Common Core State Standards Transition & Accelerated Mathematics Pathway Update

EVERGREEN SCHOOL DISTRICT

NOVEMBER 13, 2014

Mathematics Rigor

Rigor refers to deep, authentic command of mathematical concepts, not making math harder or introducing topics at earlier grades. To help students meet the standards, educators will need to pursue, with equal intensity, three aspects of rigor in the major work of each grade: **conceptual understanding**, **procedural skills and fluency**, and **application**.

http://www.corestandards.org/other-resources/key-shifts-in-mathematics/

Outcomes

- To provide an update regarding Common Core Units of Study, materials, and professional development

- To expand upon Evergreen School District's Common Core math accelerated pathway for middle school students

Mathematics Unit Design

- We believe that we have the internal capacity and ability to problem solve, design instruction, and tailor outcomes and experiences that lead to student success.
  - CTA recognizes, "they [Common Core Standards] put teachers back in control of crafting and tailoring the education of their students."

    -California Teachers Association
  - States and local school districts must place teachers at the center of efforts to develop aligned curriculum, assessments, and professional development that are relevant to their students and local communities.

    -National Education Association
- Units contain:
  - Learning objectives
  - Criteria for success
  - Essential and relevant questions
  - Assessment

WestEd

Let's Look at A Unit…

Introduction

EVERGREEN SCHOOL DISTRICT | 3rd GRADE

Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
Number & Operations in Base 10	Multiplication	Rectangular Arrays & Area	Division	Understanding Fractions	Measurement & Geometry
25 days	26 days	13 days	26 days	30 days	36 days

UNIT 1: Number & Operations in Base 10

Unit Overview:
This unit covers the topics of place value to the thousands place, rounding whole numbers to the nearest 10 or 100, fluently adding and subtracting numbers with regrouping, using properties of addition and subtraction, and solving related word problems.

- Students will investigate, understand, and use place value to manipulate numbers.
- Students will build on understanding of place value to round whole numbers.
- Students will continue to develop understanding of addition and subtraction and using strategies and properties to do so proficiently and fluently.
- Students will be able to use addition and subtraction strategies to solve real-world word problems.

Unit Overview

UNIT 1 TABLE OF CONTENTS

Table of Contents

Overview of the 3rd Grade Mathematics Program

UNIT NAME *ESSENTIAL STANDARDS*	APROX. DAYS	UNIT DESCRIPTION
UNIT 1: Number & Operations in Base 10 3.NBT.1 3.NBT.2 3.OA.8	25	In this unit, students will… • Investigate, understand, and use place value to manipulate numbers. • Build on understanding of place value to round whole numbers. • Continue to develop understanding of addition and subtraction and using strategies and properties to do so proficiently and fluently. • Be able to use addition and subtraction strategies to solve real-world word problems.
UNIT 2: Multiplication 3.OA.1 3.OA.7 3.OA.3 3.OA.8 3.OA.4 3.OA.9 3.OA.5 3.NBT.3	26	In this unit, students will… • Begin to understand the concepts of multiplication. • Learn the basic facts of multiplication. • Apply properties of operations (commutative, associative, and distributive) as strategies to multiply. • Determine addition and multiplication patterns. • Fluently multiply within 100, using strategies such as patterns. • Solve problems and explain their processes of solving multiplication problems.
UNIT 3: Rectangular Arrays & Area 3.MD.5 3.MD.6 3.MD.7	13	In this unit, students will… • Understand the attribute of area before measuring. • Discover that the length of one dimension of a rectangle tells how many squares are in each row of an array and the length of the other dimension of the rectangle tells how many squares are in each column. • Understand the concepts of area and relate area to multiplication and addition. • Find the area of a rectangle with whole-number side lengths by tiling it. • Multiply side lengths to find areas of rectangles with whole-number side lengths in context of solving real word and mathematical problems. • Construct and analyze area models with the same product. • Understand the commutative property's relationship to area. • Create arrays and area models to find different ways to decompose a product. • Use array and area models to develop understanding of the distributive property. • Solve problems involving one and two steps and represent these problems using equations with letters "n" or "x" representing the unknown quantity. • Find area of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts.

Scope and Sequence
Learning Objectives

Let's Look at A Unit…
Essential Questions & Chaptering

Grade: 3rd **Unit Number: 1**
Unit Name: Number & Operations in Base 10 **Instructional Days: 25**

ESSENTIAL STANDARDS

These are the standards that will be guaranteed: taught, assessed, and re-taught if necessary.

3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.

3.OA.8. Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

EMPHASIZED MATHEMATICAL PRACTICES

The emphasized practices for this unit are hyperlinked to www.insidemathematics.org .

MP1: Make sense of problems and persevere in solving them: Students make sense of problems involving rounding, addition and subtraction.

MP2: Reason abstractly and quantitatively: Students demonstrate abstract reasoning by connecting quantity to the relative magnitude of digits in numbers to 1,000.

MP3: Construct viable arguments and critique the reasoning of others: Students construct and critique arguments regarding mental math strategies focusing on addition and subtraction.

MP4: Model with mathematics: Students are asked to use Base Ten blocks to model various understandings of place value and value of a digit. They record their thinking using words, pictures, and numbers to further explain their reasoning.

MP5: Use appropriate tools strategically: Students utilize a number line to assist with rounding, addition, and subtraction.

MP6: Attend to precision: Students attend to the language of real-world situations to determine appropriate ways to organize data.

MP7: Look for and make use of structure: Students relate the structure of the Base Ten number system to place value and relative size of a digit. They will use this understanding to add, subtract, and estimate.

MP8: Look for and express regularity in repeated reasoning: Students relate the properties and understanding of addition to subtraction situations.

Grade: 3rd **Unit Number: 1**
Unit Name: Number & Operations in Base 10 **Instructional Days: 25**

ENDURING UNDERSTANDINGS & ESSENTIAL QUESTIONS

***Enduring Understandings (EU)**, also known as **BIG IDEAS**, are those concepts we want students to remember ten years from now. They are the important concepts underlying the content. The goal is that after instruction, students should be able to independently answer the Essential Question with a grade-appropriate version of the Enduring Understanding. Activities should be designed to allow the student to discover the Enduring Understanding*

***Essential Questions (EQ)** are questions based on the Enduring Understandings that we use to guide or drive instruction and assessment.*

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
Place Value: - Two, three or four-digit numbers can be represented in a variety of ways.	- How can you show numbers to the thousands place using base ten blocks? - How can you use a place value chart to write the numbers correctly? - How can you read and write numbers in standard, expanded, and word form? - What can you learn about the value of a number by examining its digits?
Rounding: - Rounded numbers are approximate and not exact, and can be used to solve problems.	- How can you round a two-, three-, or four-digit number to the nearest 10 and 100? - How can you use the number line to show rounding to the nearest 10 and 100? - How can you effectively estimate numbers? - What strategies are helpful when estimating sums to the nearest 10 and 100? - When would you use estimation strategies in the real world? - What strategies will help you add numbers quickly and accurately?
Addition & Subtraction: - The properties of addition and subtraction may be used as strategies to solve addition and subtraction problems. - The inverse relationship between addition and subtraction can be used to verify the results of computation.	- How can you show what you know about addition and subtraction using properties? - How do properties work in addition and subtraction problems? - How does knowing the associative, commutative, and zero properties help you add numbers easily? - How are addition and subtraction related? - How is zero different from any other whole number that you might add or subtract? - When would you use addition and subtraction in a real world situation? - What strategies have you found to be most efficient when adding and subtracting?
Addition & Subtraction Word Problems: - Addition and subtraction strategies can be used to solve everyday real-world problems.	- How can you use addition and subtraction to solve real world word problems? - How can you use what you understand about addition and subtraction to solve word problems? - What is a number sentence and how can you use it to solve word problems? - What strategies can you use to solve real world problems?

Grade: 3rd **Unit Number: 1**
Unit Name: Number & Operations in Base 10 **Instructional Days: 25**

CHAPTER 2 of 3: Addition & Subtraction within 1,000

PREREQUISITE KNOWLEDGE OR SKILLS:

- Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions (2.OA.1).
- Add and subtract within 1,000 using a variety of strategies (2.NBT.5-7).
- Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900 (2.NBT.8).
- Explain why addition and subtraction strategies work, using place value and the properties of operations (2.NBT.9).

ENDURING UNDERSTANDING:

- The properties of addition and subtraction (zero property, commutative and associative properties of addition) may be used as strategies to solve addition and subtraction problems.
- There is an inverse relationship between addition and subtraction (eg: since 45+5=50, then 50-45=5).
- We can verify the results of our computation by using the inverse operation.

VOCABULARY
- operation
- sum
- difference
- regroup
- inverse operation
- commutative property
- associative property
- zero property

EMPHASIZED MATHEMATICAL PRACTICES:

MP1: Make sense of problems and persevere in solving them: Students make sense of problems involving rounding, addition and subtraction.

MP3: Construct viable arguments and critique the reasoning of others: Students construct and critique arguments regarding mental math strategies focusing on addition and subtraction.

MP5: Use appropriate tools strategically: Students utilize a number line to assist with addition and subtraction.

MP7: Look for and make use of structure: Students relate the structure of the Base Ten number system to place value and relative size of a digit. They will use this understanding to add, subtract, and estimate.

MP8: Look for and express regularity in repeated reasoning: Students relate the properties and understanding of addition to subtraction situations.

LEARNING OBJECTIVE with Standard(s)	SUGGESTED # OF DAYS	ESSENTIAL QUESTIONS	CRITERIA FOR SUCCESS
Understand addition properties (commutative, associative, and zero) and subtraction property (zero). (3.NBT.2)	3	How can you show what you know about addition and subtraction using properties? How do properties work in addition and subtraction problems? How does knowing the associative, commutative, and zero properties help you add numbers easily?	When given a number sentence, students will be able to identify the appropriate addition or subtraction property.

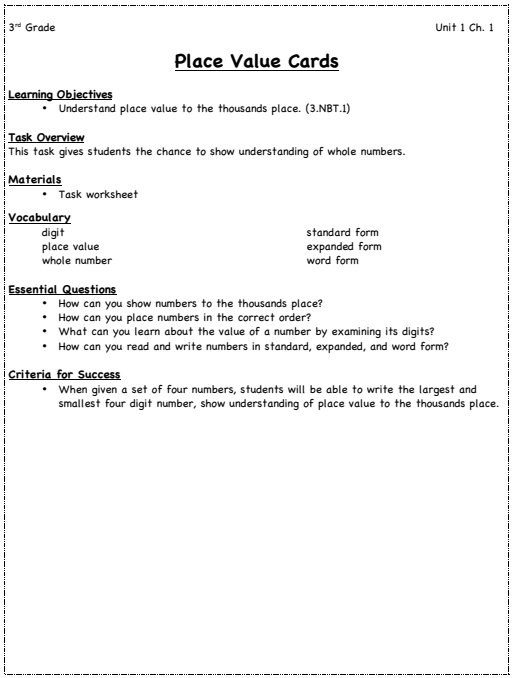
RECOMMENDED RESOURCES

NOYCE: MARS 2007 3rd grade Performance Assessment Task A Questions of Numbers:
http://www.insidemathematics.org/common-core-math-tasks/3rd-grade/3-20071%20Adding%20Numbers.pdf

Mathematical Practice and Essential Questions

Instructional Chapters

Let's Look at A Unit…
Assessment



3rd Grade Unit 1 Ch. 1

Place Value Cards

Learning Objectives
- Understand place value to the thousands place. (3.NBT.1)

Task Overview
This task gives students the chance to show understanding of whole numbers.

Materials
- Task worksheet

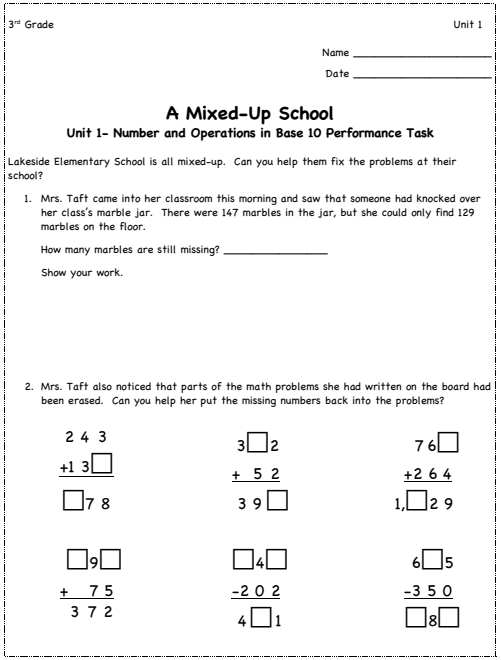
Vocabulary

digit	standard form
place value	expanded form
whole number	word form

Essential Questions
- How can you show numbers to the thousands place?
- How can you place numbers in the correct order?
- What can you learn about the value of a number by examining its digits?
- How can you read and write numbers in standard, expanded, and word form?

Criteria for Success
- When given a set of four numbers, students will be able to write the largest and smallest four digit number, show understanding of place value to the thousands place.

Rich Task



3rd Grade Unit 1

Name _____

Date _____

A Mixed-Up School

Unit 1– Number and Operations in Base 10 Performance Task

Lakeside Elementary School is all mixed-up. Can you help them fix the problems at their school?

1. Mrs. Taft came into her classroom this morning and saw that someone had knocked over her class's marble jar. There were 147 marbles in the jar, but she could only find 129 marbles on the floor.

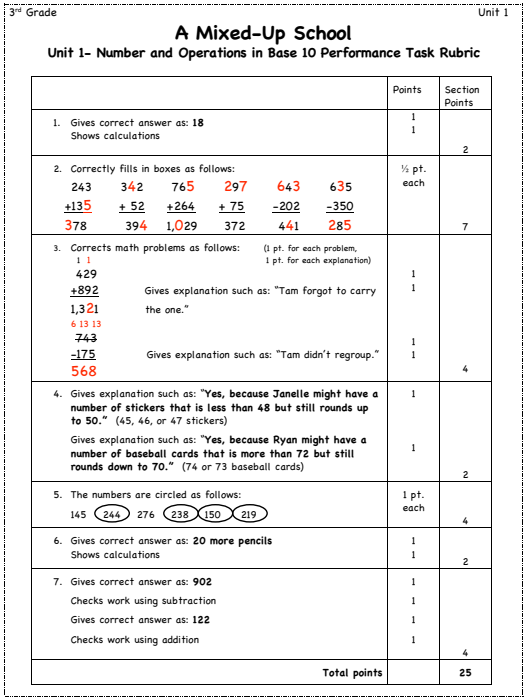
   How many marbles are still missing? _____

   Show your work.

2. Mrs. Taft also noticed that parts of the math problems she had written on the board had been erased. Can you help her put the missing numbers back into the problems?

2 4 3 +1 3□ □7 8	3□2 + 5 2 3 9□	7 6□ +2 6 4 1,□2 9
□9□ + 7 5 3 7 2	□4□ -2 0 2 4□1	6□5 -3 5 0 □8□

Assessment



3rd Grade Unit 1

A Mixed-Up School

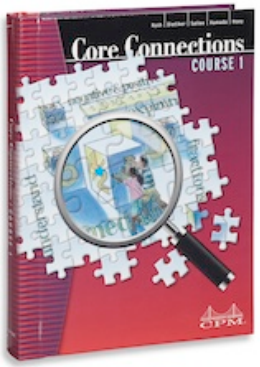
Unit 1– Number and Operations in Base 10 Performance Task Rubric

	Points	Section Points
1. Gives correct answer as: **18** Shows calculations	1 1	2
2. Correctly fills in boxes as follows: 243 342 765 297 643 635 +135 + 52 +264 + 75 -202 -350 378 394 1,029 372 441 285	½ pt. each	7
3. Corrects math problems as follows: (1 pt. for each problem, 1 pt. for each explanation) 1 1 429 +892 1,321 6 13 13 ~~743~~ -175 568 Gives explanation such as: "Tam forgot to carry the one." Gives explanation such as: "Tam didn't regroup."	1 1 1 1	4
4. Gives explanation such as: **"Yes, because Janelle might have a number of stickers that is less than 48 but still rounds up to 50."** (45, 46, or 47 stickers) Gives explanation such as: **"Yes, because Ryan might have a number of baseball cards that is more than 72 but still rounds down to 70."** (74 or 73 baseball cards)	1 1	2
5. The numbers are circled as follows: 145 (244) 276 (238) (150) (219)	1 pt. each	4
6. Gives correct answer as: **20 more pencils** Shows calculations	1 1	2
7. Gives correct answer as: **902** Checks work using subtraction Gives correct answer as: **122** Checks work using addition	1 1 1 1	4
Total points		**25**

Scoring Rubric

Unit Support Materials

Pearson Investigations Grades K-5 Investigations in Number, Data, and Space



College Preparatory Mathematics, Core Connections

- Support teacher developed units of study
- Embedded approaches and universal access to meet the needs of differentiated populations including those in special education and/or those identified as "at-risk"
- Professional development opportunities for staff

Teacher Discussion Groups

October 20, 2014

Driving Question: "How can we support teachers as they implement common core standards utilizing units of study and accompanying support materials?"

Ideas expressed involved:

- vision for common core implementation
- the idea of teachers as "curriculum developers"
- the need for "foundational materials"
- time

Next Steps

Driving Question: “How can we support teachers as they implement common core standards utilizing units of study and accompanying support materials?"

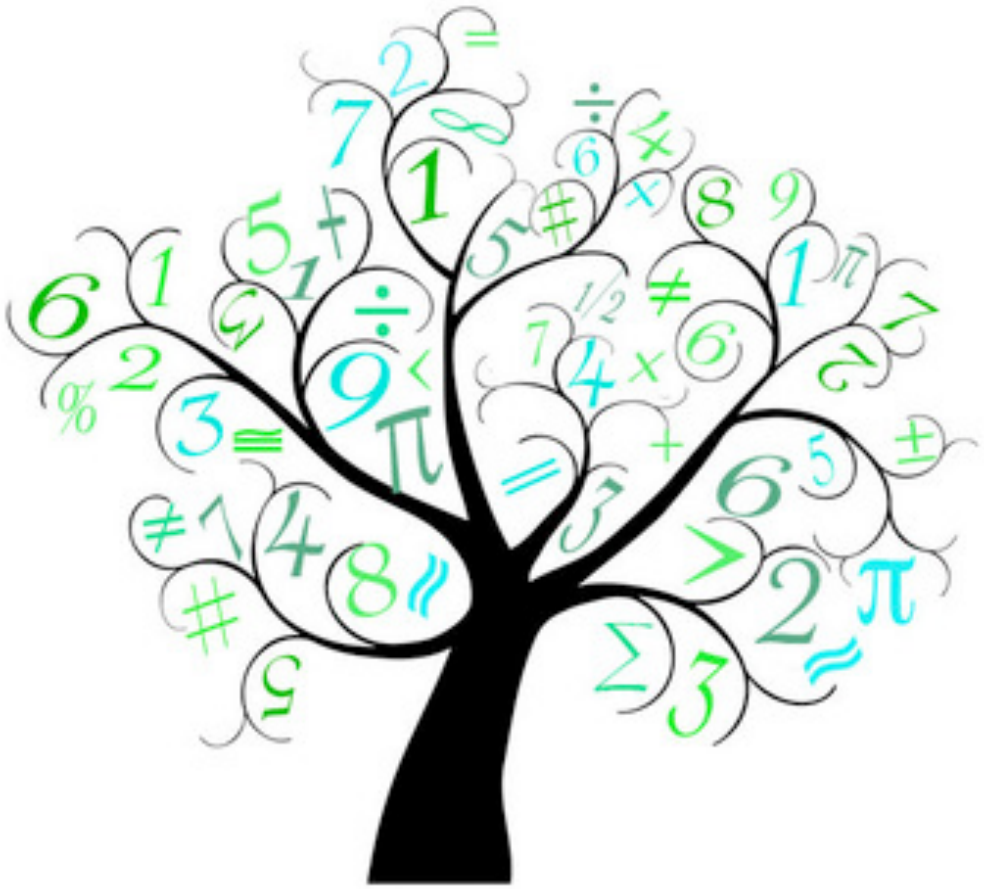
- K-5 Mathematics Instructional Materials Pilot
- *Grades K-5 Investigations Professional Development*
- K-8 Comprehensive Unit Review & Material Flexibility
- Grades 6-8 Mathematics CPM Instructional Support Materials

Shifts in Mathematics

1	Focus	Teachers significantly narrow and deepen the scope of how time and energy are spent in the math classroom. They focus deeply on only the concepts that are a priority in the standards.
2	Coherence	Principals and teachers carefully connect the learning within and across grades so that students can build new understanding onto foundations built in previous years.
3	Fluency	Students are expected to have speed and accuracy with simple calculations; teachers structure class time and/or homework time for students to memorize, through repetition, core functions.
4	Deep Understanding	Students deeply understand and can operate easily within a math concept before moving on. They learn more than the trick to get the answer right. They learn the math.
5	Application	Students are expected to use math and choose the appropriate concept for application even when they are not prompted to do so.
6	Dual Intensity	Students are practicing and understanding. There is more than a balance between two things in the classroom - both are occurring with intensity.

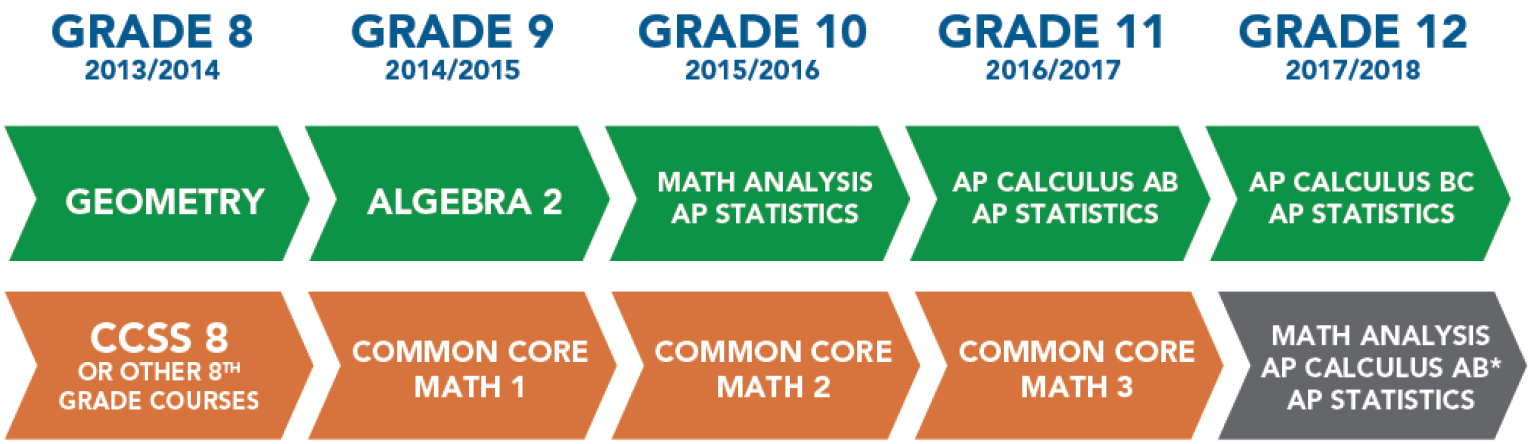
Questions

Mathematics Accelerated Pathway



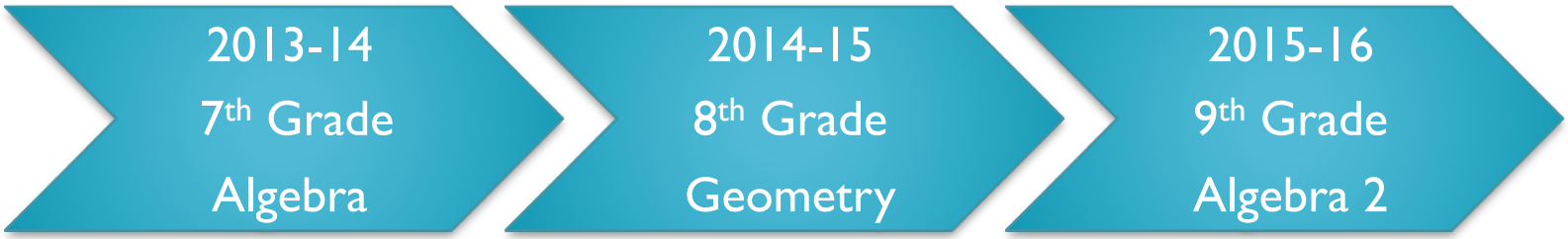
East Side Union High School District

Common Core Math Pathways Implementation



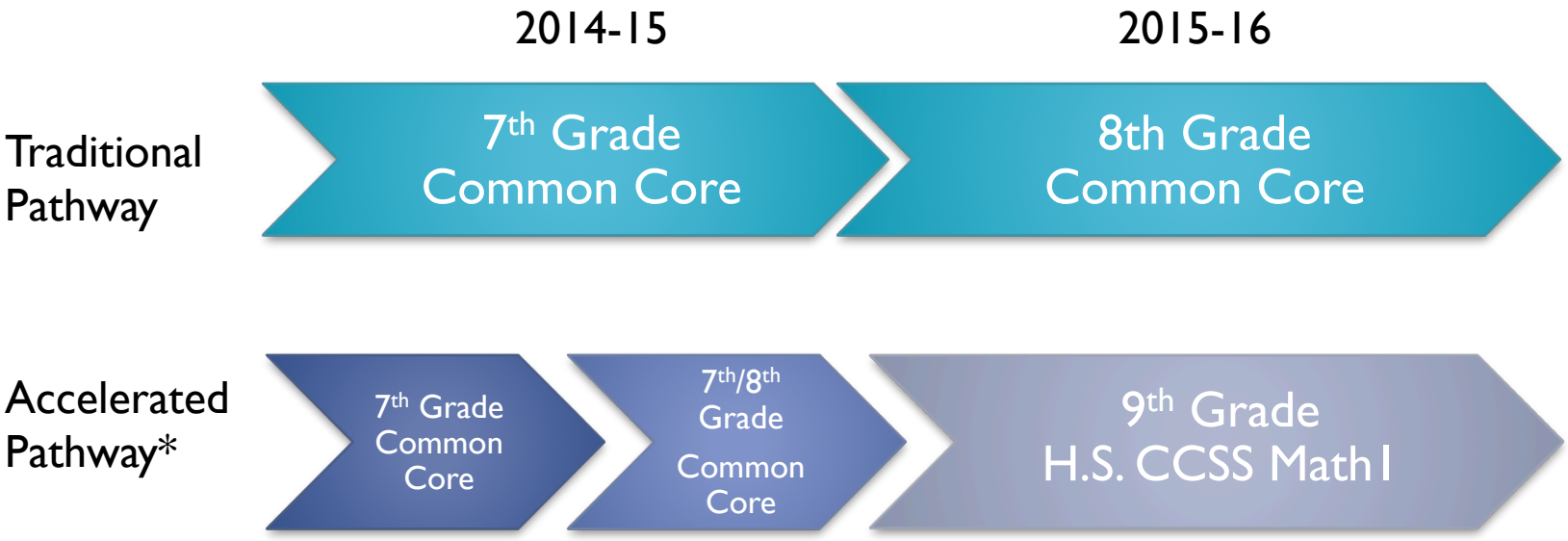
Evergreen School District

2014-15 Accelerated Pathway For8th Graders



Evergreen School District

Revised Accelerated Pathway 7th Graders

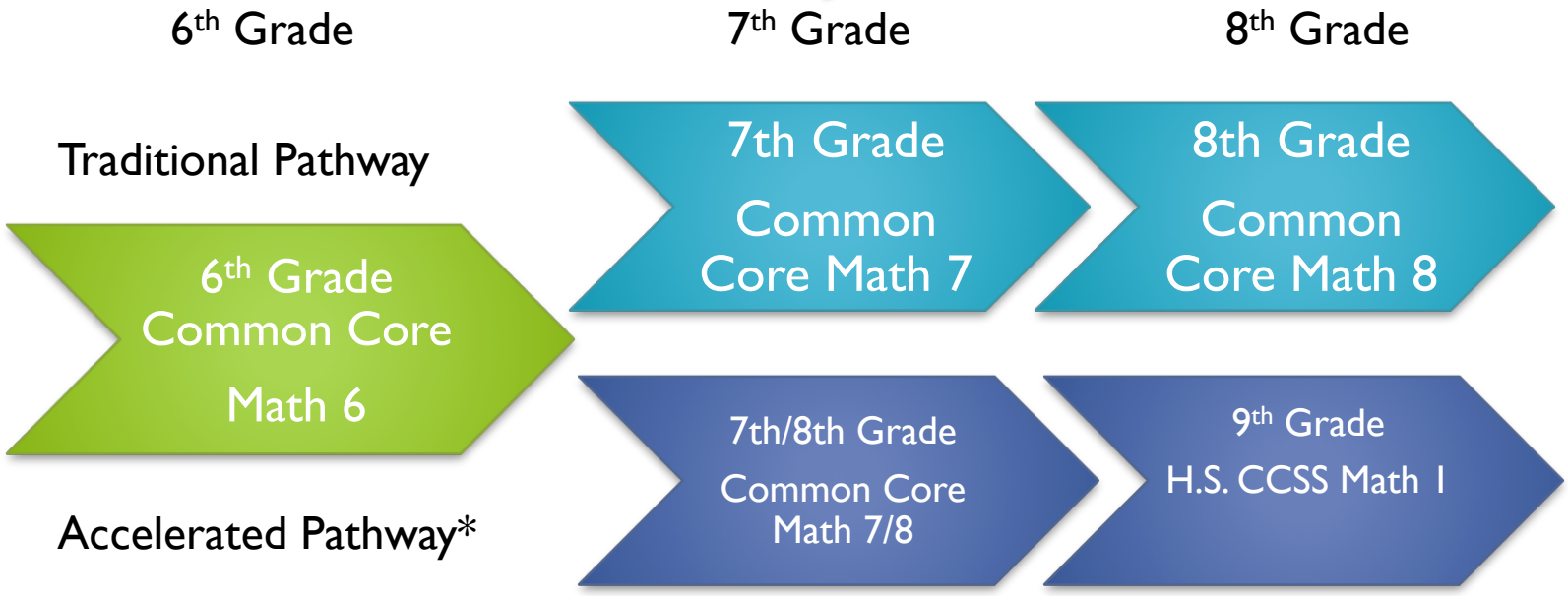


* Acceleration Criteria:

- Score on 5th grade CST
- Score on 6th grade Math Diagnostic Testing Project Assessment
- Score on 7th grade diagnostic assessment

Evergreen School District

Math Pathways for 2015-16 & Beyond



*Acceleration Criteria:

- 6th Grade Smarter Balanced (CAASPP) Assessment
- Math Diagnostic Placement Exam
- Course Diagnostic Exam

Questions