GRANT AGREEMENT – ATTACHMENT 1

MHCRC TechSmart Initiative for Student Success
Reynolds School District Grant Project Plan
Project Title: Reynolds Transformation to Constructivist Classrooms in Secondary Math
Date: June, 2015

I. Project Purpose

Serving nearly 11,000 students from five municipalities across East Multnomah County in 21 schools, the Reynolds School District strives to meet the challenges presented by rapidly changing student and community demographics. More than 40 languages are currently spoken at Reynolds High School, the second largest comprehensive high school in the State. The Reynolds School District (RSD) recently accepted the United States Department of Agriculture Community Eligibility Provision (CEP). The CEP permits school districts that meet low-income criteria to serve free lunch to every student district wide. Overall, 72% of RSD students qualify as Economically Disadvantaged. As one of an increasing number of districts made up of a majority of students of color, RSD proudly embraces the opportunities embedded within its 'majority-minority' status.

The RSD Equity Policy (http://policy.osba.org/reynolds/G/GCCB_GDCB_IKAAA%20D1.PDF), adopted by the School Board in 2013, guides every major programmatic, instructional, hiring, professional development and budgeting priority in service to the diverse student population. The District's Vision and Mission statements address the future of Reynolds students and the educational philosophy:

Vision: Each and every child prepared for a world yet to be imagined.
Mission: Each graduate embraces lifelong learning and applies skills in technology, global literacy, creativity, and critical-thinking to enhance family, career, and community.

The Reynolds School District is dedicated to closing the opportunity gap and creating learning communities that provide support and academic enrichment for all students.

There is much work to be accomplished in service to the diverse student demographics with a focus on equity. Across all grade levels, student attendance and academic achievement are underwhelming. A more detailed description of specific academic indicators is included in the Public Benefit section. The District has begun to take several necessary steps to transform instructional practice in order to improve student outcomes.

Since 2013, RSD has solicited input from numerous stakeholders to draft and adopt three important guidance documents for instructional design, implementation and assessment. They include the Reynolds Literacy Framework, Math Framework and District Technology Plan. Composed of three separate committees of teachers, administrators, community partners and other stakeholders, the

committees conducted deliberate research and discussion to compose the strategic plans to assess need, reform instructional practice and allocate the necessary resources to impact student achievement in the core competencies of reading, writing, speaking, mathematics and technology skills.

The Reynolds School Board first prioritized investments toward implementing the Literacy Framework and Technology Plan. Over the last two years, federal and local RSD funds have been invested into comprehensive and deep professional training to all teachers in order to improve student literacy. A primary focus of this work is to enhance the cultural proficiency of all professionals (teachers, administrators and classified) to conduct instructional practices in service to our burgeoning English Learners population (44% of total district wide; 45 total languages spoken). Starting in March 2015, the first cohort of 25 RSD teachers commenced earning their English for Speakers of Other Languages/Bilingual Endorsement, in partnership with the Marylhurst University Graduate School of Education and paid for by the District.

Technology is woven throughout the student and teacher instructional experience – particularly within the elementary level. Teachers record and maintain student progress through an online leveled literacy instruction, assessment and data management system. The District supported a 2:1 student iPad investment grades K-5 to increase engagement and differentiate instruction. This Spring, RSD opened to teachers a third round of technology mini-grants reserved for innovative uses of technology in the classroom. To support these teachers, the District employees two full-time Teachers on Special Assignment who serve as Instructional Technology (IT) Coaches, charged with the responsibility to inform, train, collaborate and encourage teachers to support the Literacy Framework through the use of technology.

Now completing year 2 of Literacy Framework roll-out, there is much to acclaim. Formal and informal classroom observations exemplify wide usage of District adoptions and initiatives. While student achievement has lagged as measured by meeting or exceeding state benchmarks in reading and writing, there have been robust advancements in student growth toward benchmarks. Simply put, we know students are learning because we have the systems of instruction and assessment to accurately measure their progress.

Comparable instructional reform and resource allocation in mathematics instruction is the next School Board and District priority. Effective math instruction builds upon and develops students' literacy skills and knowledge. The ***Reynolds Transformation to Constructivist Classrooms in Secondary Math project*** focuses on math instruction where it is taught as a designated core content subject at the three middle schools, 9th grade high school level at Reynolds High School. Currently, more than 3,200 students attend grades 6 through 9 in the Reynolds School District. Thirty-nine (39) certified math instructors, including Special Education math, teach math in grades 6-9.

From the breakdowns at the middle and high school levels respectively, baseline student achievement demonstrates consistent student deficit in Reynolds secondary schools – particularly pervasive for students of color and other high-risk groups (see detailed charts in the Public Benefit section). The most notable shortcoming, and therefore a specific target for this project, is 9th grade students on-track to graduate. At the end of their 9th grade year, less than half of the students have earned six or more credits. Freshmen Math (Algebra I) is the most frequent class failed by 9th graders.

The RSD Superintendent and academic directors are focused on medium and long-term academic plans and budgets to strengthen math instruction, increase student engagement and incorporate technology toward increasing math credit attainment required for graduation. Activities to date have included a technology needs study, Learning Management System (LMS) research and piloting, student data report testing and application, as well as an overhaul of secondary math instruction through framework construction.

MATH TEACHING STRATEGIES

The Reynolds Secondary Math Committee is comprised of the District Director of Secondary Education, math teachers, Instructional Technology (IT) Coach, Math Instructional Coach, and an administrator from each of the secondary schools. The Committee has focused on aligning math instruction, both in scope and sequence, across all schools and among all grade levels by establishing skill expectations and math abilities students should master as they move from one grade to the next or to another school in RSD. The scope and sequencing work is also connected to Common Core State Standards (CCSS) in math.

The Committee is in the process of building out a math and technology implementation rubric to match every math practice. The rubric synthesizes the CCSS Math Practices and Oregon Education Technology Standards while proposing examples of targeted lesson ideas and activities for the teachers and students to conduct in order to address each practice. The ones explored in the attached example are the most logical intersections of math and technology. All middle school math instructors also collaboratively created a math scope and sequence roadmap for grades 6 through 9 so that students are learning similar concepts in the same sequence across all schools in the District. Attachment A: "MHCRC Reynolds Math Implementation Rubric" shows a sample of the rubric. Attachment B provides the Math Scope and Sequence across Grades 6 through 9.

The Secondary Math Committee also generated a Theory of Action to guide teachers instruction in the classroom: When teachers work collaboratively in professional learning communities to formulate curriculum and strategies and to integrate standards within math, technology and across content areas; and as students engage in curriculum through technology and content relevant to a global and digital society; then students will have a higher understanding of mathematics and its application.

This "Constructivist" classroom approach supports students to build their own understanding and knowledge of math through experiential learning, critical thinking, relevant content and collaborative problem-solving. To do this, both students and teachers inquire into real-world problems, explore ideas and assess solutions. Reynolds administrators and teachers have nearly universally embraced to the research and theory that Constructivism is best practice for reaching all students, especially English Learners.

Currently, teachers across RSD are at different levels of proficiency in their Constructivist approaches. District-wide, teachers have been using two foundational models for Sheltered Instruction for the past three school years, focused on English Learners, which incorporate lessons that intentionally build students language skills and mastery of content simultaneously (The two models are: Sheltered Instruction Observation Protocol (SIOP) and Guided Language Acquisition Design (GLAD)). These Sheltered Instruction models also equip math teachers to restructure their instruction to be more

Constructivist in nature. The technology rich classroom environment will build on current teacher efforts and nurture expanded Constructivist approaches through access to shared digitized and online resources aligned to Reynolds Math Implementation Rubric mentioned above.

Another critical aspect to improving student outcomes, is the ability of the math teachers to differentiate and individualize learning. The combined functionality of the teacher and student devices and Schoology (discussed more in-depth under Technology Support below) will enable teachers to measure the abilities of each student through common assessment. Through their shared accounts on Schoology, teachers and students will be able to monitor progress in real time and teachers can re-direct students to resources - including online content, other students, or one-on-one time with the teacher - which better match their individual needs. Mathematical dialogue will be enhanced through Schoology as students will be able to demonstrate their understanding of math concepts in writing and by recording audio and/or video that explains their thought processes. Teachers will use data to formulate differentiated assignments that capitalize on a student's abilities while implementing real world problem solving opportunities that students will access on their own or collaboratively with other students and teachers.

Project Lead The Way (PLTW), a leading provider of STEM (Science, Technology, Engineering and Math) education programs nationwide, is currently offered as an elective at the high school and attracts non-traditional (English Learners, females, students of color) students. In Fall 2015, PLTW will expand its program to all RSD middle schools. A combination of Portland General Electric and Boeing funds are supporting this expansion. PLTW's rigorous project-based curriculum for students and high-quality teacher professional development combine to generate real-world, Constructivist learning experiences for students. PLTW courses are aligned with Common Core State Standards in math. Yet, the programs are customizable to allow schools to meet local curricular and community needs. Through PLTW assignments and projects, students work in groups to devise practical solutions to real-world problems. The industry level software that students use in PLTW curriculum challenges students to apply mathematical learning to design, aeronautical, robotics or engineering challenges.

PLTW will be offered as an elective class for 7th and 8th graders at the three middle schools and will be taught by a math teacher, starting in Fall 2015 and continuing through the four years of the project. PLTW in middle school strengthens mathematical concepts and language development as students collaborate and converse in teams to create and present projects with their peers and instructors. As students are challenged to learn complex mathematical principles, and descriptively communicate their findings, they reinforce the math while also building an academic vocabulary.

In order to fully implement a Constructivist classroom and to differentiate and individualize learning for students, math teachers will be given ample opportunities before the school year and on an on-going basis to collaborate, share data and strategies through professional development (PD) supports. In addition, math teachers will be provided the technology tools with heavy emphasis on student engagement and collaboration, relevant content, and real-time student data assessment and reports.

TECHNOLOGY SUPPORTS

The two primary technology supports for the ***Reynolds Transformation to Constructivist Classrooms in Secondary Math project*** are: Schoology, a Learning Management System (LMS); and technology in math classes for teachers and students. The combined functionality of the teacher and student devices

and Schoology will foster math teachers' abilities to implement Constructivist classroom methods and individualize and differentiate learning.

Supported by two full-time IT Coaches, RSD teachers and staff have been piloting a free, limited version of Schoology since Spring 2014. Individual teachers are uploading lessons, practice tasks and assessments through Schoology and encouraging students who own functional technology to access learning through the LMS. HB Lee Middle School conducts all PD adult-to-adult instruction related communication through Schoology. A number of District-wide training initiatives have been managed through the free online version. Most notable among these is work specific to the Guided Language Acquisition Design (GLAD) instructional strategies mentioned previously.

As a secure, closed and cloud based network, Schoology digitizes curriculum that was once confined to direct instruction through lectures, textbooks and assignments completed with paper and pencil. For example, through their devices and the camtasia software, teachers can videotape, upload and replay their lessons in Schoology, making the lessons also accessible to students on an on-demand basis. The web has rapidly expanded to incorporate more inquiry-based simulations and design-based problems in math. Teachers can incorporate and create links to any web-based application and content into their lessons.

Another way to create relevancy for solving math equations is by engaging students through use of 3D printing. Solving equations has many real life associations but few that are actually meaningful to students. 3d printers are currently used in high school math classrooms and their presence has a profound impact on student engagement, with an unexpected, yet strong, interest from female students. The students most impacted were Algebra intervention students. These students are at least two grade levels below in their mathematics abilities. The simple desire to create has provided a driving force to a student population that generally lacks motivation to be successful, specifically in mathematics. For example, one high school math teacher reported that he had a freshman in an intervention class that had not taken geometry, who started using geometric angle properties to find the centers of shapes; the student only discovered this geometry principle because he was motivated by inquiry into other mathematical concepts through the availability of 3D printing.

Ratios and scale go hand-in-hand with 3D printing. The magnitude of online simulations and programs that can interface with a 3D printer makes this a learning necessity. For example, pulling in a STL file from a program such as Inventor, the part scale is completely off. More than just a simple unit conversion, this requires students to figure out what size they actually wanted and then what size the prototype print actually is. To achieve a proper print they have to find a ratio of the two numbers and then use it as a scale factor. By doing this themselves they discover that ratios bigger than one increase the print size and ratios smaller than one decrease the print size. Fractions are an extremely difficult concept for students to master. 3D printers give students an alternative to understand not just fractions but ratios and percent, and to apply this knowledge to real life situations.

There are numerous connections with Common Core State Standards and Math Practices. For example, Algebra includes numerous systems of equations. 3D printing is at its core constraints and constraints are variables that all depend on each other, this is algebra. Simple equation solving, calculating ideal print time, systems of equations and establishing the break even points are all directly linked to CCSS Math Practices. Students work in teams to solve genuine math problems and also need to show the

teacher their math in order to support a print, which is another way to demonstrate understanding of a math concept.

Teachers also have the capacity to differentiate and individualize their instruction to meet specific student needs through Schoology and the student devices. Students can work at their pace, receive and submit their assignments to the teacher for assessment, feedback and grading. Group projects, student collaboration, content specific discussions and teacher input and grading can remain open outside of class time within the school to generate greater student and teacher interactions. Students could engage in classroom curriculum and student collaboration outside of school in circumstances where the student has Internet access and a personal computing device. While the student devices will be assigned to teacher classrooms and not travel with the students, the devices will be accessible to students for use in the classroom after school, during lunches and when the teacher is present as a tutor or advisor to extended student learning time.

Important for the expanding English Learner population specifically, the interactivity between classmates and with the teacher builds languages skills, interest and confidence. Utilizing their devices, English Learners can demonstrate their intellect beyond the traditional assessments that may, at times, not reflect their true math abilities and skills. For example, students will be able to demonstrate their mathematical understanding by recording audio and/or video that explains their thought processes, which provides student data to a teacher in order to affirm or re-direct that student's learning process and tools.

From a data perspective, Schoology enables teachers within courses or grade levels to upload and share common assessments. The common assessments combined with the flexible reporting functionality of Schoology allows teachers to run an array of reports that isolate factors and compare results related to both student outcomes and instructional practices. Measured alongside their instructional practices, these data become the basis for the Lab Cycle professional development model described below. Student level skill acquisition and growth over time permits teachers to accurately identify and modify instruction according to individual student needs. This attribute is particularly useful as teachers strategically support students to achieve mastery of the Common Core State Standards in math and other subjects.

Meanwhile, there will be greater transparency and accountability in the classroom. Principals, District staff and peer teachers will have access to the same real-time data through Schoology. When supervising and evaluating teachers, Principals will be able to isolate the strengths and weaknesses of individual students and collaborate with teachers to formulate specific interventions to address areas of student need. Team meetings with fellow teachers advance further and more efficiently when all professionals are working from the same data sets. In sum, the teacher and student devices, through Schoology, builds a learning community that is deeply connected through digital dialogue, leading edge mathematical software and is informed by informative data.

The last major component of proposed technology involves setting up of mobile laptop labs dedicated to support the hands-on STEM curriculum associated with Project Lead the Way (www.pltw.org) for the elective math classes at the three middle schools. The PLTW curriculum requires robust, industry standard laptops that are necessary to run the professional level engineering and design software.

PROFESSIONAL DEVELOPMENT (PD)

In March and April 2014, RSD conducted a district-wide a study to assess current attitudes about availability, use, goals and vision for instructional use of technology. Over 300 respondents (47% of total teaching staff) participated in the survey, with the highest response rate (95% percent of the school staff) from Walt Morey Middle School.

District wide, 77% of respondents reported using educational technology "Sometimes" or more frequently. 48% answered their use of technology in their daily instruction was "Often" or "Always." Pertaining to professional development, 78% of staff responded they desired to learn more about the use of instructional technology. Two-thirds expressed interest in becoming a leader of a 'flipped' or 'blended' classroom instruction which supports implementing a Constructivist classroom.

The same study surveyed teachers' preferences to styles and modalities for their own professional development (PD). Overwhelming responses rated strong teacher desire for interactive activities, watching or practicing demonstrations, sharing stories and examples. Participation in ongoing professional learning communities (PLCs) to collaborate with colleagues stood out as ranking consistently high.

Based on teachers' expressed preferences, the Secondary Math Committee has developed a PD plan with the objective for math teachers at each of the three middle schools and the two high schools to coalesce into PLCs within their schools and across the District to learn and collaborate on instructional practices, assessments, evaluation and student achievement outcomes. With ongoing coordination and guidance by Instructional Coaches in both technology and math, a select core of teachers will initially serve as practitioners and trainers, equipped with time and resources, who will train their colleagues so that by School Year 2017-18, all 39 Reynolds math teachers in grades 6 through 9, will have aligned instruction with the Constructivist classroom approach. Attachment C: "Reynolds TechSmart Professional Development Plan" includes the project's PD plan, components and schedule.

Four math teachers (one from each of three middle schools and one 9th grade math teacher from the high school) and one IT Coach will attend the Schoology Summer Institute in July of 2015 and an additional group will attend in July 2016. Schoology is the District's chosen Learning Management System (LMS) more fully described earlier in this section. The purpose of the Summer Institute is to build a cadre of math teachers who will have advanced skills in order to lead the development of use by their school colleagues of the LMS applications and evaluation metrics. The teachers and IT Coach who initially attend the Institute will be chosen based on a high level of participation and interest in the LMS pilot described earlier in this section.

To immediately capitalize on the acquired learning of the Schoology Summer Institute, the five attendees will conduct two full days of training and lesson planning each August with eight other 6-9th grade math teachers across all schools in 2015, 15 additional teachers in 2016 and the remaining 12 6-9th grade math teachers in 2017. This plan accounts for a dedicated on-boarding process for teachers to get devices and an introduction to Schoology lesson planning before the school year. It also addresses the scheduled support throughout the year from the IT Coach as well as a reference to the Lab Cycles, detailed more extensively below, to be facilitated by the Secondary Math Instructional Coach.

In support of English Learners in math, secondary teachers prescribe to the Sheltered Instruction Observation Protocol (SIOP). SIOP is an instructional model that incorporates lessons that intentionally build language skills and content simultaneously for English Learners as discussed previously in this Section.

Reynolds teachers have been using SIOP for three years. For this project, the professional development model overlays instructional Lab Cycles. Lab Cycles incorporate collaborative co-teaching, classroom observations and data analysis to development instructional practice focused on student outcomes and needs. During the Lab Cycles, teachers implement a specific instructional practice and collect student data. Then teachers bring their findings to their professional learning community (PLC) to determine additional student skill intervention, if needed. A typical Lab Cycle requires two full days to complete for each instructional element. The District will provide classroom substitute teachers over the next three school years in order for the secondary math teachers to participate in the Lab Cycles.
RSD teachers are provided a weekly late- start department level PD schedule throughout the school year: about 30 total sessions annually. For at least one late start PD period a month, the participating math teacher cohorts will meet to share best practices, troubleshoot, innovate and discuss student assessment data.

In years 2 and 3 of the project, the secondary math teacher cohort will expand, allowing early participating teachers the opportunity to lead PD or to share those responsibilities with others as they come onboard. The ability to layer multiple cohorts of math teacher participants, while also encouraging Schoology adopters from other content areas, cultivates broad-based support, fresh ideas and innovations, and refinement of practice to what works. Lab Cycles specifically will sunset for teachers in the fourth year of the project implementation. Yet the regular late start activities as well as ongoing coaching and support will be provided by both the IT Coach and the Secondary Math Coach, especially for the 3rd year teacher cohort, who will only be in their second year of implementation.

Project Lead the Way professional development is rolled out in three phases for teachers. Phase 1, Initial Training, is conducted individually and on-line. Teachers familiarize themselves with the PLTW approach and conduct a series of mathematical assessments to demonstrate their basic competency. Phase 2 is called Core Training. Hosted either at Oregon Institute of Technology in Wilsonville, or at a corporate facility in Hillsboro, Core Training is an intensive three-day training, conducted in-person, which delves deeper into PLTW units of study and practices. Upon completion of the Core Training, teachers are automatically included into Phase 3, Ongoing Training, which is a network of local PLTW teachers who connect to share updates, best practices and support each other to maintain fidelity of PLTW implementation.

PROJECT OUTCOMES

Like every initiative, the measure of success is primarily the impact on student learning outcomes. A more detailed description of the analysis of student achievement is incorporated in the Evaluation section. The other major focus for this project's outcomes is the transformation of math instructional practice through the use of technology.

Outcomes related to teacher instruction include:

- To identify and scale instructional strategies and practices, guided by the CCSS Math Practices and the Oregon Education Technology Standards, that have the greatest positive impact on student learning.
- Devise strategies that isolate instructional practices as measured against student achievement connected to a particular Math practice or standard.
- Devise observational tools that inform teachers and decision makers as to which classrooms are implementing the project with fidelity and discover the correlational trends on student learning that are attributable to those classrooms.
- Build capacity and collegiality among teachers across grade levels through prescribed adherence to the Lab Cycle PD model.

II. Public Benefit

The ***Reynolds Transformation to Constructivist Classrooms in Secondary Math project*** targets the following All Hands Raised (AHR) Partnership academic outcomes: Eighth grade math, ninth grade credit attainment and English Learners progress.

The District closely subscribes to the targeted academic indicators for students across the span in time as they enter K-12 education and progress through high school. The Reynolds Superintendent serves on the AHR Partnership Advisory Council, the Board Level policy making body. The District also commits to membership on numerous steering and work groups that collaboratively guide practice and data analysis for each of the AHR areas of focus across Multnomah County school districts.

First, RDS shall increase percentages of students who meet the eighth grade Math benchmark. The majority of math teacher participants will be in 7th and 8th grade. When students meet 8th grade math benchmarks, they are more likely to accomplish the project's second public benefit which is to be on track to graduate at the end of ninth grade, thus necessitating 9th grade math teachers to build on the middle school instructional practices.

From the breakdowns at the middle and high school levels respectively, baseline student achievement demonstrates consistent student deficit in Reynolds secondary schools – particularly pervasive for students of color and other high-risk groups. For comparison, included in the tables are statewide and 'like school' (defined as comparable size and demographics) results.

The most notable shortcoming, and therefore a specific target for this project, is 9th grade students on-track to graduate. At the end of their ninth grade year, less than half (49.5%) of high school students have earned six or more credits. Underservice to Reynolds English Learners, Black and Hispanic populations in this area are more glaring.

Freshmen Math (Algebra I) is the most frequent class failed by 9th graders. This project is designed to transform math instruction in the middle levels and increase rigor to earn 9th grade math credit. As the students make the critical transition into comparable math instruction at the high school, all of the above factors will contribute to success in 9th grade Algebra, thereby inverting the trends for student on-track to graduate.

To specifically address the achievement gap and in support of English Learners in math, the District is using the Sheltered Instruction Observation Protocol (SIOP) model and Lab Cycles as described previously in the Project Purpose section.

Reynolds Middle Schools Demographic and Achievement Data: 2013-14.

School Name	**Reynolds Middle / (Like School)**	**HB Lee Middle / (Like School)**	**Walt Morey Middle / (Like School)**	**State**
# Students Enrolled	960	817	631	
Attend 90% or greater	75%	75.6%	87%	
Total English Learner (EL)	58%	54%	33%	
# of Languages Spoken	27	31	15	
Economically Disadvantaged (ED)	81%	73%	59%	
Special Education (Sped)	18%	17%	15%	
Math: Meet or Exceed Whole School	32% / (54.6%)	41.4 / (55.2%)	53% / (60.7%)	62.2%
Math: EL	27.6%	40.8%	42.1%	46.5%
Math: ED	29.4%	35.6%	48.1%	49.5%
Math: Sped	<5%	9.3%	12.7%	22.3%
Math: Black Stud.	27.7%	22.8%	25%	39.1%
Math: Hisp. Stud.	25.2%	30.1%	36.8%	47%

Reynolds High School Demographic and Achievement Data: 2013-14

# Students Enrolled	2587	**Freshman on Track / State / (Like Schools)**	49.3% / 78.5% / (76.3%)
Attend 90% or greater	74.3%	**Graduation Rate / State / (Like)**	61.3% / 68.7% / (63.3%)
Total English Learner (EL)	39%	**Dropout Rate / State / (Like)**	4.1% / 4.0% / (2.9%)
# of Languages Spoken	42	**ED Frosh on Track/ State / (RHS ED Graduate)**	41% / 68.8% / (58%)
Economically Disadvantaged (ED)	62%	**Sped Frosh on Track / State / (RHS Sped Graduate)**	25.7% / 61.4% / (31.2%)
Special Education (Sped)	13%	**EL On Track / State / (RHS EL Graduate)**	40.8% / 70.3% / (43.8%)
Overall RHS Math / State / (Like Schools)	63.8% / 71.3% / (61.8%)	**Black on Track / State / (RHS Black Graduate)**	46.8% / 67% / (68.6%)
Overall RHS Science / State / (Like)	64.4% / 63.1% / (43.5%)	**Hispanic on Track / State / (RHS Hisp. Graduate)**	31.9% / 69.9% / (47.3%)

III. Project Partners and Beneficiaries

Secondary math teachers and their students are the primary beneficiaries for this project. The RSD Secondary Math Committee was the primary vehicle for collaboration to design this project. The Committee included 6-9th grade math teachers along with the District Director of Secondary Education, Instructional Technology (IT) Coach, Math Instructional Coach, and an administrator from each of the secondary schools. The Committee was involved in all phases of project design, including the technology and PD needs study, Learning Management System (LMS) research and piloting, the PD plan and the overhaul of secondary math instruction through framework construction. The Committee will continue to be a lead driver and implementer of the work.

Students: A focus of the math instructional method is student engagement and achievement. Therefore, the Committee and District obtained student input to calibrate project design with end users. Their input on Schoology as pilot users was a valuable indicator for effectiveness of the tool. The student responses were gathered and reported through Schoology directly. A cross-section of student comments from Mr. MccLellan's Algebra intervention class included:

"Yes. It (Schoology) is better than sitting staring at a whiteboard listening to someone go on and on." – Ethan
"I find Schoology useful because it is a different way of learning." – Eric
"I like Schoology because *I can get help at any time* for the problems we have in the packets." –Marissa
"Schoology helps me with the Math problems I don't understand and helps me prepare for tests." – Diana
"I like Schoology because it is Cool. I love Schoology!" – Kamaria

The survey of student users is not a scientific study. Instead, it demonstrates the capacity of the LMS to motivate students to persevere in their mathematical study through increased interaction, on their terms, in a media that is common to their lifestyle.

Project Lead the Way (PLTW): PLTW is contributing through guidance on laptop selection to support software requirements, provision of the curriculum, and teacher training to implement the PLTW program at the middle schools.

IV. Implementation Plan

The project Implementation Plan is included as Attachment D: "Reynolds Implementation Plan."

V. Evaluation Plan

RSD employs a data coordinator who conducts in-depth and complex student data examinations. The District embraces the need to measure and evaluate the entire scope of district reforms and initiatives. The data coordinator will work with the TechSmart Initiative evaluation consultant and with Portland State University to determine more detailed data needs and methods to align with the TechSmart logic model.

The data coordinator worked collaboratively with IT Instructional Coach and members of the Secondary Math Committee to develop the evaluation plan and is familiar with the scope and goals of the project. The project's evaluation plan relies heavily on the collection and management of student data and the intersection of instructional strategies and practices with changes in student performance.

Student engagement and learning will be evaluated continuously over the four years of this project using class attendance, standardized test scores, math credits earned and passing marks as data for assessing outcomes. Student attendance will be used as a proxy for student engagement within these evaluations while standardized test scores will be used as an unbiased assessment of student learning. Students enrolled in class sections with Constructivist math instruction will be compared to students in equivalent math sections who are not receiving blended instruction. The amount of time each student has participated in their respective class section will be tracked within the Reynolds student information system (SIS). Schoology is another factor within the Constructivist classroom model that will be evaluated. Student usage of Schoology will be exported out of the system and merged with the other characteristics and outcomes to evaluate the effectiveness of this piece of the blended instruction model.

As is common in educational settings, there are a number of contextual factors in addition to student demographics that need to be accounted for when examining effectiveness of instructional practices. These contextual factors can also provide excellent information to teachers and administrators for continual improvement. School-level factors such as the proportion of students who are economically disadvantaged, student mobility and the number of languages spoken within the school can have a large impact on the outcomes assessed. In addition, classroom factors such as period of the day, teacher characteristics, Schoology use and class size will also be incorporated to gain a better understanding of the effectiveness of instructional practices. Student factors that are typically considered and will be collected include gender, race/ethnicity, language proficiency and special education participation.

Since students are nested within classrooms and classrooms are nested within schools, we will use 3-level multilevel modeling to evaluate the efficacy of the Constructivist math instruction program for each of the contextual factors involved. For example, we will be able to examine not only the difference in standardized test scores between students receiving Constructivist instruction compared to those who are not, we will also be able to examine this relationship across schools and between classrooms. This type of evaluation allows for the opportunity to examine and identify strengths and where to leverage these strengths for training and improvement in other schools and classrooms. Of particular interest is the identification of teachers who are demonstrating the greatest improvements in student attendance, test scores and grades during the first year of the project. These teachers will be chosen to identify and share their instructional strategies, practices and usages of Schoology for peer-to-peer training.

A basic 3-level multilevel model using proc mixed within SAS statistical software will be used for continuous outcomes (standardized test scores and class attendance) while proc glimmix will be used for dichotomous or polytomous outcomes such as passing grades and credits earned. Proc Glimmix will also be used in the case of a Non-Gaussian distribution. Long-term analyses will include multiple years of data when available and will utilize a 3-level multilevel growth model. This type of statistical methodology is ideal due to the high potential for incomplete follow-up in the case of students leaving RSD. It is also flexible enough to account for missing data, multiple measurements per participant, and different term schedules across schools. Previous attendance and performance in math courses as well as 2014-15 standardized test scores will be used to adjust for the students' baseline. The main goal of this

type of analysis is to assess change over time and identify strengths and weakness within the project for continuous monitoring and improvement.

Teachers' instructional strategies and practices will also be continuously evaluated. RSD has developed a **"Classroom Walk Through Tool"** as an online observation tool for use by peer teachers, administrators or other evaluators. The tool incorporates observable classroom set-up and environment as well as teacher and student activities present during an instructional period.
As classroom observers utilize this observation tool on their hand-held device, their information is automatically downloaded into an excel database that compiles the data real time. As teachers prepare to conduct their Lab Cycles, or at other designated points throughout the year, the data coordinator in collaboration with the teachers can look for intersections between observable classroom traits and formative or summative student achievement as well as student attendance, behavior or other engagement measures. We acknowledge that the data does not provide conclusive information without isolating other factors. The objective is to inform teachers and decision makers as to which classrooms are implementing the instruction with fidelity and what the correlational trends are on student learning and behavior that can be attributable to those classrooms.

The Classroom Walk Through Tool also serves to isolate which instructional strategies will have the greatest impact on student learning. Through the assessment and report mechanisms within Schoology, the Secondary Math Committee is devising strategies that isolate instructional practices as measured against student achievement connected to a particular math practice or standard. Those rubrics will be constructed through the Lab Cycle process as we gather formative student data for each math course at every grade level 6 through 9.

Although the long term goal is to increase student achievement, the desired outcomes over the four year grant period focus on the transformation of math instructional practice through the use of technology.

Outcomes related to teacher instruction include:

- To identify and scale instructional strategies and practices, guided by the Math Practices and Technology State Standards, that have the greatest positive impact on student learning.
- Devise strategies that isolate instructional practices as measured against student achievement connected to a particular Math practice or standard.
- Devise observational tools that inform teachers and decision makers as to which classrooms are implementing the project with fidelity and discover the correlational trends on student learning that are attributable to those classrooms.
- Build capacity and collegiality among teachers across grade levels through prescribed adherence to the Lab Cycle PD model.

The following table summarized the evaluation plan's leading evaluation questions, strategies and data collection:

Outcomes: To identify and scale instructional strategies and practices, guided by the Math Practices and Technology State Standards, that have the greatest positive impact on student learning.	
Evaluation Questions **#1**: Is the practice positively impacting the achievement gap of the student cohort, specifically second language learners in middle school and ninth grade? #2: Is the practice improving student achievement in the targeted academic outcomes? #3: How are digital citizenship skills and responsibilities integrated into the learning and curriculum?	
Data to Be Collected:	1a. Students quarterly and semester passing grades in Math. 1b. End of year Summative Benchmark Assessments (SBAC). 1c. Rate of 9th Grade Math Credit.
How Data is Collected:	1a. Pass/Fail and School Counselor Reports 1b. Oregon Department of Education (ODE) Standardized Test Reports. 1c. Student Transcript and School Report Cards.
Outcomes: Devise strategies that isolate instructional practices as measured against student achievement connected to a particular Math practice or standard.	
Evaluation Questions **#1:** Do teachers report positive classroom results through implementation of the strategy? **#2**: How does the practice use student assessment data to provide feedback to students and teachers about a student's progress? **#3**: Does the practice use technology for individual student assessment? #4: What other positive achievement results are measurable and evident (student engagement, attendance, or similar)?	
Data to Be Collected:	2a. Formative student achievement through common Math assessments. 2b. Isolating Instructional strategies to student learning outcomes. 2c. Frequency and depth of student and teacher technology usage.
How Data is Collected:	2a. Schoology student assessment reports. 2b. Lab cycle teacher professional development and curriculum design process. 2c. "Walk Through (observation) Tool" peer-teacher/administrator data compilation.
Outcomes: *Devise observational tools that inform teachers and decision makers as to which classrooms are implementing the project with fidelity. *Build capacity and collegiality among teachers across grade levels through prescribed adherence to the Lab Cycle PD model.	

Evaluation Questions #1: In what ways is technology used to support instruction and student learning? #2**:** Has Professional Development helped teachers use technology to implement effective differentiated instruction and to use and analyze student data? #3: What is the frequency of collaborative teacher meeting? Dates? Minutes? #4: What do teachers report as to their degree of instructional understanding and collaborative approaches as measured through teacher surveys?	
Data to Be Collected:	3a. Data gathered from Walk-Through Tool. 3b. Formative and Standardized test scores and credit attainment. 3c. Teacher feedback to project impacting their instructional practice.
How Data is Collected:	3a. Analysis of student growth/achievement through common formative assessments delivered through Schoology. 3b. ODE annual reports and quarterly student grade reports. 3c. Mid and end of year teacher surveys.

VI. Technical Design

The project's technology purchases place high functioning devices into the hands of secondary math students and teachers as well as reinforce the necessary infrastructure to support the increased online traffic from middle and high school classrooms. There are 39 certified teachers who teach math in grades 6-9 in the Reynolds School District. Over three school years, each teacher will receive a Microsoft Surface Pro 3 or comparable device. Teachers' classrooms will also be outfitted with a Hitachi Ultimate Short Throw projection unit and wall mount.

Research points to the effectiveness of tablet computers upon which the user manipulates an active stylus. The benefits are especially pronounced for English Learners ("Computer Interfaces and their Impact on Learning". Dr. Sharon Oviatt, 2011). As a consequence, students in math courses grades 7 through 9 will have access to a newly released laptop tablet, the Dell Venue 3000, specifically designed for K-12 student learning. Math teachers will each manage a mobile cart with 35 laptop tablets (each math class is limited to 35 students). The laptop tablets were selected by the Secondary Math Committee because they combine the power, storage and performance of a traditional laptop, with the interactive capabilities of a tablet device. In addition, research has shown the benefits for students to process, understand and retain math concepts specifically when they can apply the active stylus to their tablet with the necessary precision for drawing, modeling or mapping their solutions onto the screen of the device as opposed to their finger or other tool.

Additionally, the transition to the Common Core State Standards in math will require students to demonstrate content mastery through online testing. The tablet laptop will allow students to take the summative tests for math in the environment and on the device on which they learned the content. The Dell Series 5 000 tablet laptop is a student device certified for the new state tests. This is strongly preferred over students transporting to a computer lab dedicated to State testing of all grade levels and content areas. As the student devices will be dedicated and secured within teacher classrooms and appointed for this project specifically, testing utilizing these devices will be reserved for math testing

only. There is District precedence for this as technology purchased from federal funds and designated for special education or homeless students specifically are not shared with the general population.

Mobile laptops labs will be purchased dedicated to specifically supporting the hands-on STEM curriculum associated with Project Lead the Way at the middle schools (one lab will be grant funded and the District will purchase two labs). The PLTW software programs that are components of the math middle school curriculum require robust hardware. The one class set (35 total) Dell Latitude 15 5000 Series with 16 GB and 1600MHz DDR3L Memory is as recommended by the Project Lead the Way middle school specifications and equipment requirements. PLTW will be implemented at one middle school in each of the first three years of the grant project. The professional development, licensing and other equipment expenses will be included as District matches for all four years of the project.

Currently, one MakerBot replicator 3D printer and one MOST Delta 3D printer are in daily use at Reynolds High School grade 9. HB Lee Middle School has two MOST Delta 3D printers. The MOST Deltas were built by teachers in Fall 2014 in a workshop who were also trained on trouble-shooting and printer maintenance. School year 2014-15 has been considered an Alpha/beta test year. The additional 3D printers will expand what has been learned through use of the current printers. The Algebra intervention class currently produces, on average, a dozen prints throughout the day at an average of 20-60 minutes per print using the MOST Delta. The MakerBot is faster and has other significant advantages. The software currently in use is Inventor and the High School is moving to Solid Works. The other softwares will be Meshmixer (for supports of overhangs), Repetier for interfacing, and Makerbot's included software. There have not been maintenance issues with the current Replicator, the durability of the Replicator played a large part in choosing it.

The Makerbot was selected because the company is a leader in the industry and has a strong track record of supporting their products. Replacement parts can easily be found and repairs are supported at the user level. The resolution is significantly better than other comparable printers and it's faster. Calibrations are made through a simple interface and getting the printer working and maintaining it can be accomplished with current level building staff. The build size is an important aspect and the increased capacity was a primary reason for selecting the Replicator. Many other companies and models were evaluated and the printer that best meets the math curriculum needs is the Replicator.

Each middle school has three or four math teachers at each grade level. The high school has 10 teachers of 9th grade math. The objective is to provide one 3D printer for each middle school grade level in each building and five printers at the high school (one for every two classrooms to share). With the current devices in the high school and HB Lee Middle School, a disproportionate number will be purchased to equip the other two middle schools, which currently have none. Year 1 will deploy one into each grade level at each middle school for a total of seven new 3D printers. Years 2 will fill the gap at the high school in order to meet the desired ratios. In Year 4, the current four 3D printers will need to be replaced.

To support the increased number of devices that draw capacity from the district network, the District will install wiring and an internet access point device within each of the math classrooms and will replace its servers at each secondary building, not including Reynolds High School where its server was replaced in Fall of 2014.

Included below is a table of the three-year technology plan targeted for secondary math teachers. It incorporates a couple of assumptions: Projecting 39 participating math teachers across four buildings. The plan is to incorporate 12 teachers SY15-16; 15 in SY16-17; and the remaining 12 in SY17-18. Each math class is capped at 35 total students.

Tech Item	**Year 1**	**Year 2**	**Year 3**
Schoology Learning Management System	238,532		
Teacher Surface Pros w/type cover, wifi adapter and docking station	15,672 $1,306 x 12 units	19,590 $1,306 x 15 units	15,672 $1,306 x 12 units
Teacher Projectors: Hitachi Ultra Short Throw, wall mount + installation	15,888 $1324 x 12 units	19,560 $1324 x 15 units	15,888 $1324 x 12 units
Student Devices – Dell Series 5000 tablet computer	205,800 $490 x 420 units	257,250 $490 x 525 units	205,800 $490 x 420 units
Dell Latitude 15 Series 16GB 1600 MHz DDR3L Student Laptops for PLTW use	$45,465 $1,299 x 35 units	$45,465 $1,299 x 35 units	$45,465 $1,299 x 35 units
LapCabby 32H Mobile Laptop charge cart	$2,829	$2,829	$2,829
LapCabby Mini 32V tablet trolley	17,940 $1495 x 12 units	22,425 $1495 x 15 units	17,940 $1495 x 12 units
Camtasia Screencast Software for Teachers + 5 Principals	3,825 $225 x 17 units	3,375 $225 x 15 units	2,700 $225 x 12 units
Student Google Screen castify software	6,300 $15 x 420 units	7,875 $15 x 525 units	6,300 $15 x 420 units
Makerbot Replicator Desktop 3D Printers - 9 total for the middle schools over 4 years; 5 total at RHS over 4 years.	24,171 $3,453 x 7 units	10,359 $3,453 x 3 units	13,812 $3,453 x 4 units (Year 4)
Network Infrastructure Enhancement. Wireless Access Point installation	13827	13,827	13,827

VI. Budget

Project Line Item Budget

Cost Category	Grant Funds	Matching Funds	TOTAL
Personnel	32,640	1,123,881	1,156,521
Equipment	1,194,968	96,588	1,291,556
Education	0	51,000	51,000
Travel	11,600	2,900	14,500
Technology Infrastructure	14,781	26,700	41,481
Miscellaneous	0	18,112	18,112
Overhead	59,565	62,661	122,226
Project TOTALS	**$1,313,554**	**$1,381,842**	**$2,695,396**

Line Item Budget Narrative

PERSONNEL

Teachers. The participating teachers will implement the curriculum planning, instruction and assessment for the project. They will coordinate their lessons individually, in groups by level and across grade levels. Early adopters will become teacher trainers to lead assistance for their colleagues. Most duties will typically be included within the teachers' regular contract salaries. Thus the budget reflects compensation for only those duties that are incremental to the project.
Early Release and Late Start - Estimated wages for an average of 4 hours monthly. Hourly wages plus employer paid benefits for teachers approximates $45 per hour.

Year 1 - 12 teachers x 4 hours x 10 months x $45/hr = $21,600
Year 2 - 27 teachers (year 1 (12) + year 2 (15)) x 4 hours x 10 hours x $45/hr = $48,600
Year 3 - 39 teachers (year 1 (12) + year 2 (15) + year 3 (12)) x 4 hours x 10 months x $45/hr = $70,200
Year 4 - 39 teachers x 4 hours x 10 months x $45/hr = $70,200
Total Early Release/Late Start Total = $210,600
Match Funds: $210,600

Two-day August Summer workshop - Calculated at $35/hr x 16 hours x # of teachers.
Year 1 - $35 x 16 hours x 12 teachers = $6,720
Year 2 - $35 x 16 hours x 15 teachers = $8,400
Year 3 - $35 x 16 hours x 12 teachers = $6,720

Year 4 - None.

Lab Cycle Professional Development.
Year 1 - $250 x 8 days x 12 teachers = $24,000
Year 2 - $250 x 8 days x 27 teachers = $54,000
Year 3 - $250 x 8 days x 39 teachers = $78,000
Year 4 - $250 x 8 days x 27 teachers (Year 1 teacher participation will be optional) = $54,000
Total Lab Cycle Costs ($210,000) + Summer Training Costs ($21,840) = $241,840
Grant Funds: $21,840
Match Funds: $210,000

Instructional Technology Coach. The District will shift duties of the current FTE instructional coaches to focus on the project. 50% of his time for Years 1-3, and 25% for Year 4, will be dedicated to the project management, implementation, monitoring, support and evaluation. 50% average salary and employer paid benefits for the IT Coach for 3 yrs. will be $54,962 per year. 54,962 x 3 years = $164,886: Year 4 at 25% = $27,481
Total IT Coach Costs = $164,886 + $27,481 = 192,367
Match Funds: $192,367

IT Coach Stipend: The District compensates teachers with a stipend whenever they are required to work beyond their allotted labor contract hours. Some of the project work of the IT TOSA will require stipend compensation. The work includes integration of Schoology, including customizations and go-live activities, consultation on equipment specs and applications, and PD development/training sessions. The hourly stipend rate, including benefits, is $45/hr. Estimated 80 hours per year. $45(80 x 3) = $10,800.
Grant Funds: $10,800

IT Support: There is a high functioning team of 10 classified FTE whose roles are defined, but regularly overlap. No single IT individual will be dedicated to this project alone. Rather the work to appraise, purchase, image, install and support equipment as well as integrate systems and provide ongoing teacher/student training and support will be shared collaboratively. Conservatively estimated: 15% of their combined work output, spread across multiple professionals, will be dedicated to this project in each Year 1-3; reduced to 5% for maintenance in Year 4. Combining salaries and district paid benefits is $944,005 per year. $944,005 x 15% x 3 years = $424,802; Year 4 $944,005 x 5% = $47,200.
Total IT Support = $424,802 + $47,200 = $472,002
Match funds: $472,002

Data Coordinator. The data coordinator obtains student data and walk through data through Schoology and Synergy information system. She integrates the information to isolate formative and summative student achievement as well as benchmark attainment attached to instructional practices. The data coordinator's annual salary including benefits is $97,281. 10% of her time will be dedicated to ongoing data maintenance and evaluation. $97,281 x 10% x 4 years = $38,912.
Match Funds: $38,912

Grant Funds: $ 32,640
Match Funds: $1,123,881

EQUIPMENT
Incorporated into the table in the Technical Design section is a line item reference to the pieces of technical equipment to be implemented over the life of the project.

Math Classrooms: Teacher devices (Surface Pro 3) $50,934 + student devices (Dell Series 5000) $668,850 + LabCabby mobile charging carts $58,305 + Hitachi Projectors $51,336 + Teacher and Student Screencasting software $30,375. Grant: $859,800

3D Printers: (14 total Makerbot Replicators) Grant: $48,342

PLTW: Dell Latitude 15 series laptops $45,465 + LabCabby mobile laptop charging cart $2,829 = $48,294. Grant: $48,294 (1). Match: $96,588 (2).

Learning Management System – Schoology. One-time, 4-Yr purchase of Schoology for middle school and high schools $238,532. The District has reduced the total cost of Schoology ($278,532) by $40,000 to offset the amount attributable to proportional cost to incorporate elementary schools. Grant: $238,532

Grant: $ $1,194,968
Match: $96,588

EDUCATION
Project Lead the Way (PLTW) Curriculum/Program Package (Middle Schools). RSD's cost to acquire the PLTW curriculum, license fees and teacher training, and to pay teacher wages for the PD in project Year 1, and to expand it in Years 2 - 4. $45,000 for teacher training; $6,000 for ongoing maintenance, additional training and license fees combined for Years 2, 3 and 4.

Match: $51,000

TRAVEL
For each of the first two years of the project, 4 teachers will attend the Schoology Summer Institute. The estimated travel and conference fees are $1,450 per person based on flights and accommodations researched for the 2015 conference. $1,450 x 4 teachers x 2 years = $11,600. The District will fund one IT Instructional Coaches to attend during each of the 2 years. $1,450 x 2 years = $2,900.

Grant: $11,600
Match: $ 2,900

TECHNOLOGY INFRASTRUCTURE

Ruckus R500s wireless devices at $379 device x 39 classrooms – Grant: $14,781. District classroom electrical wiring and installation $300 x 39 – Match: $11,700. Replacement server at each of the three middle schools- Match: $5000 each x 3 = $15,000.

Grant: $14,781
Match: $26,700

MISCELLANEOUS
Projected consumable, non-capital meeting, 3D printer filament and other supply costs estimated at $4,528 x 4 years totaling $18,112.

Match: $18,112

OVERHEAD
The Reynolds School District calculates 4.75% for indirect administrative costs for the maintenance and overhead to all public and private grant awards. Calculated for both grant amounts and match amounts: Grant Subtotal Request = $1,253,989 x .0475 = $59,565. District Costs = $1,319,181 x .0475 = $62,661

Grant: $59,565
Match: $62,661

VII. Organizational Capacity

Since her appointment as Superintendent in 2012, Dr. Linda Florence has imparted a shift in the Reynolds School District purpose, practice and policy. Not satisfied with the status quo that she inherited, Dr. Florence set about restoring a culture of modern professionalism that is exemplified by a laser focus on equitable practice and preparing students to succeed as they progress through their K-12 experience in Reynolds. Yet the broader ambition is to ready them for post-secondary college, career and citizenship. Dr. Florence is a hands-on collaborative leader who seeks input from professionals whose opinion may be different than her own. Yet she shows the willingness to consider alternate points of view if the proposed resolution is driven by data and aims to raise achievement from student populations striving to reduce the inequitable disparities persistent in the educational achievement gap. This project, with the goal to raise achievement in math through Constructivist learning environments and enhanced student use of technology is the practice that exemplifies the improved Reynolds School District Vision recently adopted as guided by Dr. Florence (previously referenced in the Project Purpose section).

Vision: *Each and every child prepared for a world that is yet imagined.*

We can study history and recent trends to formulate educated guesses as to what today's middle and high school students will face as they progress toward adulthood and their productive years as local leaders, employees, parents and citizens. Yet our ability to precisely pinpoint what the exact conditions will become is unrealistic. Embracing that reality, the District looks to foster a set of values that are resilient to shifts in culture or priorities. Therefore, we overlay the significance of among others, community involvement, active participation, higher-order thinking, and determined resilience to prepare students for whatever unforeseen circumstances they may face in education, work or life after high school.
Those values and the long-term public benefit of this project are embedded and distilled into the RSD Mission Statement: *Each graduate embraces lifelong learning and applies skills in technology, global literacy, creativity and critical thinking to enhance family, career and community.*

To this mission, the RSD School Board and administrators are dedicating significant resources to an aggressive Technology Plan referenced in the Project Purpose section. Starting at the earliest grades, the

District is investing in student and teacher technology devices and research-based education applications that challenge the learners and raise rigor for all students while teaching them 21st Century skills in usage, management and custody of modern technology. The math-focused project expedites the District's plan and builds upon many initiative and strategies currently in place at RSD.

The District has focused on STEM based learning to compliment the Project Lead the Way engineering and design programs offered at the high school. The District's administrators, teachers and students piloted Schoology before making the decision to adopt this as the District's LMS.

The project is boosted by District leadership and teachers and outside partners who are motivated to engage in the transformation of learning to commensurately accommodate the precipitous shift in student population within the Reynolds community. This dedication is documented through the development in 2013 of the Reynolds Literacy Framework, the Math Framework and the RSD Technology Plan.

VIII. Replicability

The Reynolds School District will participate in the MHCRC TechSmart Initiative goal to share learnings across school districts in Multnomah County. Additionally, the alignment of TechSmart Initiative to the student success indicators as conceived and adopted by All Hands Raised Partnership that the work under this grant investment will be aligned with the work already under way across Multnomah County school districts.

As noted in the preceding sections, this project hastens the plans while increasing the capacity and flexibility of the District to invest in technology rich learning environments targeting English Learners and other traditionally underserved students. It is culmination of research and shared decision-making processes that are becoming the new norm locally through the shared accountability structure of the All Hands Raised Partnership. The RSD is applying smarter more effective modes to student achievement.

Device	Oregon Educational Technology Standard	CCSS Math Practices
Digital inking/two-in-one computers and teacher Surface Pros	**1. Creativity and Innovation** • Demonstrate creative thinking and problem solving skills to develop innovative products and processes using (digital) technology. • Develop or apply models and simulations to explore complex systems, issues and trends.	1.Make sense of problems and persevere in solving • Find meaning in problems • Look for entry points • Analyze, conjecture and plan solution pathways • Monitor and adjust • Verify answers • Ask themselves the question: "Does this make sense?"

Sample Task:

1. Students will create screencasts or instructional videos to show understanding and receive feedback, analyze, demonstrate and defend their thought processes in problem-solving.
2. Engage in real-time research on topics relevant to math standards.
3. Engage in collaborative math discourse digitally, providing relevant research and proof to justify their position and learning.

Is strictly procedural. Does not require students to check solutions for errors.	Is overly scaffolded or procedurally "obvious". Requires students to check answers by plugging in numbers	Is cognitively demanding. Has more than one entry point. Requires a balance of procedural fluency and conceptual understanding. Require students to check solutions for errors using one other solution path.	Allows for multiple entry points and solution paths. Requires students to defend and justify their solution by comparing multiple solution paths.

Teacher

Does not allow for wait time; asks leading questions to rush through task. Does not encourage students to individually process the tasks. Is focused solely on answers rather than processes and reasoning.	Allots too much or too little time to complete task. Encourages students to individually complete tasks, but does not ask them to evaluate the processes used. Explains the reasons behind procedural steps. Does not check errors publicly.	Allows ample time for all students to struggle with task. Expects students to evaluate processes implicitly. Models making sense of the task (given situation) and the proposed solution	Differentiates to keep advanced students challenged during work time. Integrates time for explicit meta-cognition. Expects students to make sense of the task and the proposed solution.

Students

Listen to instruction and provide answers on a work-sheet. Expected to return homework as indication of understanding.	Turns in work. Receives work back. Follow procedural explanations. Explain their thought processes in solving a problem one way.	Propose different solutions and procedures based on teacher modeling during class. Reflect on procedures. Represent the solution in one to two ways.	Engage in dialogue and reflection to establish rationale for the most efficient procedure and solution in groups and with partners. Groups match student need and instructional purpose. Design and propose multiple solutions and models based on sound mathematical reasoning.

Device	Oregon Educational Technology Standard 2: Communication and Collaboration	CCSS Math Practice 3: Construct viable arguments and critique the reasoning of others
Surface Pros, screens and projectors	• Use digital media and environments to • Communicate and work collaboratively, across the global community, to support individual learning and contribute to the learning of others. • Interact and collaborate with peers, experts, or others employing a variety of digital environments and media. • Produce original works or solve problems in a team setting.	• Uses definitions and previously established causes/effects (results) in constructing arguments • Makes conjectures and attempts to prove or disprove through examples and counterexamples • Communicates and defends their mathematical reasoning using objects, drawings, diagrams, actions • Decide if the arguments of others make sense • Ask useful questions to clarify or improve the arguments

Sample Tasks

1. Teachers: Digital Professional Learning Communities. Student: Digital learning group.
2. Display student work and create digital student portfolios highlighting symbolic and real-world representations to justify their thinking.
3. Students engaging in interactive digital lessons about math through student and teacher devices.

Teacher				Student			
Does not expect students to interpret representations. Expects students to memorize procedures with no connection to meaning.	Expects students to model and interpret tasks using a single representation using a digital environment Explains connections between procedures and meaning using digital tools to	Expects students to interpret and model using multiple representations. Provides structure for students to connect algebraic procedures to contextual meaning.	Expects students to interpret, model, and connect multiple representations. Prompts students to articulate connections between algebraic procedures and contextual meaning	View and receive information from digital environments.	Use digital environments to reason with models or pictorial representations to solve problems	Are able to translate situations into symbols for solving problems. Use technology as appropriate to translate situations into symbolic	Using digital environments, convert situations in to symb to appropriately solve problems as well as

Math display information digitally.	facilitate understanding.	Links mathematical solution with a question's answer.				representations and justify their thinking.	convert symbols into meaningful situations

Device	**Oregon Educational Technology Standard 4.** Critical Thinking, Problem Solving and Decision Making	**CCSS Math Practice 4:** Model with Mathematics.
3-D Printers	• Use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. • Identify and define authentic problems and significant questions for investigation.	• Apply mathematics to problems in everyday life • Make assumptions and approximations • Identify quantities in a practical situation • Interpret results in the context of the situation and reflect on whether the results make sense

Sample Task:

1. Find the volume of 3-dimensional objects mathematically, and verify/apply this knowledge utilizing the 3-dimensional model.
2. Use 3-dimensional modeling to create models given specific geometric constraints.
3. Use 3-dimensional models to evaluate tolerances within a design and apply this knowledge to relevant, real-world scenarios.

Requires students to identify variables and to perform necessary computations.	Requires students to identify variables and to compute and interpret results.	Requires students to identify variables, compute and interpret results, and report findings using a mixture of representations. Illustrates the relevance of the mathematics involved. Requires students to identify extraneous or missing information	Requires students to identify variables, compute and interpret results, report findings, and justify the reasonableness of their results and procedures within context of the task.

Teacher				Student(s)			
Identifies appropriate variables and procedures for students. Does not discuss appropriateness of a model.	Verifies that students have identified appropriate variables and procedures. Explains the appropriateness of model.	Asks questions to help students identify appropriate variables and procedures. Facilitates discussions in evaluating the appropriateness of model.	Expects students to justify their choice of variables and procedures. Gives students opportunity to evaluate the appropriateness of model.	Solve problems abstractly based only on algorithmic instruction and the thinking of others	Use models to represent and solve a problem, and translate the solution to mathematical symbols	Use models and symbols to represent and solve a problem and accurately explain the solution representation.	Use a variety of models symbolic representations and technology tools to demonstrate a solution to a proble

Attachment B: 6th Grade Math Scope and Sequence

	September	October	November	December	January	February	March	April	May	June
Proposed	6.NS 1-4	6.EE 1 - 9	6.EE 1 - 9	6.EE 1 - 9	6.NS 5-8	6.NS 5-8	6.RP 1-3	6.G 1-4	6.SP 1-7	6.SP 1-7
	1. Multiply/Divide Fractions	1. Write and evaluate expressions with whole number exponents.			5. Understand positive and negative numbers		1. Understand the concept of ration and the language	1. Find the area of triangles, special quadrilaterals and polygons	1. Recognize a statistical question as one that anticipates variability in the data.	
	2. Fluently divide multi-digit numbers using the standard algorithm.	2. Algebraic expressions			6. Extending number line to include negative coordinates		2. Understand the concept of unit rate associated with a ratio	2. Find the volume of rectangular prism	2. Represent the distribution of a data set and describe it	
	3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	3. Properties of operations for equivalent expressions			7. Understand ordering and absolute value of rational numbers		3. Use ratio and rate to solve real-world and math problems	3. Draw polygons in the coordinate plane	3. Measure of center for a data set	
	4. GCF/LCM	4. Identify equivalent expressions			8. Solve real-world and math problems by graphing in four			4. Represent 3-D figures using nets	4. Display data in various plots	
		5. Use substitution to solve equation or inequality							5. Sumarrize numerical data sets	
		6. Use a varialbe to represent an unknown number								
		7. Solve real-world and math problems with equations								
		8. Write inequalities								
		9. Represent and analyze dependent and independent variables.								

6th Grade Math Alignment
2015-2016

Priority Standards prior to Testing

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 6

Emphases are given at the cluster level. Refer to the Common Core State Standards for Mathematics for the specific standards that fall within each cluster.

Key: ■ Major Clusters ■ Supporting Clusters ○ Additional Clusters

6.RP.A	■	Understand ratio concepts and use ratio reasoning to solve problems.
6.NS.A	■	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
6.NS.B	○	Compute fluently with multi-digit numbers and find common factors and multiples.
6.NS.C	■	Apply and extend previous understandings of numbers to the system of rational numbers.
6.EE.A	■	Apply and extend previous understandings of arithmetic to algebraic expressions.
6.EE.B	■	Reason about and solve one-variable equations and inequalities.
6.EE.C	■	Represent and analyze quantitative relationships between dependent and independent variables.
6.G.A	■	Solve real-world and mathematical problems involving area, surface area, and volume.
6.SP.A	○	Develop understanding of statistical variability.
6.SP.B	○	Summarize and describe distributions.

Attachment C: Reynolds TechSmart Professional Development Plan

Component: Professional Development		
2015		
Deliverable	**Outcomes**	Date
Summer Schoology	Teachers and IT coach acquire Schoology understanding and application	July 2015
Pre Instruction Conference	Schoology applied to teachers' content: *Digital Units Planned*	August 2015
Lab Cycle 1	**Student evidence demonstrates proficiency of:** Common Core Standards for Mathematics 7.NS.A1 http://www.corestandards.org/Math/Content/7/NS/ Oregon Educational Tech Standard 1 http://www.ode.state.or.us/news/announcements/announcement.aspx?=4315 Math Practice 3 http://www.corestandards.org/Math/Practice/	Oct 2015
Lab Cycle 2	**Student evidence demonstrates proficiency of:** Common Core Standards for Mathematics 7.EE.3 http://www.corestandards.org/Math/Content/7/EE/ Oregon Educational Tech Standard 2 http://www.ode.state.or.us/news/announcements/announcement.aspx?=4315	February 2016

	Math Practice 5 http://www.corestandards.org/Math/Practice/	
Lab Cycle 3	**Student evidence demonstrates proficiency of:** Common Core Standard for Mathematics 7.G.B.6. http://www.corestandards.org/Math/Content/7/G/ Oregon Educational Tech Standard 4 http://www.ode.state.or.us/news/announcements/announcement.aspx?=4315 Math Practice 6 http://www.corestandards.org/Math/Practice/ http://www.corestandards.org/Math/Practice/	March 2016
Lab Cycle 4	**Student evidence demonstrates proficiency of:** Common Core Standard for Mathematics 7.SP.C.6 http://www.corestandards.org/Math/Content/7/SP/ Oregon Educational Tech Standard http://www.ode.state.or.us/news/announcements/announcement.aspx?=4315 Math Practice 7 http://www.corestandards.org/Math/Practice	April 2016

Attachment C: Reynolds TechSmart Professional Development Plan

Early Release	Data analysis from Lab Cycle lessons and continuous collaborative planning. Sharing of classroom examples.	Monthly.
	2016-2017	
Deliverable	Outcome	Date
Same cycle of Summer Training to Lab Cycle professional development with Early Release data analysis and collaborative sharing continuous.	Increased student math achievement in math, language and technology per content and language standards. Teacher and student proficiency integrating Schoology and content and language instruction. *See Technology component below. Year one digital units/lessons refined: Streamlining of best lessons and strategies to acquire both content and language standards. Teachers add digital units and lessons. Capacity building: Cohort one will teach cohort two beginning Schoology	Time line repeats from year one.
	2017- 2018	
Deliverable	Outcome	Date
Same cycle of Summer Training to Lab Cycle professional development with Early Release data analysis and collaborative sharing continuous.		Time line repeats from year one and two.

Attachment C: Reynolds TechSmart Professional Development Plan

Component	**Technology**			
2015				
Deliverable	**Outcomes**	**Student Evidence**	**Teacher Evidence**	**Date**
Purchase and install devices	Devices imaged, secured and placed for deployment.	N/A	N/A	Ready for summer training and fall classroom use (July 20)
Instructional resources, student feedback and assessment leveraged through Schoology.	Create classes and create assignment.	Students upload assignments through Schoology.	Teacher share lessons and assessment feedback.	
Device Proficiency	Teachers create digital environments supporting students to apply digital tools so they gather, evaluate, validate and use information.	Students use tools to gather, evaluate, validate and use information as they acquire language standards and content standards.	Teacher will utilize Surface Pro, One Note and Schoology to create digital environments.	
2016				

Attachment C: Reynolds TechSmart Professional Development Plan

Deliverable	Outcomes	Student Evidence	Teacher Evidence	Date
Purchase and install, maintain devices.	Devices imaged, updated, secured and placed for deployment.	N/A	N/A	Ready for summer training and fall classroom use (July 20).
Instructional resources, student feedback and assessment leveraged through Schoology.	Uses technology tools to blend classroom. Teacher moves to a facilitation role.	Students lead one to two inquiry and research projects based technology tools and teacher feedback through those tools	Teacher begins centers instruction on students' inquiry utilizing tech to build platforms for research, analysis, presentation, global communication and product production.	Monthly checks through Walk Throughs, Lab Cycle data collection. This data is formatively summarized in interim reports (November, March) and summatively reported in June.
2017				
Deliverable	**Outcomes**	**Student Evidence**	**Teacher Evidence**	**Date**
Purchase and install, maintain devices.	Devices imaged, updated, secured and placed for deployment.	N/A	N/A	Ready for summer training and fall classroom use (July 20).
Instructional resources, student feedback and assessment leveraged through Schoology.	Full blended classroom as model site.	Students lead one to two inquiry and research projects based technology tools and teacher feedback through those tools	Teacher and student instructional interaction is seamless pivoting between students' inquiry, individual and group and teachers' use of tech to create platforms igniting research, analysis, presentation, global communication and product production.	Monthly checks through Walk Throughs and Lab Cycle data collection. This data is formatively summarized in interim reports (November, March) and summatively reported in June.

Attachment C: Reynolds TechSmart Professional Development Plan

2016- 2018 **Evaluation Criteria All Components**
Formative and summative data collection and evaluation process. • Formative assessment during each Lab Cycle session and Early Release per student data collection and teacher feedback. • Monthly checks through Walk Throughs. • Monthly lesson upload to lesson repository (Schoology). • Data is formatively summarized in interim reports (November, March) • Data is summatively reported in June 2016, 2107, 2018 Formative and summative data derived from Lab Cycles, Walk Through data and statewide assessment data combined with on-going teacher and student qualitative feedback will be combined to capture growth and effect and refine next steps.

Attachment D

Section IV. Reynolds Implementation Plan

		SY2015-16													SY2016-17															
Project Component	**LEAD**	**June**	**July**	**Aug.**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May.**	**June**	**July**	**Aug**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sep.**	**Oct.**	**Nov.**
Technology Management																														
· Negotiate/Execute Tech Purchase	IT																													
· Conduct IT Systems Tests	IT																													
· Receive and Image Equipment	IT																													
· Equipment Security Protocols	IT																													
· Students Digital Citizenship training	Teachers																													
· Set up/Exchange Network Information w/LMS	IT																													
· Distribute teacher devices; 12 in 2015; 15 in 2016; 12 in 2017	IT																													
· Distribute classroom devices/equipment; 12 in 2015; 15 in 2016; 12 in 2017	IT																													
· Install wiring/Internet access device in classrooms; 12 in 2015; 15 in 2016; 12 in 2017	IT																													
· Teacher Account Set-up	IT Coach																													
· Establish Student Cloud Office Accounts	IT																													
· Schoology Content Configuration and Roll-Out	IT Coach																													
· Schoology Framework Set-Up/Data Provision&Authentication	IT Coach																													
. Project Lead the Way Classroom Set-up	IT																													
Professional Development																														
· Participating Teachers receive devices/operations training	IT Coach																													
· Identify 4 Lead Math Teachers	IT Coach																													
· 4 Lead Teachers/1 IT Coach - Schoology Institute	IT Coach																													
· Lead Teachers conduct training/lesson planning with 8 teachers 2015, 11 in 2016, 12 in 2017	IT Coach																													
· Lab Cycle PD	SMT Coach																													
· Early release data sharing/collaboration; one monthly	STC																													
· Individual Teachers; Bi-Weekly, individualized PD	IT Coach																													
. Project Lead The Way (PLTW) curriculum training	PLTW Trainers																													
· Establish leveled skill expectations	SM Comm																													
Data Analysis and Evaluation																														
· Schoology student assessment/data reports: Basis for Lab Cycles	Teachers																													
· Formative Assessment Lab Cycles	Data Cord.																													
· Monthly Walk Throughs/report; Formative Student Work/Usage	Data Cord.																													
· Formative/Summative data reporting - Grant Reports	Data Cord.																													
· Disaggregated Student Grade Evaluation	Data Cord.																													
· Disaggregated Student Credit Evaluation	Data Cord.																													
· Disaggregated Standardized Assessment Evaluation	Data Cord																													
· Disaggregated Student Behavior (attendance/referrals) Evaluation	Data Cord.																													

Instructional Technology Coach (IT Coach)

Secondary Math Instructional Coach (SMT Coach)

Site-based Teacher Cohorts (STC)

Participating Teachers (Teachers)

Project Lead The Way (PLTW Trainers)

Data Coordinator (Data Cord.)

Secondary Math Committee (SM Comm)

IT Support Team (IT)

SY2017-18 **SY2018-19**