



PUSD Common Core Math Pathways

May 14, 2014



PUSD Math

- The Piedmont Unified School District currently offers a rigorous mathematics program that provides a strong foundation in mathematical skills and concepts.
- Students meet and exceed the University of California/CSU A-G, as well as other high-performing college admissions requirements and score at high levels on standardized exams, including SAT, ACT, and AP tests.
 - PHS SAT: **662** (mean score) PHS ACT: **28.2** (mean score)

Central Principles of Common Core Math

- The central principles of the Common Core State Standards for Mathematics include focus, coherence and rigor, and are designed to develop all students' skills to be successful in college and the workplace.
- The two basic types of standards, **mathematical practice** and **mathematical content** support the goal of developing students who are resilient and powerful math thinkers, armed with a robust “tool box” of problem-solving and thinking strategies that they can apply to any math challenge.
- While the content standards differ at each grade level, the practice standards are the same for all grades k-8 and gain complexity and depth as students' progress through their school career.

8 Mathematical Practices

Standard for Mathematical Practice	Student Friendly Language
1. Make sense of problems and persevere in solving them.	I can try many times to understand and solve a math problem.
2. Reason abstractly and quantitatively.	I can think about the math problem in my head first.
3. Construct viable arguments and critique the reasoning of others.	I can make a plan, called a strategy, to solve the problem and discuss other students' strategies too.
4. Model with mathematics.	I can use math symbols and numbers to solve the problem.
5. Use appropriate tools strategically.	I can use math tools, pictures, drawings, and objects to solve the problem.
6. Attend to precision.	I can check to see if my strategy and calculations are correct.
7. Look for and make use of structure.	I can use what I already know about math to solve the problem.
8. Look for and express regularity in repeated reasoning.	I can use a strategy that I used to solve another math problem.

Goals

- Our goal is to provide students with a smooth and appropriate transition from the 1997 California State Standards for Mathematics to the Common Core State Standards for Mathematics.
- Each Common Core State Standard in mathematics is an essential building block for future learning. Content cannot be “skipped”.
- Any new course pathway must provide students with the opportunity to meet and/or exceed the University of California/CSU A-G College Admissions requirements.
- Pathways must provide opportunities for multiple compression points (both at middle school and high school).
- Pathways must also provide opportunities for AP Calculus AB & BC.

2014-15

2013-2014

2014-2015

5th Grade – Elementary



CC-6 Math

6th Grade Math



CC-7 Math

6th Grade Pre-Algebra



CC-8 Math

7th Grade Pre-Algebra



CC-8 Math or Algebra I (1997)

7th & 8th Grade **Algebra I**



Geometry (1997)

8th Grade **Intro to Algebra**



Algebra I (1997)

9th & 10th Grade **Geometry**



Algebra II (1997)

9th, 10th, & 11th Grade **Algebra II**



Math Analysis (1997) or Statistics

10th & 11th Grade **Math Analysis**



AP Calculus AB or Statistics

11th Grade **AP Calculus AB**



AP Calculus BC or Statistics

Integrated or Traditional

- * The Traditional Pathway has historically been taught in the United States and includes Algebra I, Geometry, and Algebra II. The Integrated Pathway is aligned to the mathematics curriculum taught throughout the world (including those countries with the highest success rates in mathematics). Both the new California Framework for Mathematics and the University of California System (UC) support the adoption of either of these pathways for high school students. CCSSM for grades six, seven, and eight are prerequisites for either of these two pathways and are standard across the state.
- The Integrated Pathway's approach is used in most of the other developed countries of the world, and international test results show its value. While these course titles may be unfamiliar, the scope and sequence of these three courses offer the same content as the Traditional Pathway. The Integrated Pathway includes concepts of Algebra, Functions, Geometry, and Statistics throughout each of the three courses instead of being taught in isolation.

Students Currently in 5th Grade Math

Current 5th grade students will enroll in CC-6 Math.

Students currently in 5th grade Math Enrichment in the three elementary schools will be placed into clusters across sections of CC-6 Math. A 6th grade Math Enrichment & Assessment Specialist (0.2FTE) will support students and teachers with curriculum development, differentiation, and assessment practices for the CC-6 Math courses.

As we evaluate the math program at PMS during the 2014-15 school year, we will develop a middle school compression course for 2015-16.

2013-14	2014-15	2015-16	2016-17
5 th Grade	CC-6 Math → ↘	CC-7 Math	CC-8 Math
	Compression course developed (using aligned multiple measures and benchmarks) and presented to the PUSD Board and Community during the 2014-15 school year	Compression Course Available (options to consider)	
		CC-7/CC-8A	CC-8B/Alg1
			or CC-8/Alg1

Students Currently in 6th Grade Math

Current 6th grade students in 6th Grade Math will enroll in CC-7 Math. This pathway will provide students with a rigorous and challenging math experience that exceeds the UC/CSU A-G College Admissions requirement of Algebra 2.

Students Currently in 6th Grade Math

2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
6 th Grade Math	CC-7 Math	CC-8 Math	CC-Alg 1 or Math 1 (Integrated)*	CC-Geo or Math 2 (Integrated)*	CC-Alg2 or Math 3 (Integrated)*	Math Analysis
			High School Compression Course Available (options to consider)			
			Math 1A [§] (Integrated)*	Math 2A [§] (Integrated)*	Math 3A [§] (Integrated)*	AP Calculus AB
			CC- Alg1/Geo [Ⓞ]	CC- Geo/Alg2 [Ⓞ]	Math Analysis	AP Calculus AB
		Middle School Compression Course Available (options to consider)				
		CC-8/CC-Alg1 or CC-8/Math 1 (Integrated)*	CC-Geometry or Math 2 (Integrated)*	CC-Alg2 or Math 3 (Integrated)*	Math Analysis	AP Calculus AB

Students Currently in 6th Grade Pre-Algebra

Current 6th grade students in Pre-Algebra will enroll in CC-8 Math. This pathway will provide students with a rigorous and challenging math experience that exceeds the UC/CSU A-G College Admissions requirement of Algebra 2.

Students Currently in 6th Pre-Algebra

2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
6 th Grade Pre- Algebra	CC-8 Math	CC-Alg 1 or Math 1 (Integrated)*	CC-Geometry or Math 2 (Integrated)*	CC-Alg 2 or Math 3 (Integrated)*	Math Analysis	AP Calculus AB
		Compression Course Available (options to consider)				
		Math 1A \mathbb{A} (Integrated) *	Math 2A \mathbb{A} (Integrated)*	Math 3A \mathbb{A} (Integrated)*	AP Calculus AB	AP Calculus BC
		CC- Alg1/Geo \textcircled{D}	CC- Geo/Alg2 \textcircled{D}	Math Analysis	AP Calculus AB	AP Calculus BC

Students Currently in 7th Grade

- Current 7th grader students will enroll in either CC-8 Math or Algebra 1 (1997). The CC-8 pathway is recommended and will provide students with a rigorous and challenging math experience that exceeds the UC/CSU A-G College Admissions requirement of Algebra 2. The Algebra 1 (1997) pathway is not Common Core aligned.

Students Currently in 7th Grade Pre-Algebra

2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
7 th Grade Pre- Algebra	CC-8 Math	CC-Alg 1 or Math 1 (Integrated)*	CC-Geo or Math 2 (Integrated)*	CC-Alg2 or Math 3 (Integrated)*	Math Analysis
High School Compression Course Available (options to consider)					
		Math 1A [Ⓢ] (Integrated)*	Math 2A [Ⓢ] (Integrated)*	Math 3A [Ⓢ] (Integrated)*	AP Calculus AB
		CC-Alg1/Geo [Ⓞ]	CC- Geo/Alg2 [Ⓞ]	Math Analysis	AP Calculus AB
	Algebra 1 (1997)	Geometry (1997)	Algebra 2 (1997)	Math Analysis	AP Calculus AB

Compression Courses

- During the 2014-15 school year, the PMS, PHS, and MHS math teachers will investigate compression course options for students, beginning in 2015-16. The following provides information about each compression option:
- ⌘ This Integrated Math Pathway compresses Algebra 1, Geometry, Algebra 2, and Math Analysis standards into 3 courses – Math 1A, Math 2A, and Math 3A. Students completing this 3-year compression pathway will be ready for either AP Calculus AB or Statistics.
- ⓘ This Traditional Math Pathway compresses Algebra 1, Geometry, and Algebra 2 standards into 2 courses - CC-Alg1/Geo and CC-Geo/Alg2.
 - Dr. Hung Hsi Wu, Mathematics Professor at UC Berkeley, advocates for this progression in his paper entitled, *Syllabi of High School Courses According to the Common Core Mathematics Standards*, H. Wu - August 4, 2011
 - http://math.berkeley.edu/~wu/Syllabi_Grades9-10.pdf

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Decision Point #1 - At the end of 7th grade, the student/parent can choose to take Math 8 (standard path) or Math I-A (compressed path).

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{1}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Intermediate Decision Points - at the end of 8th, 9th or 10th grade, a parent/student on the standard path can choose to join the compressed path by passing a summer "gap" course or passing an entrance exam.

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Calculus Decision Point - upon completion of Math III (end of 10th grade), the student/parent can select either the AP Calc AB or AP Calc BC pathway

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Allows for parent/student choice.

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Students will be more fully developed (socially, emotionally and intellectually) and thus a more informed decision can be made about moving up. If a student cannot handle the compressed workload, they can easily be transferred back to the standard path.

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Compression is completed prior to the junior year (unless student wants rigor/challenge of the AP Calc BC path).

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

Students/parents have multiple options about if/when to move into compression - some of these transitions are easier than those currently available.

DRAFT Option for the Future

6 th Grade	CC-6 Math		
7 th Grade	CC-7 Math (decision point) ↓ ↘		
8 th Grade	CC-8 Math	Math I-A (all of CC-8 + $\frac{1}{3}$ of Math I)	
9 th Grade	Math I	Math II-A ($\frac{2}{3}$ of Math I + $\frac{2}{3}$ of Math II)	
10 th Grade	Math II	Math III-A ($\frac{1}{3}$ of Math II + all of Math III) (decision point) ↓ ↘	
11 th Grade	Math III	Math IV	Math IV – Honors (Math IV + some Calculus)
12 th Grade	Math IV	AP Calculus AB	AP Calculus BC

**Meets the PUSD commitment to compress at PMS and PHS.
Honors Math IV supports the transition to AP Calculus BC.**

Next Steps

- The PUSD math team will use the inquiry process and collect data on student performance and success in multiple ways. This will include benchmark assessments, student work, and grade and attendance data, amongst other information.
- We will also be in close communication with comparable and neighboring middle schools and high schools to look at longitudinal data, share resources and the learning from our experiences to continue our refinement and improvement of the math program. Additionally, PUSD will be focused on the continued development and communication of our Common Core transition with parents and the community.
- We have recently joined the Silicon Valley Math Initiative as an opportunity to collaborate with comparable school districts and receive support and professional development in the areas of differentiation, curriculum development, and assessment.

Decision Points for 15-16

Decision Points

- Traditional or Integrated model of Math Pathway for the 2015-16 school year.
- Define the compression pathway(s) for middle school students during the 2015-16 school year.
- Define the compression pathway(s) for high school students during the 2015-16 school year.
- Review and adopt textbooks and supplemental materials the 2015-16 school year.

2014-15

2013-2014		2014-2015
5 th Grade – Elementary	→	CC-6 Math
6 th Grade Math	→	CC-7 Math
6 th Grade Pre-Algebra	→	CC-8 Math
7 th Grade Pre-Algebra	→	CC-8 Math or Algebra I (1997)

7 th & 8 th Grade Algebra I	→	Geometry (1997)
8 th Grade Intro to Algebra	→	Algebra I (1997)
9 th & 10 th Grade Geometry	→	Algebra II (1997)
9 th , 10 th , & 11 th Grade Algebra II	→	Math Analysis (1997) or Statistics
10 th & 11 th Grade Math Analysis	→	AP Calculus AB or Statistics
11 th Grade AP Calculus AB	→	AP Calculus BC or Statistics