CORVALLIS SCHOOL DISTRICT
Inclusive Math Frequently Asked Questions

Updated May 4, 2023

1. Where is CSD in adopting curriculum?

Elementary is continuing with the previously adopted curriculum, Bridges in Mathematics, for Kindergarten through fifth grade. Teacher guides, manipulatives, and student workbooks will be upgraded or replaced as needed.

In Spring 2023, the district will adopt a new math curriculum for grades 6-10. The public can view and provide comments on the curriculum from April 19-26, 2023. Curriculum for courses following high school Geometry and Data Science will be adopted in Spring 2024.

2. How is CSD supporting teacher learning and growth?

The district hired a Math Teacher on Special Assignment (TOSA) to support teachers in elevating their teaching practices with heterogeneous student groups. The Math TOSA:

- Models math best practice for teachers
- Serves as a resource to teachers in the implementation of the core curriculum for all students
- Collects and interprets student assessment data to improve instruction
- Serves as a resource to teachers in lesson planning to meet the diverse needs of their students
- Works with district and site leadership
- Develops and leads professional development for teachers
- Collaborates with district leadership and building principals on learning opportunities
- Leads the curriculum reviews for adoptions
- Supports teachers in piloting new curriculum
- Facilitates instructional rounds with math teachers

Over the past four years, nearly all of our Federal Title II funding has gone to support teachers with math-specific professional learning. These funds have supported math teachers to attend training through the Teacher Development Group and YouCubed.

The district is supporting several committees at the secondary level that are working collaboratively to:

- Give students and families a math placement tool for course selection in 8th grade
- Develop course scopes & sequences
- Adopt new materials
- Develop +1 Math Pathways
- Participate in Lesson Study in the district (observation and pre and post-discussion of math teaching in CSD)

3. Please provide an update on the creation of high school math pathways.

In the Spring of 2023, a committee of math teachers will collaborate to create math pathways. Although that work is just beginning, the parameters for the pathways are below:

- Teachers will create at least three pathways
- All pathways have advanced course options (AP, dual credit, or CTE)
- One pathway will include AP Calculus
- Math courses and pathways will be clearly connected to Oregon CTE Career Clusters
    - Agriculture, Food, and Natural Resource Systems
    - Arts, Information, and Communication
    - Business and Management
    - Health Sciences
    - Human Resources
    - Industrial and Engineering Systems

Full implementation of new high school pathways will begin in the 25/26 school year. Click here to read more about high school math pathways designed by the Oregon Department of Education.

4. When will the new Data Science standards be introduced?

2023/24	2024/2025
• 2 units of Data Science in high school Geometry courses	• Implementation of a new Data Science curriculum • 9th and 10th-grade students enroll in Geometry and Data Science (dependent on when Algebra 1 is completed)

5. How are 8th-grade math placement decisions made?

Each year, 7th-grade students will select their 8th-grade math class. Students can choose if Math 8 or Algebra 1 best fits them. Students can take advanced math courses in high school with either course.

After students select their math class, families are asked to review their student's survey results and discuss their chosen class.

6. Does the Corvallis School District support advancing students in math over the summer in online coursework?

The district does not recommend that students rush to advance in math through a summer math program. Programs that progress quickly tend to focus on procedures rather than deep mathematical thinking, reasoning, and abstract concepts. These are required for success in advanced high school math courses.

If a student chooses to take a summer math course:

1. Math credit will not be transcribed (for incoming 9th graders).
2. Courses taken must be accredited and align to Oregon High School Math Standards (including Data Reasoning standards for the class of 2028) for students to advance to the next math course.

7. How does Corvallis School District serve students who are Talented and Gifted (TAG) in math?

Students identified as Talented and Gifted in math are served by their classroom teachers, who can adjust the rate and level of learning. Teachers can also provide students with enrichment projects in math. High school students are also served through access to AP and dual credit math options, which move faster.

8. How will the system deal with students who transfer in from other school districts and private schools already at accelerated learning levels?

Students who transfer to the Corvallis School District from private schools or other school districts in grades K-7 will be placed in their grade-level classroom for math instruction. For grade 8 or higher students, counselors will work with students and families to review their transcripts and determine appropriate math course placement.

9. How is CSD measuring success?

Math Achievement

STAR Math Assessment.
OSAS Math
Student success in Algebra by the end of 9th grade (class of 2028)

Math Mindset

Student math mindset (class of 2028) **SEE BELOW**
Student enrollment in advanced courses at high school (class of 2028)
Student persistence in math at the high school level (class of 2028)
Math class rosters at the secondary level are diverse and not predictable by race or income level

In the Spring of 2022, the district began to collect math mindset data from middle school students, including students in the class of 2028. The math mindset survey included five questions that asked students to rank their opinions of themselves as

math learners. The survey used a 1-6 scale, with 6 being the highest. Higher self-rank scores are associated with a more positive math mindset.

The math mindset data for 512 CSD middle school students in the 2021/ 2022 school year is below:

	At grade level in heterogeneous groups (Detracked, class of 2028)	At grade level in homogenous groups (Tracked, Grade level group)	Above grade level math (Tracked, High Track group)
Average math mindset score	3.9	3.45	4.18

We will continue to collect and analyze math mindset data over time and plan to administer a second math mindset survey to middle school students in Spring 2023.

10. When did CSD start heterogeneous grouping in math?

2013	Elementary schools began eliminating the practice of students from lower grade levels moving to a higher grade level classroom for math instruction **and** students in a higher grade level moving to a lower grade level class for math instruction.
2018	All elementary schools eliminated tracking for math.
2020	Middle school math teachers developed a plan to place all incoming 6th graders together at the start of the school year. In the Spring of 2021, teachers and administrators were ready to implement their plan for incoming 6th graders in the Fall of 2021.
2021	Middle school math teachers and administrators participated in book studies and professional learning that shifted their mindsets toward heterogeneous grouping through middle school.
2023	All students in grades K-7 are receiving grade-level math instruction.

Heterogeneous instructional strategies include the following.

Low Floor High Ceiling (LFHC) math tasks

A LFHC task is a math activity where everyone in the group can begin and then work on at their own level of engagement. Tasks present possibilities for the participants to do much more challenging math and allow students of mixed abilities and skills to go deeper.

In addition, teachers are developing a larger set of open-ended tasks. These tasks ask students to solve problems in multiple ways or offer multiple solutions.

1. For example, rather than asking a question like “What is the area of an 8x3 rectangle” a teacher might ask, “What are all of the rectangles that have an area of 24.”
2. Another example is modeling groups of problems. Simply adding integers can be taught quickly as a series of rules. It is also a task easily done by a phone or calculator. Pressing students to model groups of problems (Group A: -4 + -3, -1 + -5, -6 + -2; Group B: -4 + 3, -1 + 5, -6 + 2) find similarities within the group, and generalize to an algorithm builds a multitude of skills.

Students who are quickly successful in this lesson are asked to justify their algorithms with integer chips and number line models and abstract their algorithms to general numbers a, b, -a, and -b. There is an emphasis on discovering connections in math rather than moving quickly through isolated methods.

Open-ended math tasks

Open-ended math problems are problems that have more than one possible answer. These problems might present an end result and then ask students to work backward to determine how that result might have been achieved. They also might ask students to compare two concepts that can be compared in a variety of different ways.

Whatever way they are presented, the purpose of open-ended math problems is always to encourage students to use higher-order thinking skills to solve problems and understand that some problems can be solved in many ways, with many outcomes.

Tasks that encourage the use of multiple representations

Because of the abstract nature of math, people have access to mathematical ideas only through the representations of those ideas. The depth of understanding is related to the strength of connections among mathematical representations students have internalized (visual, symbolic, verbal, contextual, and physical.)

Tasks that provide a window into student thinking

When students show their thinking numerically, visually, or with words, it can help the teacher determine how much they have reached their math learning goals. Teachers can use this information to make instructional decisions during the lesson and to prepare for subsequent lessons to support students with perceived low and high math ability.

11. How will teachers keep students with advanced math skills engaged in grade-level math?

CSD teachers will use the 8 Effective Mathematical Teaching Practices to support students with perceived low and high-level math ability. The practices are listed below.

1. Establish math goals to focus learning.
2. Implement tasks that promote reasoning and problem-solving.
3. Use and connect mathematical representations.
4. Facilitate meaningful mathematical discourse.
5. Pose purposeful questions.
6. Build procedural fluency from conceptual understanding.
7. Support productive struggle in learning math.
8. Elicit and use evidence of student thinking.

National Council of Teachers of math. (2014). Principles to actions: Ensuring mathematical success for all.

12. Why are the standards that students need to learn in grades 4, 5, and 6 so critical to future success in math?

The standards taught in 4th-6th grade are critical for students to develop a deep understanding to best achieve higher levels of math.

- Common Core Standards for grade 4
- Common Core Standards for grade 5
- Common Core Standards for grade 6

These standards ask math teachers to significantly narrow and deepen how time and energy are spent in the classroom. This focus will help students gain strong foundations, including a solid understanding of concepts, a high degree of procedural skill and fluency, and the ability to apply the math they know to solve problems inside and outside the classroom. This means focusing deeply on the major work of each grade as follows:

In grades 4 and 5:

- Concepts, skills, and problem-solving related to multiplication and division of whole numbers and fractions

In grade 6:

- Ratios and proportional relationships and early algebraic expressions and equations

Students who become competent with fractions develop fundamental mathematical reasoning skills that they can apply to even more abstract concepts in the higher levels of math. Students who have worked to master fractions have "primed their brains" for advanced mathematical knowledge.

13. Where can I find research that supports this shift to heterogeneous groupings for math?

Ability and math: the mindset revolution that is reshaping education

This article reviews evidence for brain plasticity, the importance of mindset, and how mindset messages may be communicated through classroom and grouping practices.

[Antiracist math education adds up to better results for students]

Jennifer Ruef, Rebekah Elliott, and Eva Thanheiser
Ruef, who has a doctorate in math education, is an assistant professor of math education at the University of Oregon. Elliott has a doctorate in curriculum and instruction and is an associate professor of math education at Oregon State University. Thanheiser, who has a doctorate in math education, is a professor of math education at Portland State University. All three teach educators how to teach math.

[Closing the Opportunity Gap: A Call for Detracking math]

Leadership in Mathematics Education (NCSM) calls for detracked, heterogeneous math instruction through early high school. After this, students may be well-served by separate curricular pathways leading to viable post-secondary options.

[Dismantling Academic Tracking in math - Achieve the Core Aligned Materials]

Researching academic tracking reinforced that standardized assessments can contribute to and uphold a system not designed for students of color.

[Is It Time to Detrack Math?]

Districts and schools can't simply detrack and assume great results will follow. Districts that have successfully detracked have had to work with educators and parents to adapt to the new system—especially addressing the status and perceived advantage of tracking with families and students.

[Oregon Math Project Practice Brief: Promoting Equity]

Megan Brunner, Elyssa Stoddard & Rebekah Elliott, Oregon State University
Studies have shown that students who hold positive mathematical identities are more likely to succeed in
math and continue in the field.

[NCTM Position: Access and Equity in math Education]

Question: What is required to create, support, and sustain a culture of access and equity in the teaching and learning of math?

[Prove it to Me! math Teaching in the Middle School]

A teaching intervention that highlights problem-solving and reasoning and changes math pathways for students, whether at the low, middle, or high end of the achievement spectrum.

Raising Expectations and Achievement: The Impact of Two Wide Scale De-Tracking math Reforms

> *This paper shares evidence of two professional development interventions given to 120 school districts in California. When teachers de-tracked classes, taught all students high-level work, engaged students in rich tasks, and used formative assessment, student achievement on state tests increased dramatically for students at all levels of achievement.*

Research Overwhelmingly Counsels an End to Tracking | National Education Policy Center

> *Rather than achieving its purported goal – to tailor instruction to the diverse needs of students – tracking has, over decades of extensive research, been repeatedly found to be harmful to students enrolled in lower tracks and to provide no significant advantages for higher-tracked students, writes Dr. William Mathis, the author of the series.*

Students' experiences of ability grouping – disaffection, polarization and the construction of failure

> *Such studies have consistently found the net effects of tracking on achievement to be small (Slavin 1990), with evidence that tracking gives slight benefits to students in high tracks at the expense of significant losses to students in low tracks (Hoffer, 1992; Kerchkoff, 1986)*

What One Hundred Years of Research Says About the Effects of Ability Grouping and Acceleration on K–12 Students' Academic Achievement: Findings of Two Second-Order Meta-Analyses - Saiying Steenbergen-Hu, Matthew C. Makel, Paula Olszewski-Kubilius, 2016

> *Two second-order meta-analyses synthesized approximately 100 years of research on the effects of ability grouping and acceleration on K–12 students' academic achievement. Outcomes of 13 ability grouping meta-analyses showed that students benefited from within-class grouping (0.19 ≤ g ≤ 0.30), cross-grade subject grouping (g = 0.26), and special grouping for the gifted (g = 0.37) but did not benefit from between-class grouping (0.04 ≤ g ≤0.06); the effects did not vary for high-, medium-, and low-ability students.*

What recent research is available regarding middle school tracking in math, closing the achievement gap in math, and acceleration in middle school math and HS Algebra I in 8th grade?

Identifying resources that specifically addressed research on tracking middle school students in math, closing the achievement gap in math, and acceleration in middle school math and high school Algebra 1 in 8th grade.