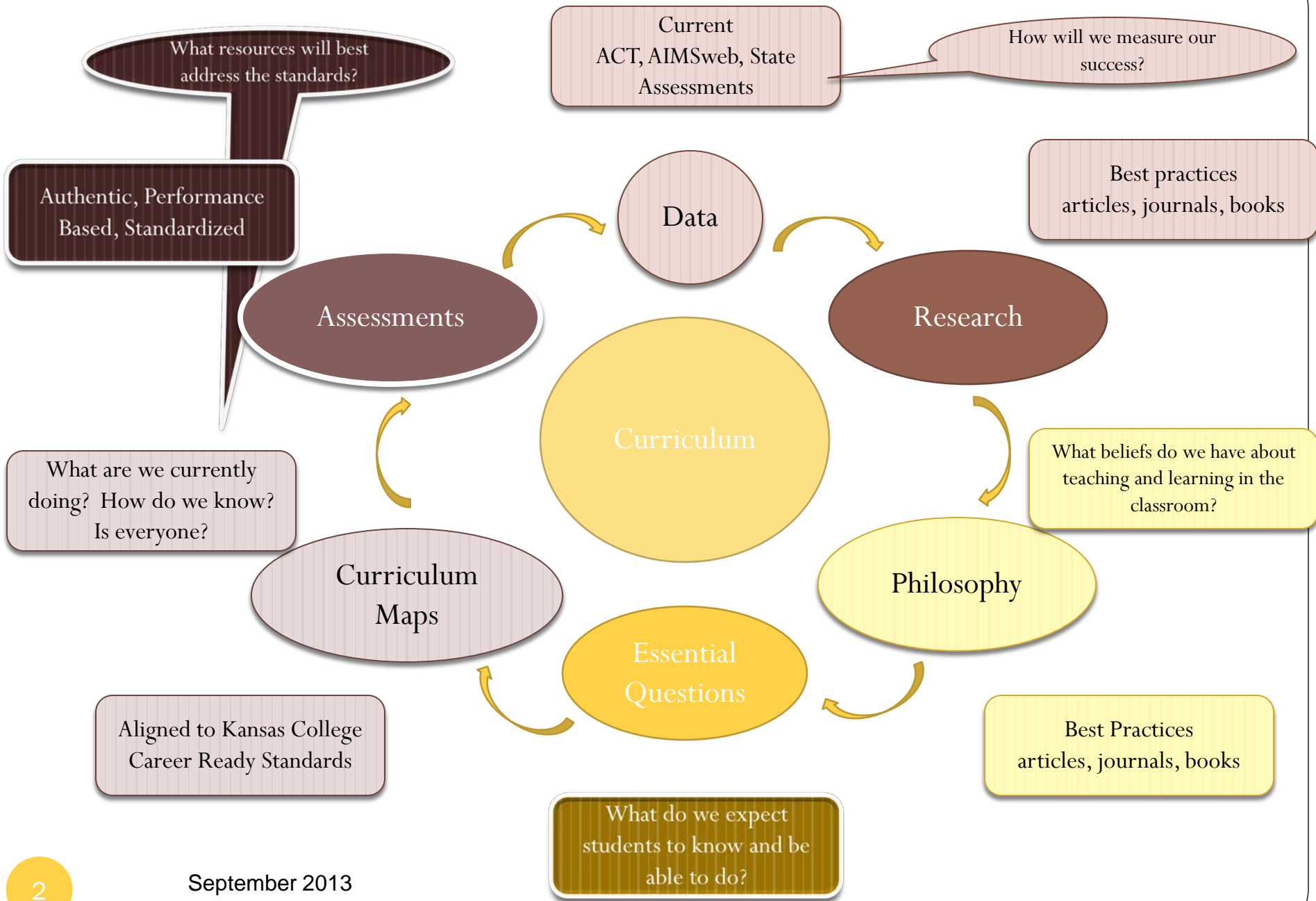# PreK-12 Math Leadership Team

Newton Schools USD 373

Jennifer Horn, Sarah Livesay, Sheila Wendling

As we transitioned to the KCCRS, we

created a team to define what effective Math instruction

looks like in any classroom in USD 373.

What resources will best address the standards?

Current
ACT, AIMSweb, State Assessments

How will we measure our success?

Authentic, Performance Based, Standardized

Best practices
articles, journals, books

Data

Assessments

Research

What are we currently doing? How do we know? Is everyone?

Curriculum

What beliefs do we have about teaching and learning in the classroom?

Curriculum Maps

Essential Questions

Philosophy

Aligned to Kansas College Career Ready Standards

Best Practices
articles, journals, books

What do we expect students to know and be able to do?

September 2013

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Philosophy Statement for Math

- We believe all students can logically develop, apply, demonstrate, and use real life applicable math skills.

October 2013

Data

- District data—ACT, ACT Aspire Interim, ACT Aspire Early High School, AIMS web, state assessments, dropout rate
- Feedback from teachers needing support and wanting a voice in implementing the KCCRS

Research

- Given what we know, what do we need to know?
- How current is our knowledge about best practices?
- Are there specific topics that we will need to research?

Professional Learning for Teachers

- Greg Tang Workshop for Grades 5-6 at Manhattan

- Math Day for Grades K-12 in Halstead with KSDE

- K-6 Math Stations at ESSDACK

- Reaching Rigor Math Grades K-4 and Grades 5-8 at Emporia State University

Definition of Curriculum

- <u>what we teach and how we teach it</u>
  this would not be the textbook or resources

Curriculum is an organized program of learning: content, instruction, assessment and context. (according to education.com)

- Content—info and skills students should learn to master the KCCRS
- Instruction—way course content is taught (essential elements)
- Assessment—how students will be measured on performance (ongoing)
- Context—educational environment in which course material will be taught

November 2013

Essential Elements for Math Instruction

We believe all students can sequentially develop, apply, demonstrate, and use real life math skills.

Essential Elements

1. Eight Mathematical Practices

   o Make sense of problems and persevere in solving them -
   Analyze, make conjectures, plan a solution, monitor and evaluate progress, explain/communicate with others.
   o Reason abstractly and quantitatively -
   Number sense, ability to represent problems symbolically, represent the problem at hand; considering the units involved, attending to meaning.
   o Construct viable arguments and critique the reasoning of others -
   Understand and use stated assumptions, definitions, and previously established results in constructing arguments. Students at all grade levels can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.
   o Model with mathematics -
   Apply the mathematics they know to solve problems arising in everyday life, society and the workplace.
   o Use appropriate tools strategically -
   Identify grade level, relevant external mathematical resources.
   o Attend to precision -
   Use common mathematical vocabulary across the district including definitions, symbols, units of measure.
   Calculate accurately and efficiently.
   o Look for and make use of structure -
   Can break down more complicated problems into basic steps.
   o Look for and express regularity in repeated reasoning -
   Looking for patterns, reasonableness of answers.

2. Base all instruction on the Kansas College Career Readiness Standards.

3. State or post instructional goals and/or learning objectives.

4. Provide instructional scaffolding.

5. Integrate appropriate technology. (math apps, websites, etc.)

6. Differentiate instruction based on individual student needs.
   * Pre-assessment data - learning styles, performance, ability
   * Environment - physical room conditions.
   * Content - standards taught, common outcomes
   * Process - teaching the topic in multiple ways, structure/grouping for collaboration
   * Product - allowing student "voice" and "choice"

7. Provide a mathematically rich environment including explicit vocabulary instruction, hands-on experiences with manipulatives both concrete and abstract.

8. Provide explicit instruction using

Definition of Curriculum
~WHAT we teach and HOW we teach it (this would not be the textbook or resources).

Curriculum is an organized program of learning: content, instruction, assessment and context (according to www.education.com/definition/curriculum/).

* Content—info and skills students should learn to master the KCCRS
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One Year Curriculum Map for Math Fifth Grade Example

Domain	Cluster	Identifiers	Standard	Grade Level Essential Questions	Learning Goals	Vocabulary
Operations and Algebraic Thinking	Write and interpret numerical expressions.	5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.	1) Why is it important to follow an order of operations? 2) What is the difference between an equation and an expression? 3) In what kinds of real world situations might we use equations and expressions? 4) How can we evaluate expressions? 5) How can I effectively explain my mathematical thinking and reasoning to others? 6) How can you decide if your answer is reasonable?	1) I can use order of operations including parenthesis, brackets, or braces. 2) I can evaluate expressions using the order of operations includign parenthesis, brackets, or braces.	Algorithm, Distributive Property, Dividend, Divisor, Equation, Exponents, Expression, Factors, Order of Operation, Partial Product, Partial Quotient, Product, Properties of Operations, Quotient, Remainder, Sum, Difference, Place Value, Digit

[Newton USD 373 Curriculum Map for Math](#)

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K-6 Framework

Guided Math Framework
90-minute model
Total math time 90 minutes; 60 minutes minimum uninterrupted

Component	K-1	2-4	5-6
Whole Group (No pull out)	*calendar *vocabulary *problem solving *KCCRS lesson *review/assess (30 minutes suggested)	*vocabulary *problem solving *KCCRS lesson *review/ assess (30 minutes suggested)	*vocabulary *problem solving *KCCRS lesson *review/ assess (60 minutes suggested)
Small Group	SUGGESTED DAILY: *teacher guided group *number/ fact fluency OPTIONAL/ AS NEEDED: *skill review *journal *independent lesson skill practice *technology (online/digital resources)	SUGGESTED DAILY: *teacher guided group *number/ fact fluency OPTIONAL/ AS NEEDED: *skill review *journal *independent lesson skill practice *technology (online/digital resources)	SUGGESTED DAILY: *teacher guided group *number/ fact fluency OPTIONAL/ AS NEEDED: *skill review *journal *independent lesson skill practice *technology (online/digital resources)

District Website for Parents and Students

Algebra II

Standard	Grade Level Essential Questions	Learning Goals
Know there is a complex number i such that i^2 = −1, and every complex number has the form a + bi with a and b real.	What is the definition of a complex number? Can you write a complex number in standard form?	I can define a complex number. I can write a complex number in standard form.
Use the relation i^2 = −1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	Can you add, subtract, and multiply complex numbers?	I can add, subtract, and multiply complex numbers.
Solve quadratic equations with real coefficients that have complex solutions	Can you solve a quadratic equation that has complex solutions?	I can solve a quadratic equation that has complex solutions.

K-4 Grade Cards

Newton USD 373 School District First Grade Standards Based Grade Card 2014-2015
Academic Marking Guide
4- The student has surpassed the grade level standard.
3- The student has met the grade level standard.
2- The student is making acceptable progress toward the grade level standard.
1- The student needs extensive support at school and home to meet the grade level standard.
Blank-Item not evaluated for that term

3rd Grade Math Skills				
		Term		
	Q1	Q2	Q3	Q4
Round numbers to the nearest 10 or 100				
Add numbers within 1000				
Subtract numbers within 1000				
Multiply within 100				
Find the missing number in a multiplication equation.				
Multiply any one digit whole number by a multiple of 10				

Grade Level Input/Feedback During District Grade/Department Time on Professional Days

- September 3
- November 26
- January 27
- February 10
- March 24
- April 11

Writing in Math Instruction

Writing Activity for Fifth Grade

DIRECTIONS: We have learned 4 methods to multiply numbers: Partial Products, Lattice, Japanese, and Traditional Algorithm. On the back of this paper, explain in **COMPLETE SENTENCES** which method you prefer and WHY. You should focus on using complete sentences, correct spelling and grammar.

Writing in Math Instruction

<u>Writing Activity for High School</u>

Some chairs have 3 legs and others have 4. Explain how the chair legs can relate to points on a plane. What would be the points? What would be the plane?   Include how many legs would create a chair that doesn't wobble. Explain

(Use 4-6 complete sentences)

What questions do you have for us?