Appendix B – Cover Page

APPLICATION COVER PAGE
(Please Print or Type – All Fields Must Be Completed)

Project Name: Tigard-Tualatin Manufacturing CTE Program of Study
Amount Requested: $394,340

Project Director: Noelle Gorbett		
District, School or ESD: Tigard-Tualatin School District		
Address: 6960 SW Sandburg St		
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Grant Fiscal Agent Contact: Ray Grosenbach		
District, Charter School or ESD: Tigard-Tualatin School District		
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Superintendent: Ernie Brown		
District or ESD: Tigard-Tualatin School District		
Address: 6960 SW Sandburg St		
City: Tigard	State: OR	Zip: 97223
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	Participating High School or Middle School Name (add additional rows as needed)	Lead Contact Name	Grade Levels	Student Enrollment
1.	Tualatin High School	Darin Barnard	9-12	1841
2.	Tigard High School	Andy Van Fleet	9-12	1946
3.	Twality Middle School	Carol Kinch	6-8	1012
4.	Fowler Middle School	Dan Busch	6-8	805
5.	Hazelbrook Middle School	Eric Nesse	6-8	1016
6.				
7.				
8.				
9.				
10.				

A. Project Abstract

In this project, Tigard-Tualatin School District (TTSD) will establish a new Manufacturing Program of Study (POS) at Tigard and Tualatin High Schools. The POS will be developed with local industry partners, Portland Community College, the South Metro-Salem STEM Hub and municipal and non-profit partners. Pathway courses and experiences will align with industry requirements, carry dual credit, articulate to PCC manufacturing certifications and AA degree programs, lead to an industry credential (Certified Production Technician) and provide a foundation for four-year university professional programs. Middle school STEM classes will build interest for the high school pathway. A new Technical Math course, carrying dual credit, will provide a high-interest, hands on curriculum integrated with the pathway. High school students and industry representatives will recruit students to the new pathway through in-classroom, hands-on activities at the middle schools. Students in the manufacturing pathway will participate in work readiness activities, job shadows, and internships coordinated by local workforce development partner Worksystems. Lastly, students will have additional extracurricular opportunities through Skills USA, a career and technical student organization.

B. CTE Revitalization Grant Vision Participating schools will be: Fowler, Hazelbrook and Twality Middle Schools, and Tigard High (THS) and Tualatin High (TUHS). CTE programs currently operating in the high schools are: Computer Technology (THS, TUHS), Digital Arts (THS, TUHS), Communication Journalism (THS), Marketing (THS, TUHS), Early Childhood Education (THS,TUHS), Mechanical Technology [Automotive] (THS), Culinary (TUHS) and Accounting and Finance (TUHS).

Project Design: School, community and industry partners have identified manufacturing as the highest priority area for CTE development. In this project, we will develop a new CTE Program of Study (POS) in Manufacturing at Tigard and Tualatin High Schools. Target enrollment in pathway courses is over 180 students in 2017-18 and over 240 by 2018-19. Middle school STEM and "maker" classes will provide students with opportunities to experience a wide variety of projects and processes which will build interest for the high school pathway. A new Technical Math course, carrying dual credit, will provide a high-interest, hands on curriculum integrated with the pathway. This will be available to students in a variety of other CTE pathways, strengthening CTE programming overall.

The Manufacturing pathway itself will initially include four courses, with the planned development of a 6 course (3 credit) pathway within three years. The curriculum will be developed with input from local industry partners and in association with PCC to ensure relevance to industry needs, academic rigor, and articulation to post-secondary certifications and two-year and four-year degrees. Students will also earn the Certified Production Technician industry certification. Courses will carry dual credit. Pathway students will complete job shadowing and internships with local industry partners coordinated and supported by Worksystems. Worksystems staff will also build industry partnerships to work in classrooms and

develop and support student placements. Industry resources will be integrated and shared with teachers via the South Metro STEM Hub Oregon Connections database.

The POS will meet the needs of a wide variety of students and prepare students for post-high school entry level manufacturing jobs, community college certification programs, Associate degrees and four-year college programs in engineering, digital design and related fields. Special emphasis will be placed on recruiting students of color and girls (traditionally underrepresented in skilled manufacturing). The program will be strengthened with the establishment of Skills USA chapters. Outcomes that address CTE Vision include:

1) An innovative experiential and hands-on curriculum and experiences spanning middle school and high school, coupled with out-of-school on-the-job experiences, incorporating the experience of an array of experienced industry, post-secondary, and non-profit partners.

2) Strong integration of middle school curriculum, high school curriculum, industry experience and extracurricular opportunities. The project will also build strong integration between partners.

3) Expansion and growth of CTE programs and students served. The program will develop a new CTE Manufacturing pathway at both high schools, expected to serve a minimum of 180 students in 2016-17 and 240 at full capacity.

4) Significantly increased experiential learning opportunities through hands-on middle school courses; a new, project-based math course; an experientially-based pathway of manufacturing courses; and experiential learning opportunities with industry partners.

5) Pathways leading to high-wage, high demand jobs. Manufacturing jobs pay 10% above the national average for all jobs, with an expected need for over two million additional skilled workers in the next decade.

6) The project will change the way all students experience CTE by a) providing a wide range of hands-on STEM experiences in middle school, b) offering a high-interest course pathway appealing to a wide variety of students, c) offering a new Technical Math class aligned with CTE curriculum, d) integrating on-site experiential opportunities with industrial partners, and e) providing multiple pathways to high wage jobs.

We expect that these elements of the program will make it interesting and rewarding for all students, including underserved students. In addition to the above, though, the project will change the experience of CTE for historically underserved students by a) recruiting underserved students CTE pathways in middle school through STEM classes and presentations from CTE students and industry representatives including ethnically and gender-diverse role models, b) expressly linking coursework, in-school and out of school experiences to career opportunities, c) promoting family involvement and engagement, d) maintaining a close working relationship with the Multi-Cultural Counselor as a resource to families in educational planning, e) offering academic support in a variety of ways including afterschool tutoring, and f) providing a dual-credit counselor for college and career planning.

C. Partnerships The past spring, local manufacturing businesses and the Tualatin Chamber (representing a number of other local manufacturing-based business) approached TTSD about the need for skilled, local workers and with an offer to work together. The group met through the summer and fall to develop a plan for a new CTE Manufacturing Program of Study. Partners are:

Partner	Correlation to Manufacturing Jobs
Sunset Manufacturing, Charlie Hopewell, President	Local manufacturing industry employer
Western Precision Products, Inc., Bill Mullins, President	Local manufacturing industry employer
LAM Research Corporation, Cheryl Laird, Executive Administrator	Local manufacturing industry employer
World of Speed, David Schaeffer,	Local non-profit providing education for local schools,

Executive Director	organizations and groups focusing on the automobile industry including manufacturing
Worksystems, Reese Lord, Senior Project Manager	The Workforce Investment Board serving the City of Portland, Multnomah, and Washington Counties supporting workforce development for manufacturing and other sectors.
Portland Community College, Beth Mollencamp, Dual Credit Program Manager	Represents PCC's dual credit CTE program, including potential manufacturing dual credit options.
South Metro STEM Hub; Melissa Dubois, Executive Director	Coordinates and leverages STEM resources for K-12 to develop career ready workforce
City of Tualatin, Mayor Lou Ogden, Sara Singer, Deputy City Manager	Represents the interests of local businesses including manufacturing
City of Tigard, Lloyd Purdy, Economic Development Manager	Represents the interests of local businesses including manufacturing
Tualatin Chamber, Linda Moholt, Executive Director	Represents the interests of local businesses including manufacturing

Partners articulated workforce needs as well as specific skills and competencies required. They reviewed and further developed the initial pathway, identified curriculum areas of focus and content, and confirmed their roles in the project. These will be:

Partner	**Role**
Sunset Manufacturing	Participate in curriculum development, orient teachers to skill needs, partner with teachers in classrooms, serve on local and regional boards, participate with Chamber to bring more businesses to the table, on-site opportunities including internships
Western Precision Products, Inc.	Provide opportunities for students including in-class presentations, tours of facilities, and on-site experiences including visits, field trips, job shadows and possible internships
LAM Research Corporation	Participate in manufacturing career related events, orient teachers to skills and competencies required by industry, advise on curriculum design, offer tours of facility, provide opportunities for on-site learning such as field trips, site visits, job shadowing and internships
World of Speed	Approach and involve partners in the automotive industry, provide hands-on opportunities to CTE students, offer on-site educational experiences, provide access to WOS educational events, provide venues for project activities and Partnership showcase, participate as a member of the Project Advisory Team
Worksystems	Provide labor market information, convene Regional CTE Advisory Board, business and industry outreach, curriculum consultation and workforce preparation modules including Tooling U module, industry experiences for youth including Summer Internships.
South Metro STEM Hub	Serve as a member of the Project Team; identify new local partners; coordinate Oregon Connections, provide resources for teachers for STEM

	curricula and project-based learning, promote awareness of career pathway opportunities, promote training and internship connections
City of Tualatin	Identify new local partners and invite them to participate, increase access to STEM learning resources, promote awareness of career pathways and CTE opportunities, promote training and internship opportunities with local employers
City of Tigard	Participate as a member of the Project Advisory Team, identify new potential business partners and facilitate project partnerships; advise on development of manufacturing pathway in relation to needs of employers, assist in the identification of on-site learning opportunities for youth in pathway
Tualatin Chamber	Project Advisory Team membership; provide linkage to other industry partners; provide industry events appropriate for students (Career Fair for middle school parents and students, Career Fair for high school students, industry site visits and tours for admin., staff and students
Portland Community College	Collaborate to develop a new Program of Study in Manufacturing, provide training for teachers to assure alignment through dual credit, provide Validation of Participation through PDU or CEU certificates, work in collaboration with PCC faculty and/or industry to assure that training meets industry needs

Project partners are committed to identifying and involving additional partners to strengthen the project and expand opportunities for students. This project involves extensive development and will be fully implemented over a period of three years. TTSD will rely heavily on these partners, who will become the Project Advisory Group, throughout project implementation, which will extend two years beyond the grant period.

The project partnership provides strong opportunities for historically underrepresented students. Worksystems, provides college preparation, career exploration, work-readiness training and work experience with an emphasis on underrepresented students. Of youth receiving services from Worksystems, 97% are low income and 71% are students of color. PCC serves a highly diverse student population. PCC's dual credit program provides opportunities that are especially important to underrepresented and low-income students who may otherwise have barriers to college and career training programs. Our industry partners have articulated a strong

commitment to underrepresented students. As part of the project, will identify and use diverse role models and mentors for students in the pathway.

The partnership with PCC offers opportunities for increasing the number of articulated credits students may receive. Students in the two-credit Manufacturing pathway will earn a minimum of 12 dual credits applicable to a number of PCC manufacturing certificate programs, the Associate Degree in Machine Manufacturing Technology, and eligible for transfer to four-year universities. When the three-credit pathway is complete, student will earn 18-21 dual credits.

D. Project Outcomes—follows narrative

E. Evaluation Progress Markers and Results—follows narrative

F. Activities and Timeline—follows narrative

G. CTE Program of Study Design This project will lead to the creation of a new CTE program of study in Manufacturing at both Tigard and Tualatin High Schools. Initially, the pathway will be a four-course, two credit sequence consisting of Intro to Engineering, Computer-Aided Design, and Digital Design and Fabrication 1 and 2. A new Technical Math class will be developed as part of the pathway, although students may also take the traditional math sequence. This will be expanded to a six-course, three credit sequence by 2017-18.

Intro to Engineering and Computer Aided Design, currently taught Tualatin High School, both carry dual college credit. These courses will be added at Tigard High School starting next school year. Digital Design and Fabrication 1 and 2 (to be developed collaboratively with PCC to carry dual credit) will be added at Tualatin High next year and at Tigard the following year. Technical Math will be developed in association with PCC for dual credit and will fulfill high school graduation requirements and also the math requirement for many PCC certification

programs. It will be offered Tualatin High in 2016-17 and at Tigard High in 2017-18. Courses will be aligned to overarching Common Core State Standards in Literacy and Math, as well as Oregon Department of Education Career and Technical Education Standards including the Oregon Skill Sets Manufacturing Production Process Development. Two further pathway courses will be developed for 2018-19.

Courses will explicitly reflect industry standards. The Columbia-Willamette Regional Workforce Collaborative's Common Performance Expectations Subcommittee developed a set of regional standards for academic, technical and employability skills for curriculum, instruction and assessment in CTE programs, including standards for manufacturing pathways. These will be used as foundational competencies for curriculum development. Pathway courses, and associated industry experience, will align with PCC's Machine and Manufacturing Technology courses and certifications and dual credit course offerings. Employability skills will be directly taught and woven into the curriculum as well as through industry experiences. Lastly, as part of pathway curriculum, students will complete requirements for the industry certification of Certified Production Technician (CPT). Certification preparation will be partially accomplished through Tooling U, an online, industry-aligned modularized curriculum.

Students completing the pathway will be well prepared for education beyond high school. Courses will be well aligned with community college manufacturing certificates and degrees with direct articulation to PCC, as well as with four-year programs including Oregon Institute of Technology and other Oregon universities. Students in the pathway will earn 12 dual credits, giving them a jump start on both certification and degree programs, and 15-18 dual credits upon full pathway implementation. Lastly, pathway teachers and middle school STEM teachers will

participate in significant professional development, including industry exposure and partnership, and will jointly develop and update curriculum.

This design addresses the CTE Revitalization vision in many ways. It is innovative in that initial hands-on experiences start in middle school. It integrates middle school, high school, post-secondary courses and credits, and the contributions of diverse industry, education and workforce development partners. The pathway will significantly expand and grow our CTE program and the number of students served, and will provide continuous experiential learning opportunities beginning in middle school and reinforced by out-of-school. Lastly, it builds a career path to manufacturing jobs, a high wage high demand occupation.

We will seek approval for the Manufacturing pathway as an ODE approved CTE program, likely in 2017-18 The program will meet the Foundation Criteria: minimum CTE offering of 2 credits; aligned to high-wage, high demand pathways; aligned to industry-recognized standards; and equitable access and continuous improvement. Program design and curriculum will incorporate the Five Core Elements: Standards & Content, Alignment & Articulation, Accountability & Assessment, Student Support Services and Professional Development. TTSD will ensure that the Manufacturing teacher holds an appropriate CTE endorsement.

The program is designed to be culturally responsive to meet the needs of historically underserved populations. Firstly, it will be a hands-on series of courses beginning with middle-school STEM classes of interest to a wide range of students including those who have been traditionally underrepresented. Students will engage with ethnically and gender-diverse role models. Family involvement and engagement will be promoted through extensive

communication with families, events such as STEM nights, Career Fairs and CTE Showcases, and working closely with the Multi-Cultural Counselor for communication and problem solving.

H. High Wage and High Demand Occupations The proposed project will prepare students for skilled manufacturing jobs. Targeted career areas within skilled manufacturing include but are not limited to: assemblers and fabricators; computer numerical control (CNC) Operator; grinding and polishing workers; inspectors, machine operators; production workers; tool & die makers; and welders, cutters, solderers and brazers.

The Oregon Business Plan identifies manufacturing as a fast-growing industry critical to Oregon's economy. The Oregon Employment Department lists multiple manufacturing jobs as high wage and in high demand, including Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic Layout Workers, Metal and Plastic Model Workers, Plant and System Operators, Stationary Engineers, Boiler Operators, and Tool and Dye Makers.

Manufacturing is a rapidly growing sector of the regional economy. Worksystems, the Workforce Investment Board serving Multnomah and Washington Counties, reports:

> *With 87,000 regional workers, a 10-year projected growth rate of nearly 20%, and significant openings due to retirements, Advanced Manufacturing is one of the region's largest and fastest growing industry sectors and a major contributor to the health and vitality of the local economy.* (Worksystems 2014 Industry Sector Report: Advanced Manufacturing)

The report notes that this growth will be led by Washington County, accounting for four out of 10 new jobs. The median wage for advanced manufacturing is $23.04/hr (2012), almost 1.5 times that of all industries**.** The average annual wage of $79,369 exceeds the regional average by 58%.

Students, parents and the community will receive information about the pathway and manufacturing occupations though a number of channels. Information about manufacturing and other CTE careers will be: a) an explicit part of middle school class instruction, b) shared by

middle school counselors with students prior to forecasting and communicated during forecasting, c) shared at school programs (e.g. Back to School Night, Career Day), school newsletters, flyers and other communications d) communicated through industry partners working in classrooms, and e) further highlighted and reinforced through participation in industry and education events such as the recent Manufacturing Day which was attended by students from both high schools.

In addition, parents and students will receive regular communications about the purpose of this and other career pathways at 8th grade transition nights, at back-to-school nights, at family middle school STEM nights, as part of the course forecasting process and in course handbooks. CTE opportunities, including opportunities to talk with CTE teachers and tour classrooms, will be publicized in school newsletters and in flyers and posters. CTE pathways, including the Manufacturing pathway, will also be shared at the District PASS meeting, a district-wide meeting of parents of color.

I. Equity Two important objectives of the project are to 1) increase the overall number of students enrolled in the skilled manufacturing pathway, 2) increase the percentage of students of color enrolled, and 3) increase percentage the number of girls enrolled. TTSD already makes extensive efforts to recruit students of color and females into CTE courses. Of existing pathway courses (Intro to Engineering, CAD and Robotics), all offered at Tualatin High School), 26% of enrollees are students of color. The gap is greater for girls—18% of enrollees are female.

Recruitment of historically underserved students: Firstly, the project will provide coursework of high interest to a wide range of students. This process will begin in Middle School. Hands-on Middle School STEM classes have already begun attracting girls and students of color at higher rates. For example, in Twality Middle School, 37% of students are students of

color and 50% are female, significantly higher percentages than in traditional STEM electives. Middle school STEM teachers will explicitly make linkages to STEM careers, including manufacturing, and to CTE pathways. Secondly, students in the Manufacturing pathway will make presentations in middle school STEM and other classes which will include hands-on activities. High school student presenters will explicitly include females and students of color as role models. Presentations will also be made in AVID classrooms, which include a high proportion of underrepresented and female students. Our industry partners are highly committed to equity and will assist by providing diverse role models and mentors. For instance, the recent Manufacturing Day featured a female presenter and a presenter who had come to manufacturing through a non-traditional pathway. In addition, middle school counselors have a good understanding of CTE programming and will encourage interested students to forecast for appropriate courses.

The project will provide support for underserved students through 1) a new, hands-on math course integrated with CTE pathways, 2) afterschool tutoring offered at both high schools, 3) a robust RTI system to identify students in need of interventions and match them with services, and 4) Dual-Credit counselors to serve students who may be struggling and work with the student, staff and family to ensure success.

The project will retain underserved students through high-interest classes where students will design and produce a variety of automated and non-automated products, the award of dual credits, industry certification (Certified Production Technician) extracurricular opportunities including Skills USA and robotics, out-of-school opportunities, and diverse role models and mentors throughout the program.

J. Diploma Connections The Manufacturing pathway supports the Oregon diploma, including Oregon's 40-40-20 goal. Manufacturing offers a rewarding and high-wage career for individuals with a variety of education levels with significant numbers of skilled workers needed at every entry point. Nearly two-thirds of the sector's jobs have entry paths of less than an Associate degree (Worksystems 2014), with the majority based on industry certifications. One third or more require education at the Associate level or a four-year college program of study, leading to high wage careers such as digital design and manufacturing engineering.

Worksystems has engaged local industry in supporting the Certified Production Technician as an initial certification of a candidate's foundation manufacturing skills and knowledge. The District will incorporate the Certified Production Technician (CPT) credential preparation in the Manufacturing Program of Study. Preparation for the credential will be done facilitated by Tooling U, a new online, modularized training program which will be incorporated into the pathway. It is expected that students will be able to complete the full CPT credential process as part of the course pathway. A full assessment of how certification competencies will be distributed among pathway courses will be made as the curriculum is developed.

In discussions, industry partners have repeatedly emphasized that technical skills are not enough. Students need all important workplace "soft" skills including professionalism, teamwork, collaboration and problem solving. Through Worksystems programs, youth will participate in activities to build these job readiness skills including resume development, mock interviews, attending career fairs, orientations to job-site expectations, job shadows and summer internship experiences.

Students will receive academic support to meet core academic requirements through high-interest, hands-on coursework in middle and high school; a new, hands-on Technical Math

course; after-school tutoring at both high schools; TTSD's longstanding Response to Intervention system which identifies students in need of interventions and matches them with services; a school-wide instructional emphasis on Constructing Meaning strategies to enable all students to successfully access content: and dual-credit counselors at each high school.

Students' CTE experience will be planned and personalized through student planning with dual credit counselors as well as through the Naviance College and Career Readiness platform, used by Tigard and Tualatin high schools. Using Naviance, students create a plan for by identifying strengths and learning styles and explore college and career options.

In summary, the project will address the needs of underserved students by 1) increasing the number and percentage of students of color and girls in pathway courses through high-interest classes and targeted recruitment, 2) providing a high-interest, hands-on path of coursework, including a new Technical Math class, 2) providing academic support via tutoring, school-wide strategies and a dual credit counselor to ensure the success of unrepresented students, and 5) offering a pathway for multiple entry points to manufacturing jobs.

K. Sustainability The project is designed for sustainability. Specific strategies and plans are:1) TTSD has made a commitment to maintain the new Manufacturing Pathway teacher position after the grant ends 2) Supporting courses (e.g. Technical Math) will be taught by existing teachers. 3) We will apply for certification as a CTE program eligible for ongoing Perkins funds. Perkins funds will assist with the need for future upgrades of supplies and equipment. 4) Worksystems and partners are negotiating for volume discounts for licensing of Tooling U. It is expected that the cost will decrease significantly in the next two years and become sustainable, 5) Also over the course of the grant, partnerships will increase exponentially. TTSD and Worksystems will work with local industrial partners to develop job shadowing, internship and

other experiences which can be sustained by existing High School College to Career Counselors. 6) We will partner with Worksystems, industry, regional and municipal partners to maximize all potential sources of workforce development funds, and 7) we will continue to provide ongoing training for Middle School STEM teachers and the High School CTE teachers as part of the TTSD's STEM Implementation plan which includes significant professional development.

Partners will support sustainability with the following roles: TTSD will be responsible for the CTE teaching position, essential to the continuation of the program. PCC will be an on-going partner in developing and providing dual credit classes in the Manufacturing pathway. Industry partners will provide on-going job shadow and internship opportunities as well as classroom partnerships. The cities of Tigard and Tualatin, as well as the Tigard Chamber, will identify and involve new partners. We will work together with Worksystems and our industry, municipal and regional partners to maximize all possible sources of funding to provide on-the-job experiences for pathway students. Southeast Metro STEM Hub will provide on-going professional development, identify and involve new partners, and share information about partner interests and capabilities through the Oregon Connections database.

L. Communication Students will receive regular communication about career pathway options. The Manufacturing pathway, as well as other STEM-based pathways, will be woven into middle school class instruction, part of planning conversations middle school counselors conduct with students prior to forecasting. Information will be explicitly shared during forecasting course selection for middle and high school students, through industry partners working in classrooms, and through participation in industry and education events such as the recent High School Manufacturing Day.

Parents will receive regular communications at 8th grade transition nights, at back-to-school nights, family middle school STEM nights, as part of the course forecasting process, and in course handbooks. CTE opportunities, including opportunities to talk with CTE teachers and tour classrooms, will be publicized in school newsletters and programs. CTE pathways and opportunities, including Manufacturing will also be shared at the District PASS meeting, a district-wide meeting of parents of color.

TTSD's newly adopted STEM Plan includes significant professional development for school staff. This will include a focus on integration of STEM learning, STEM activities and STEM career paths. Teachers will highlight STEM career paths in lessons, activities, field trips and in-classroom partnerships with industry. Partnerships developed though this grant will significantly increase the number of industry partners in classrooms, all of which will increase school staff's knowledge of STEM careers and ability to communicate opportunities to students and families. The District will also announce the new CTE manufacturing pathway to all staff and provide information about it, raising awareness of this new opportunity.

Communication with the community will be facilitated by community partners, including industry partners, the Tualatin Chamber, the City of Tualatin, and the City of Tigard. All of these organizations have been very active in promoting the purpose of career pathways and made the initial approach to the school district with concerned about needs for skilled workforce in the community. Students, staff and industry partners will share information in a variety of community and business venues, with student presentations being an important part of communication about the Manufacturing and other CTE programs.

V. Bonus Narrative (Optional)

A. Career and Technical Student Organizations

As part of this new pathway, and to support existing CTE pathways, Tigard and Tualatin High Schools will start chapters of SkillsUSA. SkillsUSA is a partnership of students, teachers and industry working together to ensure a skilled workforce.

With a focus on professional development, community service and becoming career-ready, Skills USA will provide an important extension of the CTE manufacturing program, as well as for related CTE pathways. Participation will strengthen students' CTE experience and provide important opportunities for learning, connections to industry, interaction with students, staff and community professionals with similar interests, and leadership. In addition, as a nationally-based Career and Technical student organization, Skills USA offers regional and national events which will provide new and increased opportunities for our students.

We will identify staff advisers and recruit students to join this organization in January 2016 in order to have leaders identified by fall 2016. The aim will be to have a cadre of students ready to lead recruitment at Club Rush in the fall (when students first learn about and sign up for student clubs). Skills USA students will play a key role in raising awareness of skilled marketing the CTE program and specifically the Manufacturing program. Through Skills USA's Student2Student program, they will be leaders in presentations to middle school students introducing them to skilled technical career options, as well as serving as CTE ambassadors to other high school students.

B. Middle School Component

Each middle school offers at least one STEM or "maker" class. At Twality, the STEM class teaches scientific principles through hands-on projects in the areas of wind power, solar power, bridge/tower constructions and electronic circuits. Fowler offers Robotics using computer science, technology and engineering to design, build, and operate robotic devices. At Hazelbrook, an Engineering course includes 3D design and the study of land and air vehicles using hand, machine and computer controlled tools.

These classes are already attracting enthusiastic student interest. However, they are hampered by lack of equipment. For instance, most only have one 3-D printer which can create long waits. New equipment would allow for significant expansion and extension of experiential learning. In this project, we will purchase new equipment including 3-D printers, laser engravers, vinyl cutters and wind tunnels. Teachers will receive professional development time during the summer to create new curriculum modules and to plan with high school teachers for curriculum articulation. Middle school classes will be well integrated into the overall program and will lead naturally to the first two courses in the sequence (Intro to Engineering and CAD). Middle school teachers will explicitly communicate CTE opportunities including the new Manufacturing pathway.

The middle school component supports the CTE Revitalization vision by providing an innovative entry point to the pathway, 2) integrating middle school and the high school CTE pathway curriculum, 3) expanding the number of students enrolling in CTE pathways by developing interest and providing career exploration at an early stage, 4) providing extensive experiential learning (all classes are build around experiential learning), and 5) creating interest leading to entry into high school CTE pathways leading to high-demand, high–wage jobs.

C. Out of School Time Programming

Students in the pathway will have a variety of opportunities for out-of-school and on-jobsite experiences with manufacturing partners. Beginning in middle school, students will participate in field trips to industry partners, afterschool and family programs such as STEM Night and Career Night, and through opportunities to attend local events such as Robotics and other STEM competitions.

High school students in the pathway will have multiple opportunities to visit job sites, including field trips (multiple partners have offered individual and group tours to students, attendance at local and regional industry events such as Manufacturing Day, job shadowing, and internships). Through Worksystems, youth will participate in a 6-9 week paid work experience. As part of the program, youth build job readiness, teamwork and problem solving skills through creating resumes, participating in job interviews, attending job-site orientations, and on-the-job modeling and mentoring.

Lastly, students will have a variety of extracurricular opportunities through SkillsUSA which will meet afterschool. Skills USA offers experiences at the local, regional and national level, including the Student2Student Ambassador program.

D. Focus on Regional, Statewide or System Changes

The South Metro STEM Hub, Worksystems, and Portland Community College, all regionally-based, are partners in this project and long-term members of the Project Advisory Council, connecting the project to larger opportunities as they arise and sharing our work with others in the region. Partnerships with The Tualatin Chamber, City of Tualatin and the City of Tigard's Economic Development office will ensure that the project closely connects to local,

municipal and regional economic development priorities. TTSD will also participate as a member of the Regional CTE Advisory Board.

The project will benefit school district and industry partners within the Southwest Metro STEM Hub. As part of the project, Worksystems will identify industry partners interested in and willing to work with schools to provide in-school and out-of-school learning as well as job shadow and internship opportunities. Partnerships will include but not be limited to field trips/site visits, classroom speakers, curriculum advisors, career fairs, CTE club/team mentors and on-site experiences for students. Industry partners will be profiled in Oregon Connections, operated by the South Metro STEM Hub. Through Oregon connections, TTSD teachers and those in our partnering districts can create a request based on an in-classroom or afterschool STEM topic or activity that can benefit from an industry connection. Oregon Connections matches the skills of industry professionals with the teacher's request New partners generated by the project will be added to Oregon Connections making information accessible to teachers in all partner Hub districts. This will also be helpful to industry partners, many of whom would be happy to provide career-related services in schools but do not know how to communicate this interest. The process will develop a sustainable and trackable methodology for connecting with industry partners across the region.

Project Outcomes and Progress Measures

Identify at least five outcomes and their measures that describe what will be achieved or accomplished with the help of this project. Outcomes should be measureable, manageable, and meaningful. The measurement of progress and expected results constitute your evaluation plan.

Project Outcome – These should focus beyond the life of the grant funds and be measureable, manageable, and meaningful. There must be at least one outcome in each of the five areas. For ease of reference later in the application, you may wish to number each outcome.
Progress Markers – Include specific methods you will use to measure short-term progress toward the outcome. Measurement can be qualitative and quantitative. More than one measurement can be used in each outcome.
Expected Results – Include specific results you would expect for the progress measurements if the project is successful. These should be realistic and ambitious.

Area 1 - Improved and sustainable partnerships with business, industry, labor, and educational providers.		
Project Outcome	**Progress Markers**	**Expected Results**
1.1 Increase the number of identified industry partners to 20+ over the period of the grant	10+ industry partners by 9/16 20+ industry partners by 8/17	Minimum of 20 industry partners actively engaged over the period of the grant
1.2 A minimum of 10 Industry partners will participate as members of the Project Advisory Council throughout the grant and beyond.	7 industry partners commit to membership in the Project Advisory Team by 1/17 10+ partners members by 8/17	Minimum of 10 industry partners participating as members of the Project Advisory Council
1.3 A minimum of 3 industry partners will participate in pathway articulation and curriculum development to ensure that pathway prepares students for industry standards	3 industry partners participate in curriculum development sub-group Curriculum is reviewed by all industry partners on the Project Advisory Team	Partners will continue to participate in pathway articulation and curriculum development after the grant period is over
Area 2 – Improved student access to CTE programs of study with particular attention to historically underserved students.		
Project Outcome	**Progress Markers**	**Expected Results**
2.1 Develop a CTE Manufacturing Program of Study to serve 180	Equipment installed in five schools by 8/16	4 course path implemented at Tualatin High in 2016-17 and Tigard High 2017-

students in 2015-16 and 240 in 2016-17.	Courses 2016-17 available for forecasting by 3/16 Planned 2016-17 courses implemented 9/16 Planned 2017-18 courses implemented 9/17 Full 6 course pathway implemented at both schools 2018-19 9/18	18 (for all four courses), full six course path implemented in 2018-19
2.2 Increase the percentage of students of color in pathway courses from 26% to 35%	Increase from 26% to 30% of all students enrolled in 2016-17 Increase to 35% of all students enrolled in 2017-18	35%+ of students enrolled in pathway courses in 2017-18 will be students of color
2.3 Increase the number of girls in pathway courses from 18% to 35% by end of the grant period and 50% by 2018/19	Increase from 18% to 25% of all students enrolled in 2016-17 Increase to 35% of all students enrolled in 2017-18	50% of students enrolled in pathway courses in 2018-19 will be girls
Area 3 – Increased rigor in technical and academic content alight to diploma requirements, industry-recognized technical standards such as the Oregon Skill Sets, and employability skills.		
Project Outcome	**Progress Markers**	**Expected Results**
3.1 Develop and implement dual-credit Technical Math course in conjunction with PCC	Technical math in course handbook for forecasting by 3/16 Fulll course developed by 8/2016 Technical math course implemented at Tualatin High School 2016-17 and Tigard High School 2017-18	Technical Math offered at both high schools in 2017-18
3.2 Develop and implement Digital Design and Fabrication 1 and 2 based on Common Core State Standards in Literacy and Math, Oregon Skill Sets for Manufacturing; and identified industry standards. This will be done in association with PCC as a dual credit	Digital Design and Fabrication 1 and 2 in course handbook by 3/16 Courses fully developed by 8/2016 Digital Design and Fabrication 1 and 2 implemented at Tualatin High School 2016-17 and Tigard High School 2017-18	Rigourous technical Program of Study fully implemented by end of year 2017-18.

sequence.		
Area 4 – Increased student awareness of career opportunities through exposure to employers.		
Project Outcome	**Progress Markers**	**Expected Results**
4.1 Increase the number of partners providing in-school and out-of-school learning opportunities to 40+ as measured by profiles in the Oregon Connections database	20_{+} community partners providing in-school and out-of-school opportunities in 2016-17 40+ community partners providing in-school or out-of-school opportunities over the life of the grant	40+ community partners providing in-school and out-of-school learning opportunities to 40+ as measured by profiles in the Oregon
4.2 With industry partners, develop 25+ internship opportunities for students in the manufacturing pathway	25+ internships offered in 2017-18	25+ ongoing internship opportunities developed
4.3 Over 250 students will attend CTE pathway related career related events such as Manufacturing Day or CTE Student and Family information programs/career nights.	100+ students attend in 2016-17 100+ students attend in 2017-18	Strong, continuous student interest in and participation in the manufacturing pathway evidenced by 100+ students per year attending out-of-class events.
4.4 Students will receive over 360 exposures to industry professionals both in the classroom and out of the classroom in 2017-18 and 720 2018-19. Exposure is defined as attendance at a presentation by industry professional, Manufacturing related school event, field trip or industry event, or job shadow/internship.	360 exposures in 2017-18 720 exposures in 2018-19	720+ exposures yearly ongoing
Area 5 – Improved ability to meet workforce needs in the region with a focus on high wage and high demand occupations.		
Project Outcome	**Progress Markers**	**Expected Results**
5.1 60+ students per year will complete the CTE Manufacturing pathway beginning in 2017-18	180 students enrolled in pathway courses in 2015-16 240 enrolled in pathway courses in 2016-17	60+ students complete pathway in 2017-18 and onwards

5.2 Students completing pathway will graduate with 12 articulated dual credits to PCC Mechanical Engineering certificates and Associate (18 dual credits when full pathway is established).	Continue Intro to Engineering and Computer Aided Design carrying joint credit Develop Technical Math course Develop Digital Design and Fabrication 1 and 2 carrying joint credit	A total of 12 articulated dual credits will be available to students at Tualatin High school in 2015-16 and to Tigard High Students in 2016-17. 18 Dual credits will be available beginning 2017-18.
5.3 Students will be hired into high-wage, high demand jobs	Beginning in 2018-19, 75%+ of program students will enter manufacturing jobs, manufacturing credentialing programs, or college programs in a related field of study based on student report at the end of the year	Ongoing, 75%+ of program students will enter manufacturing jobs, manufacturing credentialing programs, or college programs in a related field of study based on student report at the end of the year

Appendix G – Activities and Timeline

Activities and Timeline

Describe the specific activities associated with the attainment of each of the project outcomes in the table in Appendix F.

Activity – Activities may include planning and implementation. The project should have significant implementation activities by Fall 2016.
Outcome(s) addressed – List the specific outcomes or areas of outcomes related to the activity. These can be listed by the numbers from the table in Appendix F.
Timeline – Indicate the beginning and ending month and year for each activity.
Person(s) responsible – Indicate the names, positions, or groups that will be responsible for making sure the activity will be accomplished within the proposed timeline.

Activity	Outcome(s) addressed	Timeline	Person(s) responsible
Hire Project Coordinator	all	1/16-2/16	TTSD Assistant Superintendent
Meet regularly with partners through Project Advisory Council	1.1,1.2,1.3	1/16 onwards	TTSD Assistant Superintendent, Project Coordinator, Math/Science TOSA, Project Management Advisory Committee
Establish curriculum develop sub-group including TTSD teachers, PCC, industry and other partners	3.1,3.2		TTSD Assistant Superintendent, Project Coordinator, Math/Science TOSA, Manufacturing teacher (when hired), PCC Dual Credit Manager, Sunset Manufacturing, other industry partners,

			Worksystems
Order equipment for middle schools and high schools	2.1,3.2	2/16-3/16	Project Coordinator
Install equipment	2.1,3.2	3/16-4/16	Project Coordinator, Facilities Department, participating schools
Identify/hire Manufacturing teacher. If selected candidate meets industry experience criteria but lacks k-12 educational certification, develop plan for obtaining certification.	2.1,2.2,2.3,3.1,3.2,4.1, 4.2,5.1,5.2	2/16-6/16	TTSD Assistant Superintendent, hiring committee, TTSD Human Resources Director
Develop curriculum for Technical Math Class	3.1,.3.2	3/16-8/16	Identified math teacher, Math/Science TOSA, PCC Dual Credit Program Manager
Ensure new classes are in course catalogs for forecasting	3.1,3.2	3/16	Identified math teacher, Math/Science TOSA, PCC Dual Credit Program Manager
Begin SkillsUSA group at both high schools	4.1,4.3,4.4	3/16-6/16	Teacher Advisors
With PCC, develop curriculum for Digital Manufacturing 1 and 2 as dual credit courses	3.1,.3.2	3/16-8/16	Project Coordinator, Math/Science TOSA, PCC representatives, Manufacturing teacher
With local industry partners, develop and offer up to 25 summer opportunities for students in current CTE Manufacturing pathway courses (Engineering 1 and	4.2,.4.3,.4.4	3/16-5/16	Worksystems, in coordination with Project Coordinator

Computer Aided Design).			
Communicate new Manufacturing pathway and classes to students, staff, parents and community	3.1,3.2,4.1,4.2,.4.3,4.4,5.1,5.2,.5.3	3/16 ongoing	Project Coordinator, Manufacturing teacher, high school and middle school counselors and administration
Provide professional development for middle school STEM teachers and middle school administrators to 1) incorporate new experiential learning and use of new equipment and 2) increase awareness of career pathways	2.1,2.2,2.33.1,3.2	6/16-8-16	Middle school teachers, Math/Science TOSA, additional trainers
Begin offering Technical Math, Digital Design and Fabrication 1 and 2 at Tualatin High School	3.1,3.2	9/16	Manufacturing teacher, identified math teacher
Begin offering Engineering 1 and Computer-Aided Design at Tigard High Schools	3.1,3.2	9/16	Manufacturing teacher, identified math teacher
Continue refining Manufacturing curriculum	3.1,3.2,5.1,5.2,5.3	9/16-6/17	Project Coordinator, industry partners, Math/Science TOSA, PCC representatives, Manufacturing teacher
With industry and higher education partners, identify additional courses in the sequence to be developed	3.1,3.2,5.1,5.2,5.3	1/17	Project Coordinator, industry partners, Math/Science TOSA, PCC representatives, Manufacturing teacher
Develop curriculum for additional course in consultation with industry partners and	3.1,3.2,5.1,5.2,5.3	1/17-6/17	Project Coordinator, industry partners,

PCC			Math/Science TOSA, PCC representatives, Manufacturing teacher
With local industry partners, develop internship opportunities as well as other in-class and out-of-class partnerships	4.1,4.2,4.3,4.4	9/16-6/17	Worksystems, in coordination with Project Coordinator
With local industry partners, offer 25+ summer opportunities for students in CTE Manufacturing pathway	4.1,4.2,4.3,4.4	6/17-8/17	Worksystems, in coordination with Project Coordinator
Offer Technical Math at Tigard High	3.1	9/17	Identified math teacher
Offer Digital Design and Fabrication 1 and 2 at Tigard High	3.2	9/17	Manufacturing teacher; additional CTE FTE if needed
Offer additional pathway coursework at Tualatin High for a total of 3 credits in the pathway, consider adding addition pathway course work at THS mid-year or 2018-19 to complete 3 credit program of study at both schools.	3.2,5.1,5.2,5.3	9/17	Manufacturing teacher, additional CTE FTE if needed
With industry and post-secondary partners, continue refining and evaluating pathway, curriculum and student industry experience	3.1,3.2,5.1,5.2,5.3	9/17 onwards	Project Advisory Council