C.C.M.A.C. – 2nd Meeting – December 5, 2013

# COMMON CORE MATHEMATICS ADVISORY COMMITTEE

# CCMAC – GOALS

## By Priority

| **Elementary** | **Secondary** |
| --- | --- |
| **Research and create new assessments that align with planned Common Core assessments** | **Recommend a Secondary Math Pathway for the District** |
| **Identify Necessary Instructional Shifts** | |
| **Identify Necessary Types of Technology Tools** | |
| **Write a Common Core Math Transition Plan** | |

# Recommend a Secondary Math Pathway

## Traditional vs. Integrated

- **Recommendation Based On**
  - Research of CC Math Standards
  - Alignment to SMPs and Best Practices
  - Alignment to SBAC Assessments

Agenda Change
Discussing Curriculum First

## Acceleration Pathways

- **Acceleration Points**
  - Middle School
  - High School
- **Acceleration Type**
  - Double Up (2:1)
  - Accelerated (3:2)
  - Enhanced (4:3)
  - Other

# Integrated and Traditional Pathways

## The History

Traditional Pathway:

- Algebra/Geometry/Algebra sequence evolved in the 1800s one course at a time as U.S. universities (esp. Ivy League) increased their admission requirements year by year.


Integrated Pathway:

- Reform movement under Felix Klein in the early 1900s. It was designed so students received a curriculum unified under math function, not math subject.
  - Accepted by almost every nation except the United States

# Integrated vs. Traditional Pathways

## Current Pre-Conceptions/Stereotypes

Traditional – Common in U.S. (Grade 8-11)

- Content: Sequential – Algebra → Geometry → Algebra 2
- Practice: Direct instruction in class, followed by practice at home. Students might not apply this math to real-world circumstances.
  - Assessed products: Single day tests or worksheet assignments, completed individually.

Integrated – Common Internationally (all Grades) and in U.S. Grades K-7

- Content: Integrated – Algebra/Geometry/Statistics
- Practice: No direct instruction, instead focusing on "discovery" style lessons to teach concepts. Students might practice at home with no direct instruction on a topic.
  - Assessed products: Multiple day lab-type projects completed in groups.

# Integrated vs. Traditional Pathways

## What's in a Name?

Traditional – Content and Practice Standards Changed Substantially

- The Traditional Pathway is not very "traditional."

Integrated – Now Shares SMPs With Traditional Pathway

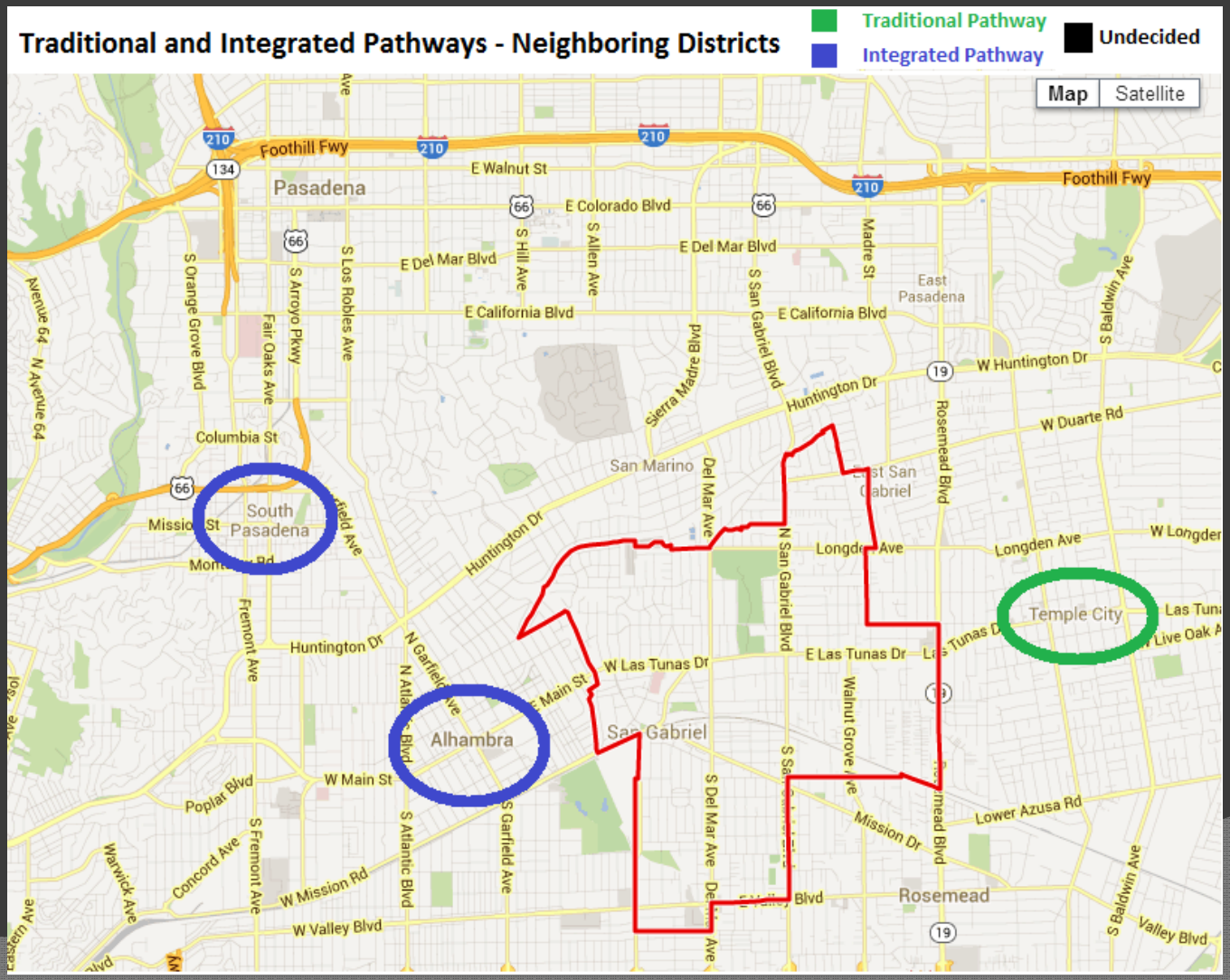
- Integrated must now be judged on the value of its Content, not its Practices

"You must unlearn what you have learned."

-Yoda

# Integrated vs. Traditional Pathways

## What Are Other Districts Choosing?




### Integrated

Alhambra USD
Charter Oak USD
Covina-Valley USD
Duarte USD
El Monte Union High SD
Norwalk-La Mirada USD
Oceanside USD
Perris Union High SD
San Diego USD
Shasta County (35 Districts)
South Pasadena USD

### Traditional

Bonita USD
Santa Monica-Malibu USD
Walnut Valley USD
Whittier Union High SD
La Canada USD

### Undecided

Baldwin Park USD
Claremont USD
Chaffey Joint Union High SD
Glendora USD
Monrovia USD

# Integrated vs. Traditional Pathways

## Why Are Districts Choosing the Integrated Pathway?

Traditional Math
Integrated Math

Traditional Organized P
- Objectives built into s
- Taught via rules, proc
- Lecture based, teache
- Continuous practice c

Integrated Organized Pa
- Objectives from algeb statistics interwoven
- Real world problems experience
- Teacher serves as faci
- Collaborative learnin
- Practice with a purpo

**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.

*Key words*: Curriculum; Curriculum effectiveness; HLM, Integrated curriculum; Secondary mathematics

ney Differ?

**INTEGRATED**

- Objectives from algebra, geometry, functions, math modeling, and probability and statistics, are interwoven
- Real world problems are investigated via lab-type experiences
- Teacher serves as facilitator and coach
- Collaborative learning
- Practice with a purpose

# Integrated vs. Traditional Pathways

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# Integrated vs. Traditional Pathways

## Common Core Practices

Both Integrated and Traditional pathways are governed by the same **practices** – the Standards of Mathematical Practice

# Integrated vs. Traditional Pathways

## Common Core Content

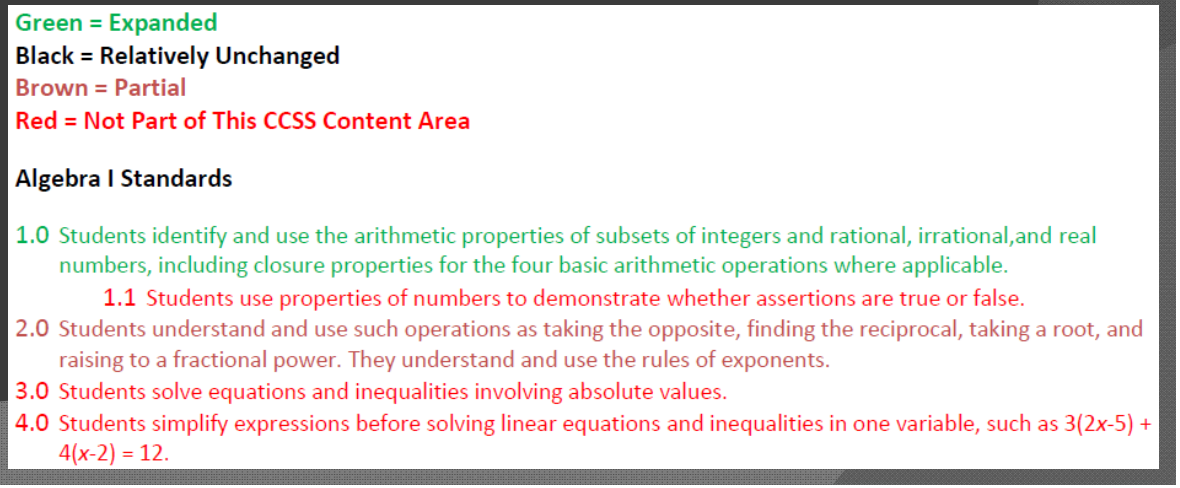
1997 Algebra, Geometry, Algebra II Crosswalk

- Review the "CCSS Crosswalk – 1997 – Simplified" handout.
- You can also look at the longer "CCSS Crosswalk - 1997." To delve deeper into each standard.

***Discuss (4 songs):***

***What differences and similarities to the 1997 Content Standards do you see?***

***What does this mean for your site?***



Green = Expanded
Black = Relatively Unchanged
Brown = Partial
Red = Not Part of This CCSS Content Area

**Algebra I Standards**

1.0 Students identify and use the arithmetic properties of subsets of integers and rational, irrational,and real numbers, including closure properties for the four basic arithmetic operations where applicable.
1.1 Students use properties of numbers to demonstrate whether assertions are true or false.
2.0 Students understand and use such operations as taking the opposite, finding the reciprocal, taking a root, and raising to a fractional power. They understand and use the rules of exponents.
3.0 Students solve equations and inequalities involving absolute values.
4.0 Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.

# Acceleration Pathways

## A New Necessity

- The Common Core Math standards no longer repeat between grade levels.
  - Material is consistently expanded upon, not repeated.

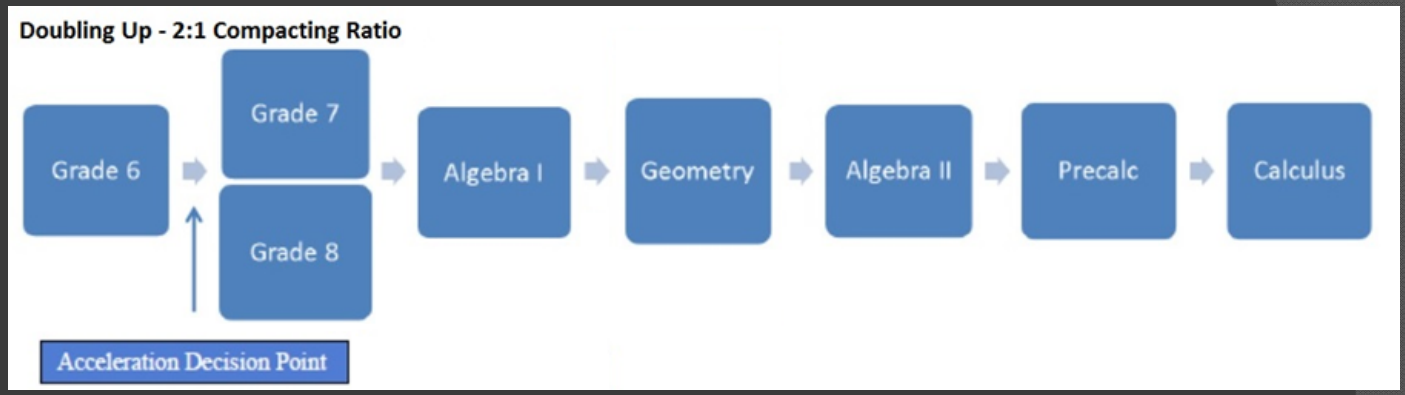
- $7^{th}$ → $8^{th}$ Grade Progression Examples
  - Create Single Variable Equations and Inequalities →
    - Graphing and Solving 1-Variable Linear Equations
  - Proportionality and Unit Rate →
    - Graph and Interpret Proportional Relationships
  - Random Sampling and Basic Probability →
    - Create and Investigate Scatterplots from Experimental Data
    - Identify Positive, Negative, Linear Associations, and Estimate Line of Best Fit – Interpret Slope and Y-Intercept

- In light of this, current practice needs to be revisited

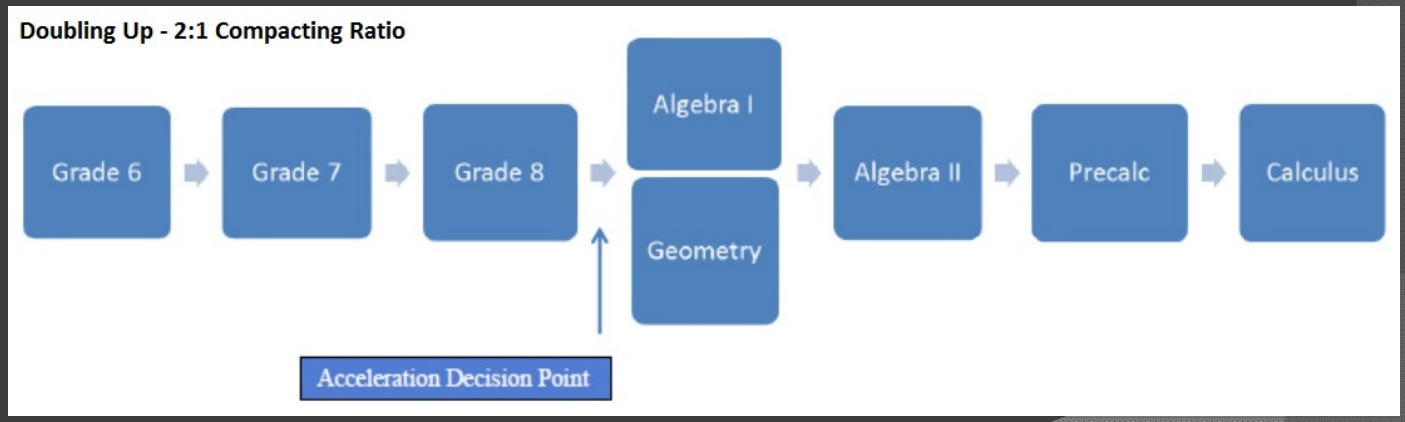
# Acceleration Pathways

## "Doubling Up"

JMS Acceleration



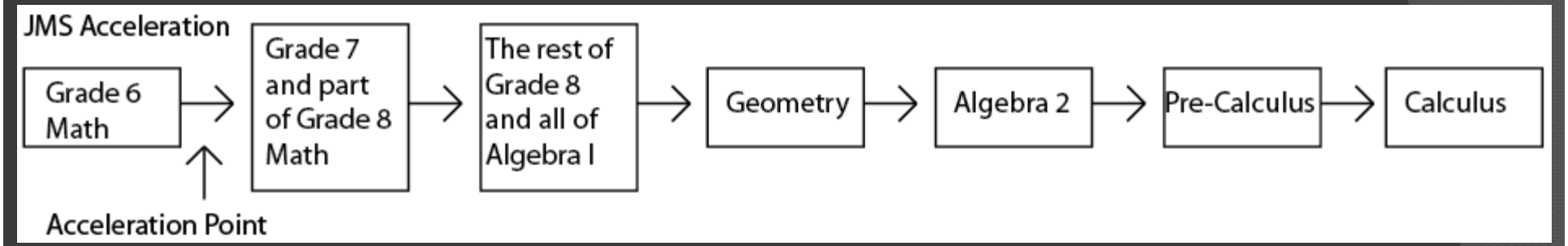

GHS Acceleration

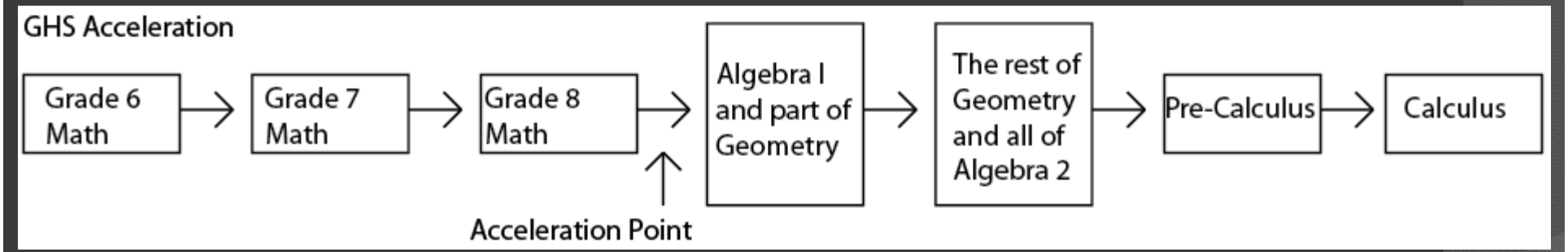



Two math courses taken simultaneously

# Acceleration Pathways

## "Accelerated Pathway" – 3:2 Ratio



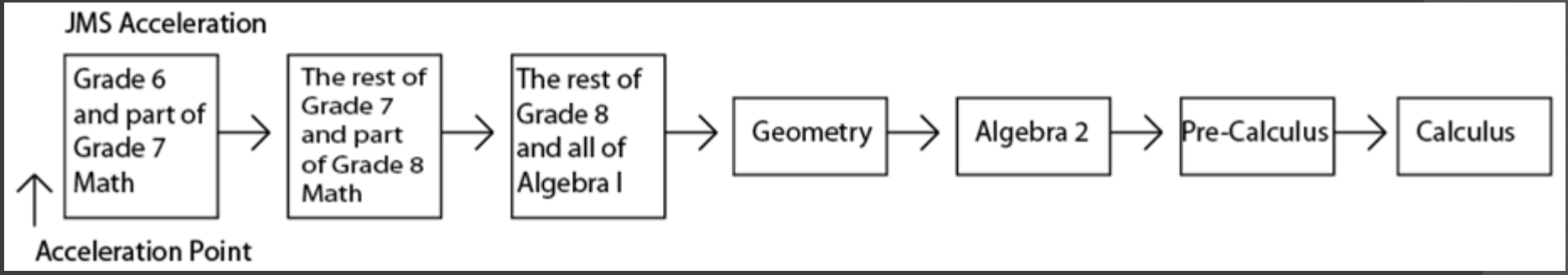



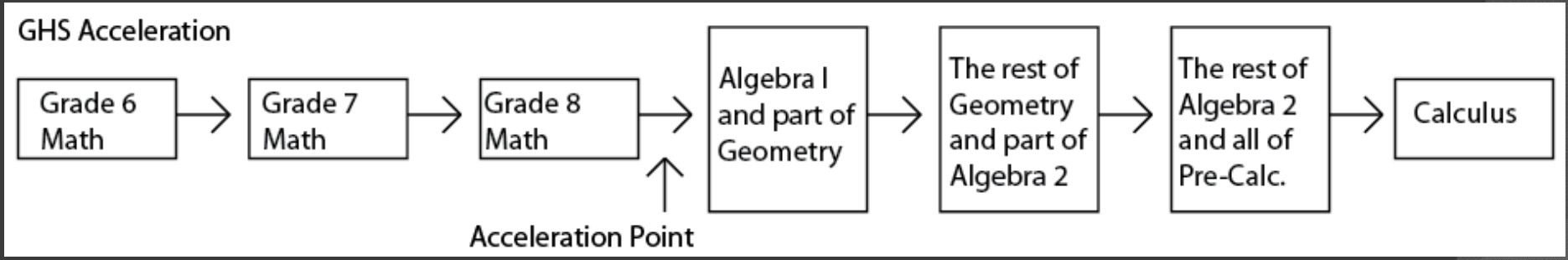

Can occur at any grade where a student will remain on site for two years

- $6^{th}$, $7^{th}$, $9^{th}$, $10^{th}$, $11^{th}$ Grades

# Acceleration Pathways

## "Enhanced Pathway" – 4:3 Ratio




Acceleration point can occur in 6th, 9th, and 10th Grades

- Student would have to remain at that school site for three years

# Acceleration Pathways

## Other Options

### Summer

- Students could take a course of math over the summer to advance.
- Makes scheduling easier – no compacted courses
- Paid course – Accessibility Problem

### No Acceleration Pathway

- Offer enrichment and differentiation through honors coursework

# Common Core Acceleration Examples

## The New "Grade Level"