BEAVERTON SCHOOL DISTRICT

BOARD MEETING DATE
March 14, 2016

WE EXPECT EXCELLENCE WE INNOVATE WE EMBRACE EQUITY WE COLLABORATE

MATHEMATICS PROJECT TEAM AND SECONDARY MATH SEQUENCE UPDATE

POLICY ISSUE/SITUATION:

At the November 16, 2015 School Board meeting, the Board charged the Superintendent to form the Mathematics Project Team. The work of the Project Team to date is contained in the Mathematics Project Team Board Update. The Algebra/Geometry/Statistics implementation work is contained in the Secondary Mathematics Sequencing Courses Board Update.

ACTION:

It is recommended that the School Board receive the attached documents for review.

BEAVERTON SCHOOL DISTRICT

WE

MATHEMATICS PROJECT TEAM SCHOOL BOARD UPDATE – *MARCH 2015*

The Mathematics Project Team has met twice, Tuesday, January 26th and Tuesday, February 23rd. The next meeting is scheduled for Tuesday, March 15th. The team, as approved by the School Board, provides representation of teachers, administrators and parents from elementary, middle and high school levels and from all regions of the district. There are members representing Special Education, English Language Learners, and Career Technical Education.

The majority of the work has been focused on setting expectations and on developing a working relationship. The team built background knowledge through a few selected readings related to philosophy and best practices. The team is in a learning space at this point, and several of the activities have focused on understanding the School Board Charge, shifts in the Oregon Department of Education Content Standards and Mathematical Practices, and preparing our students mathematically for post-secondary opportunities.

Below is a brief summary of each meeting. More detail can be found on the Mathematics Project Team page on the BSD website.

January 26, 2016 Meeting

The members of the Mathematics Project Team participated in the following activities.

- Looking at the School Board charge for the team and expectations.
- Developing Community Agreements to build a working relationship
- Reviewing the decision making strategy
- Communicating through a text protocol after having read the introduction and Chapter 1 of Jo Boaler's, *What's Math Got To Do With It?*
- Examining and providing feedback on the first draft of the BSD Mathematics Position Paper

February 23rd Meeting

The members of the Mathematics Project Team participated in the following activities.

- Discussing the information provided by a PowerPoint presentation outlining the shifts in the state standards and the strategic measures outlined by the BSD School Board.
- Collaborating through a sorting activity examining one strand of math content from Kindergarten through High School to build a deeper understanding of the math curriculum
- Communicating through a text protocol on Chapter 5 of *Best Practices Bringing Standards to Life in America's Classrooms*
- Examining and providing feedback on the first draft of the BSD Mathematics Best Practices
- Sharing revisions of the Math Position Paper and voting on initial revised draft.

The Project Team parents will have an opportunity to visit Elementary classrooms, Tuesday, March 15th and high school and middle school classrooms on Thursday, March 17th.

The next meeting will focus on continued work related to the Mathematical Best Practices and begin work on the materials review process.

BEAVERTON SCHOOL DISTRICT

WE

BSD Mathematics Position Statement - *Draft*

The ability to think and communicate mathematically is essential to becoming a successful and productive member of our dynamic global society. To prepare our students, they must develop the skills to:

- Use number sense fluently
- Problem-solve
- Attend to precision
- Think creatively and flexibly
- Build, support, and critique an argument
- Communicate mathematical thinking orally, visually, and in writing
- Make connections between mathematical ideas, patterns and concepts in a variety of contexts.

Each of these critical components of a rigorous and balanced K-12 mathematics program based on the Common Core State Standards must include the use of the proper tools, including the most appropriate technology.

If we are to meet this challenge, we must provide students with multiple opportunities to engage with a variety of problem solving tasks that reflect the diverse backgrounds, abilities, and experiences of each student. Students should explore and collaborate on rich problems with multiple entry points and multiple paths to a solution that challenges them. Students should be encouraged to work through their thinking and computations in order for them to recognize the patterns, significance, and relevance of the true nature of mathematics. Developing number sense, estimation, and computation skills will create students who are more efficient in their problem solving skills.

We must provide all students with a rigorous, accessible, and challenging curriculum that will develop critical thinkers and prepare them for post-secondary, career, and life success. This will require a combination of materials and the use of multiple instructional strategies, including evidence-based intervention and extension methods to successfully reach all children. Proficiency on learning targets, mathematical practices, and ongoing assessment of student progress will inform next steps for instruction.

Mathematics instruction that develops conceptual understanding and problem solving skills must reflect a progression of learning that builds Kindergarten through 12th grade and grows confidence to further explore and use mathematics throughout life. In order to best support teachers, purposeful, evidence-based, and ongoing professional development is essential to improving educational practices. At all levels, teachers need time to collaborate with colleagues with the goal of increasing student learning. In addition, teachers need access to quality resources that deepen their knowledge, instructional and differentiation skills, and cultural competency to meet the needs of our diverse student population.

Ultimately, mathematics education is achieved through a partnership among all stakeholders: teachers, students, families, schools, and the community. Therefore, the task of the Beaverton School District is to create a thoughtful learning environment, in which all students are valued for their diversity, fostered in their mathematical thinking, empowered to explore and solve problems, and challenged to continue learning throughout their lives.

BEAVERTON SCHOOL DISTRICT

SECONDARY MATHEMATICS SEQUENCING SCHOOL BOARD UPDATE – *MARCH 2015*

ALGEBRA/GEOMETRY/STATISTICS COURSES

Communication to Parents and the Beaverton School District Community

There have been nine Algebra/Geometry/Statistics Parent and Community Information sessions beginning spring 2015. All the sessions were promoted through Community Involvement and through Middle and High School Newsletters and/or Websites. The dates and locations are listed below.

Location	Date
Conestoga Middle School	April 14, 2015
Westview High School	April 23, 2015
Intel	May 5, 2015
Stoller Middle School	January 21, 2016
Southridge High School	January 28, 2016
Cedar Park Middle School	February 2, 2016
Highland Park Middle School	February 4, 2016
Whitford Middle School	February 9, 2016
Aloha High School	February 16, 2016

Dennis Williams, Secondary Mathematics Specialist, presented information on the new secondary math sequence with a focus on the changes to the Oregon Department of Education Mathematical Standards and Practices, the BSD School Board Strategic Measures, a need for more emphasis on Statistics, and alleviating the need to review Algebraic concepts for nearly a semester in Algebra 2 after having a Geometry course. *The attached information sheet, which was provided to parents in both English and Spanish, provides more detail about the presentation.*

There was at least one session scheduled in every region throughout the district. Most were held at middle schools since the current middle school students are the ones being impacted by the change.

Each session offered plenty of opportunity for parents and community members to ask questions. The sessions were well attended with the total from all nine sessions surpassing 300. The response to the change was overwhelmingly positive after all the questions had been addressed.

SECONDARY MATH SEQUENCE PLANNING TEAM

Below, in italics, are the last three paragraphs of the update on the Mathematics Curriculum work presented to the School Board at the November 2015 meeting. Updates on the additional work since the last report are inserted below in blue-colored text.

Through the process of writing and aligning targets and developing coursework to prepare students for college and career, it became apparent that we must align our math courses across the district. Now that we have defined our BSD Math curriculum through a K-12 Learning Progression of Long-Term Learning Targets, the data clearly shows that it is possible for many of our students to get three credits in math by taking courses that provide them with a small portion of the knowledge and skills necessary to be ready for a college credit-bearing course. The criteria for success, for some, has become earning three credits, rather than being prepared for post-secondary study.

To meet the BSD School Board charge, work has begun on defining a set of math courses that upon completion will ensure our students have demonstrated a level of proficiency on all the math content, and developed skills and habits defined by the CCSS Mathematical Practices. This will provide our students with many college and career options. The defined Learning Progression will live in these courses. Students will be supported in order to successfully complete these courses, rather than allow them to complete a sequence we know doesn't prepare them.

All Algebra 1 courses and courses with Algebra 1 learning targets will be replaced by Algebra/Geometry/Statistics 1 at all secondary schools next fall. The three pilot high schools will be adding Algebra/Geometry/Statistics 2 courses to their schedules for students currently in Algebra/Geometry/Statistics 1. Westview High School will be offering both Algebra/Geometry/Statistics 2 and Geometry to accommodate students from their middle school feeders. The Algebra/Geometry/Statistics 2 and Algebra/Geometry/Statistics 3 classes will be implemented throughout the district in 2017-18 and 2018-19, respectively. Completion of these three courses will ensure that students have demonstrated a level of proficiency on all of the math learning targets required to prepare them for college and career post-secondary opportunities.

Teachers will be supported in the delivery of the curriculum with materials, professional development and collaboration time. This will allow them to make the shifts in instruction and assessment required by the CCSS and Mathematical Practices, and prepare all BSD students for college and career.

The pilot schools are currently using the Mathematics Vision Project open source materials and are reporting the following successes...

- The students are more engaged than they were with the old materials.
- The students are developing problem solving and communication skills using precise mathematical language.
- The students are making connections between the Algebra, Geometry and Statistics strands of mathematics.

Pilot teachers are supporting each other by developing Tier 1 and Tier 2 supports for students, formative assessment tasks and activities, and summative assessment opportunities for all the targets.

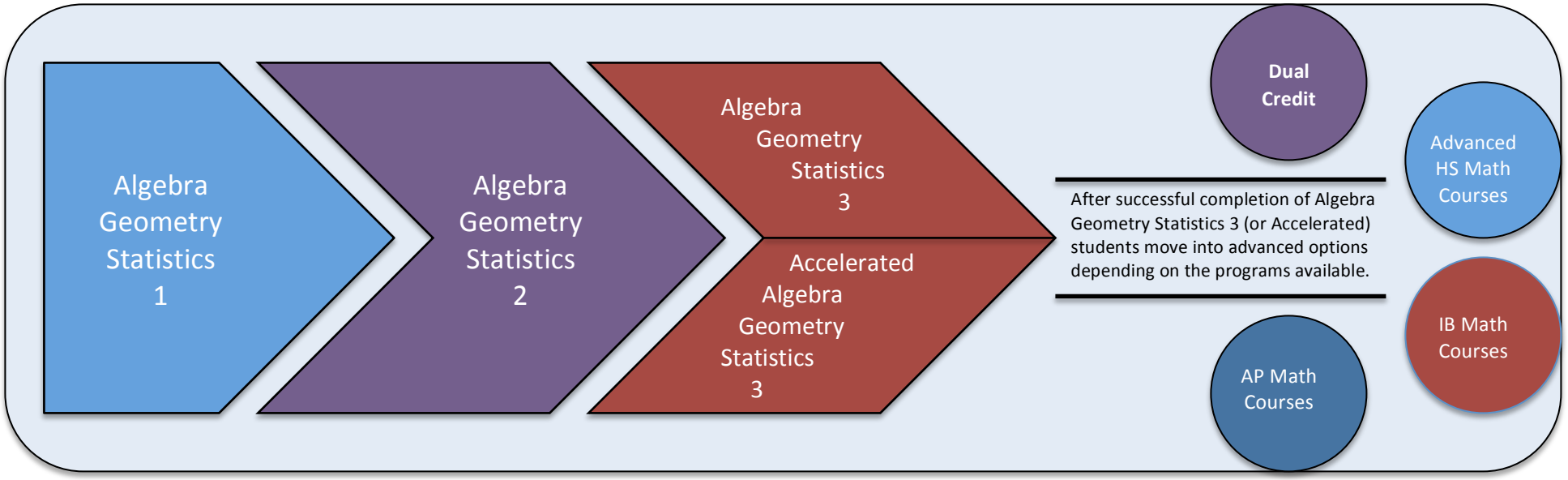
The spiral design of the curriculum allows for multiple opportunities to be an integral part of both instruction and assessment. The teachers are evaluating and adjusting the materials as needed to support the needs of our students.

All the high schools are making decisions about how to support students through the Algebra/Geometry/Statistics courses. A couple of additional course options were piloted this year. An Algebra/Geometry/Statistics Workshop allows students to be concurrently enrolled in Algebra/Geometry/Statistics 1 and the Workshop class as a support. The Algebra/Geometry/Statistics Prep class provides students with another opportunity to prepare for Algebra/Geometry/Statistics 1. Each high school is in the process of evaluating their students needs and whether or not to offer the support courses.

Professional Development is set for August 22nd, 23rd, and 24th for all Algebra/Geometry/Statistics 1 teachers, with two additional sessions scheduled later that fall and in late winter. This professional development will focus on the content and mathematical practices required by our curriculum and how to best support and challenge our students. An additional workshop opportunity is scheduled for Tuesday, August 30th for all secondary math teachers with Stanford Professor and Author, Jo Boaler.
Individual schools will work on finding collaboration time for building teams. Also, we are working on providing the opportunity for collaboration time so the teams of teachers, or representatives, teaching the Algebra/Geometry/Statistics 1 course across the district can meet.

BEAVERTON SCHOOL DISTRICT

SECONDARY MATH COURSE SEQUENCE



Below are a few examples of how students might move through the BSD Math Sequence (Dual Credit Courses are italicized)							
Grade 6	**Grade 7**	**Grade 8**	**Grade 9**	**Grade 10**	**Grade 11**	**Grade 12**	**College**
Math 6	Math 7	Math 8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Algebra Geometry Statistics 3	*Math 95* *IB Math Studies*	College Algebra Math 111
Math 6	Math 7	Math 8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus *Math 111/112*	Calculus 1/2 Math 251/252
Math 6/7	Math 7/8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus *Math 111/112*	AP Calculus AB *Math 251/252*	Calculus 3 Math 253
Math 6/7	Math 7/8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus or IB Math SL 1	IB Math SL 2	200 Level Math Courses
Math 7/8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus *Math 111/112*	AP Calculus AB or IB Math HL 1 or *Math 251/252*	AP Calculus BC or IB Math HL 2 or *Math 253*	Calculus 4 or other 200/300 level Math
Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	AP Statistics *Stats 243/244*	Pre-Calculus *Math 111/112*	AP Calculus AB or IB Math HL 1 or *Math 251/252*	AP Calculus BC or IB Math HL 2 or *Math 253*	Calculus 4 or other 200/300 level Math

Why is BSD changing the Secondary math sequence of courses?

There are several issues that are precipitating the change to the Secondary math sequence of courses. A few are outlined below with solutions.

1. **Issue:** Even though a BSD team of Math teachers representing all middle and high schools have defined the BSD secondary math curriculum through 32 Long-term Learning Targets aligned to Oregon State Math Standards, many students are able to follow pathways through courses that provide 3 math credits but only cover about two-thirds of the 32 Long-term Learning Targets required to be college and career ready.

   Solution*: A BSD team of Math teachers representing all middle and high schools created an initial single sequence of Math courses that ensures all students will receive multiple opportunities through instruction and assessment to demonstrate proficiency on all the learning targets that define college and career readiness in mathematics. This initial single sequence will better prepare students for advanced Math options through International Baccalaureate (IB), Advanced Placement (AP) and concurrent enrollment in College Math courses.*

2. **Issue:** The BSD Math curriculum aligned to Oregon State Math Standards and Practices require a shift in instruction. Students will be expected to demonstrate proficiency in the following; 1) communicating their mathematical thinking, including supporting and critiquing solutions and arguments, 2) mathematically model problems in context to enhance their ability to solve problems, 3) finding patterns in the structure and systems of mathematics.

   Solution: *Provide support and material to teachers to make the required shifts in instruction and assessment that will ensure students have multiple opportunities to demonstrate these skills. One set of courses will promote district-wide collaboration to find support material, and to develop lessons, units, assessments and tasks to enrich these courses to meet the requirements of the instructional shifts.*

3. **Issue:** The BSD Math curriculum aligned to Oregon State Math Standards places greater emphasis on Statistics, which is currently not thoroughly addressed in our math courses.

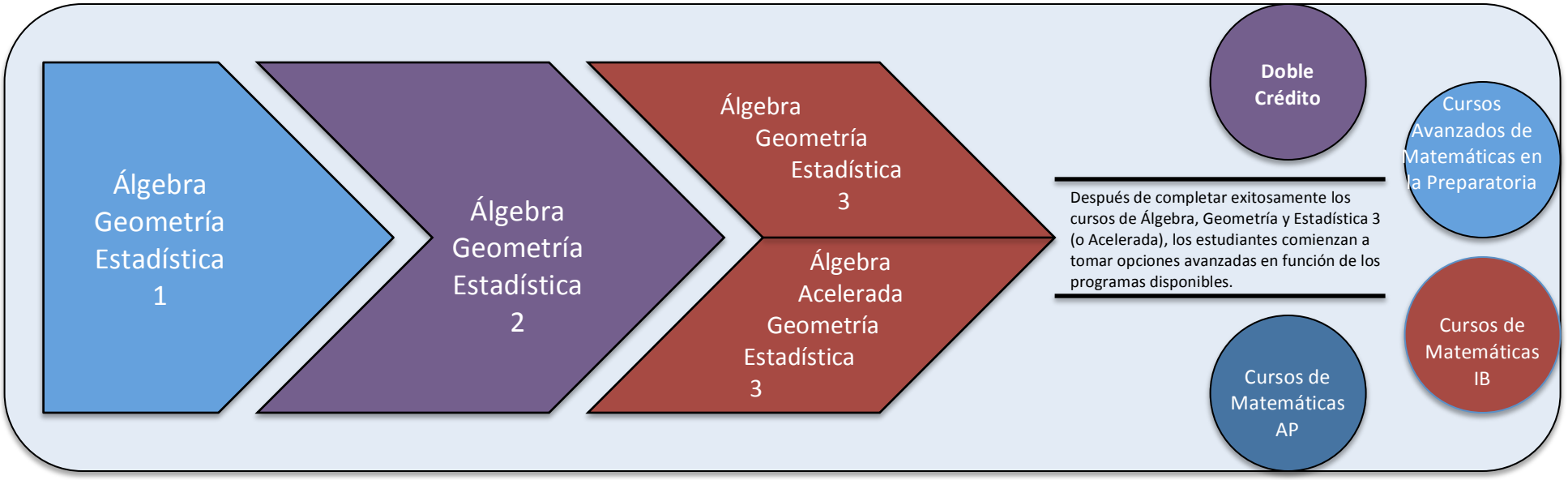
   Solution: *Include the statistics targets in the curriculum and provide support to teachers to instruct and assess the statistic targets. Mix the statistics targets throughout the three Algebra/Geometry/Statistics courses to provide context and application for some of the algebraic manipulation targets.*

4. **Issue:** Having a Geometry course placed between two Algebra courses requires that the second Algebra course review material for approximately one-third of the year.

   Solution: *Assimilate the geometry targets throughout the three Algebra/Geometry/Statistics courses to provide context for the Algebra, Statistics and Probability targets. This placement of targets will provide a more efficient way to instruct all the concepts. For example, typically the first one-third to one-half of an Algebra 2 course reviews the targets taught in Algebra 1 because many of these concepts are not used in Geometry. Having the Algebra targets used repeatedly will be reinforce retention and require less time to re-teach.*

BEAVERTON SCHOOL DISTRICT

CURSOS DE SECUENCIAS DE MATEMÁTICAS PARA LA SECUNDARIA Y PREPARATORIA



A continuación se presentan algunos ejemplos de Secuencias de Matemáticas en BSD (Los cursos de doble crédito están en letra itálica							
6 ° Grado	**7 ° Grado**	**8 ° Grado**	**9 ° Grado**	**10 ° Grado**	**11 ° Grado**	**12 ° Grado**	**Universidad**
Math 6	Math 7	Math 8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Algebra Geometry Statistics 3	*Math 95*	College Algebra Math 111
Math 6	Math 7	Math 8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus *Math 111/112*	College Algebra Math 111
Math 6/7	Math 7/8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus *Math 111/112*	Calculus 1/2 *Math 251/252*	Calculus 3 Math 253
Math 6/7	Math 7/8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus or IB Math SL 1	IB Math SL 2	Calculus 3 Math 253
Math 6/7	Math 7/8	Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	Pre-Calculus *Math 111/112*	AP Calculus AB or *Math 251/252*	Calculus 3 Math 253
Algebra Geometry Statistics 1	Algebra Geometry Statistics 2	Accel. Algebra Geometry Stats 3	AP Statistics *Stats 243/244*	Pre-Calculus *Math 111/112*	AP Calculus AB or IB Math HL 1 or *Math 251/252*	AP Calculus BC or IB Math HL 2 or *Math 253*	Calculus 4 or other 200/300 level Math

¿Por qué BSD está cambiando la secuencia de los cursos de matemáticas de la secundaria y preparatoria?

Existen varias situaciones que están precipitando el cambio de la secuencia de los cursos de matemáticas de la secundaria y preparatoria. A continuación se describirán algunas de estas situaciones con sus respectivas soluciones.

1. **Situación:** El equipo de maestros de matemáticas de BSD que representan a todas las secundarias y preparatorias definió un plan de estudios de matemáticas para la secundaria y preparatoria de BSD, a través de 32 Objetivos de Aprendizaje de largo plazo, los cuales están alineados con los Estándares de Matemáticas del Estado de Oregon. Aunque muchos estudiantes son capaces de tomar cursos que proporcionan 3 créditos académicos en matemáticas, ellos sólo alcanzan a cubrir aproximadamente dos tercios de los 32 Objetivos de Aprendizaje a largo plazo necesarios para estar preparados para la universidad y profesión.

   ***Solución**: El equipo de maestros de matemáticas de BSD que representa a todas la secundarias y preparatorias crearon una secuencia inicial de cursos de matemáticas que aseguran que todos los estudiantes reciban múltiples oportunidades, por medio de una enseñanza y evaluación que permita demostrar su competencia en todos los Objetivos de Aprendizaje que definan la preparación para la carrera y profesión en el área de matemáticas. Esta secuencia inicial preparará, de mejor manera, a los estudiantes con opciones avanzadas en Matemáticas, a través del Bachillerato Internacional (IB), Clases Avanzadas (AP) y la inscripción simultánea a cursos Universitarios de Matemáticas.*

2. **Situación:** El plan de estudios de Matemáticas de BSD, alineado con los Estándares de Matemáticas del Estado de Oregon y de su práctica, requieren un cambio en la enseñanza. Se requiere que los estudiantes demuestren su destreza en lo siguiente; 1) comunicando su pensamiento matemático, incluyendo el apoyo y crítica de soluciones, así como argumentos, 2) problemas de matemáticas modelados en el contexto para mejorar su habilidad de resolución de problemas, 3) encontrar patrones en la estructura y sistemas en las matemáticas.

   ***Solución:** Proporcionar apoyo y materiales a los maestros para generar los cambios necesarios en la enseñanza y evaluación que garanticen a los estudiantes con múltiples oportunidades al demostrar estas habilidades. Una serie de cursos promoverá la colaboración en todo el distrito para encontrar material de apoyo y para desarrollar lecciones, unidades, evaluaciones y tareas para enriquecer los cursos que satisfagan los requisitos en los cambios de la enseñanza.*

3. **Situación:** El plan de estudios de matemáticas de BSD, alineado como los Estándares de Matemáticas del Estado, implementa un mayor énfasis en la Estadística; la cual actualmente, no está dirigida a fondo en nuestros cursos de matemáticas.

   ***Solución:** Incluye los objetivos de la Estadista en los planes de estudios y proporciona apoyo a los maestros para enseñar y evaluar los objetivos de aprendizaje de Estadística. Mezclar los objetivos de aprendizaje de Estadística en los tres cursos de Álgebra /Geometría/Estadística para proporcionar el contexto y aplicar algunos de los objetivos a la manipulación algebraica.*

4. **Situación:** El curso de Geometría está colocado entre los dos los cursos de Álgebra, por lo tanto es necesario hacer una revisión del material del segundo curso de Álgebra, aproximadamente un tercio del año.

   ***Solución:** Asimilar los objetivos de aprendizaje de Geometría en los tres cursos de Álgebra /Geometría/Estadística para proporcionar un contexto de los objetivos de Álgebra, Estadística y Probabilidad. Esta colocación de los objetivos de aprendizaje proporcionará una manera más eficiente de enseñar todos los conceptos. Por ejemplo, típicamente en el primer tercio de Álgebra 2 hasta la mitad de este curso se deben repasar los objetivos de aprendizaje de Algebra 1, ya que muchos de estos conceptos no se utilizan en Geometría. Así que el repasar repetidamente los objetivos de Álgebra 1 permitirá reforzar la retención de estos objetivos y tomará menos tiempo el volverlos a enseñar.*