before high school.

C. Out of School Time Programming

Robotics: The high school out-of-school-time robotics program will be greatly enhanced by this project. Many students in robotics have expressed interest in designing and manufacturing parts for their robots, but we do not have the technology and equipment. With this project, the robotics instructor would be trained in the use of design and manufacturing tools, allowing these students to be able to more fully engage in their program. Students would be designing and manufacturing parts for their robots, creating a whole new set of authentic projects for students.

Skills USA may be an after school program. The goals of this program are fully defined in the **CTSO** section of the proposal.

Student entrepreneurship: One of the main goals of this revitalization effort is to give students real world projects and experiences, so they can directly visualize and experience potential pathways to post-secondary education, training and careers. With the use of state of the art technology and tooling, students will be involved in coming up with projects that can be designed, built, finished and marketed within the school construction, engineering and manufacturing areas.

Students will discuss ideas, come up with saleable products and determine the process for creating and manufacturing them. Industry and post-secondary partners will be involved with project design, job costing, production flow modeling, quality control and marketing. Students will design and create parts, either with automated equipment, or by hand. Students will assemble/fabricate products, then work to market their product. Students will learn to lead their own organization, doing sales, invoicing, estimating, design and fabrication. See Appendix D for project ideas.

D. Regional, Statewide or System Changes

The priorities we have set and the path we are taking to revitalization are not unique. We have chosen to embark on a path of revitalization which is transferable to any school. Schools face many of the same issues when it comes to CTE: Lack of connection with industry and post-secondary partners, lack of current tools and resources, and overcoming the “separateness” that defines these programs at schools. CTE programs are usually set off in their own corner of the campus, they are consistently referred to as “the fun classes,” and they are the place where students who have a hard time in standard classroom settings are advised to enter.

It is true that CTE is different, and many students who struggle in traditional classrooms succeed in career and technical classes. With new graduation requirements and the need for more training for high-wage, high-demand careers, however, we need to keep students abreast of potential careers, bring academic education to all students through CTE and make sure we are giving them both the ability and the reasons to succeed in education.

We believe that all schools should be making the changes that we are proposing, from bringing together CTE and academic teachers (changing curriculum in *both* directions), to student leadership opportunities, connecting schools across age levels and bringing facilities up to industry standard. We propose that the successes we are expecting will be used as a success story that can be taken on in any district.

We will be working to document and publish our successes (and lessons) through local and regional media. We will be working with the Lane Education Services District to disseminate our successes to other districts in the region, offering advice and guidance to interested educators and administrators.

E. STEM

Our project has many connections to Science, Math, Engineering, and Technology, all of which are laid out in the grant narrative. This is a summary of STEM connections in our proposal:

1. Industry and post-secondary partners in STEM fields. See **Partnerships** section.
2. New and enhanced Programs of Study have STEM curriculum. See **Programs of Study, Part B**.
3. STEAM workgroup will focus on STEM curriculum, embedding STEM in CTE and CTE in STEM classes.
4. Robotics groups are teaching STEM curriculum and problems. See **Out of School Time Programming, bonus Section C**.

BUSINESS, INDUSTRY, LABOR AND POSTSECONDARY EDUCATION PARTNERS

The following individuals and/or organizations have reviewed, discussed, and agreed to their part in implementing the project proposed in this grant application:

	Name	Title	Organization
1.	Byron Knudtson	Owner	Knutson Manufacturing
2.	Stan Reynolds	Operations Manager	Pre-Tec, Willamette Valley Industries
3.	Jim Creech	Owner	Northwest Stamping & Precision
4.	Jonathan Price, Trace Ward	Associate, Principal Member	gLAs Architects
5.	Jennifer Adams	HR Manager	Bulk Handling Systems
6.	Jim Suess	Owner	JAS Industrial
7.	Bill Manghelli	Production Manager	The Cabinet Factory
8.	Kristin Gunson	Regional CTE Coordinator	Lane Education Service District
9.	Patricia Lytton	Liaison	Lane Community College High School Connections
10.	Patrick O'Connor	Division Dean	Lane Community College Advanced Technology
11.	Steve Caffey, Al Laskey, Mark Huntington, Greg Wilton	Lead Faculty, Faculty, welding and manufacturing	Lane Community College Advanced Technology
12.	Jon Bridges	Faculty	Lane Community College Drafting and Design
11.	Michelle McAllaster	Head Advisor	Oregon State University Mechanical Engineering Department
12.	Karl Haapala	Assistant Professor	Oregon State University, School of Mechanical, Industrial and Manufacturing Engineering

¹ <http://www.nrccte.org/core-issues/curriculum-integration>, <http://www.iwitts.org/proven-practices>

² "The Forgotten Half: Pathways to Success for America's Youth and Young Families," and "Forgotten Half Revisited: American Youth and Families, 1988-2008". Samuel Halperin, 1988, 1998.

³ "The Silent Epidemic: Perspectives of High School Dropouts." Bill and Melinda Gates Foundation, 2006.

⁴ "Pathways to Prosperity: Meeting the Challenge of Preparing Young Americans for the 21st Century." Harvard Graduate School of Education, 2011.

⁵ <http://www.google.com/edu/resources/project-spectrum.html>,
<http://www.3dvinci.net/ccp0-display/projectspectrum.html>