
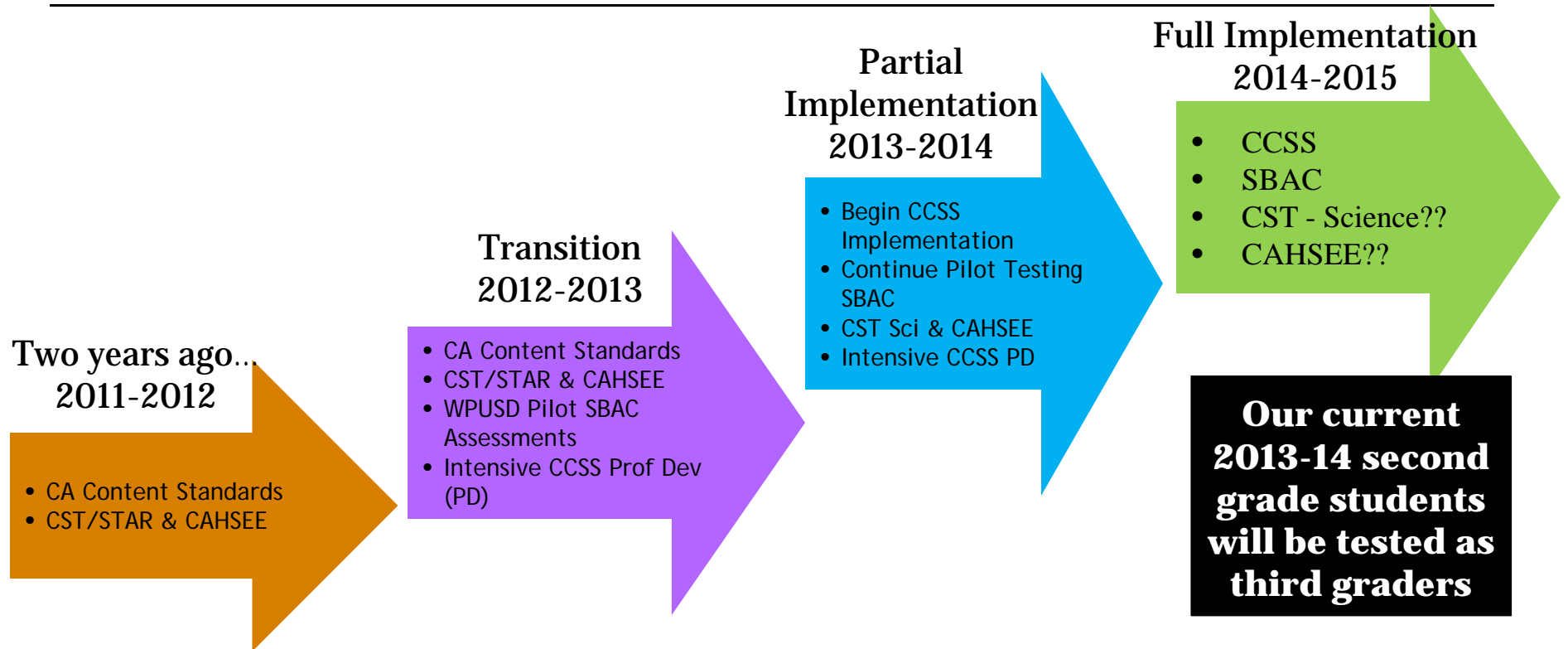


Western Placer Unified School District
 Common Core State Standards ~
Mathematics – What’s the Difference?

Mary Boyle, Deputy Supt Educational Services

October 15, 2013

California & WPUSD's Transition to the Common Core





Common Core State Standards – 2013/14 Board & Community Outreach

□ Series of CCSS Informational Board Presentations

- August – CCSS Overview, History/Myths & Progress Check
- September – CCSS Literacy ~ Is it Just for English/Language Arts?
- October – CCSS Mathematics ~ What’s the Difference?
- November ~ SPSA’s (Single Plans for Student Achievement) & LCAP (Local Control Accountability Plan)
- January ~ SBAC (Smarter Balanced Assessment Consortium) Assessment & Preparation
- March ~ Accountability ~ What About NCLB, AYP, API, & PI??
- May ~ Report on Progress/Next Steps

□ CCSS Information at Site Levels

- Back to School Night & Open House Information
- Parent Information Brochures
- Posters – DOK Levels; Close Reading Strategies

□ Website Information



Strengths of the New Common Core

- Focus on **Literacy and Mathematics across ALL content areas**
- Aligned with expectations for **College and Career Readiness**
- Developed to provide **consistency** from state to state
- Include content understanding requiring **deep thinking and complex solutions** on the parts of **students** in response to **complex questioning** on the parts of **teachers**
- For California: more of a shift in **how we teach** and **what** we expect students to do ~ students develop **Habits of Mind (HOM)** as they approach problems/questions

CCSS Math – What's the Difference?

Organizational Structure

Mathematical Thinking

- Standards of Mathematical Practice (SMP's)
- Consistent K – 12
- An approach to math problem solving
- Require students to think deeply, make **real-world connections** & to persevere!

Mathematical Concepts

- Grade level **content, concepts, skills, & fluencies**
- Domains (broad categories of standards) consistent K/12
- Standards are unique at each grade level but **stair-step up within domains**
- Some grade level **content shifts** compared to 1997 CA Standards



Focus of CCSS for Mathematics

SIX SHIFTS IN MATHEMATICS INSTRUCTION

Learn more deeply about fewer concepts at each grade level

Build skills within and across grade levels

Develop mathematical speed (fluency) and accuracy

Require deep levels of understanding (DOK 3/4)

Require applications to the real world (DOK 3/4)

Require mathematical thinking to solve problems (DOK 3/4)

CCSS Math – What’s the Difference?

Organizational Structure – **SMP’s**

Mathematical Thinking

- **Standards of Mathematical Practice (SMP’s)**
- Consistent K – 12
- An approach to math problem solving
- Require students to think deeply, make real-world connections & to persevere!

Mathematical Concepts

- Grade level content, concepts, skills, & fluencies
- Domains (broad categories) consistent K/12
- Standards are unique at each grade level but stair-step up within domains
- Some shifts of content between grade levels

Standards for Mathematical Practice

SMP's K/12

Overarching SMP's

1. Make Sense of Problems and Persevere in Solving Them
6. Attend to Precision

Reasoning & Explaining SMP's

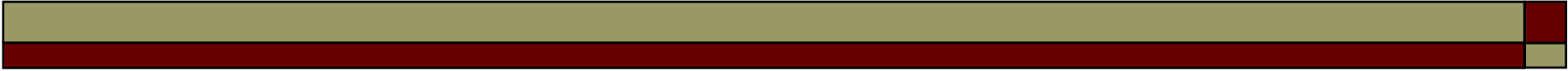
2. Reason Abstractly & Quantitatively
3. Construct Viable Arguments & Critique Reasoning of Others

Modeling and Using Tools SMP's

4. Model with Mathematics
5. Use Appropriate Tools Strategically

Seeing Structure & Generalizing SMP's

7. Look For & Make Use of Structure
8. Look for & Express Regularity in Repeated Reasoning



Standards for Mathematical Practice

– What's the Difference?

How is teaching/learning from an SMP perspective different?

- Past emphasis on SMP #6 – Being precise
- Past testing primarily on SMP #6 – Using algorithms
- CCSS adds emphasis of students using reasoning, requiring students to make decisions re the math to use
- CCSS requires that students communicate re math, explaining how and why they chose to use mathematical structures and concepts, and to defend their decisions verbally and in writing.
- CCSS requires students to go beyond solving a written equation or a problem with precision, and to apply mathematical concepts to real-life situations.

CCSS Math – What’s the Difference?

CCSS Math vs 1997 CA Math - Grade 4

What does this mean?

Consider these sample math fraction problems from past CA Math Standards:

$$2 \frac{1}{3} + 4 \frac{1}{2} =$$

- A** $6 \frac{1}{6}$
- B** $6 \frac{1}{5}$
- C** $6 \frac{2}{5}$
- D** $6 \frac{5}{6}$

CST Math Grade 4 Released Test
Question 2009

Maurice talked on the telephone to two friends. He talked to Sherry for $\frac{1}{4}$ hour and to Gabriel for $\frac{1}{3}$ hour. How much time did Maurice spend on the telephone?

- A** $\frac{1}{6}$ hour
- B** $\frac{2}{7}$ hour
- C** $\frac{5}{12}$ hour
- D** $\frac{7}{12}$ hour

CST Math Grade 5 Released Test
Question 2011

CCSS Math – What's the Difference?

CCSS Math vs 1997 CA Math - Grade 4

Now consider this [CCSS Grade 4 Math](#) Fraction Problem:

- Tito and Luis are stuffed with pizza! Tito ate one fourth of a cheese pizza. Tito ate three eighths of a pepperoni pizza. Tito ate one half of a mushroom pizza. Luis ate five eighths of a cheese pizza. Luis ate the other half of the mushroom pizza. All the pizzas were the same size. Tito says he ate more pizza than Luis because Luis did not eat any pepperoni pizza. Luis says they each ate the same amount of pizza. Who is correct? Show all of your mathematical thinking.

SBAC Trial Test Item 2013

CCSS Math vs 1997 CA Math - Grade 4

Possible Solution – (See handout)

- SMP #1 – Make sense/persevere
- SMP #2 – Correct reasoning (proportional parts/whole)
- SMP #3 – Models with mathematics (circle diagrams)
- SMP #1 – Precision (labels diagrams correctly; correct answer)
- SMP #3 – Explains/viable arguments (use of fract/dec/%'s)
- SMP #7/8 – Extended thinking (shown through diagram)

Scoring Based on -

- Concepts/Procedures – 40%
- Problem Solving – 20%
- Communicat/Reasoning – 20%
- Modeling/Data Analysis – 20%

Stuffed with Pizza

Tito and Luis are stuffed with pizza! Tito ate one-fourth of a cheese pizza. Tito ate three-eighths of a pepperoni pizza. Tito ate one-half of a mushroom pizza. Luis ate five-eighths of a cheese pizza. Luis ate the other half of the mushroom pizza. All the pizzas were the same size. Tito says he ate more pizza than Luis because Luis did not eat any pepperoni pizza. Luis says they each ate the same amount of pizza. Who is correct? Show all your mathematical thinking.

I will find who is correct, Tito or Luis.
I will make a diagram.

Key

T Tito
L Luis
C cheese
P Pepperoni
M Mushroom
↑
pizzas

Tito ate

$\frac{3}{8} + \frac{1}{4} + \frac{1}{2} = ?$

$\frac{3}{8} + \frac{2}{8} + \frac{4}{8} = \frac{9}{8}$

Luis ate

$\frac{5}{8} + \frac{1}{2} = ?$

$\frac{5}{8} + \frac{4}{8} = \frac{9}{8}$

you have to find how to have 8 in the denominator so you add equivalent fractions

Answer: Luis was right because they both ate $\frac{9}{8}$ pizza

The student models with mathematics. The area model/diagram of the pizzas is accurate, labeled, and a key defines Tito, Luis, and the types of pizzas. The student uses the diagram to record some of her/his extended thinking to percents and decimals.

The student is able to make sense and persevere in solving the problem. The student demonstrates correct reasoning of proportional parts of a whole, correctly assigns each boy pizza pieces, and finds the correct equivalent fractions to state a correct answer. The student verifies her/his answer with decimals and percents and brings prior knowledge of statistics to the solution.



CCSS Math vs 1997 CA Math

What's the Difference?

1997 CA Standards

- Included opportunities for extending thinking, showing viable arguments, using mathematical modeling & tools, and showing proofs (geometry) but **did not require** such.
- “Word problems” were often at the end of a chapter or assignment and might be frequently skipped – lack of time and/or difficulty grading

CCSS Math

- **REQUIRES** the SMP's
- Is **built around** the SMP's
- Requires a new way of **delivering instruction**
- **Requires students** to **explain** and **defend** their solutions

CCSS Math What's the Difference?

Instructional Sequences

1997 CA Standards

- Teach a concept
- Find real-life applications for the concept
- Test the concept (usually multiple choice plus word problems)

CCSS Math

- Present a real-life intro lesson to hook students into the realistic application/need for the mathematical concept (Ex - video/article on population growth, radioactive decay, or credit card debt)
- Teach concept within context (exponential functions)
- Test the concept (real-life application to new situation, requiring multiple steps & explanation)

CCSS Math – What's the Difference?

Organizational Structure - Content

Mathematical Thinking

- Standards of Mathematical Practice (SMP's)
- Consistent K – 12
- An approach to math problem solving
- Require students to think deeply, make real-world connections & to persevere!

Mathematical Concepts

- Grade level **content, concepts, skills, & fluencies**
- Domains (broad categories) consistent K/12
- Standards are unique at each grade level but stair-step up within domains
- Some shifts of content between grade levels



CCSS Math – What’s the Difference?

Organizational Structure - Fluencies

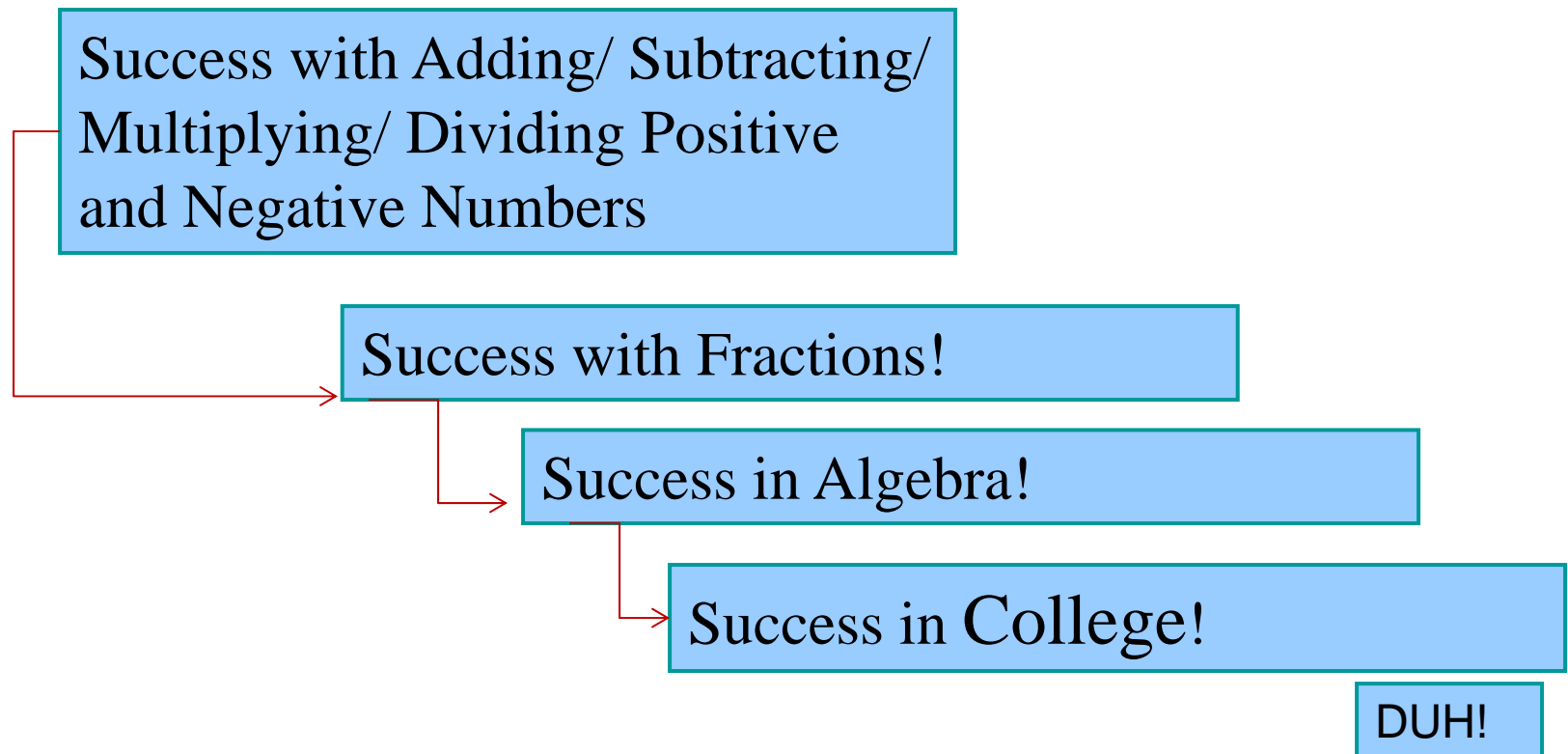
Fluencies (automaticity)

- K Count to 100 by 1’s & 10’s; Add/subtract within 5
- 1 Add/subtract within 10
- 2 Add/subtract within 20; Add/subtract within 100
(pencil and paper)
- 3 Multiply/divide within 100; Add/subtract within 1000
- 4 Add/subtract within 1,000,000
- 5 Multi-digit multiplication
- 6 Multi-digit division; Multi-digit decimal operations
- 7 Solve $px + q = r$, $p(x + q) = r$
- 8 Solve simple 2 X 2 systems by inspection

CCSS Math – What’s the Difference?

Organizational Structure – Concepts/Content

National Mathematics Advisory Panel Final Report –
2008 (US DOE)



CCSS Math What's the Difference?

Grade Level Content Standards K/5 - Content

MAJOR CHANGES IN GRADE-LEVEL STANDARDS

Geometry in ALL Grades K – 12
(Math applications!)

Counting & Cardinality
(K – from count to 30 by 1's to count to 100 by 1's & 10's)

K/5 Emphasize Foundational Math
(Data/Statistics from 3rd to 6th; place value in 3rd to 100's not 1000's ;
rounding; associative property; word problems -
SMP's – creating viable arguments; modeling with math – deep thinking!!)

Fractions
(Intro from 2nd to 3rd; +/- simple from 3rd to 4th; +/- complex fractions from
4th to 5th; decimals from 3rd to 4th; use of number line for fractions)



CCSS Math What's the Difference?

Grade Level Content Standards 6/8 - Content

MAJOR CHANGES IN GRADE-LEVEL STANDARDS

Grades 6/8 – Emphasize Fraction Apps, Data/Stats, Equations

Grade 6 multiply fractions; grade 7 divide fractions;

Survey/sampling from 6th to 7th;

Square roots/rationals from 7th to 8th;

Grade 8 Standards – include multi-step equations

SMP's – creating viable arguments; modeling with math – deep thinking!!

Opportunity for Acceleration for Advanced Learners

Compact Grades 6 – 8 Math into Two Years

Begin high school sequence in Grade 8

Grade 8 Accelerated Class SAME AS High School Entry Class

(Past 8th Algebra I NOT SAME as High School Algebra I)

CCSS Math What's the Difference?

Grade Level Content Standards 9/12 - Content

MAJOR CHANGES IN GRADE-LEVEL STANDARDS

Traditional Sequence

- Algebra I (Accelerated - 8th)
- Geometry
- Algebra II (SBAC)

Integrated Sequence

- Integrated Math I (Accelerated - 8th)
- Integrated Math II
- Integrated Math III (SBAC)

Both Sequences

- Pre-Calculus (Accelerated – 11th; Non-Accelerated – 12th)
- Calculus A/B (Accelerated -12th)
- Calculus B/C (Twice Accelerated – 12th)



CCSS Math – Notable Areas of Correlation to CCSS Literacy?

1. Focus on **Increased Text Complexity**
2. Emphasis on **Reading and Writing Across the Curriculum**
3. Emphasis on **Informational Text**
4. Emphasis: **Collaborative Conversations** Using Academic Vocabulary re Text-Based Questions
5. Emphasis on **Writing Arguments/Drawing Evidence** from Sources
6. Emphasis on Integrating **Multi-Media Sources/Tech**

Depth of Knowledge (DOK)

Based on Work of Norman Webb – University of Wisconsin

DOK Level	Descriptive Task
1	Recall ~ facts, definitions, details; one right answer
2	Skills/Concepts ~ application of skills/concepts; explaining why; making decisions; cause/effect; main idea
3	Strategic Thinking ~ reasoning & planning; complex thinking; drawing conclusions; multiple answers
4	Extended Thinking ~ multiple-step investigations with extended real world applications to new situations; innovations



CCSS Habits of Mind (HOM) ~ Literacy AND Mathematics Capacities

- Demonstrate independence
- Build strong content knowledge
- Respond to varying demands of audience, task, purpose, and discipline
- Comprehend as well as critique
- Value evidence
- Use technology and digital media strategically



CCSS Habits of Mind ~

All content area teachers:

- Design deeper learning environments where students develop **Habits of Mind**
 - Lead high-level, text-based discussions
 - Focus on the process, not just content
 - Create assignments for real audiences and with real purposes
 - Teach argument (logic/reasoning), not just persuasion (emotion)
 - Increase text complexity~use challenging text!



Common Core State Standards – In the classroom - **Literacy AND Math!**

- Deeper questioning techniques - **teachers**
- More complex assignments/projects with real-life applications/use of academic language - **teachers**
- More use of textbooks, (high-level novels), & challenge of student answers - **teachers**
- Defense of answers showing greater understanding of concepts & detailed evidence from text - **students**
- More writing, research-based & project-based learning & use of academic language– **students**
- More use of technology – **students**



Common Core State Standards – In the classroom – Literacy AND Math!

- Intentionally sequence instructional strategies to progressively engage students in **Habits:**
 - Think, Pair-Share (or Think, Write, Pair-Share)
 - Show/model “thinking” in classrooms
 - Practice questioning and wait time
 - Group students and use engaging problems
 - Use deep questions and prompts with student groups
 - Allow struggle time; require evidential responses
 - Encourage/model logical reasoning

CCSS Math – What's Next?

Professional
Development

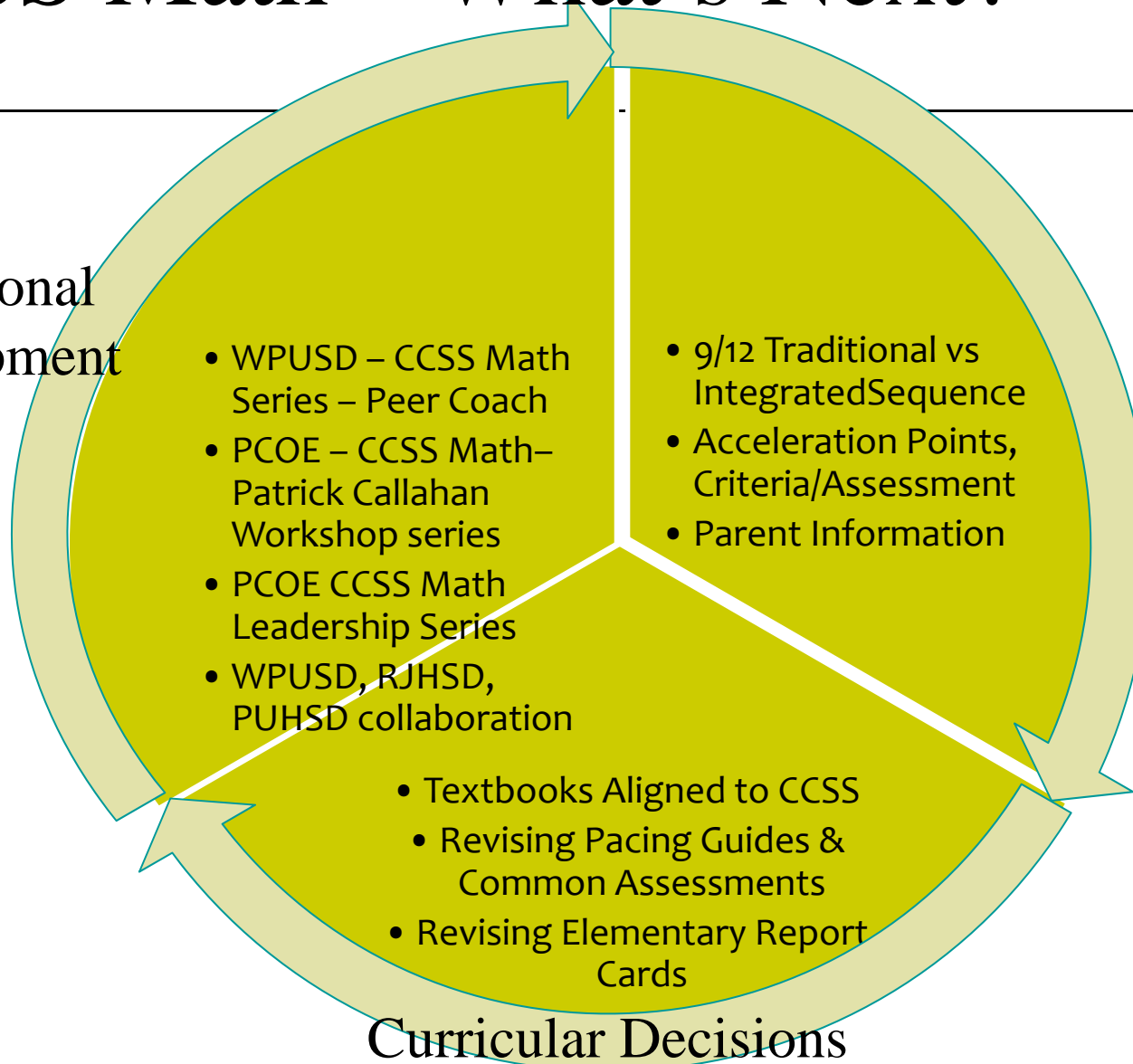
- WPUSD – CCSS Math Series – Peer Coach
- PCOE – CCSS Math– Patrick Callahan Workshop series
- PCOE CCSS Math Leadership Series
- WPUSD, RJHSD, PUHSD collaboration

Program
Decisions

- 9/12 Traditional vs Integrated Sequence
- Acceleration Points, Criteria/Assessment
- Parent Information

- Textbooks Aligned to CCSS
- Revising Pacing Guides & Common Assessments
- Revising Elementary Report Cards

Curricular
Decisions





On the road to CCSS!

