Agenda

1. Where the story begins...
2. Review process
3. Curriculum recommendation
4. Potential 9th Grade course names
5. Implementation
Meeting Objectives

• Review the process to date
• Learn the curriculum recommendation for next year
• See the potential 9th grade course names
• Hear about the curriculum implementation plan
Where the story begins...

• **Convergence**
  – Change in State Curriculum Frameworks; emergence of the Standards of Mathematical Practice.
  – Budget: with declining enrollments, increasing difficulty of filling all class room seats.

• An additional consideration: teacher collaboration is enhanced.
Review Process Overview

• Disciplined review process
  – More than 70 hours per teacher since 2012
  – Developed shared understanding of the Standards for Math Practice

• Determined curricula to review

• Determined criteria

• Curriculum study

• Curriculum evaluation

• Department recommendation

• Administrative review
Curricula Reviewed

– Center for Mathematics Education Project
– College Preparatory Math
– Core-Plus Math
– Interactive Mathematics Program

*Carnegie Learning and Discovering Series considered*
Review Criteria

• Established curriculum review criteria
  – Rigor
  – Standards for Math Practice
  – Differentiation
Rigor

- Conceptual Understanding
- Procedural Fluency
- Application

“K–8 Publishers’ Criteria for the Common Core State Standards for Mathematics”
http://www.corestandards.org/assets/Math_Publishers_Criteria_K-8_Summer%202012_FINAL.pdf
Standards for Math Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

- Reasoning and explaining
- Modeling and using tools
- Seeing structure and generalizing
- Overarching habits of mind of a productive mathematical thinker.
Differentiation

• Multiple means of...
  – Representation (What?)
  – Action and Expression (How?)
  – Engagement (Why?)
Review Process

• Curriculum Study
  – Overview
  – Lesson/unit experience
  – Guided exploration
  – Visited area schools
  – Piloted units
Department Evaluation and Recommendation Process

• Quantitative Analysis
  – Teacher ranked each program based on the set criteria
    • Rigor
    • Standards for Mathematical Practice
    • Differentiation
  – Teachers ranked each program in order from 1 – 4, with 1 being the program that met the criterion the best and 4 indicating the program that least met the criteria.
Rigor

#1
- Core-Plus: 8%
- Center for Math Education Project: 10%
- College Prep Math: 25%
- Interactive Math Program: 56%

#2
- Core-Plus: 7%
- Center for Math Education Project: 19%
- College Prep Math: 24%
- Interactive Math Program: 50%

#3
- Core-Plus: 7%
- Center for Math Education Project: 36%
- College Prep Math: 42%
- Interactive Math Program: 15%

#4
- Core-Plus: 8%
- Center for Math Education Project: 6%
- College Prep Math: 6%
- Interactive Math Program: 8%

Legend:
- Core-Plus
- Center for Math Education Project
- College Prep Math
- Interactive Math Program
Standards for Mathematical Practice

- Core-Plus
- Center for Math Education Project
- College Prep Math
- Interactive Math Program
Differentiation

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Administrative Review

• Program research
• District outreach
• Internal course data
  – ARHS has been using IMP for years, why don’t we just compare our own internal results to see which is better, IMP courses or “Traditional” courses?
  – Considering that IMP is one of the programs under review what can we see in our own internal data?

• Contacted STEM Professors and College Admissions departments
Interactive Mathematics Program

• Balanced approach
  – Direct instruction and inquiry
    • Assessment
    • Homework
    • Reference materials

• Accessibility
  – Designed to meet needs of advanced students and those working below grade level

• 2015 edition
Example Quiz

• Find the length of the vertical leg of the triangle at the left to the nearest hundredth. Show your work. No measuring!

• Find the length of the horizontal leg (still without measuring). Can you find it another way?
You’ve seen that the trigonometric functions *sine*, *cosine* and *tangent*, can be useful for finding unknown sides and angles of right triangles. In this assignment, your task is to connect several geometric ideas to explain why.

The sine of an angle, \( \theta \), is defined as,

\[
\sin \theta = \frac{\text{length of opposite side}}{\text{length of hypotenuse}}
\]

- In the two triangles at the left, and any other right triangle with a 35 degree angle, this ratio must have the same value. **Explain** why this has to be true.
Defining Circles

Earlier in this unit, you found that the equation \(x^2 + y^2 = r^2\) describes the circle of radius \(r\) with center at the origin \((0, 0)\). That is, points whose coordinates fit the equation are on the circle, and points that do not fit the equation are not on the circle.

In this assignment, you will generalize this formula to circles whose center does not have to be at the origin.

The first two questions should help you get started thinking about distances and coordinates.

1. Suppose the tree in the orchard at \((6, 2)\) has been replaced by a sprinkler, and the water reaches all points within 5 units of the sprinkler. Which trees get wet?

2. Suppose a blade of grass is growing in the open space in the orchard, at the point with coordinates \((7.9, 6.1)\). Will this blade of grass get wet from the sprinkler in Question 1? How do you know?
Completing the Square and Getting a Circle

Examine each of these equations. If possible, find an equivalent equation in the form \((x - a)^2 + (y - b)^2 = r^2\) and identify the center and radius of the circle that the equation represents. If this is not possible, explain why not.

1. \(x^2 - 8x + y^2 - 6y - 11 = 0\)
2. \(x^2 - 10x + y^2 + 12y + 28 = 0\)
3. \(x^2 + 3x + y^2 - 4y - 7 = 0\)
4. \(x^2 + 6x + y^2 + 2y + 13 = 0\)
The Equation of a Circle

According to the distance formula, the distance from \((x, y)\) to \((a, b)\) is given by the expression

\[
\sqrt{(x-a)^2 + (y-b)^2}
\]

This formula can be used to write the equation of a circle, because a circle is the set of points that are some fixed distance from a given point.

The equation \(\sqrt{(x-a)^2 + (y-b)^2} = r\) says, in algebraic form, that the point \((x, y)\) is \(r\) units from \((a, b)\), so the graph of this equation is the circle with center at \((a, b)\) and radius \(r\).

For convenience, we usually square both sides of this equation to avoid the square-root symbol. The standard form for the equation of this circle is

\[(x-a)^2 + (y-b)^2 = r^2\]
Potential 9th Grade Course Titles

9th Grade

• Geometry (Algebra, Prob/Stats) – Honors
  – Geometry Honors Elective (Bridge course as needed)

• Geometry (Algebra, Prob/Stats) – CP
  – Geometry CP Elective (Bridge course as needed)

• Algebra (Geometry, Prob/Stats) – SE
Implementation

• Professional Development
  – Spring 2015
  – Summer
  – 2015/16 School year

• Family nights
  – This Spring
    • Ex: Learn more about the 9th grade courses
  – Next Fall
    • Ex: How can I support my child at home?
Closing

• Partnership going forward
Thank You