Kentucky Center for Mathematics

- KCM seeks to advance the knowledge and practice of effective mathematics teaching and learning, encompassing early childhood through adult education.
- KCM provides and develops statewide leadership, facilitate professional learning experiences, and cultivate innovation with the aim of improving mathematics education, practice and policy.

KCM Yearly Numbers

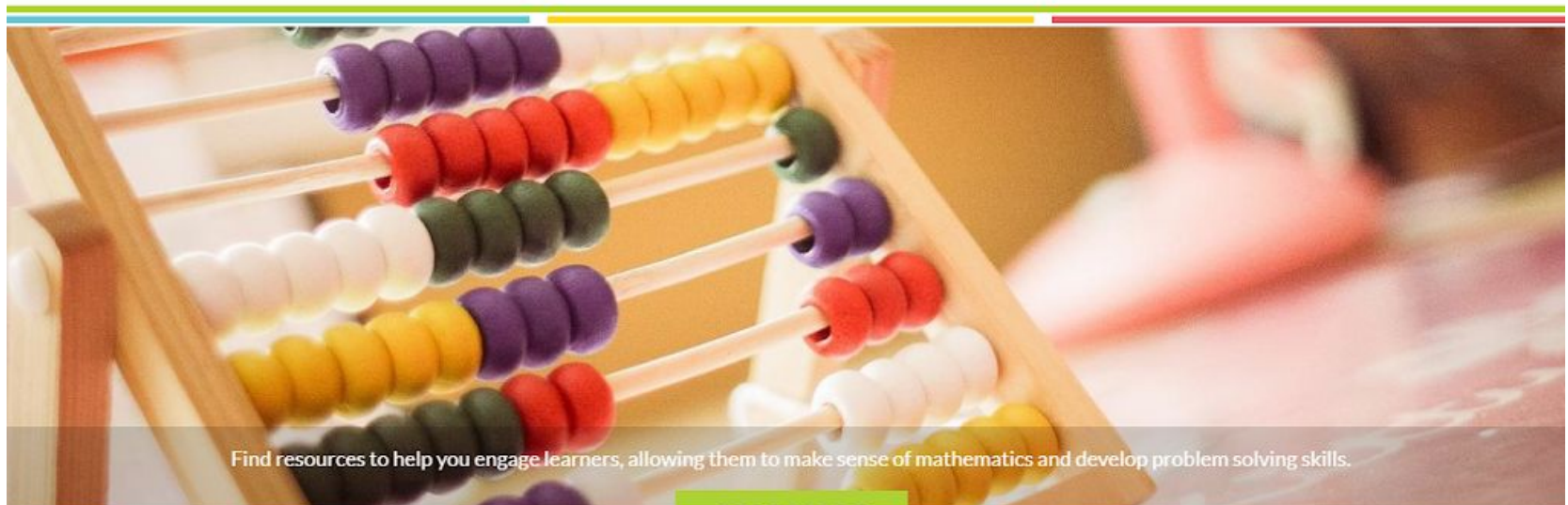|		
29 math courses taught	109 school districts	Closing the achievement gap for our KY math students.
73 cohorts of teachers	300 KY schools	
Over 1000 KY teachers attending	100 principals trained	Math Achievement Fund intervention students (3000) had an average of 10 percentile points gained as a direct result of KCM trained math interventionists.
Over 182 days of math professional learning	>5000 students impacted	
Over $150,000 of math materials directly in the hands of teachers	KCM Annual Math Conference national prominence	

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Visit Our Website

www.kentuckymathematics.org

Welcome!

Expert Math Interventionist

Kristie Manley
Kenwood Elementary School
Jefferson County Public Schools
Louisville, KY

kristie.manley@jefferson.kyschools.us

@kmanley0628

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More About Me

- ❏ Interventionist for 3 years
- ❏ Instructional Coach for 11 years
- ❏ NBCT
- ❏ Connected to KCM for 8 years
- ❏ Crafts- wreath making, scrapbooking
- ❏ Mom of one, 8 yr old girl

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KY Math Intervention

Thank You!

Kentucky legislators created the Mathematics Achievement Fund in 2005.

The goal of the MAF is…

"to provide developmentally appropriate diagnostic assessment and intervention services to students, primary through grade 12, to help them reach proficiency in mathematics on the state assessments."

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Agenda

- Bridging the Gap: Fluency to 100
- What the Research and Standards Say
- Strategies

  Adding up to a decuple
  Subtracting down to a decuple

- Games

  How far away?
  Bump it?
  Four in a Row

- Links to Resources

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What the research says...

"The ability to **flexibly decompose** numbers is foundational for using both traditional and alternative algorithms for addition, subtraction, multiplication, and division (Fuson 1990, 2003). Therefore, a **deep understanding** of place value is crucial (Hiebert and Wearne 1992), but this understanding hinges on developing ideas across K–grade 5 (Common Core Standards Writing Team 2015)."

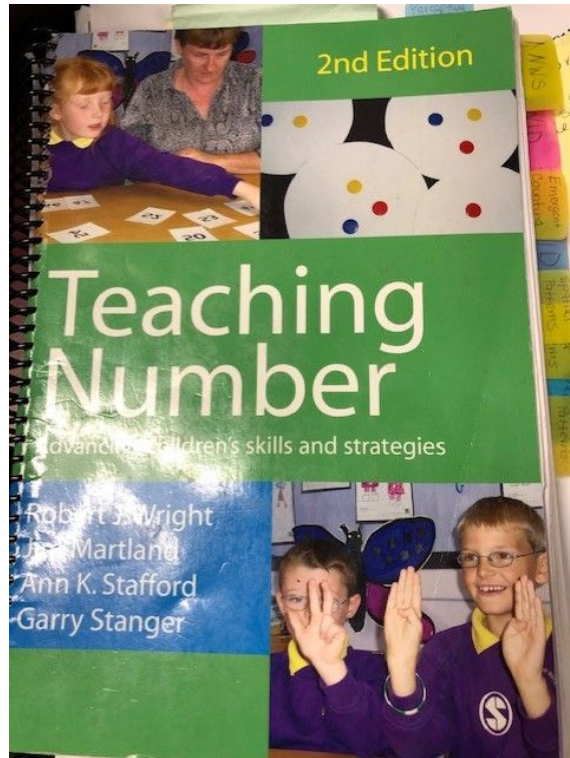Common Core brief: The place-value progression **Temple A. Walkowiak**

NCTM Teaching Children Mathematics April 2016, Vol. 22, Issue 8

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What the research says...

"... Children develop, discuss, and use efficient, accurate, and generalizable methods to add and subtract multi digit whole numbers. They select and apply appropriate methods to estimate sums and differences or calculate them mentally, depending on the context and numbers involved. They develop fluency with efficient procedures, including standard algorithms, for adding and subtracting whole numbers, understand ==why the procedures work== (on the basis of place value and properties of operations), and use them to solve problems. (NCTM 2006, p. 14)"

Addition and Subtraction: The Big Ideas and Essential Understandings,

NCTM pdf- in handouts

Research

Standards

KY.1.OA.6 Add and subtract within 20. a. Fluently add and subtract within 10. b. Add and subtract within 20, demonstrating fluency for addition and subtraction within 10. Use strategies such as counting on; making 10; decomposing a number leading to a 10; using the relationship between addition and subtraction; creating equivalent but easier or known sum

KY.2.OA.2 Fluently add and subtract within 20 using mental strategies. MP.2, MP.7, MP.8

KY.2.NBT.5 Fluently add and subtract within 100 using strategies based on place value, properties of operations and/or the relationship between addition and subtraction.

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Stages of Early Arithmetic Learning (SEAL)

(Steffe et al. 1988; Steffe 1992; Wright et al. 2006*)

A framework for Interpreting Student's Counting, Addition and Subtraction Strategies

Pathways to Number Link

* Steffe, Leslie. 1992. "Learning Stages in the Construction of the Number Sequence." In *Pathways to Number: Children's Developing Numerical Abilities, edited by Jacqueline* Bideaud, Claire Meljac, and Jean-Paul Fischer, pp. 83–88. Mahwah, NJ: Lawrence Erlbaum Associates.

Steffe, Leslie P., Paul Cobb, and Ernst von Glasersfeld. 1988. *Construction of Arithmetical Meanings and Strategies. New York:* Springer-Verlag.

Wright, Robert J., James Martland, and Ann Stafford. 2006. *Early Numeracy: Assessment for Teaching and Intervention.* 2nd ed. London: Paul Chapman Publications/Sage.

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Developing Qua...

Use these descriptions of diagnostic and instructional tools to help young learners move beyond reliance on physical materials to negotiate arithmetic tasks.

By Jonathan N. Thomas and Pamela D. Tabor

Joseph is a first-grade student whose teacher is w... to better understand the manner in which he ad... following exchange around the task 11 + 4.

By Jonathan N. Thomas and Pamela D. Tabor

Mental Imagery

NCTM ArtitleLink

FIGURE 1

Each new phase in the Stages of Early Arithmetic Learning (SEAL) model incorporates, rather than displaces, the knowledge and understanding of prior stages.

Stages of Early Arithmetic Learning (SEAL)
(Steffe et al. 1988; Steffe 1992; Wright et al. 2006)

Emergent

Child approximates counting activity (e.g., saying number words when asked, "How many?") but is typically unable to determine the numerosity of a collection.

What it might look like: Child is presented with a collection of twelve counters and asked how many are there. Child touches some, but not all, the counters, saying, "One, two, three, five, seven, eight, nine—nine!"

Hallmark strategy: Attempting to count a collection

Perceptual

Child can determine the numerosity of collections when physical materials are available for counting but is unable to negotiate arithmetic tasks in the absence of physical materials.

What it might look like: Child is presented with collections of nine counters and five counters and asked, "How many altogether?" The child touches each of the counters while saying, "One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen!"

Hallmark strategy: Physically interacting with materials to count collections

Figurative

Child can negotiate arithmetic tasks in the absence of physical materials by generating mental imagery of past sensory experiences referred to as *re-presentations*.

What it might look like: Child is presented with a collection of nine counters and five counters; the counters are then concealed. Child is asked how many altogether. The child looks away, begins counting at one (may or may not sequentially raise fingers), and says, "One, two, three, four, five, six, seven, eight, nine, ten, eleven, twelve, thirteen, fourteen—fourteen!"

Hallmark strategy: Continuing the count from one when materials are physically unavailable

Initial number sequence

Child can negotiate arithmetic tasks in the absence of physical materials by constructing a single chunk of a number, referred to as *a numerical composite*, and then counting on from this chunk.

What it might look like: Child is presented with collections of nine and five counters, and the counters are then concealed. Child is asked how many altogether. Child counts on from nine (may or may not sequentially raise fingers) and says, "Ten, eleven, twelve, thirteen, fourteen—fourteen!"

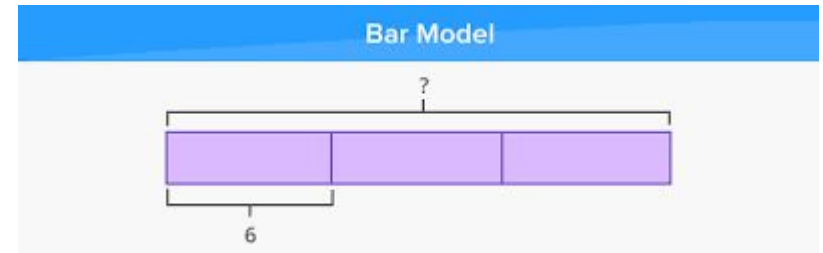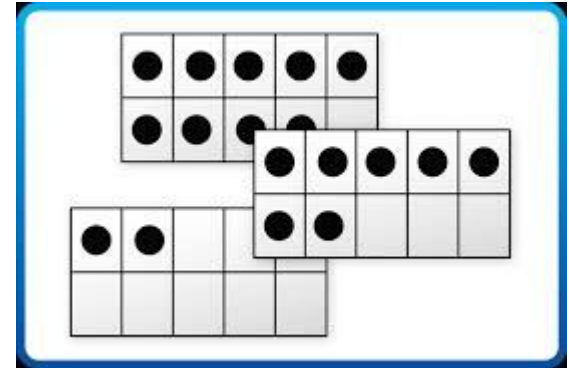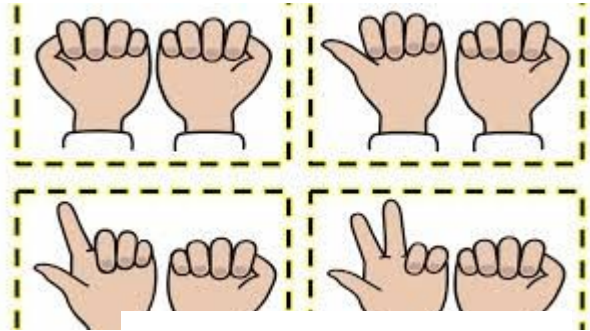*Hallmark strategy: Counting on when materials are physically unavailable*

Facile number sequence

Child can negotiate arithmetic tasks in the absence of physical materials by constructing multiple chunks of numbers, referred to as *abstract numerical composites*, and decomposing/recomposing these chunks.

What it might look like: Child is presented with collections of nine and five counters, and the counters are then concealed and asked how many altogether. The child responds immediately, "Fourteen—I borrowed one from the five to make ten, and then just added ten and four in my head."

Hallmark strategy: Multiple non-count-by-ones strategies when materials are physically unavailable
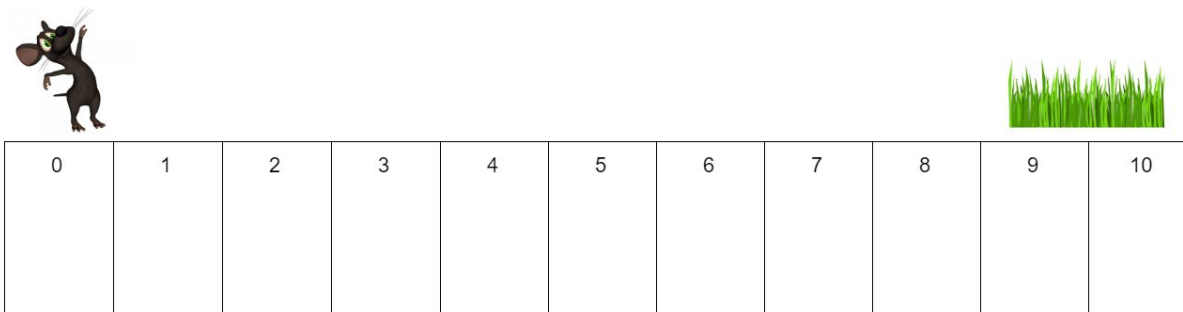
What is structure?

Adding up to a Decade

Subtracting down to a Decade

How far away?

0	1	2	3	4	5	6	7	8	9	10

You can use this for adding up to a decuple or subtracting down to a decuple.

Students will roll place value dice and then determine how far to the next decuple. First person to cover their path wins.

Bump It

Need Place value dice

Counters (two colors)

Materials for support

How to Play:

P1 rolls the dice. They create a 2 digit number. They then determine how many more to the next decuple. That is the number they cover on the board. P2 does the same. If all the numbers of the answer are covered, then the player may "bump" their opponent. Players are trying to get 4 in a row.

https://myfreebingocards.com/bingo-card-generator

BUMP IT
Adding to a decuple

1	9	6	3	2
7	2	1	3	1
8	4	3	9	2
5	3	8	4	9
1	7	6	4	5
6	5	2	7	8

4 in a Row

P1 will either spin a spinner or roll place value dice to get a 2 digit number. Then subtract down to the previous decuple. How many they subtract down is what they cover. The goal is to get 4 in a row.
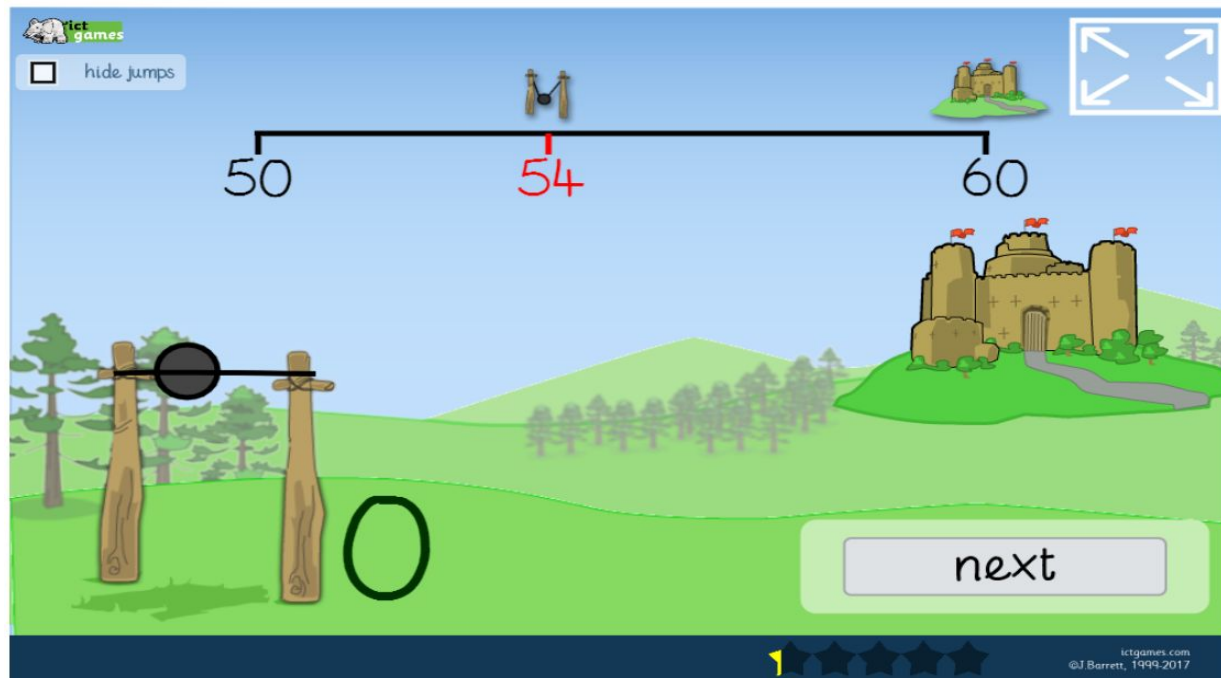
Four -in- a -Row
Subtracting to a decuple

1	9	6	3	2
7	2	1	3	1
8	4	3	9	2
5	3	8	4	9
1	7	6	4	5
6	5	2	7	8

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Handouts

- ❏ How far away?
- ❏ Bump it

  adding up to a decuple

  subtracting down to a

  decuple

  partners of 5

  small and large partners of 10

  NWA teen numbers

  Crossing the decade (29 to 30)

- ❏ Four-in-a-Row

  adding up to a decuple

  subtracting down to a decuple

  partners of 5

  NWB within 100

  Partners of 10

  Number Id 1-5

  NWA within teen numbers

- ❏ ten frame cards (2 sets)
- ❏ dot strips

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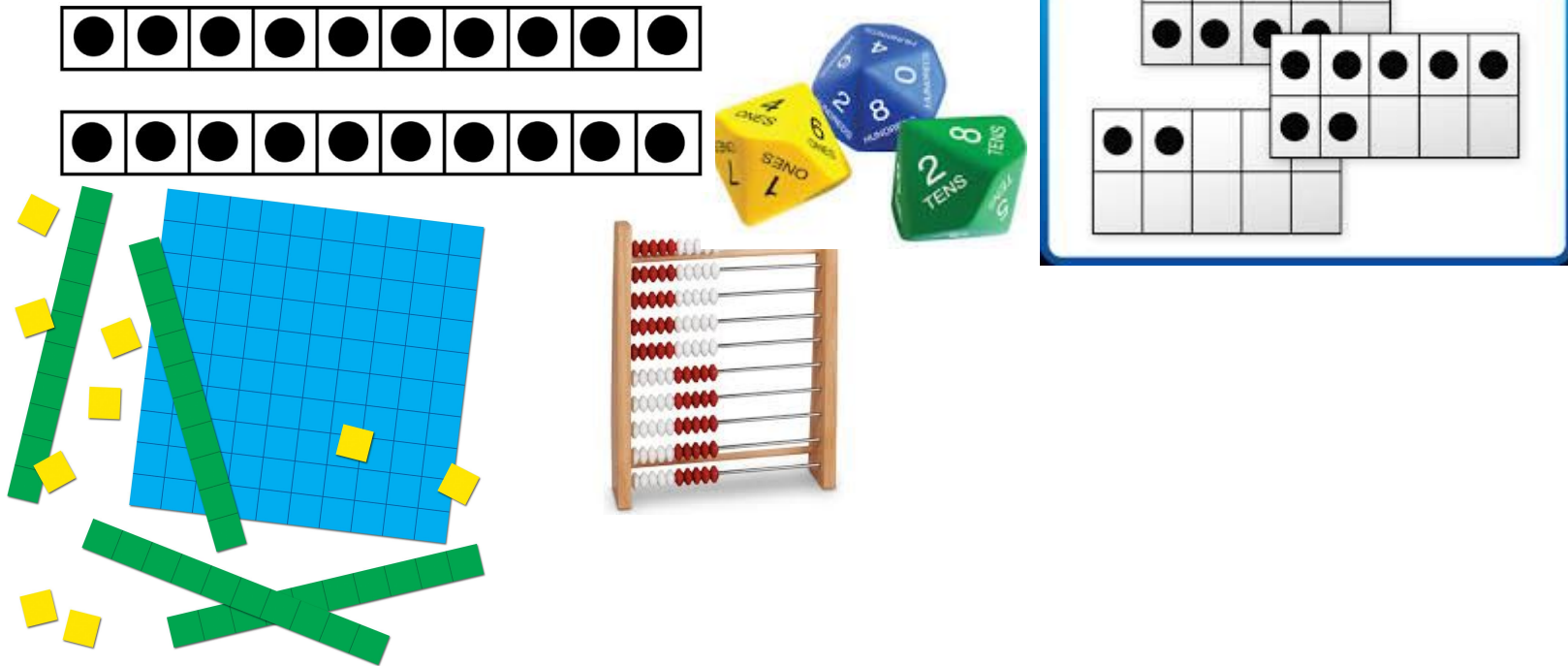KENTUCKY CENTER
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Virtual Option

Materials to have on hand…..

https://www.coolmath4kids.com/manipulatives/base-ten-blocks

https://toytheater.com/rekenrek-ten-rows/

Visit Our KCM Website

www.kentuckymathematics.org

Good News!

The KCM is hard at work to ensure Kentucky teachers have access to innovative professional development from home.

Through the newly launched KCM Virtual site, mathematics teachers from all grade levels will have access to live zoom meetings, video records and corresponding materials. Read more.

Elementary: Make 'n Take Supporting Number Sense and Fluency - Mar. 23-27

Middle: Fractions, Decimals & Percents - Mar. 30-Apr. 3

High: Algebra & Geometry - Thursdays, Mar. 26 - Apr. 16

Math Intervention Expert Talks - Apr. 6 - Apr. 10

Focus on Place Value - Apr. 13 - Apr. 17

Upcoming Virtual Professional Learning

APRIL 6 - 10
2:00-2:30 PM EST

KCM Math Intervention Expert Talks!
w/ KY Math Leaders

Monday, April 6 - Meet the Expert- Kristie Manley

Tuesday, April 7 - Instructional Moves with KCM's Lisa Riggs

Wednesday, April 8 - Meet the Expert- Michael Hines

Thursday, April 9 - Instructional Moves with KCM's Tonda Thompson

Friday, April 10 - Meet the Expert- Jackie Damron

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KCM is here to support teachers!

Expert Math Interventionist

Kristie Manley
Kenwood Elementary School
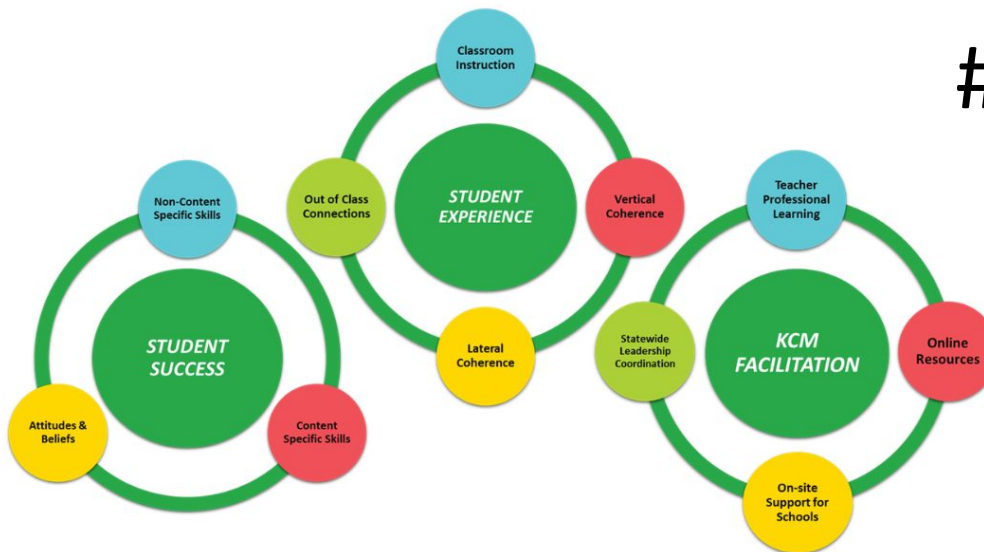### Jefferson County Public Schools
Louisville, KY

kristie.manley@jefferson.kyschools.us

@kmanley0628

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KCM Support for Educators

- Kentucky Center for Mathematics is here to support our KY educators
- We are aspire to be a national leader in mathematics education

#BetterTogether

#TeamKCM