



# **WPI: Mathematics in the Winnetka Public Schools**

Tuesday, October 22, 2013

# Agenda

- Welcome and Introductions: 9:00-9:05 a.m.
- Poll Everywhere Activity: 9:05-9:15 a.m.
- Overview of Common Core Standards: 9:15-9:30 a.m.
- Parents Do the Math: 9:30-9:40 a.m.
- Students Do the Math: 9:40-9:55 a.m.
- Quote and Exit Slips: 9:55-10:00 a.m.
- *There will be prizes!*

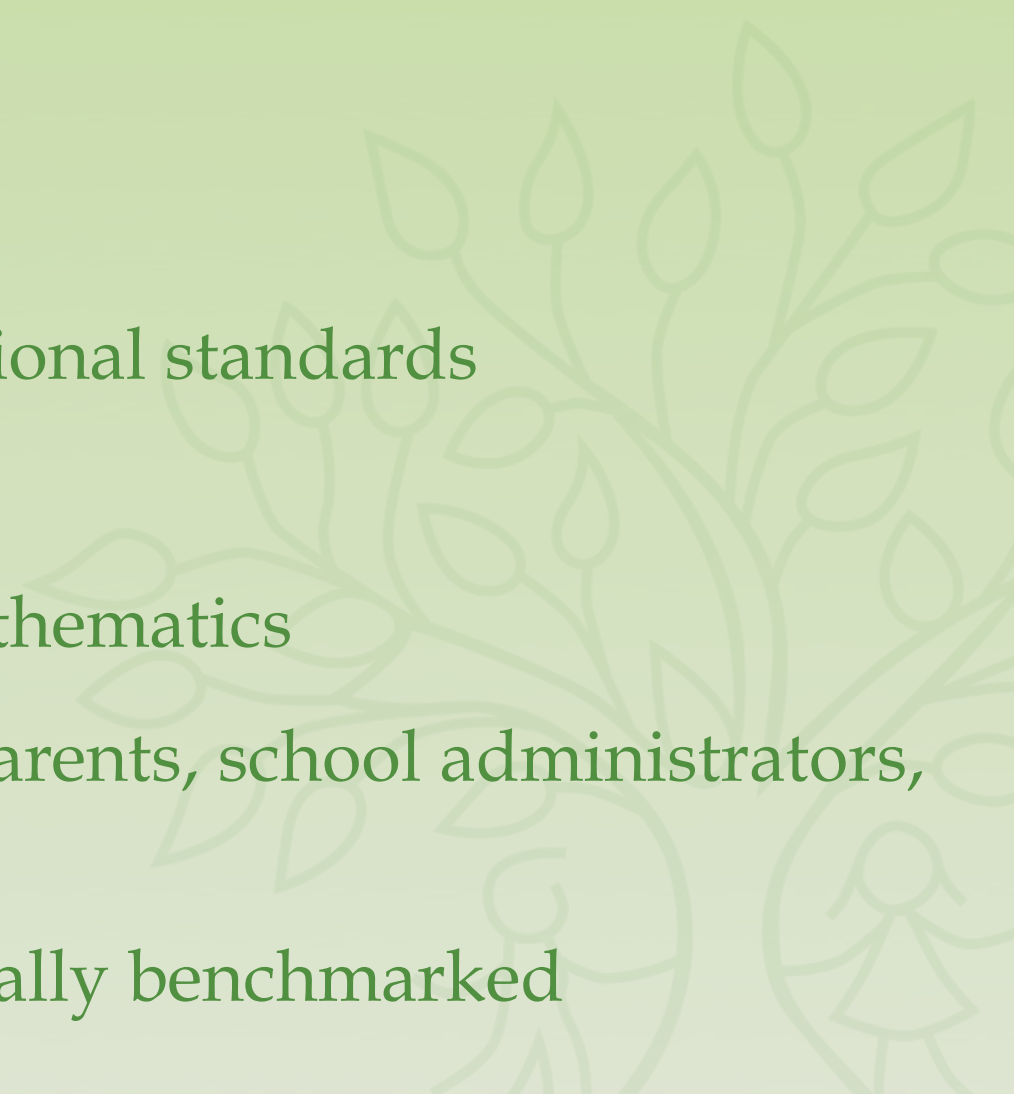
# Other Notes

- This WPI is the first in a series.
- We will collect your questions on an exit slip.
- Please leave your email address on the sign in sheet so we can email you additional information.
- Handout Buffet - help yourself!
- Now, please take out your cell phones...

# Poll Everywhere



# What are the Common Core Standards?

- State-led effort
    - Voluntary adoption
  - Single, clear set of educational standards
    - K-12
    - Language Arts and Mathematics
  - Developed by teachers, parents, school administrators, experts, and state leaders
  - Standards are internationally benchmarked
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# Mission of the Standards

- “The Common Core State Standards provide a **consistent, clear** understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be **robust** and **relevant** to the real world, reflecting the knowledge and skills that our young people need for **success in college and careers.**”

# To Whom Do the Standards Apply?

- 45 states, The District of Columbia, four territories, and the Department of Defense Education Activity
  - All **chose** to adopt the CCSS
- Illinois adopted the CCSS in June 2010
- PARCC assessment will replace ISAT next year
  - PARCC is based on CCSS

# Math Common Core Standards

- Lay a solid foundation in whole numbers, addition, subtraction, multiplication, division, fractions and decimals
- This foundation supports students in learning and applying more demanding math concepts
- Focus on applying mathematical ways of thinking to real world issues
- Prepares students to be mathematical thinkers



# Mathematical Shifts

## ◉ Focus

- ◉ Narrows the scope of content in order to deepen understanding

## ◉ Coherence

- ◉ Thoughtfully constructed so that learning builds

## ◉ Rigor

- ◉ Conceptual understanding, procedural skill and fluency, and application are equally important

# Number of Math Topics

Grade Level	Typical State's Standards 2008	Highest Performing Countries
1	22	3
2	22	3
3	22	7
4	22	15
5	29	20

# Required Fluencies

## K-6

Grade	Standard	Required Fluency
K	K.OA.5	Add/subtract within 5
1	1.OA.6	Add/subtract within 10
2	2.OA.2 2.NBT.5	Add/subtract within 20 (know single digit sums from memory) Add/subtract within 100
3	3.OA.7 3.NBT.2	Multiply/divide within 100 (know single digit products from memory) Add/subtract within 1,000
4	4.NBT.4	Add/subtract within 1,000,000
5	5.NBT.5	Multi-digit multiplication
6	6.NS2.3	Multi-digit division Multi-digit decimal operations

# Math Common Core Standards K-12

- **Standards for Mathematical Practice**
  - Rest on important processes and proficiencies with longstanding importance in mathematics education
- **Standards for Mathematical Content**
  - Balanced combination of procedure and understanding

# Standards for Mathematical Practice

Overarching habits of mind of a productive mathematical thinker.

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

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

Reasoning and explaining

4. Model with mathematics
5. Use appropriate tools strategically

Modeling and using tools

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

Seeing structure and generalizing

This chart was created by Bill McCallum in an attempt to provide some higher order structure to the practice standards, just as the clusters and domains provide higher order structure to the content standards.

# What is the difference between curriculum and materials?

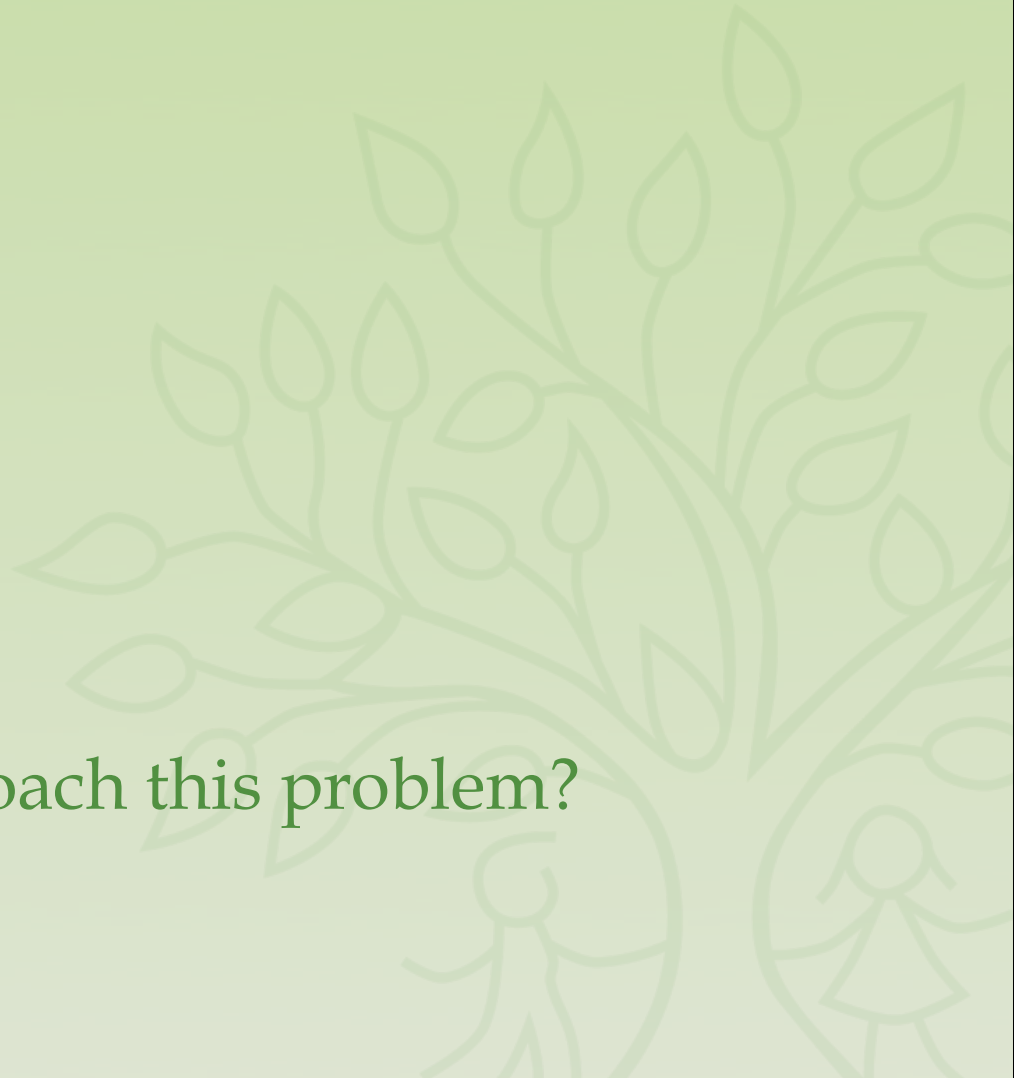
- The Common Core Standards are the foundation for the curriculum
  - District curriculum was written by the math committee
  - An outside consultant supported this work
- The materials chosen are tools we use to support the implementation of the curriculum
  - Materials are supplemented when necessary to meet learning goals

# Curriculum Materials Must...

- Support students to make sense of mathematics and learn that they can be mathematical thinkers
- Focus on computational fluency with whole numbers
- Provide substantive work in important areas of math and make connections between them
- Emphasize reasoning about mathematical ideas
- Communicate mathematics content and pedagogy to teachers
- Engage a range of learners

# Parents Do the Math

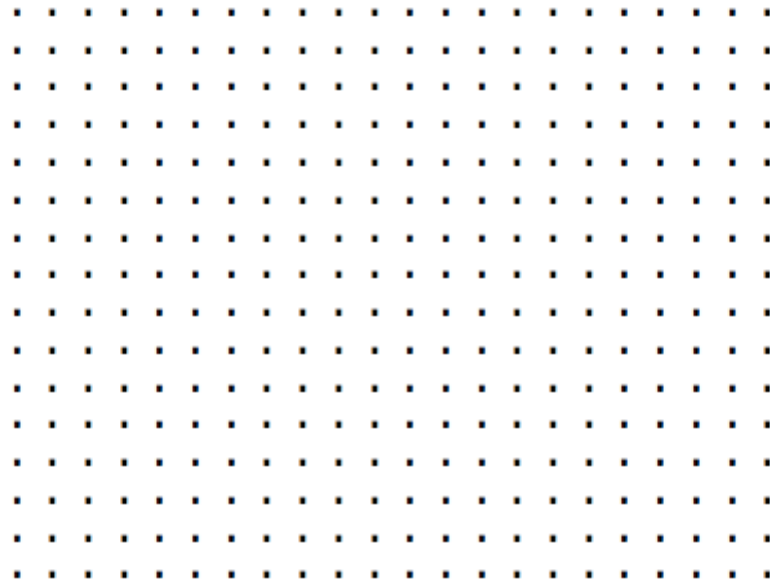
- Lesson objective
- Discuss approach
- Solve independently
- Share and compare
- How else could you approach this problem?





# Math Problem

**Figure out how many total dots there are below, *WITHOUT COUNTING ALL THE DOTS!***  
Show your strategy using symbols, words or drawings. Then, share your strategy with the other people at your table group. Are all the strategies equally correct? Are they all equally efficient?



# Students in the Classroom

- In this video, you will see Skokie students working on the same math problem you just solved
- Pay close attention to the students' conversations to gain insight into their mathematical thinking

# Reflect on Video

- What did you observe?
- What are teachers looking for?



# Keith Devlin, Stanford University

At a "21st Century Mathematics" conference held in Stockholm, Sweden in April of 2013, Dr. Devlin said:

*Every technique and method I learned in obtaining my bachelor's and doctorate in mathematics can now be outsourced. What makes me still marketable is mathematical thinking.*

He mentioned a particular project he did for the Department of Defense in which, upon reflection, he realized it wasn't the mathematics he knew, it was the way he approached the problem and framed the question that made him valuable and marketable.

Lastly, he recognized that innovative mathematical thinkers need to:

- a) think outside the box
- b) adapt or create methods and techniques
- c) collaborate
- d) communicate

~Keith Devlin, Stanford University

Dr. Keith Devlin is a co-founder and Executive Director of the university's H-STAR institute, a co-founder of the Stanford Media X research network, and a Senior Researcher at CSLI. He is a World Economic Forum Fellow, a Fellow of the American Association for the Advancement of Science, and a Fellow of the American Mathematical Society.

# Thank you for coming!

- Our raffle winners are...
- Please fill out your exit slip; your feedback will guide our future sessions.

