ANNUAL REPORT 2016

KENTUCKY CENTER FOR MATHEMATICS
www.kymath.org

CONTENTS

VISION, MISSION & GOALS

The KCM (Kentucky Center for Mathematics), established by the Kentucky General Assembly in 2006, supports diverse teacher and student populations across the Commonwealth. The vision of the KCM is a world in which everyone is mathematically enlightened and empowered.

This annual report contains highlights of the KCM's statewide work from July 1, 2015 to June 30, 2016. The mission of the KCM is to advance the knowledge and practice of effective mathematics teaching and learning encompassing early childhood through adult education. We provide and develop statewide leadership, facilitate professional learning experiences, and cultivate innovation with the goal of improving mathematics education, practice, and policy. We promote environments which engage learners, allowing them to make sense of mathematics. We are grounded in research, centered on practice and focused on learners.

GOALS

1 LEADING

Inform, collaborate and cultivate leadership to improve education in mathematics.

2 LEARNING

Prepare and develop educators to improve achievement in student mathematics.

3 INNOVATING

Strengthen and advance mathematics education practice and policy through research and resource development.

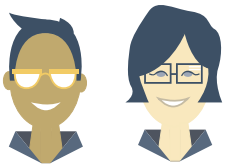
2015-2016 HIGHLIGHTS

KCM provided more than 2,500 hours of professional learning experiences for more than 2,900 Kentucky educators in 2015-16. This represents a 25% increase in educators attending KCM events, compared with 2,328 participants in 2014-15.

587 educators attended the 2016 KCM conference, making it the largest attended KCM conference in history.

737 distinct users accessed the family math activities on the KCM Kentucky Family Math Resources website 6,204 times.

The total number of registered users of the Kentucky Numeracy Project Intervention Guide increased to 2,738. This is a 98% increase, as compared to 1,386 users in 2014-15.



162 teachers administered 10,185 KCM Fluency Assessments to 2,854 students across the state.

264 middle school educators attended a middle school professional learning experience provided by KCM during 2015-16.

MAF MITs provided approximately 1,541 hours of professional learning during 2015-16.

Since 2012, the EERTI cohorts have had a total of 888 Kentucky educators participate – 201 of those participants attended during 2015-16.

LETTER
FROM THE EXECUTIVE DIRECTOR

Dear Kentucky Math Education Stakeholders,

This is truly a time of celebration at the KCM as we begin our second decade as a mathematics education center! Our first decade was marked by strong and effective collaboration and truly outstanding professional learning throughout the Commonwealth. Our partnership with the KDE (Kentucky Department of Education) has produced effective professional learning for teachers, coaches and administrators that has impacted thousands of teaching professionals and hundreds of thousands of students in 119 of Kentucky's 120 counties. Our collaboration with the CPE (Council on Postsecondary Education) and Kentucky universities has helped prepare future teachers to meet the needs of Kentucky students at all levels. Our ongoing partnership with KYAE (Kentucky Adult Education) helps adult learners obtain the problem solving skills they need for success. Our work with other education centers and Kentucky universities promotes the role of mathematics in the world about us (in STEM and other fields), and provides professional learning so that pre-service and in-service teachers are able to bring this perspective into mathematics classes throughout Kentucky.

Going forward into the next decade, united with the KDE, CPE, CMA (Committee for Mathematics Achievement), KYAE, Kentucky postsecondary institutions, Kentucky education centers, and other mathematics education stakeholders we will continue our work to assure that:

- Kentucky schools have a culture of high expectations for students and coherent evidence-based mathematics education experiences across grade levels to help students achieve them.
- The student mathematics education experience will be coherent across grade levels and school transitions with a focus on evidence-based teaching and learning practices that are student centered, dedicated to making sense of mathematics, connected to the world about us, and not based on rote memorization.
- Kentucky postsecondary institutions are able to provide pre-service teachers with the tools they need to be effective mathematics instructors for students of all levels.

As we enter our second decade, some of the steps we are working with our partners to promote are:

- Mathematics education strategies and initiatives will be vetted based on how they impact the long term mathematics education experiences of students in Kentucky classrooms.
- KCM whole school approaches to professional learning will promote a school-wide mathematics culture of student engagement, sense-making and high expectations for students.
- KCM school visits to Mathematics Achievement Fund and other schools will be extended to support (i) the individual and collective practices of multiple teachers; (ii) the mathematics education leadership efforts of administrators, coaches and other instructional leaders; and (iii) a school-wide culture of student engagement and sense-making.
- Effective schools with a culture of engagement, cooperation and sense-making will be connected to pre-service teacher preparation to assure future teachers are prepared to make a difference both in their classroom and in their school when they graduate.

As we look back on our first decade, we are incredibly grateful for the partnership we have had with the dedicated teachers, coaches, administrators, and agencies of Kentucky to serve the Commonwealth. We are truly excited by the future as we move forward together to assure that each child in Kentucky has the opportunity to realize his or her potential.

Daniel McGee, PhD
Executive Director

PRESCHOOL

KENTUCKY-ERIKSON EARLY MATH COLLABORATIVE

The K-EEMC (Kentucky-Erikson Early Math Collaborative) preschool professional development features content developed by the Erikson Institute, leaders in early childhood education. Participants learn how to spark children's mathematical learning through developmentally appropriate exploration, discussion and activity using high-impact, evidence-based strategies and children's literature which support the teaching and learning of early mathematics.

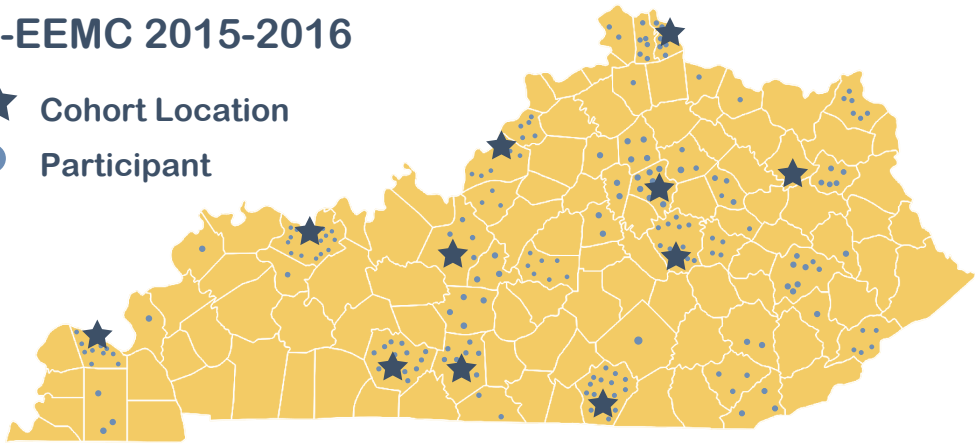
In 2015-16, with sponsorship from the KDE, 193 participants representing 44 different Kentucky counties were able to attend K-EEMC.

> [I] loved all parts of this program. It was a fresh outlook for me and one that provided many hands-on activities for my class. It was fun to 'test' out the activities we did during instruction with my own class and to see the class reaction. I am looking forward to the changes I will see this next school year!
>
> **K-EEMC PARTICIPANT**

K-EEMC 2015-2016

★ Cohort Location

● Participant



193

PARTICIPANTS

attended a K-EEMC cohort during the 2015-16 school year.

ELEMENTARY

MATHEMATICS ACHIEVEMENT FUND

During 2015-16, 113 participating schools received $41,000 in MAFs (Mathematics Achievement Funds) for paying and supporting a primary grades (K-3) MIT (Mathematics Intervention Teacher), including costs of salary, benefits, training, travel, and materials.

MITs participate in intensive training in the first year that includes sustained, job-embedded professional learning experiences: 10 days of training spaced throughout the year; coaching visits from KCM RCs (Regional Consultants); quarterly in-person collegial team meetings; and weekly online meetings.

Experienced MITs select from a variety of continued professional learning experiences and participate in monthly online meetings. Experienced MITs also select and deliver a KCM community service project, such as a conference presentation, resource development or leading a course for colleagues.

To maximize program impact, MIT leadership was supported through a one-day principal and MIT meeting where they collaborated on improving their school's comprehensive mathematics education program.

> This has been such an opportunity of growth for me as a teacher. I had a district curriculum specialist recently model a classroom lesson. She came to me and said, 'Your kids were the only ones who knew how to do this! What strategies are you using?' I was so excited!

MAF MATHEMATICS INTERVENTION TEACHER

PRIMARY MATHEMATICS INTERVENTION PROGRAM

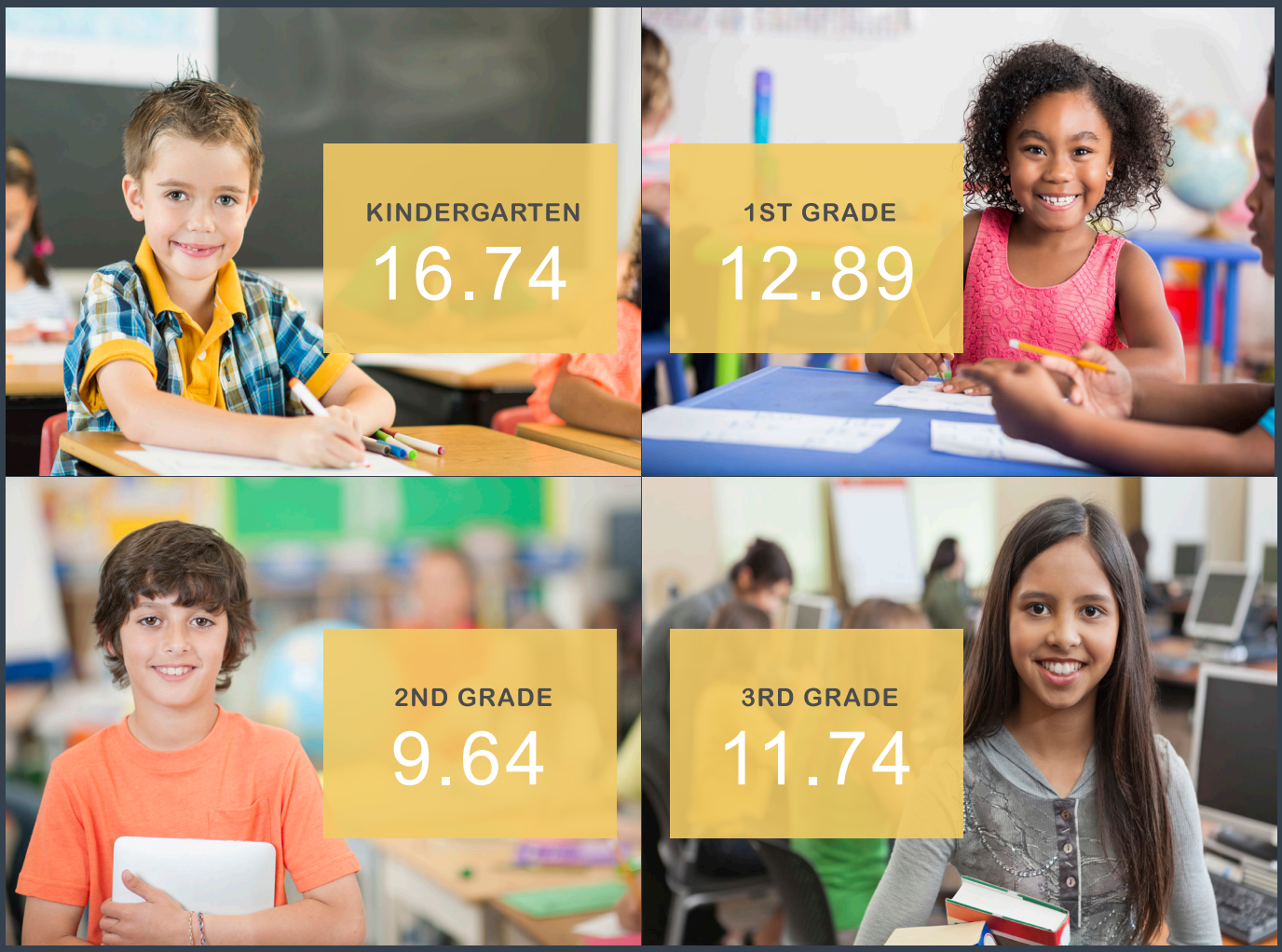
1 GOAL

The goal of the state mathematics diagnostic intervention program is to expand the capacity of teachers to assess a child's current level of understanding and adjust instruction accordingly. KCM provides highly effective research-based training for MITs at 113 schools in Kentucky in order to develop expertise for best practices for teaching mathematics and specialized knowledge for assessing and advancing foundational fluency.

2 INTERVENTION

MITs provided intensive intervention to 4,256 students in 2015-16, improving mathematical fluency and achievement. MITs indirectly serviced more than 48,486 students by sharing their passion and knowledge with colleagues. Collectively MITs provided approximately 1,541 hours of professional development during 2015-16.

AVERAGE MAP PERCENTILE POINT GAINS OF STRUGGLING* MAF INTERVENTION STUDENTS BY GRADE LEVEL



* Struggling students are defined as MAF intervention students placing in the 25th percentile or below on the 2015-16 fall MAP assessment.

3 STUDENTS

Students receiving intervention from KCM-supported MITs and assessed by the MAP (Measures of Academic Progress) test made impressive growth compared to national norms for mathematics achievement. Primary grades students receiving intervention in 2015-16 gained, on average, 7.21 percentile points with 70.89% of all struggling* primary grades intervention students meeting or exceeding the expected gains on MAP.

4 PLE

During 2015-16, KCM's eight RCs provided sustained, job-embedded professional learning experiences for 693 teachers, as well as regular online meetings and coaching visits.

ELEMENTARY

ENACTING EFFECTIVE RESPONSE TO INTERVENTION

Sponsored by the KDE, EERTI (Enacting Effective Response to Intervention) cohorts are professional learning communities that grow K-3 teachers' understanding of early numeracy development and improve their abilities for establishing in students strong foundations for fluently adding and subtracting. As a member of an EERTI cohort, participants receive specialized training from an experienced math intervention teacher featuring evidence-based strategies and materials from experts in early numeracy development. The EERTI community provides support to each educator as new strategies and methods are utilized in the classroom.

16

EERTI cohorts offered throughout the state of Kentucky in 2015-16.

201

Kentucky educators attended an EERTI cohort during 2015-16.

44

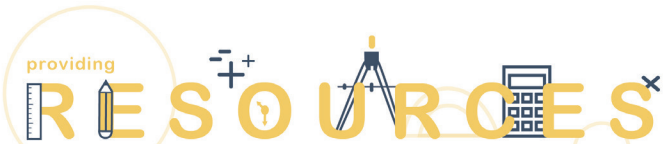
Kentucky counties were represented at the 16 EERTI cohorts during 2015-16.

EERTI TEACHER LEADER INSTITUTE

In August 2015, the KCM offered a teacher leader institute in Northern Kentucky. A total of 25 participants, including EERTI leaders, MAF MITs and RCs, attended this two-day event.

The teacher leader institute was facilitated by Cathy Carroll of WestEd. Based on a set of goals for developing leaders of mathematics professional development and guided by a conceptual framework for considering when, how and why various practices might be employed, this leadership work placed mathematics at the forefront as participants considered issues related to designing and facilitating PLE opportunities for teachers. Experiences in the teacher leader institute and follow-up online meetings helped participants learn to establish productive group norms for ongoing teacher learning.

> I thought EERTI was a great experience. It allowed me to collaborate with other teachers and take useful resources back to my classroom for my students that could be implemented immediately.
>
> **EERTI PARTICIPANT, 2015-16**



EERTI SUMMER INSTITUTE

The KCM offered a free, two-day summer institute for EERTI graduates targeting big ideas, strategies and models essential for developing mathematical proficiency in elementary children.

Participants explored a variety of rich problems that allowed participants to engage in deepening their own mathematical content knowledge and problem-solving habits of mind.

Facilitator and Master Teacher, Anne Burgunder, guided participants through an experience with the foundational big ideas in early number and how these big ideas are the building blocks of addition and subtraction.

> I learned more about myself and how learning procedures without conceptual understanding was a hardship in my younger mathematizing journey.
>
> **SUMMER INSTITUTE ATTENDEE**

> Definitely made me think about my students and their struggles and how I might be able to help them move forward.
>
> **SUMMER INSTITUTE ATTENDEE**

ELEMENTARY

KENTUCKY NUMERACY PROJECT

Realizing the urgency to extend the KCM professional learning community and support participating teacher leaders, the KCM created the KNP (Kentucky Numeracy Project) with assessments and instructional activities tied to the Math Recovery Learning Framework in Number and the Kentucky Academic Standards for Mathematics for grades K to 3. Aligned to the shifts required in the standards, KNP focuses on the major work of number and operation while providing differentiated versions tied to coherence within the standards and addressing all three facets of rigor: conceptual understanding, procedural fluency and application.

During 2015-16, the total number of official, registered Kentucky KNP users increased to 2,738. This is a 98% increase, as the number of official, Kentucky KNP users in 2014-15 was 1,386. In addition, 1,859 non-Kentucky users are also registered users of the KNP site and include educators from across the United States, as well as several different countries including Australia, Ireland, Canada, and India.

The KCM designed the Fluency Assessments to assess student mathematical knowledge and fluency rather than computational speed or memorization. They are research and evidence-based and are appropriate for diagnostic intervention, progress monitoring and assessment of instructional readiness.

During 2015-16, 162 teachers accessed and administered 10,185 of the online Fluency Assessments to 2,854 students, producing valuable evidence of student progress and need with graphs for individual student performance and student groupings according to mastery of numeracy standards.

Additionally, the collection of 466 KNP Intervention Guide differentiated tasks were accessed 30,715 times, including 19,191 hits from the KCM Pinterest site.

> These activities have been wonderful for our students to stay engaged and also learn the foundational skills necessary to be part of the classroom discussions, [which are] vital to their growth in mathematical understandings.

KENTUCKY NUMERACY PROJECT USER

> Thank you for sharing your ideas! [The Family Math website] is very well organized and easy to navigate!

FAMILY MATH USER

FAMILY MATH

The newest addition to the KNP Intervention Guide, the Kentucky Family Math website, kyfamilymath.org, features activities for families based on popular activities from the Intervention Guide. Additionally, the new website includes exemplar websites and online games for students as well as resources for parents to help facilitate mathematical conversations at home.

During 2015-16, 69 Family Math Fun activities, which were adapted from the KNP Intervention Guide, were accessed 6,204 times by 737 distinct users - a dramatic increase from 2015-16 when the Family Math Fun activities were accessed 688 times.

737 distinct users accessed the Family Math activities 6,204 times

ELEMENTARY

KNPI PLUS

The KNPI (Kentucky Numeracy Project Intensive) Plus is an MSP (Math Science Partnership) grant for primary grades teachers and administrators. All but one of the participating schools are from high-need districts and are geographically distributed in 10 school districts throughout Kentucky.

KNPI Plus is a four phase course that includes intensive, student-centered study and reflection with colleagues. Participants engage in job-embedded implementation of targeted, diagnostic assessments and evidence-based instructional decision making. Program content for the KNPI Plus aligns to the Kentucky Academic Standards for Mathematics, Kentucky law for primary grades RTI (Response to Intervention) and the IES (Institute for Educational Sciences) evidence-based recommendations.

A third year of MSP funding allowed participants further study and applied research to practice developing mathematical concepts, extending fluency development expertise and refining professional noticing skills. Participating teachers were given the opportunity to enhance their leadership capacity through teacher leader experiences and facilitation of school-based professional learning opportunities.

> This program has changed the way our school approaches math. The information our teachers learned helped us change our math RTI program and our common assessments. Students are using more manipulatives and have a better number sense.

KNPI PLUS PARTICIPANT, 2015-16

75% of KNPI Plus participants completing both the pre and post-test LMT (Learning Mathematics for Teaching) made mathematical knowledge for teaching gains over the course of the PLE, as measured by the LMT.

ELEMENTARY

THIRD GRADE FRACTION FOUNDATIONS

> I wish all 2nd and 3rd grade teachers in my district could have this training!
>
> **FRACTION FOUNDATIONS PARTICIPANT**

Third grade is a critical year in which students should develop strong foundations for understanding fractions. In response to this need, the KCM hosted two cohorts of Third Grade Fraction Foundations. In these sessions, teachers explored hands-on activities and tasks designed to support students in developing conceptual understandings of fractions as numbers.

Teachers deepened their understanding of the third grade fraction standards, seeing them as part of a progression starting in first grade and continuing through middle school and beyond. They explored ways to use classroom manipulatives to build an understanding of fractions as numbers that have a location on a number line.

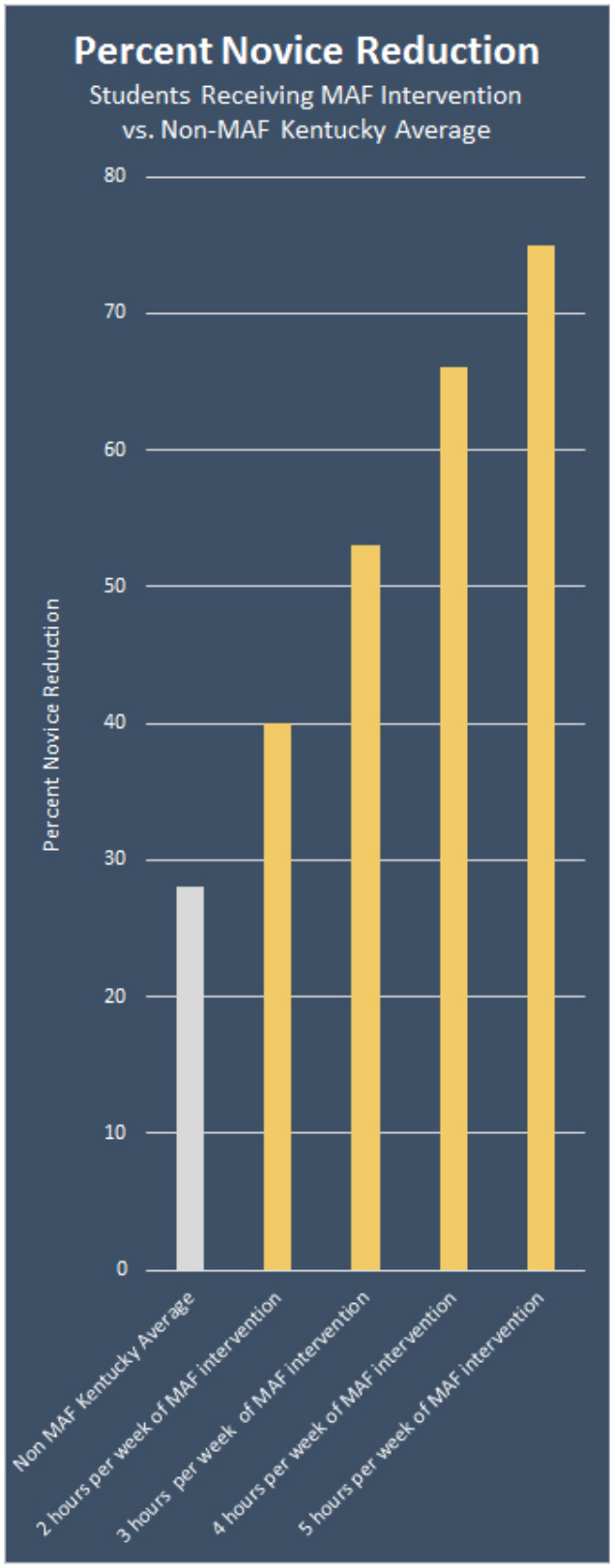
Attendees were primarily math intervention teachers, many of whom were accompanied by a third grade classroom teacher in their building. Math interventionists were also given access to the course resources including PowerPoints and digital copies of the handouts, along with permission to use these resources with teachers in their own schools.

Thirty-four participants from 21 different school districts attended the Fraction Foundations professional learning experience.

> The best thing about this PLE was that I feel like I can make immediate changes to instruction without over-turning an entire curriculum.
>
> **FRACTION FOUNDATIONS PARTICIPANT**

DATA

THIRD GRADE NOVICE REDUCTION STUDY



In his June 2015 blog post titled, *A Moral Imperative*, former Kentucky Commissioner of Education, Dr. Terry Holliday, outlined a need to reduce the alarming number of Kentucky students that perform at the novice level on the state assessment, the lowest rating obtainable.

In response, the KCM designed a study to analyze whether KCM programs make an impact on novice reduction in Kentucky. In this study, the KCM focused on third grade mathematics achievement as measured by the K-PREP (Kentucky Performance for Educational Progress) assessment. In order to capture the long term impact of MAF intervention, the math achievement scores of students who received intervention services in 2012 were reviewed again in 2015.

Results from this study concluded with statistical significance (p-value<.005) that third grade novice intervention students of KCM MITs had 2015 novice reduction rates far exceeding the state average.

CLOSING THE GAP

In order to evaluate whether the center is appropriately supporting novice reduction among traditionally underrepresented populations, the 2012 and 2015 achievement data of the same third grade students were reviewed and found that:

• African American MAF intervention students had two times the reduction rate of non-MAF African American students in Kentucky.

• Latino MAF intervention students had 62% better novice reduction rates than non-MAF Latino students in Kentucky.

ELEMENTARY & MIDDLE

SMART BOOKS INSTITUTE

The SMART Books (Supporting Mathematics and Reading through Books) Institute took place in November 2015 at Cochran Elementary School in Louisville. The Institute encouraged Kentucky educators to explore the incorporation of high-quality literature into math instruction. In addition, participants worked together to create instructional support materials that are available for teachers throughout the state on the SMART Books website, hosted by the KCM.

Twenty-six educators from across Kentucky participated in the two-day workshop that was facilitated by math and literacy experts Jennifer Bay-Williams (University of Louisville), Lori Norton-Meier (University of Louisville), Dorie Combs (Eastern Kentucky University), Sherri Martinie (Kansas State University), and representatives from the KCM and CCLD (Collaborative Center for Literacy Development).

Classroom resource activities for blending and incorporating math and literature content that were produced during the SMART Books Institute, as well as from other experts across the state, can be accessed at http://kcm.nku.edu/smartbooks/.

> A fast-paced and exciting day and a half of collaboration, new ideas and content standards that sparked creativity, laughter and great teaching tools. I am excited to see what will transpire...I probably will never look at a book I use with children in quite the same way again.
>
> **SMART BOOKS PARTICIPANT**

SMART Books
Supporting Mathematics and Reading through Books

Collaborative Center for Literacy Development

University of Louisville
College of Education & Human Development

KCM
Kentucky Center for Mathematics

Kansas State University

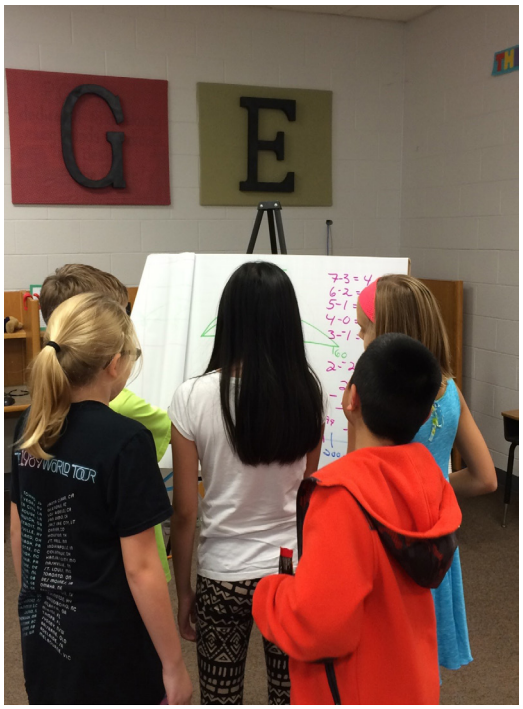
EKU

ELEMENTARY & MIDDLE
MATHEMATICS CONTENT COACHING

For the past five years, KCM has partnered with the Kentucky Department of Education to offer Mathematics Content Coaching professional learning experiences for educators across the Commonwealth. Content Coaching provides mathematics coaches, teacher leaders and administrators with job-embedded, learning opportunities that are aimed at initiating profound, sustainable, school-wide improvements in teaching and learning. The focus of the Content Coaching model is to cultivate a shared understanding of effective mathematics instruction with the goal of establishing a collective clarity about how to engage students in learning mathematics through well-designed learning tasks and activities.

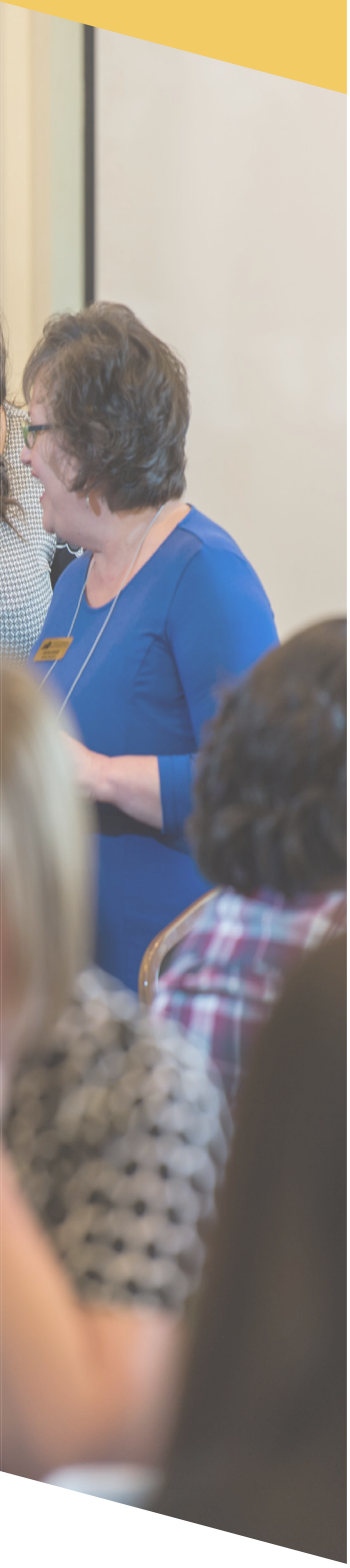
In 2015-16, KDE grant funds provided support for five cohorts of educators: three cohorts for coaches and teacher leaders, and two cohorts for administrators. All of the Content Coaching participants observed a master teacher as she co-planned with a teacher, co-taught mathematics lessons and then debriefed the lessons. Participants were able to go into live classrooms to observe the impact of effective mathematics teaching as modeled by a master teacher. The Content Coaching program provided unique opportunities for educators to examine these questions:

- How can coaches and administrators support teacher growth?
- What does it mean to plan and implement an effective mathematics lesson?
- What does it look like in a classroom where the Standards for Mathematical Practice and the NCTM (National Council of Teachers of Mathematics) Mathematics Teaching Practices are naturally occurring?



Picture (above) of students who were in one of the classes participating in the Content Coaching PLE that showed up after school continuing to think about the rich mathematics they had been exposed to earlier in the day.

> Empowering. Practical. Encouraging. Essential to growing lifelong learners, not just good students.
>
> **ELEMENTARY INSTRUCTIONAL COACH**



MASTER COACHING

In 2015-16, KCM, with funding and support from the Kentucky Department of Education, undertook a new initiative: KCM Master Coaching. The KCM Master Coaching Program focused on providing support for instructional coaches to sharpen their knowledge and increase their expertise in Mathematics Content Coaching. Two cohorts of instructional coaches were formed: one elementary cohort and one middle school cohort. Each cohort worked throughout the school year to deepen the coaches' capacities to influence the improvement of classroom practice, while equipping them to become leaders of other coaches.

The model for the Master Coaching program is the KCM Mathematics Content Coaching initiative which involves a three part cycle of support for classroom teachers: 1) co-planning a lesson; 2) co-teaching the lesson; and 3) debriefing and planning the next lesson. Participants in both coaching cohorts met for two 2-day sessions. At these in-person meetings, the participants observed and engaged with a Master Coach as she co-planned with a teacher, co-taught two mathematics lessons and then debriefed the lessons. Both cohorts went into live classrooms to observe the coaching/ teaching process where they experienced the impact of effective implementation of the Content Coaching cycle.

Throughout the year, participants attended, and at times each one lead, online meetings addressing topics of interest to instructional coaches. Another requirement of the program was that each coach documented, in detail, their work with one teacher. Participants in both of the Master Coaching cohorts presented sessions on what they learned through the program at the 2016 KCM conference.

2015-16 Designations Earned

Elementary Cohort

Master Coach:

Chrystal Rowland (Washington County)

Elite Coaches:

Shannon Blackburn (Fayette County)
Bonnie Humphries (Gallatin County)
Kristy Marsh (Fayette County)
Melanie Schaefer (Campbell County)
Kristi Woods (Clay County)

Middle School Cohort

Master Coach:

Jennifer Donnelly (Berea Independent)

Elite Coaches:

Stephanie Fields (Jefferson County)
Casimer Granz (Campbell County)
Jennifer Phipps (Corbin Independent)
Sallye Thompson (Jefferson County)
Stacy Walker (Livingston County)

MIDDLE SCHOOL

MATHEMATICS RESPONSE TO INTERVENTION FOR 6TH & 7TH GRADES

Since 2013, KCM has partnered with the KDE to provide impactful learning experiences focused on addressing effective teaching strategies for middle school mathematics. Building on KCM's previous work at the elementary and intermediate levels, the MaRTI (Mathematics Response to Intervention) Middle PLE explored effective ways for middle grade students to learn mathematics. The goal was for teachers and administrators to gain a greater understanding of sixth and seventh grade content, as well as to gain strategies for assessing and teaching that content, particularly for students who are struggling. Participants were given resources and professional knowledge that allowed them to explore evidence-based strategies for use with tiered intervention.

In 2015-16, two cohorts were established for sixth grade teachers and four cohorts were created for seventh grade teachers. The cohort locations were all across the state: Hopkinsville, London, Lexington, Elizabethtown, Georgetown, and Louisville.

All participants met for six sessions spread out through the school year. These six sessions allowed participants to explore materials and methods for strategically and explicitly helping students better understand middle school mathematics content including: number system, fractions and decimals, proportional reasoning, geometry, and equations. Administrators were invited to attend one session alongside their teachers.

118 MIDDLE SCHOOL EDUCATORS PARTICIPATED IN MARTI MIDDLE 6 & 7 in 2015-16 FROM THE FOLLOWING KY SCHOOL DISTRICTS:

Bath County
Berea Ind.
Boyd County
Bullitt County
Campbell County
Christian County
Clay County
Crittenden County
Dawson Springs Ind.
Fayette County
Frankfort Ind.
Garrard County
Glasgow Ind.
Graves County
Hardin County
Harrison County
Hart County
Jefferson County
Johnson County
Lincoln County
Livingston County
Logan County
Madison County
Morgan County
Murray Ind.
Nicholas County
Owensboro Ind.
Paris Ind.
Pulaski County
Scott County
Trimble County
Warren County
Washington County

> I have been in education 27 years. This is the most useful PLE I have ever attended.

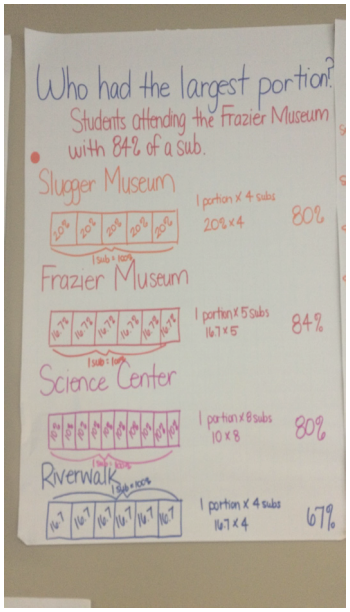
MIDDLE SCHOOL ADMINISTRATOR

> This experience has transformed my teaching (and I've been teaching a LONG time)! I finally feel like I can effectively teach number sense and make kids into lifelong problem-solvers and mathematical thinkers!...MaRTI Middle and KCM, with the support from KDE, have an excellent program to give Kentucky teachers and math coaches the tools they need to make a tremendous difference.

SIXTH GRADE TEACHER

> This is the best PLE I have attended in 12 years of teaching and has had an immediate impact on my teaching and student learning.

SEVENTH GRADE TEACHER



MaRTI Middle 6/7 teachers were challenged to work through rich problems and explore different ways of thinking about the solutions. The picture above is a sample of some of the ways teachers modeled their thinking.

MIDDLE SCHOOL

MIDDLE SCHOOL SUMMER INSTITUTE

In June 2016, KCM offered a three-day Summer Institute for middle school teachers. Participants in the institute explored conceptual understandings needed to be successful in seventh and eighth grade mathematics content, specifically related to algebra and algebraic reasoning.

Seventy-three participants learned about research-based instructional strategies that can help struggling middle school students succeed in algebra across the three days.

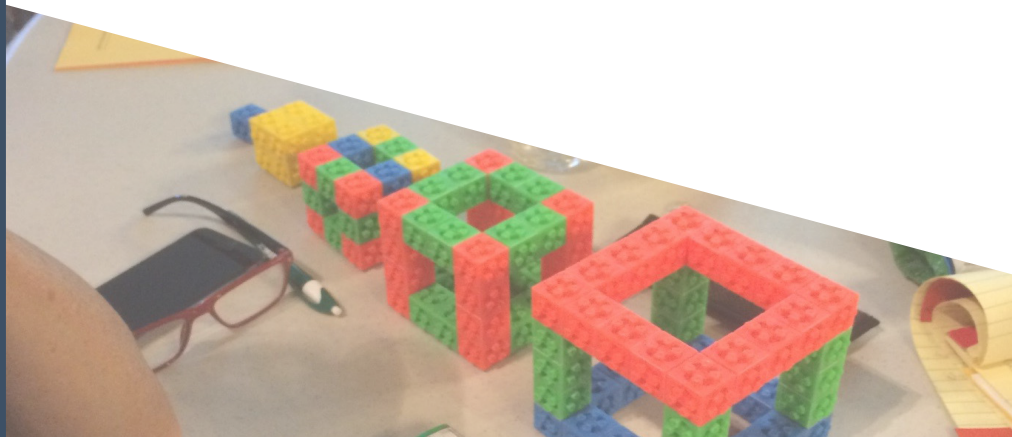
73

Middle School Educators Attended the June 2016 Middle School Summer Institute

> Teaching is hard work and takes careful planning, so this is not a PLE with one solution, but an experience that changes your thinking and motivates teachers to make some changes that can significantly impact student learning in the long run.
>
> **MIDDLE SCHOOL SUMMER INSTITUTE ATTENDEE**

> This learning experience was very valuable in giving me strategies to help struggling learners be engaged.
>
> **MIDDLE SCHOOL SUMMER INSTITUTE ATTENDEE**

> This PLE has helped to transform my philosophy of teaching and will definitely affect my pedagogical practice.
>
> **MIDDLE SCHOOL SUMMER INSTITUTE ATTENDEE**



HIGH SCHOOL

FLIP

FLIP-EKY, a collaborative project between the KCM, the Kentucky CPE, the Kentucky Valley Educational Cooperative, and NKU (Northern Kentucky University), has continued its outreach to provide support to teachers in eastern Kentucky schools.

The FLIP-EKY Project was initially funded in 2015 with a $137,000 grant from the CPE. Based upon the results of the first year of the grant, the grant was renewed in 2016 for an additional $113,000. During the summer of 2015, 16 mathematics teachers and three science teachers completed one week of training at Big Sandy Community and Technical College in Prestonsburg. In a flipped classroom, teachers use video cameras or video recording software to develop content lessons and then deliver these lessons as videos where students review the lesson the night before the class as homework. The next day when students come to class, teachers can use class time to do things that are more integrated – classroom discussions, hands-on activities, answering questions, or dividing the class into small groups. Teachers can then work with students that need additional help or offer extensions to advance student learning.

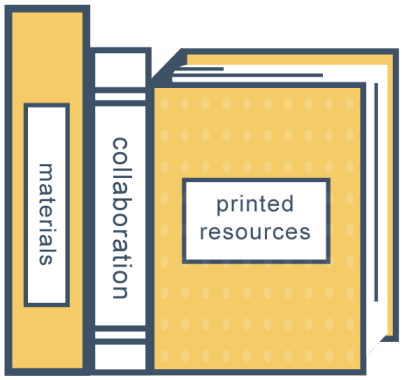
During the 2015-16 school year, data were collected from each of the 19 FLIP-EKY teachers. Data suggest that: (1) the project is having a positive impact on teachers' use and confidence with classroom technology; (2) teachers enter with high expectations regarding the effectiveness of flipped instruction and its impact on student learning and engagement, and these perceptions remain high after a year with the project; and (3) students appreciate the greater access to teacher feedback and teacher-specific resources that flipping affords. The impact on student achievement continues to be positive, with 11 of 13 sites that provided full comparison data showing increased achievement in the flipped classroom.

> My only regret is that I did not get this training much earlier in my teaching career. I think the flipped classroom is a powerful teaching/learning method that will ultimately make me a more effective teacher.
>
> **FLIP-EKY PARTICIPANT**

MAKING SENSE OF ALGEBRA

KCM partnered with the EDC (Education Development Center, Inc.) to offer a two-day workshop focused on algebraic reasoning. This program focused on developing students' mathematical habits of mind in order to help improve student readiness for algebra.

Mary Fries, from EDC, provided participants with insights into how to assist struggling students with concepts needed to be successful in Algebra I. Participants received the *Making Sense of Algebra* book and the Transition to Algebra teacher kits.



POSTSECONDARY

MATHEMATICS TEACHING CLINICAL HORIZONS

In 2015-16, KCM participated in a pilot project exploring how to build and support clinical sites for pre-service teachers. The MaTCH (Mathematical Teaching Clinical Horizons) was a collaborative effort between KCM, the CPE and NKU. Two Kentucky school districts were selected to serve as hosts for the clinical sites: Bellevue and Ludlow School Districts.

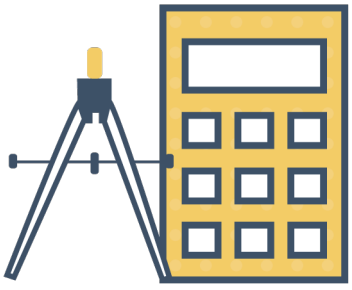
KCM provided unique professional learning experiences for in-service and pre-service teachers which focused on how to approach grade-level standards in rigorous and engaging ways.

Working collaboratively with NKU's Department of Teacher Education, KCM assured that the messages pre-service teachers heard from their professors and from KCM consultants were consistent. During the professional learning events, KCM encouraged both the in-service and pre-service teachers to explore the mathematical understandings of their students and to build upon those understandings.

Participants were provided with materials, printed resources and collaborative time to plan how to use those materials within their classrooms.

> "I thought the program was great. I learned a lot and have already reflected on this year so far and how I would tweak next year due to this program.
>
> **MATCH PARTICIPANT**

NKU NORTHERN KENTUCKY UNIVERSITY

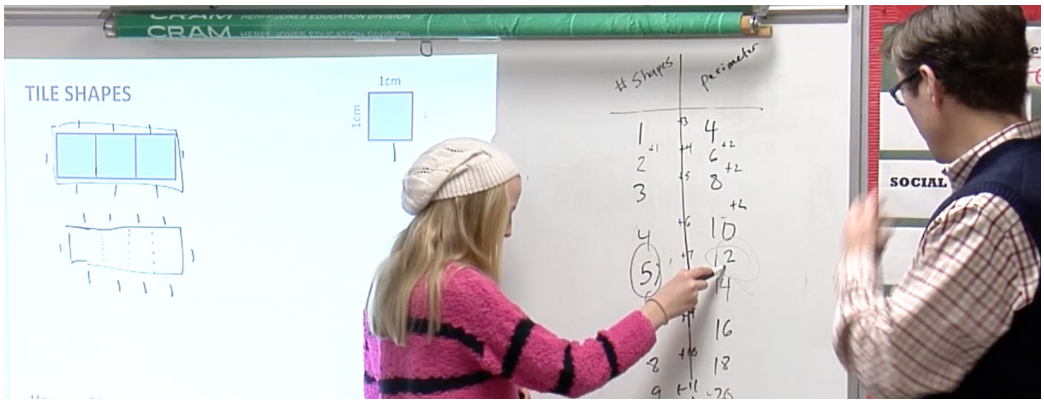


POSTSECONDARY
PROJECT TECHNO

Project TECHNO (Technology-Centered Mathematical Noticing) is developing technologically centered learning modules for use in online teacher preparation contexts that will positively affect pre-service teachers' capacity to professionally notice and respond appropriately to children's mathematical thinking along learning trajectories in numeracy and early algebra. This project was awarded nearly $500,000 by the National Science Foundation in the summer of 2014 and is entering its third year of operation.

This construction of innovative learning materials builds upon the successful N3 (Noticing Numeracy Now) endeavor which was also funded by the National Science Foundation. The N3 project aimed to specifically enhance professional noticing capacities of pre-service elementary teachers in the area of early numeracy. An online version of the N3 module has been developed and is currently being piloted at three institutions.

Additionally, Project TECHNO expands the development of responsive teaching practices into mathematical contexts organized around promoting rich algebraic thinking among children. Towards this end, project leaders in different areas of Kentucky coordinated with practicing classroom teachers to co-teach a series of innovative algebraic lessons which were video recorded. These video recordings served as the basis for a second instructional module, E3A (Examining Essential Elements of Algebra). This module is currently being piloted at three institutions and, pending modifications from the pilot experience, an online adaptation is planned for mid-2016.



POSTSECONDARY

KMED CONFERENCE

The second KMED (Kentucky Mathematics Educator Development) Conference was held April 22, 2016 in Lexington, KY.

The purpose of KMED is to disseminate research and effective mathematics teacher education practices, establish collaborative working groups of mathematics teacher education professionals, inform mathematics education policy, and advocate for high-quality mathematics education for all.

Twenty-five mathematics educators from across the Commonwealth gathered at this year's conference to share their expertise and experiences in these areas. Sessions at the conference ranged greatly in content: transformations in mathematics, online teaching and learning, mathematics coaching, building numeracy in grades K-3, elementary mathematics specialists programs, undergraduate involvement in mathematics education research, statistics professional development, transdisciplinary preparation of secondary math and science teachers, and the MAA vision for undergraduate mathematics programs.

Attendees left the conference encouraged and energized to return to their work at their home institutions, knowing they are part of a network of mathematics educators in Kentucky. A special lunch session focused on the possibility of AMTE (Association of Mathematics Teacher Educators) affiliation. There was great support for the AMTE affiliation and future KMED meetings will continue to work toward this goal.

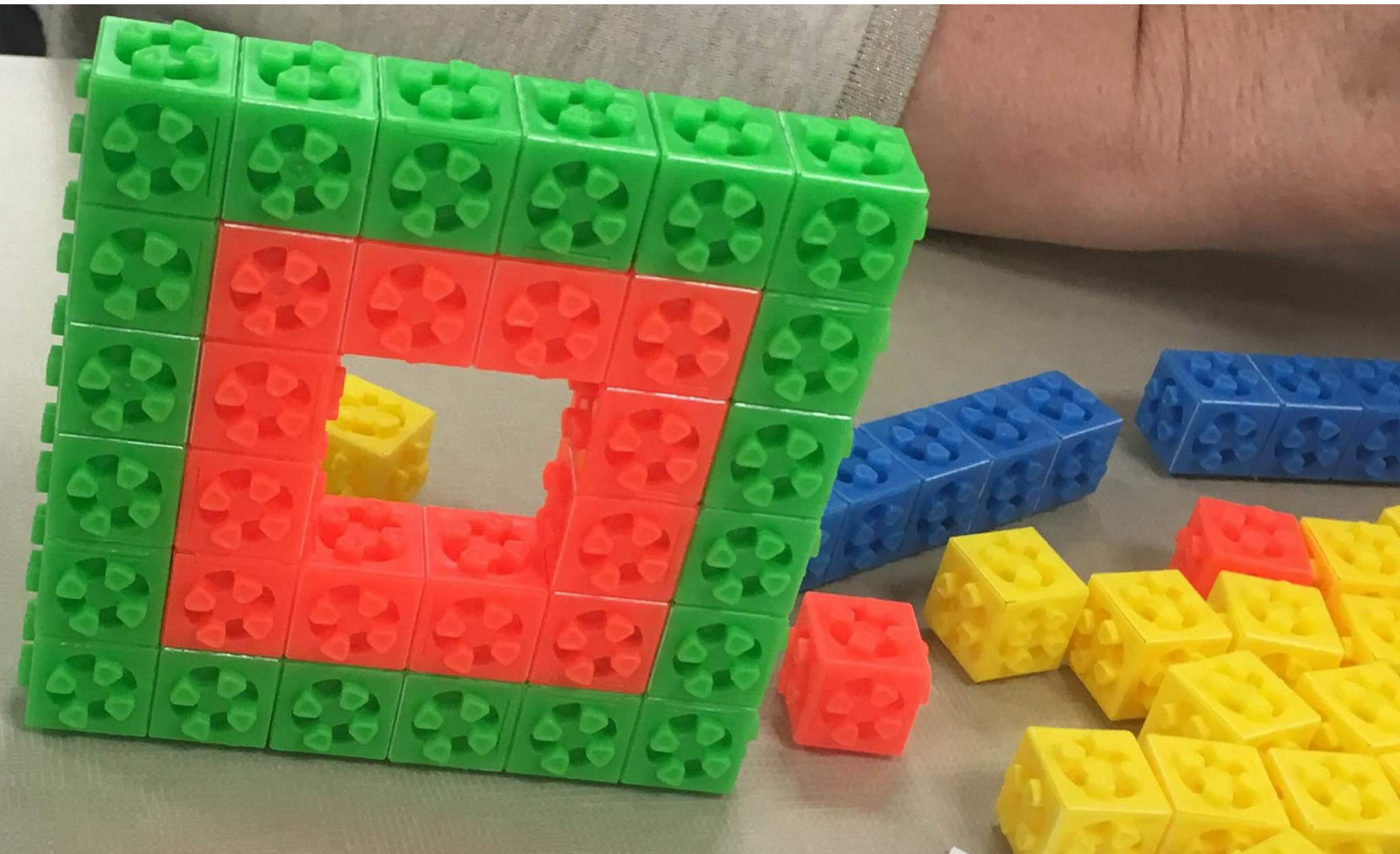
ADULT EDUCATION

M4AE

The KCM works collaboratively with KYAE, to provide teachers of adult learners with a greater understanding of mathematical teaching and learning strategies. In 2015-16, KCM offered five days of professional learning for adult education teachers that revolved around a mathematical topic or idea with an emphasis on building conceptual learning by addressing gaps in student understandings. The program was entitled "Math for Adult Educators," or M4AE. Twenty-eight participants attended M4AE and explored how students learn mathematics, evidence-based intervention strategies and resources and professional knowledge for in-depth implementation of the College and Career Ready Standards and the Standards for Mathematical Practice.

In 2015-16, KCM also provided support for the KYAE Lesson Bank project. The Lesson Bank is a repository of high-quality, standards-based lessons created by and for KYAE instructors. It is designed as a one-stop shop for instructors to find high-quality lesson plans and resources for their standards-based classroom. A KCM staff member served as a reviewer for the math lessons submitted to the KYAE Lesson Bank.

Pictured below: Adult Educators worked with blocks to analyze patterns during one of the M4AE professional learning experiences.



KCM CONFERENCE

The KCM hosted its eighth annual conference on March 7 & 8, 2016, in Lexington, Kentucky. The theme of the conference, "Call to Action!", encouraged attendees to explore the high-leverage teaching practices as described by the NCTM in their landmark publication, ***Principles to Actions: Ensuring Success for All.***

> The conference, just as my participation in many of the KCM professional offerings, has helped grow my confidence, has given me a place to learn, ask questions, network, and collaborate with peers from other districts.
>
> **2016 KCM CONFERENCE ATTENDEE**

A record number of 587 educators attended the 2016 conference, representing preschool through postsecondary education, from 93 Kentucky school districts and 9 Kentucky postsecondary institutions. In addition, 98 breakout sessions were offered throughout the two-day event - the most in KCM conference history.

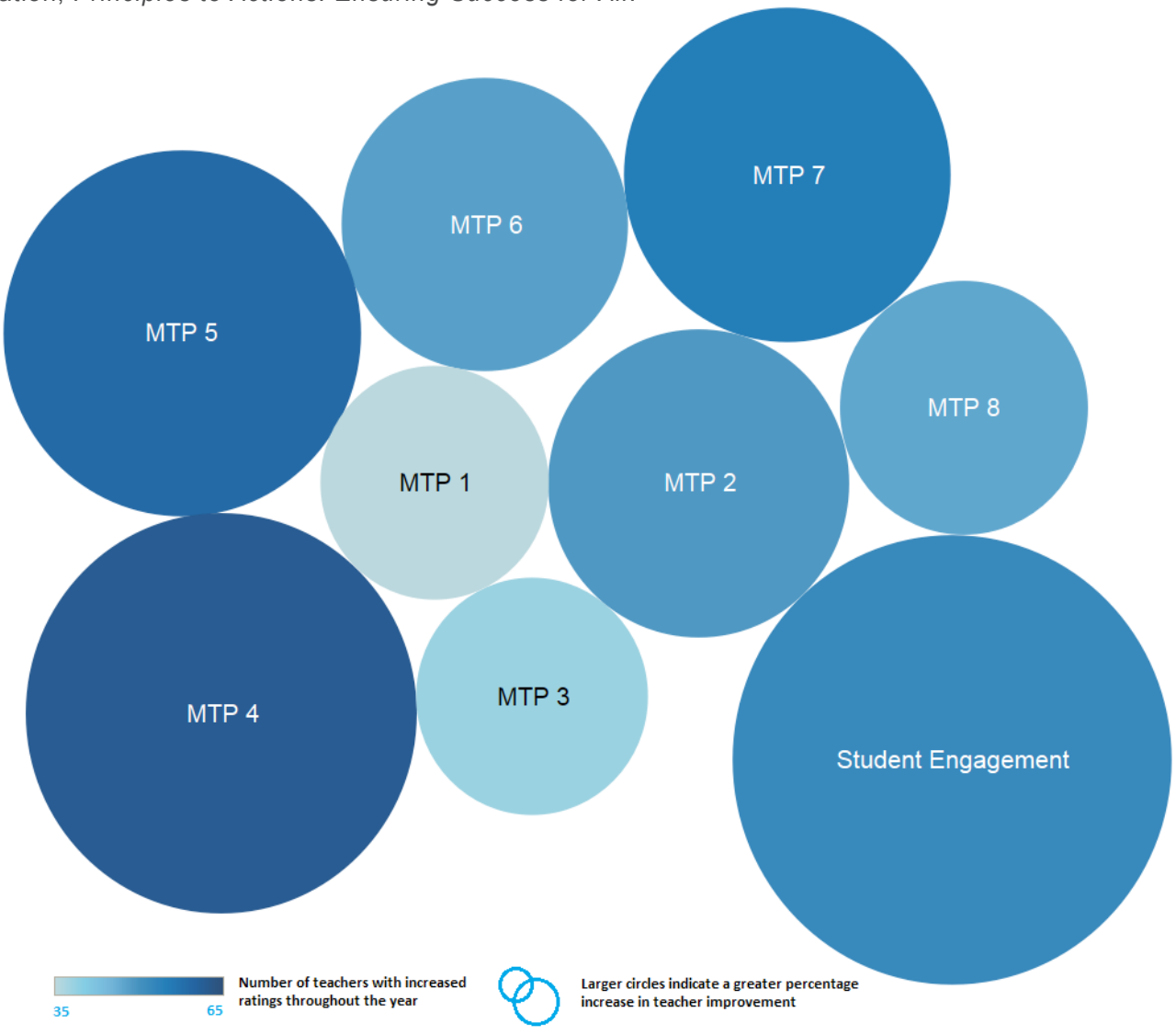
In celebration of KCM's 10 years of service, the KCM conference provided two luncheons for attendees, which featured a multitude of special guests including Senator Jimmy Higdon, Majority Whip of the Kentucky Legislature, and Steve Leinwand of the American Institutes for Research and co-author of Principles to Actions.

On Tuesday, March 8, conference attendees excitedly welcomed Commissioner Stephen Pruitt to the conference luncheon. Commissioner Pruitt shared his clear passion for education and his unbridled appreciation of Kentucky teachers.

DATA

BOOTS ON THE GROUND

During the 2015-16 school year, the KCM's Regional Consultants visited MITs funded through the MAF a preset number of times per school. This was a "boots on the ground" effort to provide individualized support to teachers in order to promote the development of high-quality teaching practice and facilitate growth of teacher capacity through the eight MTPs (Mathematics Teaching Practices) as defined by the NCTM in their publication, *Principles to Actions: Ensuring Success for All*.



KEY

MTP 1: Establish mathematics goals to focus learning.
MTP 2: Implement tasks that promote reasoning and problem solving.
MTP 3: Use and connect mathematical representations.
MTP 4: Facilitate meaningful mathematical discourse.
MTP 5: Pose purposeful questions.
MTP 6: Build procedural fluency from conceptual understanding.
MTP 7: Support productive struggle in learning mathematics.
MTP 8: Elicit and use evidence of student thinking.
Student engagement (as indicated by observed student behaviors).

BUDGET

FISCAL YEAR 2016 FUNDING

	Expenditures
KCM Personnel Salary (Full-Time and Part-Time Staff)	$362,335
KCM Personnel Fringe Benefits	$251,140
Faculty (Executive Director & Faculty Associates)	$147,536
TOTAL STAFF & FACULTY	$761,011
Other Personnel (Student Workers)	$58,593
Regional Consultants Across the State of Kentucky	$577,511
Other Contracted Personnel (Evaluators, Trainers)	$244,348
TOTAL OTHER PERSONNEL	$880,452
SUBTOTAL PERSONNEL	$1,641,463
Operating	$329,535
TOTAL EXPENDITURES FY 2015-2016	$1,970,998

In addition to the above expenditures, the following external projects were entrusted to the KCM:	Grant Funding Received
Kentucky Department of Education - Mathematics Content Coaching	$79,801
Kentucky Department of Education - Mathematics Master Coaching	$53,153
Kentucky Department of Education - Enacting Effective Response to Intervention	$123,174
Kentucky Department of Education - Mathematics Response to Intervention Middle	$128,854
Kentucky Department of Education - Kentucky-Erikson Early Math Collaborative	$63,687
Mathematics & Science Partnership - Kentucky Numeracy Project Intensive Plus	$80,000
Council on Postsecondary Education - Senate Bill 1 Clinical *	$26,710
Council on Postsecondary Education - Senate Bill 1 *	$35,277
National Science Foundation - Technology Centered Mathematical Noticing *	$35,709
SUBTOTAL GRANTS	$626,365

* previously received awards - funds spent in this fiscal year.

THE KENTUCKY CENTER FOR MATHEMATICS

Address:
Northern Kentucky University
90 Campbell Drive, CA 220
Highland Heights, KY 41099
Phone: (859) 572-7690
Fax: (859) 572-7677
E-mail: kcm@nku.edu

www.**kymath.org**