High School Pathways

for the

Common Core State Standards

for

Mathematics

Columbus City School District

September 26, 2012

Bradford R. Findell, PhD

brad@findell.org

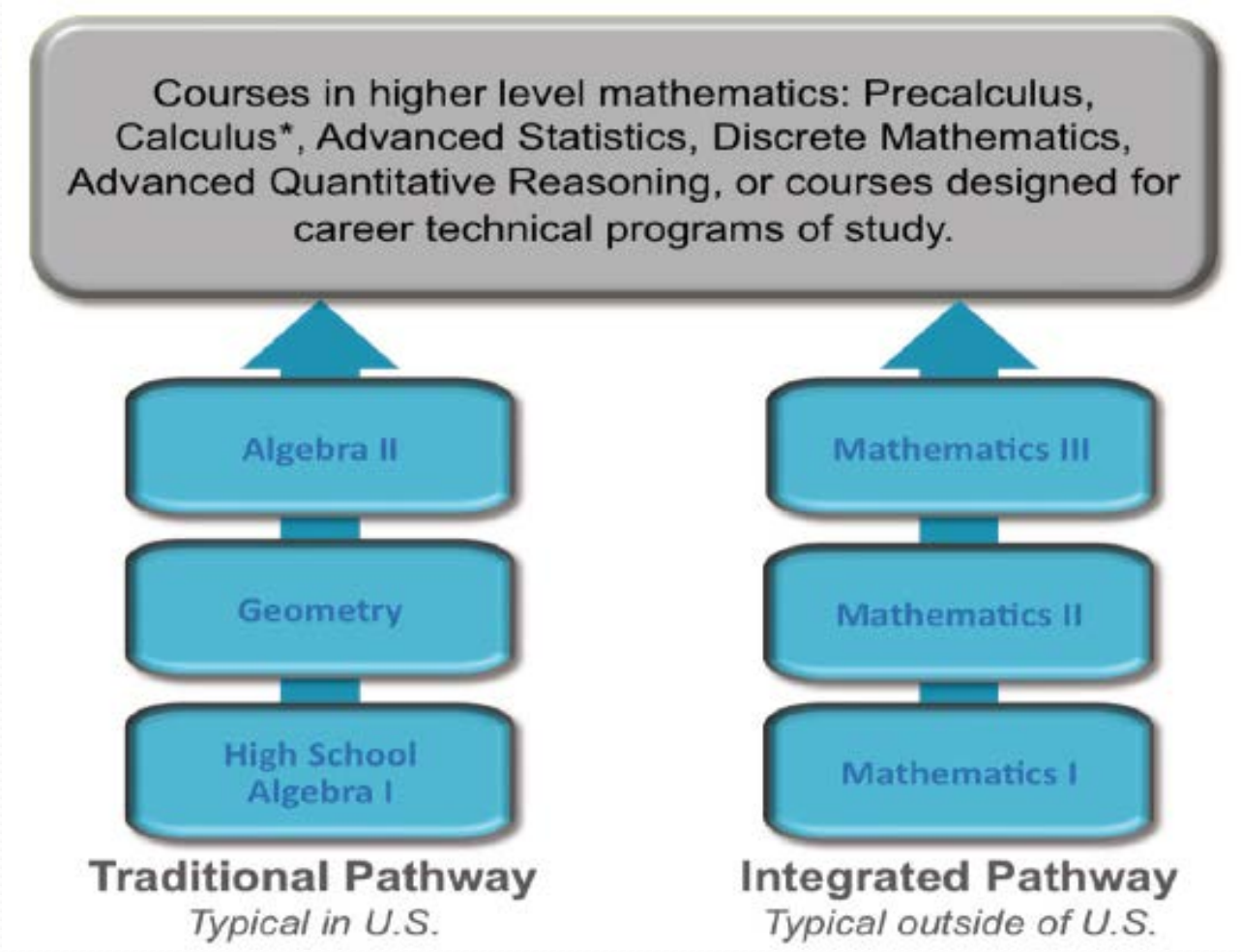
High School Mathematics Pathways

- CCSS Appendix A, developed by Achieve
- Two main pathways:
  - Traditional: Two algebra courses and a geometry course, with statistics and probability in each
  - Integrated: Three courses, each of which includes algebra, geometry, statistics, and probability
- Both pathways:
  - Complete the Core in the third year
  - Include the same "critical areas"
  - Require rethinking high school mathematics
  - Prepare students for a menu of fourth-year courses

Typical in U.S.

Typical outside U.S.

Two Main Pathways



Comparison of Pathways "Units"

Relationships Between Quantities Linear and Exponential Rel. Descriptive Statistics Expressions and Equations Quadratic Functions and Modeling	Relationships Between Quantities Linear and Exponential Rel. Reasoning with Equations Descriptive Statistics Congruence and Constructions Connecting A & G through Coords.
Congruence and Constructions Similarity and Trigonometry Extending to Three Dimensions Connecting A & G through Coords. Circles w/ and w/o Coordinates Applications of Probability	Extending the Number System Quadratic Functions and Modeling Expressions and Equations Applications of Probability Similarity and Trigonometry Circles w/ and w/o Coordinates
Polynomial, Rational, and Radical Rel. Trigonometric Functions Modeling with Functions Inferences and Conclusions from Data	Inferences and Conclusions from Data Polynomial, Rational, and Radical Rel. Trigonometric Functions Mathematical Modeling

Common Core Assessments

- The Partnership for Assessment of Readiness for College and Careers (PARCC) used these Pathways as the starting point for the design of end-of-course exams for these high school courses:

- Algebra 1, Geometry, Algebra 2

  and

- Mathematics 1, Mathematics 2, Mathematics 3

PARCC Mathematics Frameworks

- Individual end-of-course overviews
- For each course
  - Examples of key advances from previous grades
  - Discussion of Mathematical Practices in relation to course content
  - Fluency recommendations
- Pathway summary table
- Assessment limits table for standards assessed on more than one end-of-course test

Prealgebra at High School?

- Prealgebra should not count as high school mathematics
  - Preparation for current HS graduation tests
  - College admissions requirements (and NCAA)
  - Reaching college and career readiness
- You can't help students catch up by slowing them down
- NCAA counts Algebra A and Algebra B as one credit
- When students are behind
  - Give them access to the regular curriculum *and* extra support (*a la* Response to Intervention)

CCSSM and Acceleration

- The CCSSM represent significant curricular acceleration in grades K-8
  - Much Algebra 1, Geometry, and Statistics are in the middle grades
  - Many "accelerated" programs will no longer be ahead
  - The CCSS for Grade 8 is a reasonable, internationally benchmarked response to "Algebra for all" in grade 8
- Accelerating large percentages of students much beyond the CCSS for K-8 is probably unwise
- The CCSSM for high school include much advanced content and much new content for all students
  - Most students will need three years in high school to complete CCSS
- *So we need to rethink mathematics, grades 6-12*

Math Programs for All Students

- Main pathway completing the CCSS in grade 11
  - Provide support for *all* students to reach these standards
  - Provide alternatives to Precalculus for seniors
- Alternative pathway completing the CCSS in grade 10, allowing for AP Calculus in grade 12
  - Determine where "compacting" should happen
- Flexibility for the small numbers of students who are eager for still more mathematics
  - Align with gifted education policies
  - Expect PSEO during senior year