Santa Clara County Office of Education

Common Core State Standards
High School Mathematics
Course Pathway Forum

April 26, 2013

Silicon Valley
Mathematics Initiative

WELCOME AND INTRODUCTION

Forum Participants

- Berryessa Union SD
- Butte COE
- Chico Unified SD
- Cupertino Union SD
- East Side Union HSD
- Franklin-McKinley ESD
- Fremont Union High
- Gilroy Unified SD
- Los Altos Elementary
- Los Gatos-Saratoga Joint Union High
- Morgan Hill Unified SD
- Mountain View-Los Altos Union High
- Mt. Pleasant ESD
- Mt. View-Whisman
- Oak Grove Elementary
- Palo Alto Unified
- San Joaquin COE
- San Jose Unified SD
- Santa Clara COE
- Santa Clara Unified SD
- Saratoga Union Elementary
- Sunnyvale Elementary

Forum Participants

- Assistant Principals
- Assistant Superintendents
- Coordinators
- Curriculum Support Teachers
- Department Chairs
- Directors
- Instructional Supervisors
- Principals
- Site Champions
- Project Specialists
- Superintendents
- Teachers
- TOSA

Outcomes

- Participants will analyze CCSS Mathematics aligned high school course pathways.
- Participants will understand how the CCSS high school pathways will effect middle school course offerings and acceleration.
- Participants will discuss CCSS mathematics course pathways with high school and feeder school districts.

Agenda

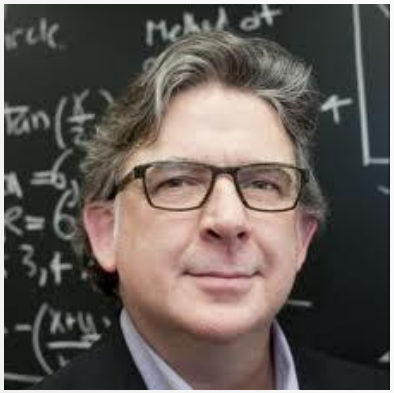
- Welcome and Introduction
- CCSS-Mathematics Overview
- Scope and Sequence
- Course Pathways and Acceleration
- Course Pathway Plan
- Next Steps and Action Items
- Closing

CCSS-MATHEMATICS OVERVIEW

Common Core Standards:

A New Direction linking Instruction and Assessment

Three Central Authors
Common Core State Standards in Mathematics



Bill McCallum

Phil Daro

Jason Zimba

Charges given to the authors:

- All students College and Career Ready by 11th grade
- Internationally Benchmarked
- Make the standards "Fewer, Clear and Higher"

CCSS Mathematical Practices

OVERARCHING HABITS OF MIND

1. Make sense of problems and persevere in solving them
6. Attend to precision

REASONING AND EXPLAINING

2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others

MODELING AND USING TOOLS

4. Model with mathematics
5. Use appropriate tools strategically

SEEING STRUCTURE AND GENERALIZING

7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Content Specifications
for the Summative assessment of the
Common Core State Standards for Mathematics

DRAFT TO ACCOMPANY GOVERNING STATE VOTE ON ASSESSMENT CLAIMS

March 20, 2012

Developed with input from content experts and Smarter Balanced Assessment Consortium Staff, Work Group Members, and Technical Advisory Committee

Acknowledgements

Alan Schoenfeld, University of California at Berkeley and **Hugh Burkhardt**, Shell Centre, University of Nottingham served as principal authors of this paper. Sections of the document were also authored by **Jamal Abedi**, University of California at Davis; **Karin Hess**, National Center for the Improvement of Educational Assessment; **Martha Thurlow**, National Center on Educational Outcomes, University of Minnesota

Significant contributions and organization of this second draft were provided by **Shelbi Cole**, Connecticut State Department of Education, and **Jason Zimba**, Student Achievement Partners. The project was facilitated by **Linda Darling-Hammond** at Stanford University.

Others who offered advice and feedback on the document include:
Rita Crust, Lead Designer, Mathematics Assessment Resource Service
Past President, Association of State Supervisors of Mathematics
Brad Findell, Former Mathematics Initiatives Administrator, Ohio Department of Education
David Foster, Director, Silicon Valley Mathematics Initiative
Henry Pollak, Adjunct Professor, Columbia University, Teachers College,
Former Head of Mathematics and Statistics, Bell Laboratories
W. James Popham, Emeritus Professor, University of California, Los Angeles
Cathy Seeley, Senior Fellow, Charles A. Dana Center, The University of Texas at Austin
Malcolm Swan, Professor of Mathematics Education, Centre for Research in Mathematic Education,
University of Nottingham

Performance Assessments

To Inform Instruction And Measure Higher Level Thinking

The Baker

This problem gives you the chance to:
- choose and perform number operations in a practical context

The baker uses boxes of different sizes to carry her goods.

Cookie boxes hold 12 cookies.
Donut boxes hold 4 donuts.
Muffin boxes hold 2 muffins.
Bagel boxes hold 6 bagels.

1. On Monday she baked 24 of everything.
   How many boxes did she need? Fill in the empty spaces.
   cookie boxes _____ donut boxes _____
   muffin boxes _____ bagel boxes _____

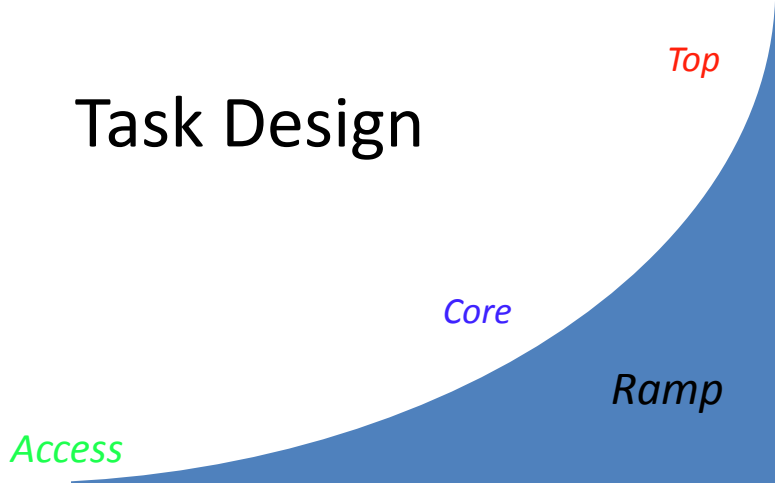
2. On Tuesday she baked just bagels. She filled 7 boxes.
   How many bagels did she make? _____
   Show your calculations.

3. On Wednesday she baked 42 cookies.
   How many boxes did she fill? _____
   How many cookies were left over? _____
   Explain how you figured this out.
   _____
   _____

4. On Thursday she baked 32 of just one item and she filled 8 boxes.
   What did she bake on Thursday? _____
   Show how you figured this out.

10

Task Design



Entry level (access into task)

Core Mathematics - (meeting standards)

Top of Ramp (conceptually deeper, beyond)

- The Mathematics Assessment Resource Service (MARS) is an NSF funded collaboration between U.C. Berkeley and the Shell Centre in Nottingham England.
- The Assessments target grades 2- Geometry and are aligned with the State and NCTM National Math Standards.

SHELL CENTRE

BALANCED ASSESSMENT

MARS

Apprentice Task

CR 4: Baseball Jerseys

Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks 2 local companies to give him a price.

1. 'Print It' will charge $21.50 each for the jerseys.

   Using *n* for the number of jerseys ordered and *c* for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

   _____

2. 'Top Print' has a Set-Up cost of $70 and then charges $18 for each jersey.

   Using *n* to stand for the number of jerseys ordered and *c* for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

   _____

3. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to order for the price from 'Top Print' to be less than from 'Print It'.
   Explain how you figured it out.

   _____

   _____

   _____

   _____

   _____

4. Bill decides to order 30 jerseys from 'Top Print'.
   How much more would the jerseys have cost if he had bought them from 'Print It'?
   Show all your calculations.

   _____

Baseball Jerseys

This problem gives you the chance to:

- work with equations that represent real life situations

Bill is going to order new jerseys for his baseball team.

The jerseys will have the team logo printed on the front.

Bill asks two local companies to give him a price.

1. 'Print It' will charge \$21.50 each for the jerseys.

   Using n for the number of jerseys ordered, and c for the total cost in dollars, write an equation to show the total cost of jerseys from 'Print It'.

2. 'Top Print' has a one-time setting up cost of \$70 and then charges \$18 for each jersey.

   Using n to stand for the number of jerseys ordered, and c for the total cost in dollars, write an equation to show the total cost of jerseys from 'Top Print'.

3. Bill decides to order 30 jerseys from 'Top Print'.
How much more would the jerseys cost if he buys them from 'Print It'?
Show all your calculations. _____

4. Use the two equations from questions 1 and 2 to figure out how many jerseys Bill would need to buy for the price from 'Top Print' to be less than from 'Print It'.
Explain how you figured it out. _____

_____

_____

_____

_____

Performance Exams

40,000 – 70,000 students per year since 1999

Students in grades 2 through 10th/11th grade are administered performance exams (5 apprentice tasks per exam).

Task 1: Candies		Rubric
The core elements of performance required by this task are: • work with fractions and ratios Based on these, credit for specific aspects of performance should be assigned as follows	points	section points
1. Gives correct answer: 2/3 or 6/9	1	1
2. Gives correct answer: 3 Shows work such as: 1 + 3 = 4 12 ÷ 4 = Accept diagrams.	1 1	2
3 Gives correct answer: 18 Shows work such as: 2 + 3 = 5 30 ÷ 5 = 6 6 x 3 = Accept diagrams.	2 1	3
4. Gives correct answer: 6 Gives a correct explanation such as: Anthony mixes a ratio of one cup of cream to two cups of chocolate. The ratio stays the same for different amounts. So I wrote the numbers in a chart like this 1 to 2 = a total of 3 2 to 4 = a total of 6 3 to 6 = a total of 9 Accept diagrams.	1 1	2
	Total Points	8

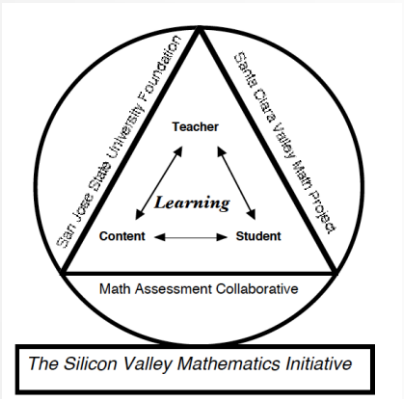
District scoring leaders are trained in using task specific rubrics

Student tests are hand scored by classroom teachers trained and calibrated using standard protocols.

Random sample of student papers are audited and rescored by SJSU math & CS students. (Two reader correlation >0.95)

Student results are collected, analyzed, and reported by an independent data contractor.

EDUCATIONAL DATA SYSTEMS



MAC vs. CST 2012

Silicon Valley Mathematics Initiative

Mathematics Assessment Collaborative
Performance Assessment Exam 2012

What can MARS tests tell us?

	Below standards on MARS test	Meeting/exceeding on MARS test
Below standards on NCLB test	Accurately identified as struggling	
Meeting/ exceeding on NCLB test		Accurately identified as understanding

What can MARS tests tell us?

	Below standards on MARS test	Meeting/exceeding on MARS test
Below standards on NCLB test	Accurately identified as struggling	Misidentified as struggling ("hidden gems")
Meeting/ exceeding on NCLB test	Misidentified as understanding ("false positives")	Accurately identified as understanding

MAC vs CST 2012

2nd Grade	MAC Level 1	MAC Level 2	MAC Level 3	MAC Level 4
Far Below Basic	1.0%	0.3%	0.1%	0.0%
Below Basic	1.9%	2.4%	1.2%	0.0%
Basic	1.3%	4.8%	5.5%	0.3%
Proficient	0.4%	3.5%	17.7%	3.4%
Advanced	0.3%	0.9%	23.4%	31.4%

2nd Grade	MAC Below	MAC At/Above	Total
CST Below	11.7%	7.1%	18.8%
CST At/Above	5.1%	75.9%	81.0%
Total	16.8%	83.0%	100%

Elementary Grades

3rd Grade	MAC Below	MAC At/Above	Total
CST Below	15.9%	5.2%	21.1%
CST At/Above	13.7%	65.4%	79.1%
Total	29.6%	70.6%	100%

4th Grade	MAC Below	MAC At/Above	Total
CST Below	16.9%	2.8%	19.7%
CST At/Above	20.3%	60.0%	80.3%
Total	37.2%	62.8%	100%

5th Grade	MAC Below	MAC At/Above	Total
CST Below	20.6%	3.8%	24.4%
CST At/Above	18.7%	56.9%	75.6%
Total	39.3%	60.7%	100%

Middle School

6th Grade	MAC Below	MAC At/Above	Total
CST Below	37.2%	1.4%	38.6%
CST At/Above	25.1%	36.5%	61.6%
Total	62.3%	37.9%	100%

7th Grade	MAC Below	MAC At/Above	Total
CST Below	33.3%	2.1%	35.4%
CST At/Above	27.4%	37.1%	64.5%
Total	60.7%	39.2%	100%

Course 1	MAC Below	MAC At/Above	Total
CST Below	34.5%	3.6%	38.1%
CST At/Above	30.3%	31.5%	61.8%
Total	64.8%	35.1%	100%

8th Graders Taking HS Geometry

Course 2	MAC Below	MAC At/Above	Total
CST Below	3.1%	0.8%	3.9%
CST At/Above	51.3%	44.8%	96.1%
Total	54.4%	45.6%	100%

Domains K–8

Counting & Cardinality						Ratios & Proportional Relationships		
Operations and Algebraic Thinking						The Number System		
Number and Operations in Base Ten						Expressions and Equations		
			Fractions					Functions
Measurement and Data								
Geometry						Geometry		
						Statistics and Probability		
K	1	2	3	4	5	6	7	8

Mathematics Standards for High School

Arranged by conceptual categories (NOT by course):

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

Foster, David. "Assessment for Learning: In the Era of Common Core Standards." Power Point Presentation. Algebra Leadership Conference, San Jose, CA 2011.

Two Mathematics Pathways

Two Regular Sequences:

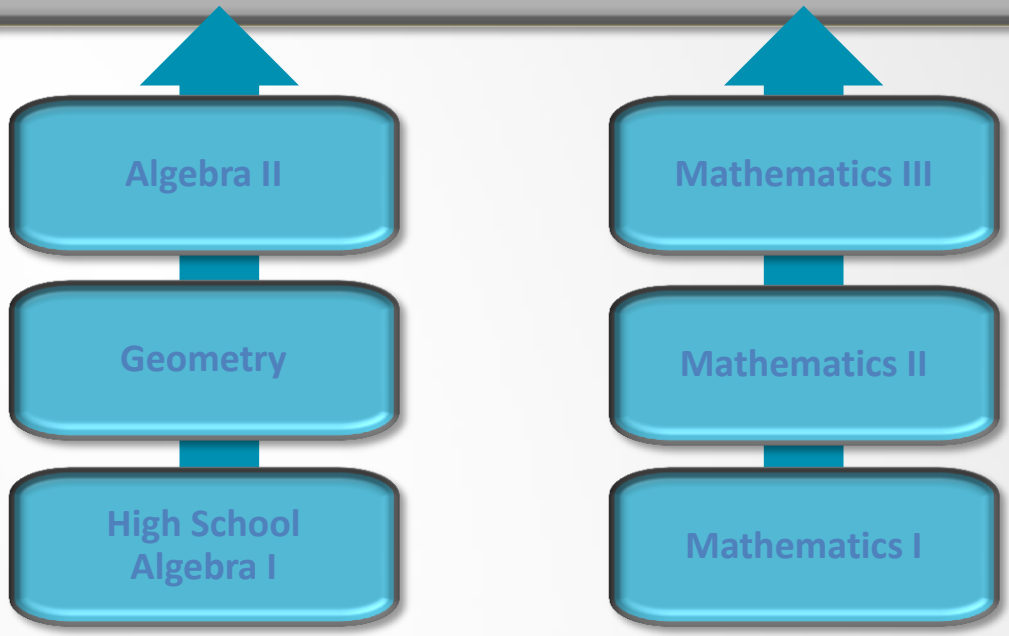
Traditional Pathway

- 2 Algebra courses,1 Geometry course, with Probability and Statistics interwoven

International Pathway

- 3 courses that attend to Algebra, Geometry, and Probability and Statistics each year

Courses in higher level mathematics: Precalculus, Calculus*, Advanced Statistics, Discrete Mathematics, Advanced Quantitative Reasoning, or courses designed for career technical programs of study.



Traditional Pathway
Typical in U.S.

International Pathway
Typical outside of U.S.

Algebra Forever vs CCSSM

Arnold Schwarzenegger
July 8, 2008

"We have made significant gains in enrolling students in Algebra I in eighth grade in recent years, surpassing other state in the U.S. But we must set our goal higher."

We have also made more significant gains in FAILING students in Algebra I in eighth grade in recent years, surpassing other state in the U.S.

3 out of 4 failed in 2008

California Adopted the CCSSM on August 2, 2010 with an addition 15% of a traditional Algebra 1 course and other added standards. We selected PARCC as the assessment to complete the Race to the Top application that we never won.

State Senator Hancock

"Several implementation issues arise by California adopting a different set of grade 8 math standards from other participating states. For example, instructional materials for use in California would need to be different from those used by other states - the unique additional standards may increase the costs of those materials for our local school districts. In addition, assessment consortia will be developing assessment aligned to the common core standards and not the variation adopted in California. This may result in issues with our Algebra standards and curriculum not being aligned with our assessment and accountability system."

CALIFORNIA DEPARTMENT OF EDUCATION
NEWS RELEASE

TOM TORLAKSON
State Superintendent
of Public Instruction

California Adopts Modified Math Standards to Restore Local Decision Making

Required by Legislation, Move Allows Progress Toward Common Core

The move rescinds action by the prior Board in 2010, which adopted standards that contained a unique Grade 8 Algebra I course inconsistent with the published *Common Core State Standards for Mathematics*.

Torlakson recommended the unique Grade 8 Algebra I course be replaced with Algebra I and Mathematics I courses based upon the *Common Core State Standards for Mathematics*.

Date: Wed, 16 Jan 2013


A FLU NT
My Child is in **PRE-NATAL**
Algebra $3x^2 - y = \pi$

The California Algebra Experiment

- In 2012, 59% of all eighth grade students took the CST Algebra 1 exam and more than half were not successful. Even more will repeat the class again in high school.
- In 9th grade, 49% of the students took CST Algebra 1 exam and 75% of those students did not pass.

The California Algebra Experiment

- Research studies indicate nearly 65% of the students who were placed in Algebra in eighth grade are placed in the same level of Algebra in ninth grade.

- About 46% of the students who were successful in Algebra in the eighth grade (B-grade and Proficient) and who were placed again in Algebra in ninth grade were less successful in their second experience.

It is not Algebra for All, it is Algebra Forever.

The word *Algebra* in the title of the course is a major hurdle to improving student learning in mathematics.

It leads to misplacement of students, tracking, and traditional beliefs that only some students can success at mathematics.

What's in a Name?

- Algebra is the greatest gatekeeper to higher education. (ETS 1988)
- There is no official Algebra 1 course, it differs greatly from state to state although they are all use the same title.
- No other course a has such a failure rate. Teachers believe the Algebra 1 course must be difficult .

What's in a Name?

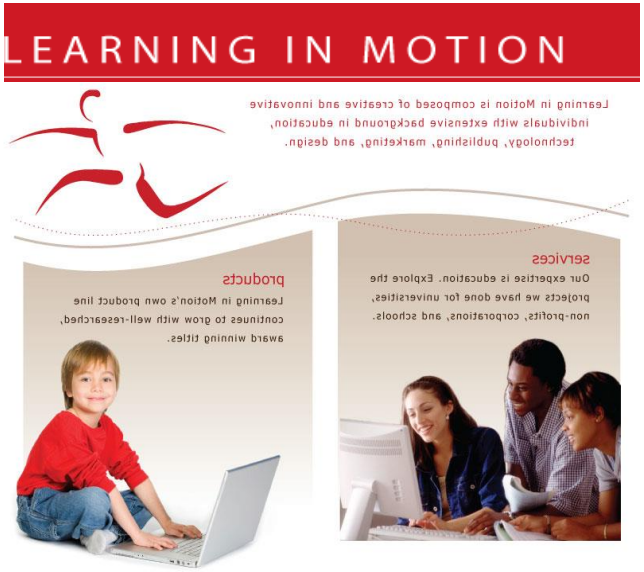
- There is no mathematical reason why for a course to be called Algebra (it is a misnomer). Algebra is a strand of mathematics.
- Failure in the course Algebra 1 is the single greatest reasons cited for dropping out in CA (Los Angeles Times 2009).
- Algebra as a course is all about status.

SCOPE AND SEQUENCE

New K-12 Math Curriculum Inspired by The Common Core State Standards

PEARSON FOUNDATION

BILL & MELINDA GATES *foundation*

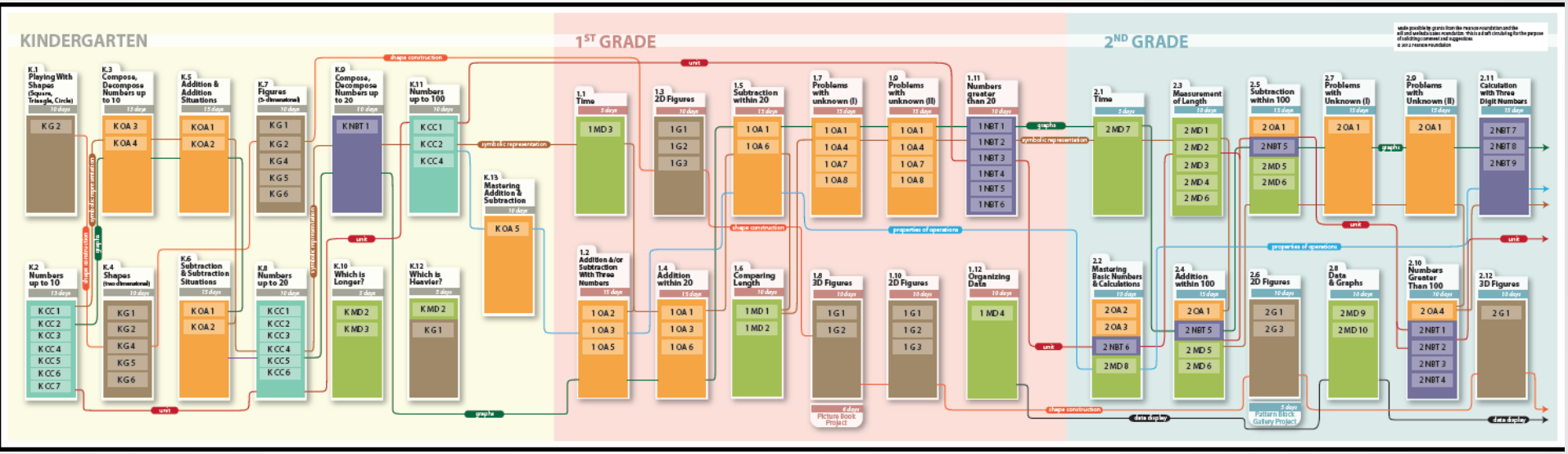


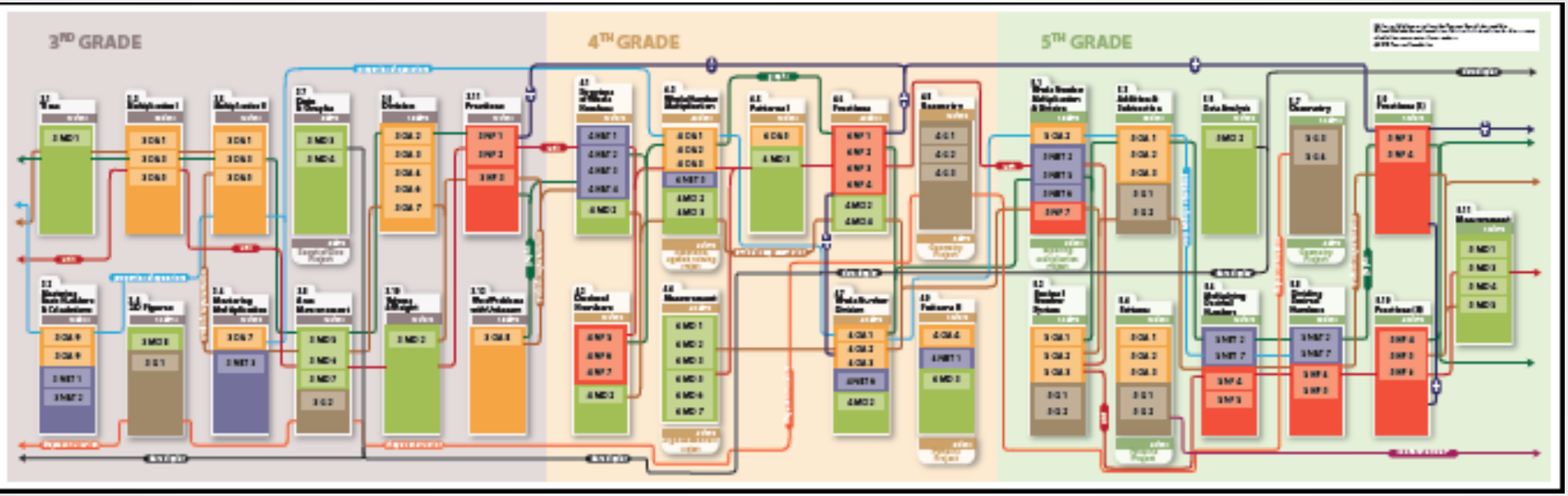
The Gates Foundation and the Pearson Foundation are funding a large scale project to create a system of courses to support the ELA and Mathematics CCSS. These will be a modular, electronic curriculum spanning all grade levels. A Santa Cruz based company, Learning In Motion, is working to write the lessons.

Think in Terms of Units

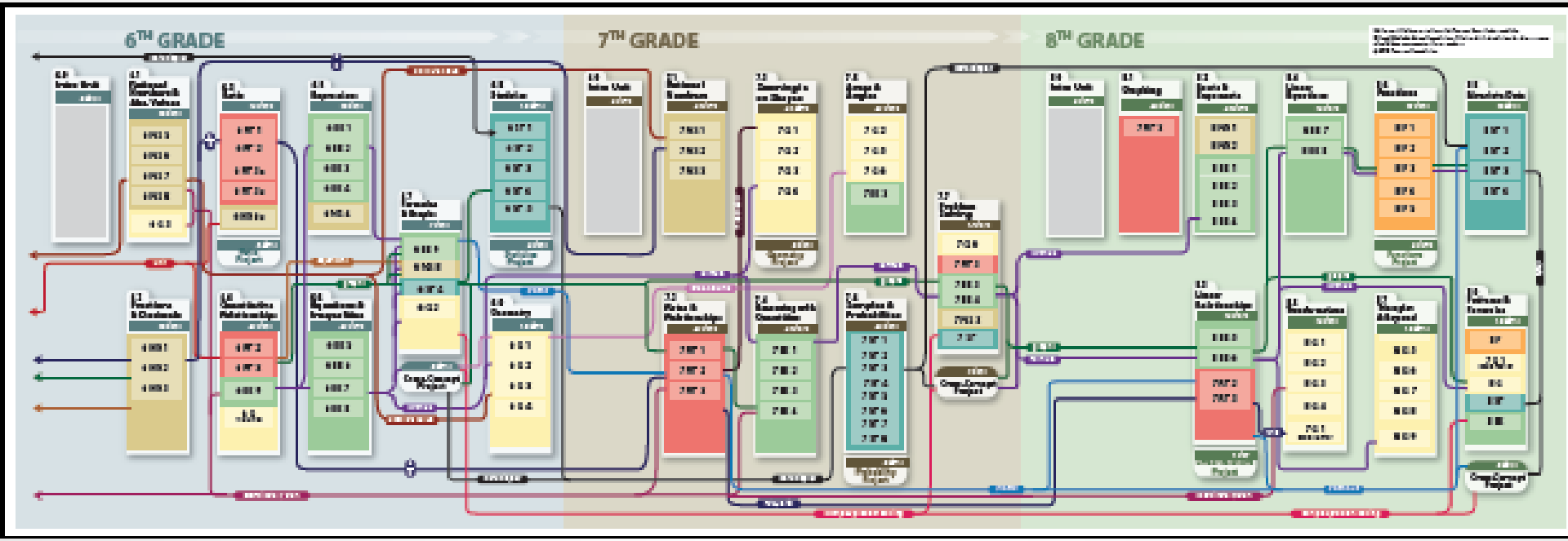
Phil Daro has suggested that it is not the lesson or activity, but rather the **unit** that is the "optimal grain-size for the learning of mathematics". Hence that was the starting point for our Scope and Sequence.

Developers of High School:
Patrick Callahan, Dick Stanley, David Foster, Brad Findell, Phil Daro, and Marge Cappo


KINDERGARTEN
1ST GRADE
2ND GRADE


3RD GRADE
4TH GRADE
5TH GRADE

Middle School Curriculum



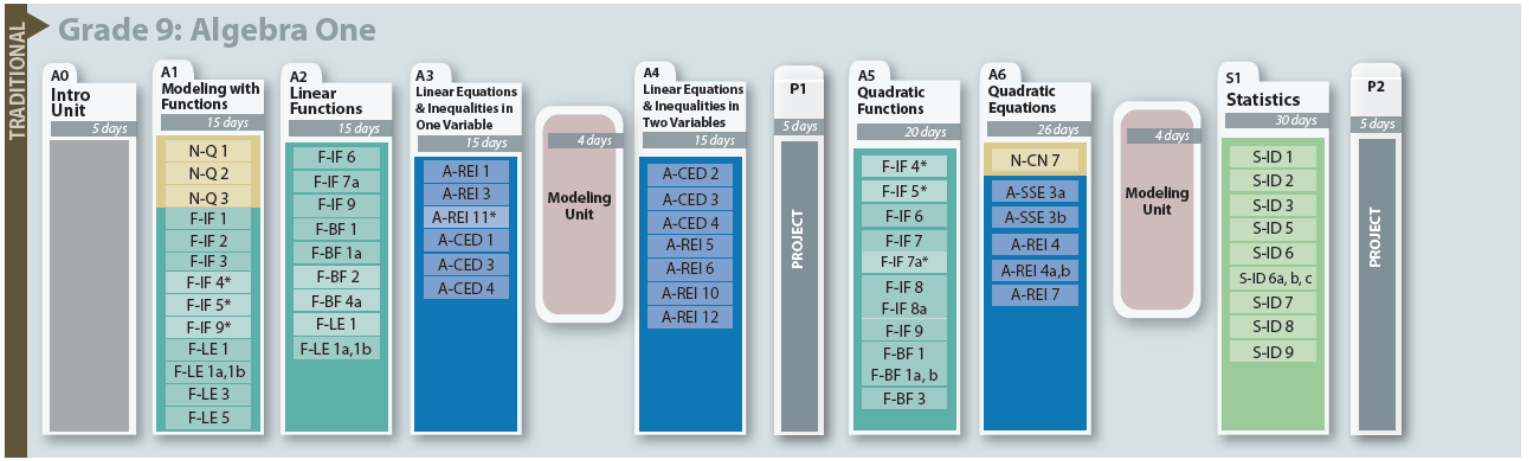
CCSS High School Units

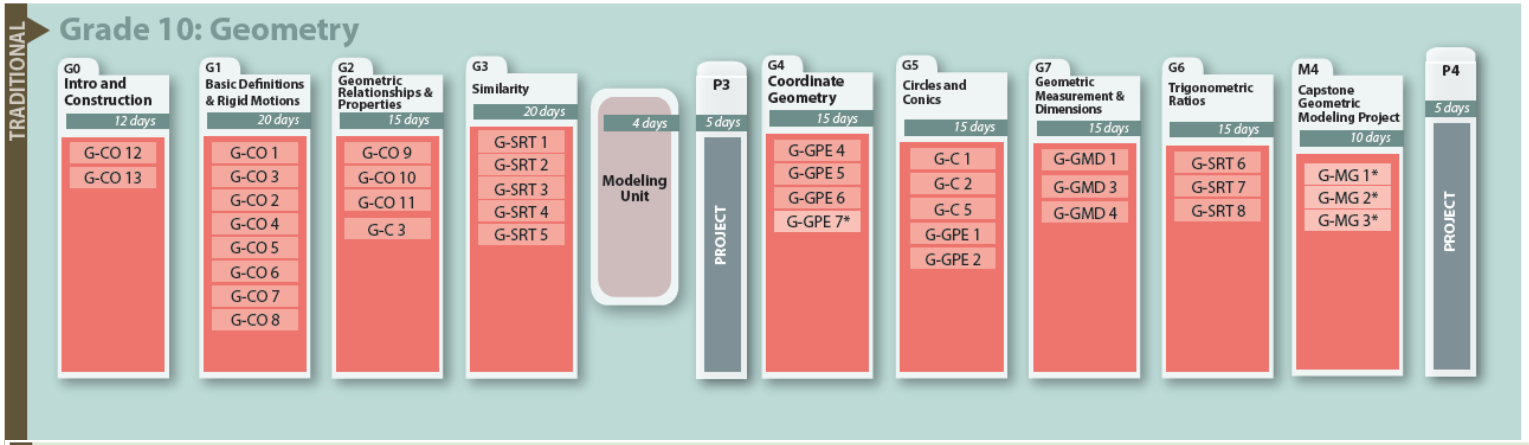
High School Algebra Units:
A0 Introductory Unit
A1 Modeling with Functions
A2 Linear Functions
A3 Linear Equations and Ineq in One Var
A4 Linear Equations and Ineq in Two Var
A5 Quadratic Functions
A6 Quadratic Equations
A7 Exponential Functions
A8 Trigonometric Functions
A9 Functions
A10 Rational and Polynomial Expressions

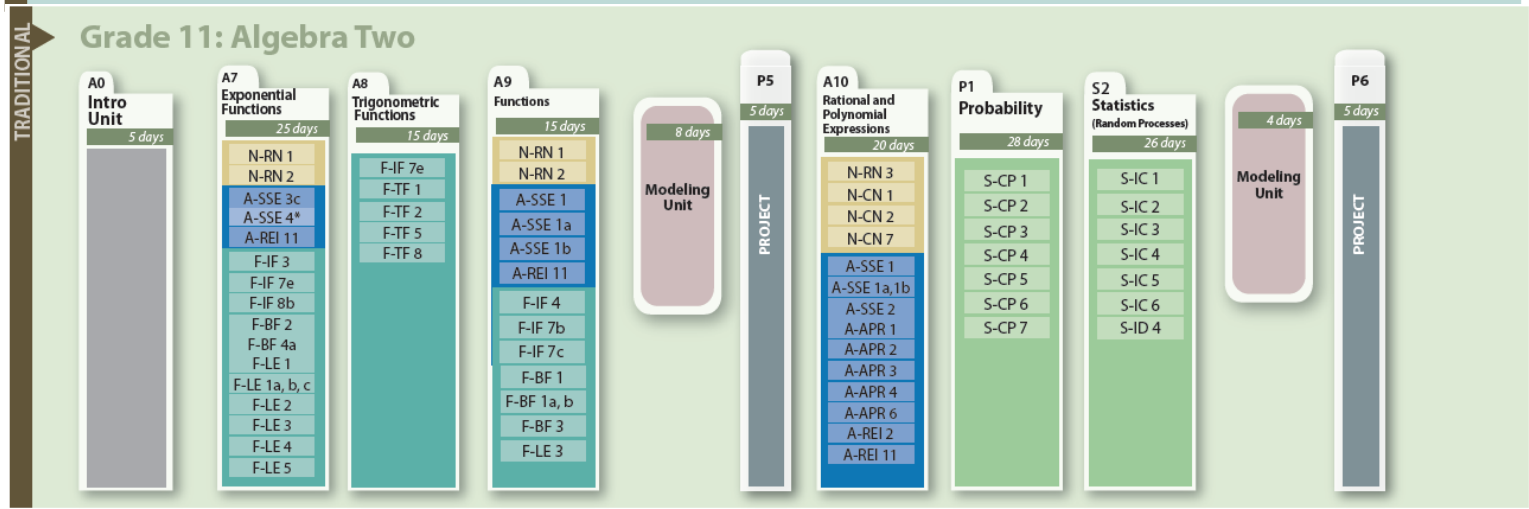
High School Geometry Units:
G0 Introduction and Construction
G1 Basic Definitions and Rigid Motions
G2 Geometric Relationships and Properties
G3 Similarity
G4 Coordinate Geometry
G5 Circle and Conics
G6 Trigonometric Ratios
G7 Geometric Measurement and Dimension
M4 Capstone Geometric Modeling Project

High School Prob & Stat Units:
P1 Probability
S1 Statistics
S2 Statistics (Random Process)

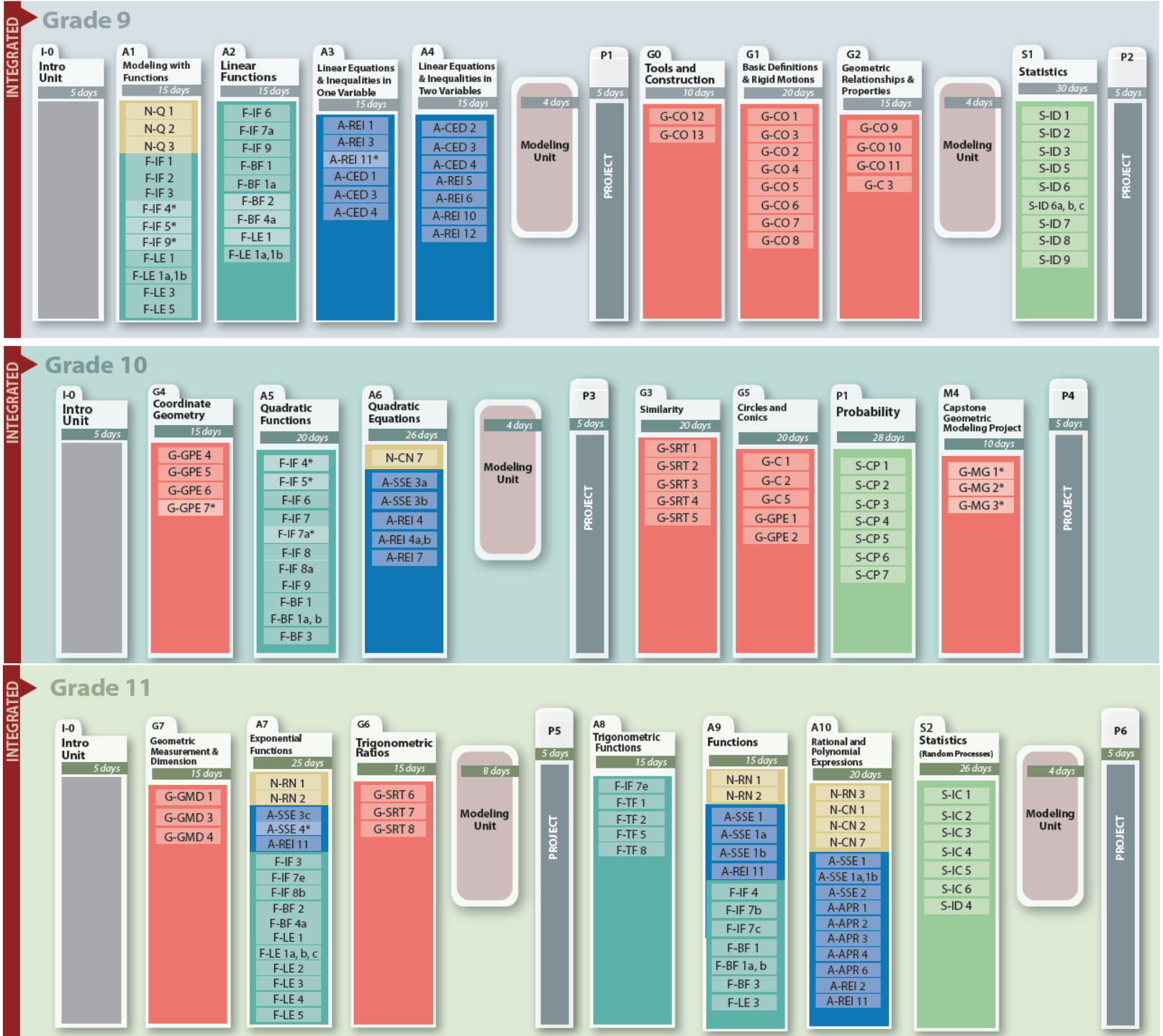
TRADITIONAL







INTERNATIONAL



Curriculum and Implementation Effects on High School Students' Mathematics Learning From Curricula Representing Subject-Specific and Integrated Content Organizations

Douglas A. Grouws, James E. Tarr, Óscar Chávez,
Ruthmae Sears, Victor M. Soria, and Rukiye D. Taylan
University of Missouri

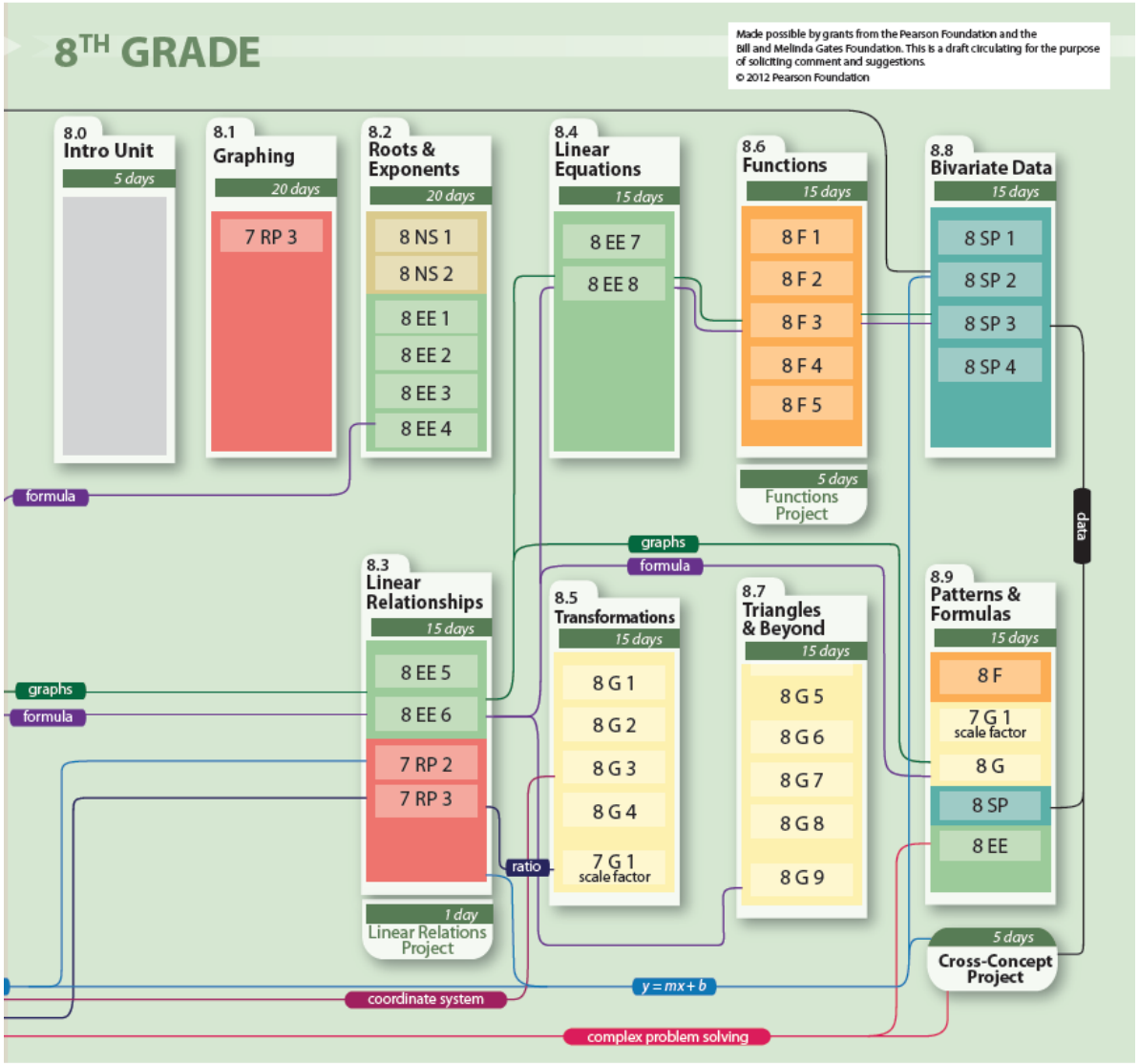
This study examined the effect of 2 types of mathematics content organization on high school students' mathematics learning while taking account of curriculum implementation and student prior achievement. The study involved 2,161 students in 10 schools in 5 states. Within each school, approximately 1/2 of the students studied from an integrated curriculum (Course 1) and 1/2 studied from a subject-specific curriculum (Algebra 1). Hierarchical linear modeling with 3 levels showed that students who studied from the integrated curriculum were significantly advantaged over students who studied from a subject-specific curriculum on 3 end-of-year outcome measures: Test of Common Objectives, Problem Solving and Reasoning Test, and a standardized achievement test. Opportunity to learn and teaching experience were significant moderating factors.

Jason Zimba
co-Author CCSSM

It is **incorrect** to say that algebra isn't covered until high school. There is a great deal of algebra in the 8th grade standards.

For example, students in grade 8 are expected to solve two simultaneous equations with two unknowns. I don't see a lack of rigor there. The standards actually invest heavily in algebra because of the way they focus so strongly on the prerequisites for algebra in the elementary grades.

CCSSM 8th Grade are HS Standards



- Algebra/Functions 67%
- Geometry (Transformations and Triangle Proofs) 20%
- Bivariate Data 10%
- Cross-Concept Project 3%

COURSE PATHWAYS AND ACCELERATION

When do we Accelerate?????

Where to Accelerate?

Can we live without understanding….

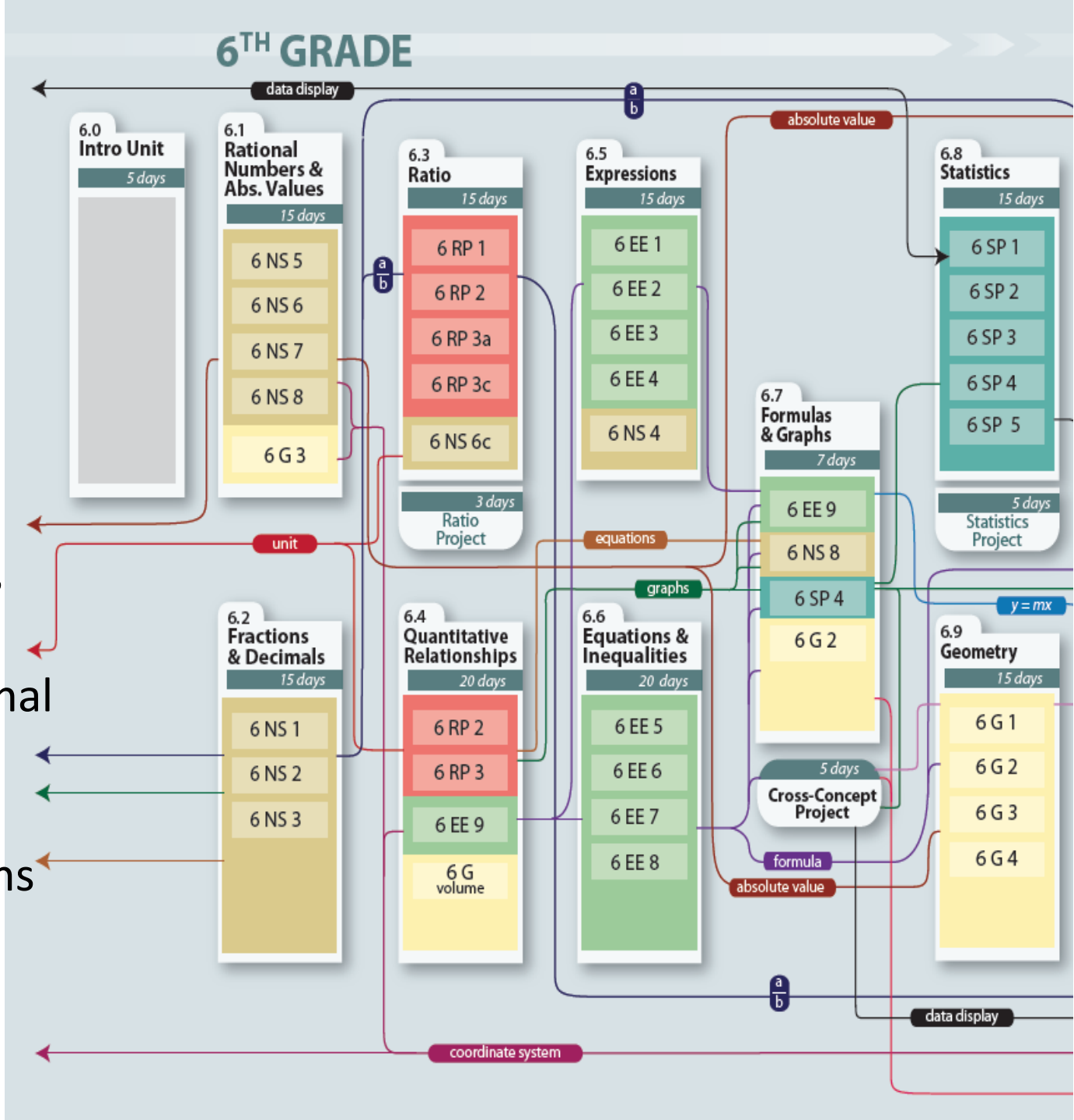
Integer and their operations

Division of Fractions

Ratio and proportional reasoning

Expression, Equations and Inequalities

Statistics



Where to Accelerate?

Can we live without understanding….

Properties of rational numbers, percents, discounts, markups, etc.

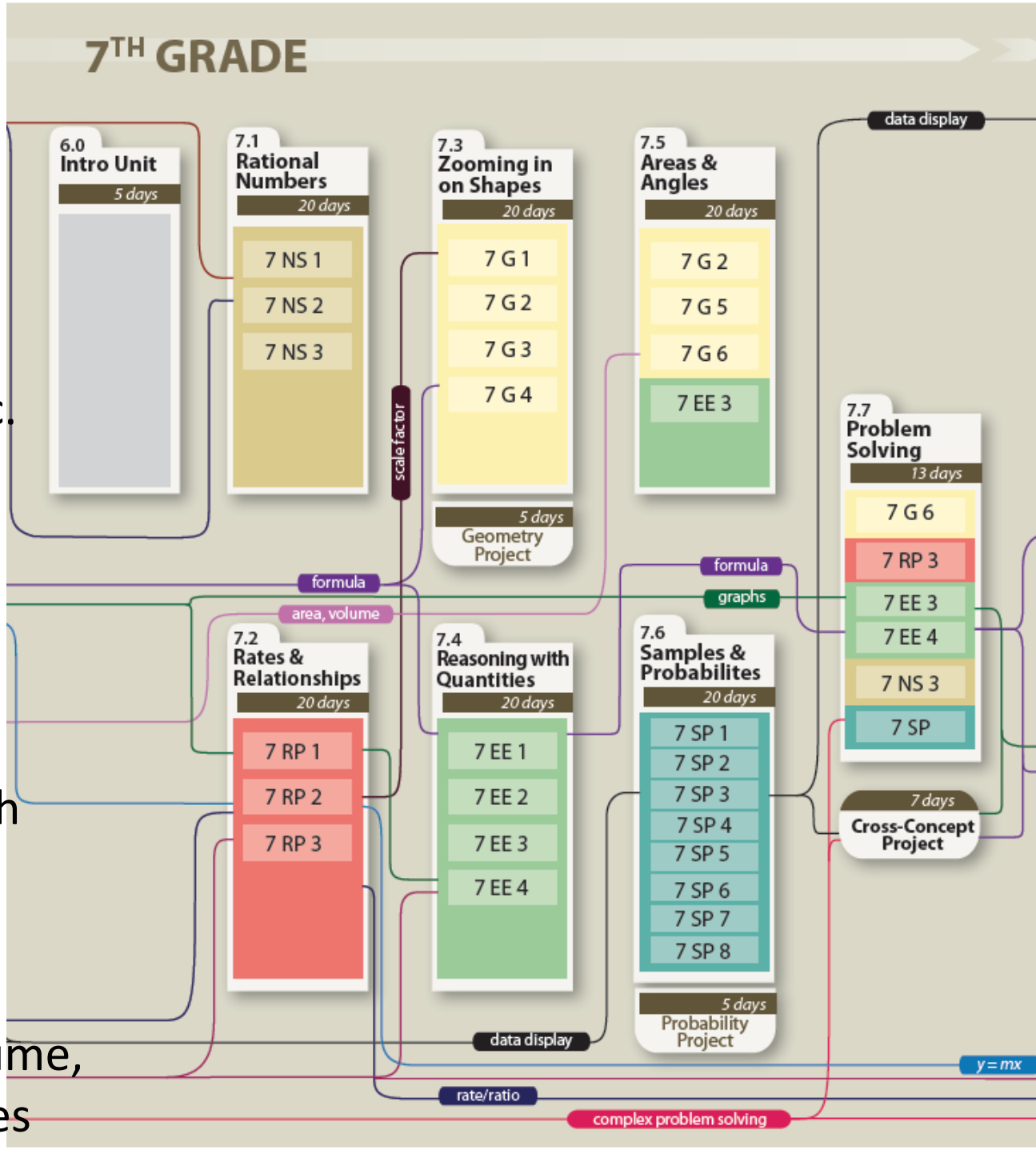
Rate and problems solving using rate

Similarity, proportional reasoning

Algebraic Modeling with Equations

Probability

Geometry: Angles, Volume, Surface Area, 3-D shapes



When do we Accelerate?????

How will kids who are ready for advanced work accelerate to reach courses like calculus during high school?

Those are questions for policy, not for standards. The standards don't speak to this issue. Decisions about acceleration and ability grouping are still the purview of local districts, just as they've always been.

Jason Zimba
co-Author CCSSM

Appendix A

COMMON CORE STATE STANDARDS FOR

Mathematics

Appendix A:

Designing High School Mathematics Courses Based on the Common Core State Standards

Brad Findell

Accelerated Seventh Grade by Appendix A

Properties of rational numbers, percents, discounts, markups, etc.

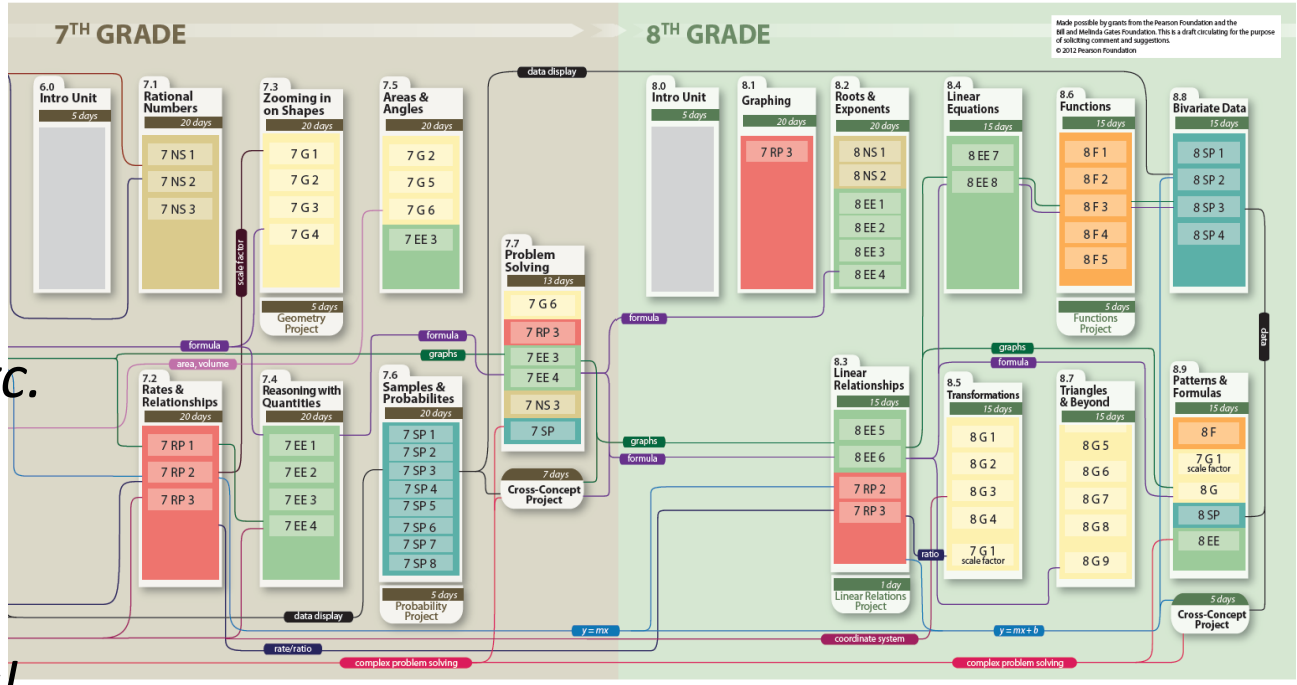
Rate and problems solving using rate

Similarity, proportional reasoning

Algebraic Modeling with Equations

Probability

Geometry: Angles, Volume, Surface Area, 3-D shapes



In Addition you have nearly all of the 8th grade CCSSM course in 7th (accept for 3 standard sets)

Algebra/Functions (through Systems of Equations)

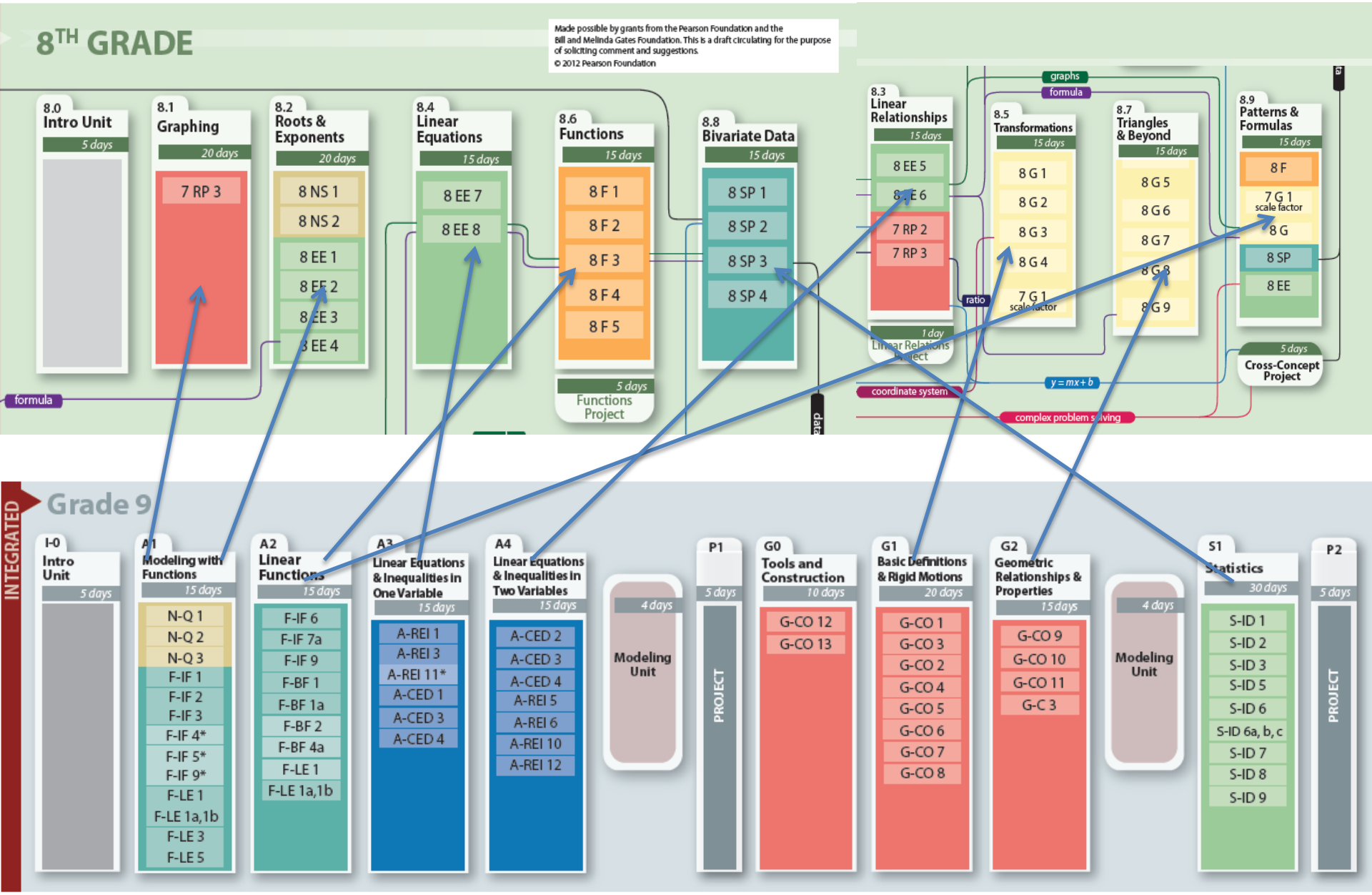
Geometry (Congruence and Similairty Triangle Proofs)

Statistical Inferences

When do they Accelerate in Japan?

After 8th Grade!!!!!!

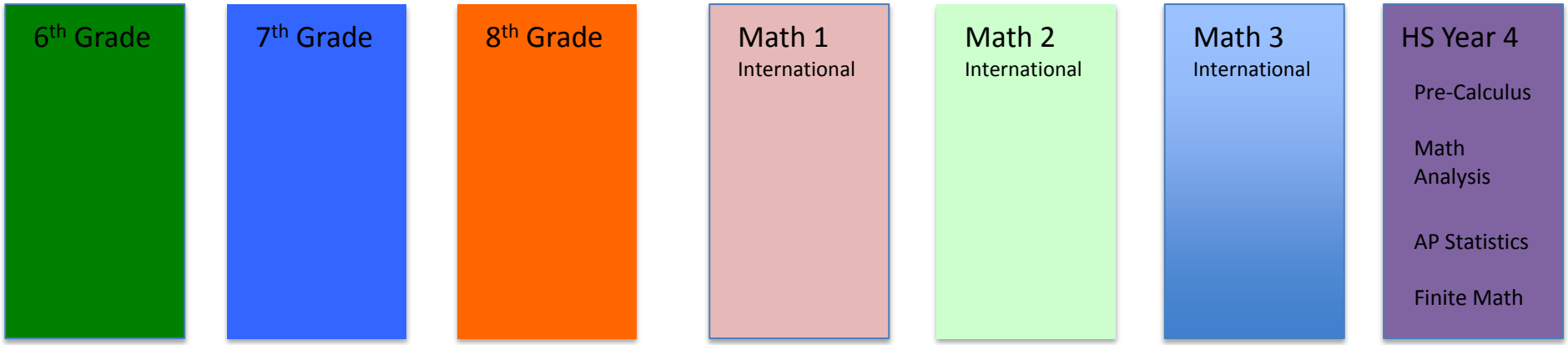
Where to Accelerate????



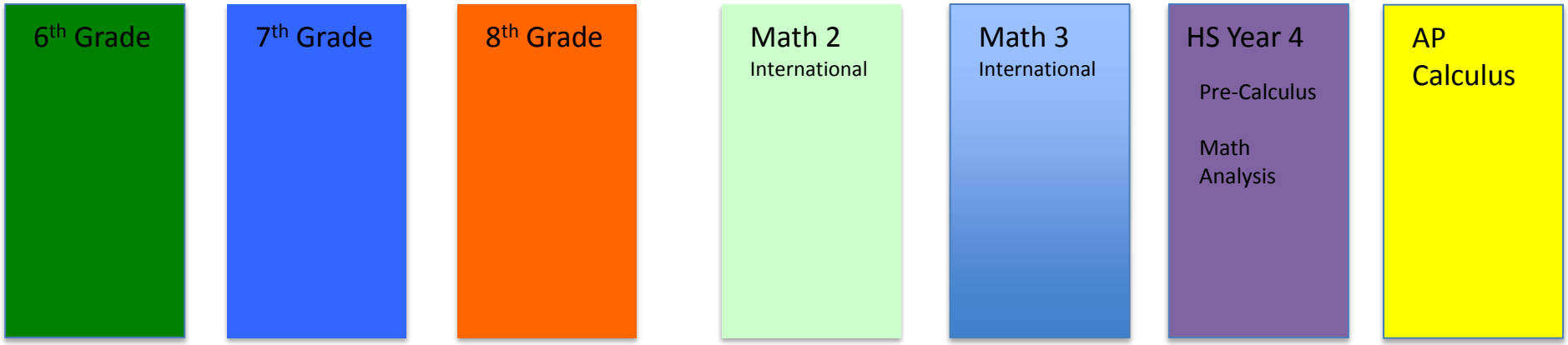
When do we Accelerate?????

The Only Reasonable Answer for Learning: 9th Grade!!!!

College Ready Sequence



Accelerated Sequence



California Mathematics Framework: Possible Pathways to Calculus in 12th Grade

For clarity, "HS Course 1, 2 or 3" could refer to either the "traditional" high school pathway (Algebra 1, Geometry, Algebra 2) or "integrated" (Math 1, Math 2, Math 3).

1. ***Compacting in Middle School: Three CCSS courses in two years during grades 7 and 8***
   Decision point to accelerate: after grade 6

Grade 6 students	Grade 7 students	Grade 8 students	Grade 9 students	Grade 10 students	Grade 11 students	Grade 12 students
CCSS 6	CCSS 7 and CCSS 8, part 1	CCSS 8, part 2 and CCSS HS Course 1	CCSS HS Course 2	CCSS HS Course 3	CCSS HS Course 4	AP Calculus

2. ***Doubling Up in High School: Two CCSS courses during two class periods of math in grade 9***
   Decision point to accelerate: after grade 8

Grade 6 students	Grade 7 students	Grade 8 students	Grade 9 students	Grade 10 students	Grade 11 students	Grade 12 students
CCSS 6	CCSS 7	CCSS 8	1st semester: CCSS HS Course 1	CCSS HS Course 3	CCSS HS Course 4	AP Calculus
			2nd semester: CCSS HS Course 2			

3. ***Compacting in High School: Three CCSS courses in two years during grades 9 and 10***
   Decision point to accelerate: after grade 8

Grade 6 students	Grade 7 students	Grade 8 students	Grade 9 students	Grade 10 students	Grade 11 students	Grade 12 students
CCSS 6	CCSS 7	CCSS 8	CCSS HS Course 1 and CCSS HS Course 2A	CCSS HS Course 2B and CCSS HS Course 3	CCSS HS Course 4	AP Calculus

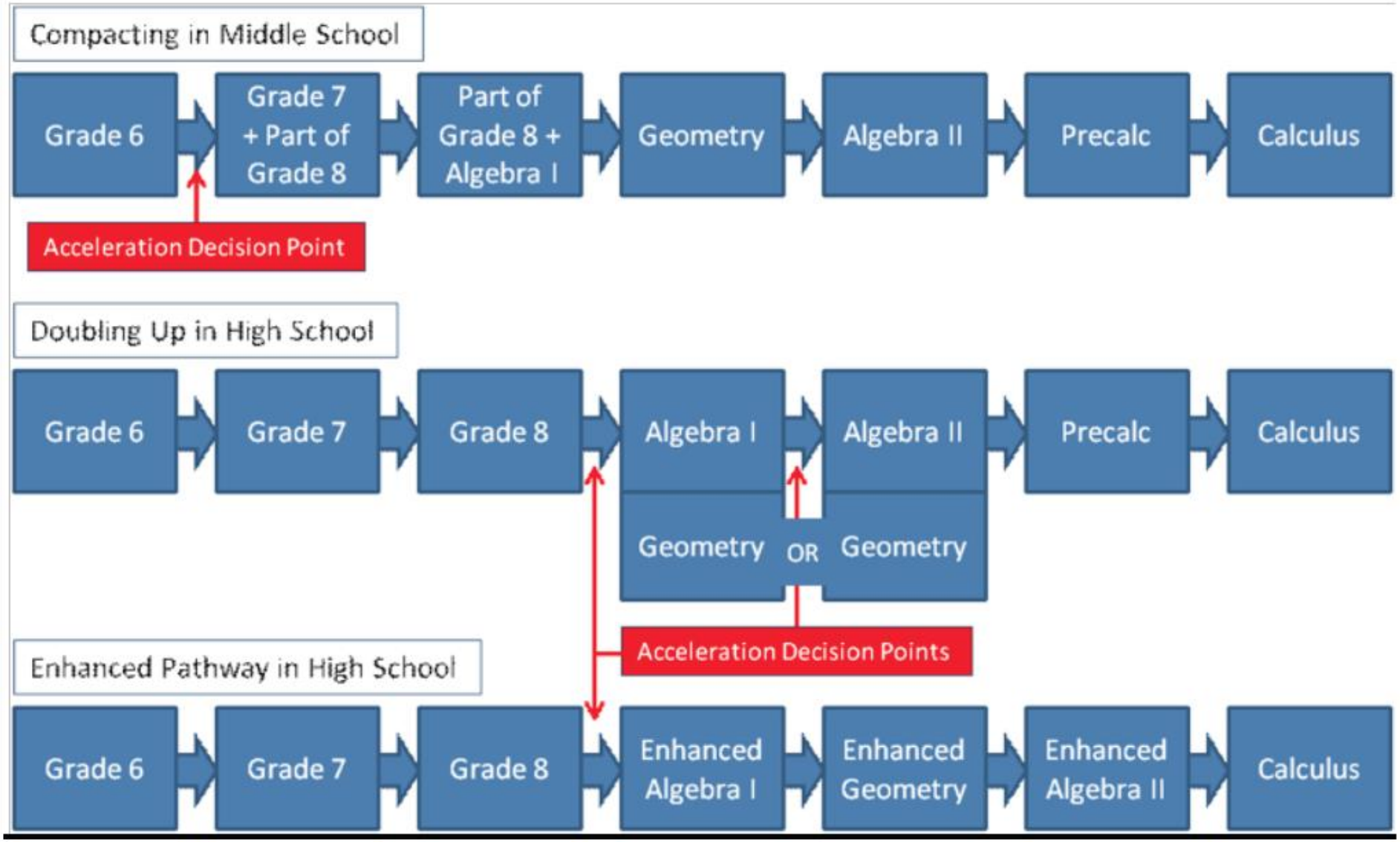
4. ***Enhanced Pathway in High School: STEM High School Courses 1, 2, and 3 will include the advanced CCSS (+) pre-calculus standards***
   Decision point to accelerate: after grade 8 (STEM – Science, Technology, Engineering, and Mathematics)

Grade 6 students	Grade 7 students	Grade 8 students	Grade 9 students	Grade 10 students	Grade 11 students	Grade 12 students
CCSS 6	CCSS 7	CCSS 8	Enhanced (STEM) CCSS HS Course 1	Enhanced (STEM) CCSS HS Course 2	Enhanced (STEM) CCSS HS Course 3	AP Calculus

5. ***Pre-Calculus Summer Bridge Pathway: After completing Courses 1, 2 and 3, students can take a summer course in preparation for Calculus***
   Decision point to accelerate: after grade 11

Grade 6 students	Grade 7 students	Grade 8 students	Grade 9 students	Grade 10 students	Grade 11 students	Grade 12 students
CCSS 6	CCSS 7	CCSS 8	CCSS HS Course 1	CCSS HS Course 2	CCSS HS Course 3	AP Calculus
					Summer Pre-Calculus	

Massachusetts - Making Decisions about Course Sequences



Acceleration is a political decision that has huge ramifications on student learning

A-G Requirements

Board of Admissions and Relations with Schools (BOARS)
Statement on High School Mathematics Curriculum Development under the Common Core State Standards

April 2013

Consistent with past policy and practice for course approval, BOARS reiterates its full support for either the integrated pathways or the traditional pathways, as stated in the A-G Guide's section on Mathematics ("c"). It is BOARS' expectation that courses developed in accordance with either sequence will receive subject area "c" approval provided that they satisfy the course requirements for area "c" presented in the A-G Guide and that they support students in achieving the Standards of Mathematical Practice given in the CCSSM:

Break

- Please return in 15 minutes.

Credentialing

- Multiple Subject Credential with a Supplementary Authorization
  - Can only teach mathematics to students in grades 9 and below
  - Can teach any mathematics content
- Single Subject Teaching Credential with a Math Supplementary
  - Can teach mathematics to students in grades K-12
  - Mathematics content is from grade 9 or below courses
- Subject Matter Authorization
  - Can teach mathematics to students in grades K-12
  - Mathematics content is from grade 9 or below courses

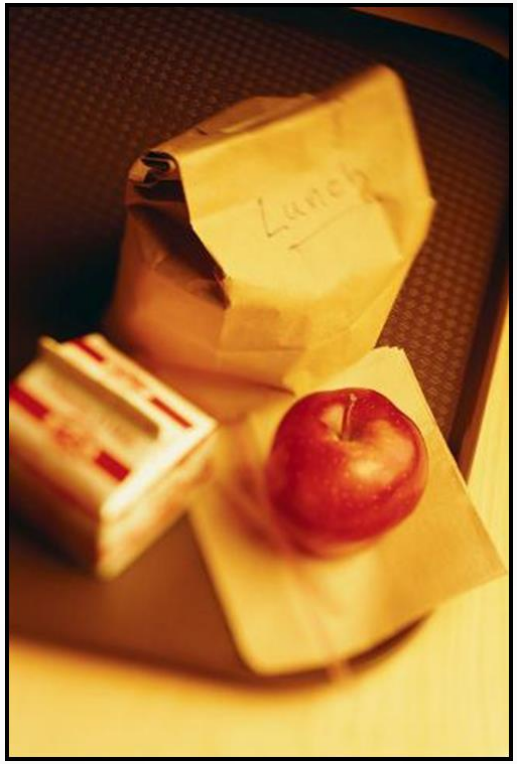
Credentialing (continued)

- Single Subject Teaching Credential- Foundational Level Mathematics
  - Can teach
    - General mathematics
    - All levels of Geometry
    - Probability and Statistics
    - Consumer Mathematics
  - Cannot teach
    - Trigonometry (unless it's being introduced in one of the above listed courses)
    - Calculus
    - Math Analysis
  - Can be taught to students in grades K-12

Credentialing (continued)

- Single Subject Teaching- Mathematics
  - Can teach mathematics to students in grades K-12
  - – Can teach the following mathematics courses:
    - General mathematics
    - All levels of Geometry
    - Probability and Statistics
    - Consumer Mathematics
    - Trigonometry
    - Pre-Calculus
    - Math Analysis
    - Calculus

Lunch



Please return by 12:15.

Depth of Knowledge (DOK)

Low-Cognitive Demand

Level 1: Recalling and Recognizing

Student is able to recall routine facts of knowledge and can recognize shape, symbols, attributes and other qualities.

Level 2: Using Procedures

Student uses or applies procedures and techniques to arrive at solutions or answers.

Depth of Knowledge (DOK)

High-Cognitive Demand

Level 3: Explaining and Concluding

Student reasons and derives conclusions. Student explains reasoning and processes. Student communicates procedures and findings.

Level 4: Making Connections, Extending and Justifying

Student makes connections between different concepts and strands of mathematics. Extends and builds on knowledge to a situation to arrive at a conclusion. Students use reason and logic to prove and justify conclusions.

TOM TORLAKSON
State Superintendent
of Public Instruction

Common Core Big Ideas
Depth of Knowledge (DOKs)

	Mathematics		ELA/Literacy	
	DOK3	DOK4	DOK3	DOK4
Current Assessments	<2%	0%	20%	2%
New SBAC Assessments	49%	21%	43%	25%

Yuan & Le (2012); Herman & Linn (2013) from Linda Darling-Hammond, Assembly Hearing, 3.6.13

COURSE PATHWAY PLAN

Example Course Pathway Plan

- Identify a Course Pathway Team
  - Teacher leaders and department chairs
  - Site and district administrators
- Gather Resources
  - CCSS-Mathematics Standards
  - Appendix A
  - Pearson Foundation Scope & Sequence

Example Course Pathway Plan

- Professional Development
- Evaluate current course offerings and identify new CCSS-aligned courses
- Transition Courses
  - "Phasing In" and "Phasing Out" Courses
- Communication
  - Internal (within district and feeder system)
    - School Board
  - External
    - Parents and Community

Course Pathway Transition Plan

	2013-2014	***2014-2015***	2015-2016	2016-2017	2017-2018	2018-2019
Grade 6	CCSS 6	***CCSS 6***				
	CA 6					
Grade 7	CA Alg 1	***CCSS 7***	CCSS 7			
	CCSS 7					
	Pre-Alg					
Grade 8	CA Alg. 1*	***CCSS HS 1 or 2***	CCSS 8	CCSS 8		
	CA Geometry	***CCSS 8***				
	CCSS 8 w/ TR					
Grade 9	CA Alg 1	***CCSS HS 1 or 2 w/TR***	CCSS HS 2 or 3	CCSS HS 1 or 2	CCSS HS 1 or 2	
	CA Geometry	***CCSS HS 2 or 3****	CCSS HS 1 or 2			
		CCSS HS 1 or 2 w/TR				

Course Pathway Transition Plan

	2013-2014	*2014-2015*	2015-2016	2016-2017	2017-2018	2018-2019	2018-2019
Grade 9	CA Alg 1	*CCSS HS 1 or 2 w/TR*	CCSS HS 2 or 3	CCSS HS 1 or 2	CCSS HS 1 or 2		
	CA Geometry	*CCSS HS 2 or 3***	CCSS HS 1 or 2				
		CCSS HS 1 or 2 w/TR					
Grade 10	CA Geometry	*CA Geometry w/CCSS*	CCSS HS 2 or 3	CCSS HS 3 or PreCalc	CCSS HS 2 or 3	CCSS HS 2 or 3	
		CA Alg 2 w/CCSS	CCSS HS 3 or "+"	CCSS HS 2 or 3			
			CCSS HS 2 or 3				
Grade 11		*CA Alg 2*	CA Alg 2	CCSS HS 3 or PreCalc	Pre Calcc/AP	CCSS HS 3 or Pre Calc	CCSS HS 3 or Pre Calc
			Pre Calc w/ CCSS	"+" or AP	CCSS HS 3 or PreCalc		
				CCSS 3 or Pre Calc			
Grade 12			Pre-Cal	Trig/ Pre Calc	AP	AP	Pre Calc/AP
				AP	AP	Pre Calc or AP	
					Pre-Calc or AP		

District Team Discussion

- How are the current math pathways enabling your students to be college and career ready? What opportunities and challenges do students face?
- What are the merits and demerits of the *traditional* US high school pathway versus an *international* pathway?
- What data should we consider in evaluating our current system? What do we already have available and what would need to be researched or tracked?
- What would it take to really change your current pathway system?
  - What are political implications?
  - What articulation would be required in your vertical feeder system?
  - Who would need to be educated and how?
  - How would current students be phased into a new pathway system?
  - What would it take for your institution to be successful in this change process?

NEXT STEPS AND ACTION ITEMS

Planning and Articulation

- Examine the example "Course Pathway Plan"
- Personalize the "Course Pathway Plan"
  - If possible, begin to create your "Course Pathway Transition Plan"
- Identify next steps
- Create a poster outlining where you are in the decision making process and your next steps.

Gallery Walk

- Select a spokesperson for your team's poster.
  - Answer questions from visiting teams
- Visit other districts' posters to gather ideas and ask questions.

Debrief Gallery Walk

CLOSING

Closing

- Thank you for attending today's forum!
- Please complete the Four-Square evaluation forms.