

# KY MATH SUMMIT BRIEF



# Document prepared for the Interim Joint Committee on Education by Kentucky Center for Mathematics

**KY Math Summit  
September 28, 2023**

Co-moderated by:

Kentucky Center for Mathematics

Kentucky Association of Mathematics Teacher Educators

Kentucky Council of Teachers of Mathematics

This brief is a synthesis of 89 Kentucky mathematics educators expert input gathered at the KY Math Summit.



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# Overview

Eighty-nine dedicated Kentucky mathematics experts gathered to analyze data and brainstorm possible trends and solutions to advance mathematics across Kentucky. This influential event provided a platform for dedicated mathematics educators to discuss, analyze, and propose research-based solutions, with the aim of enhancing student achievement in mathematics across the state.

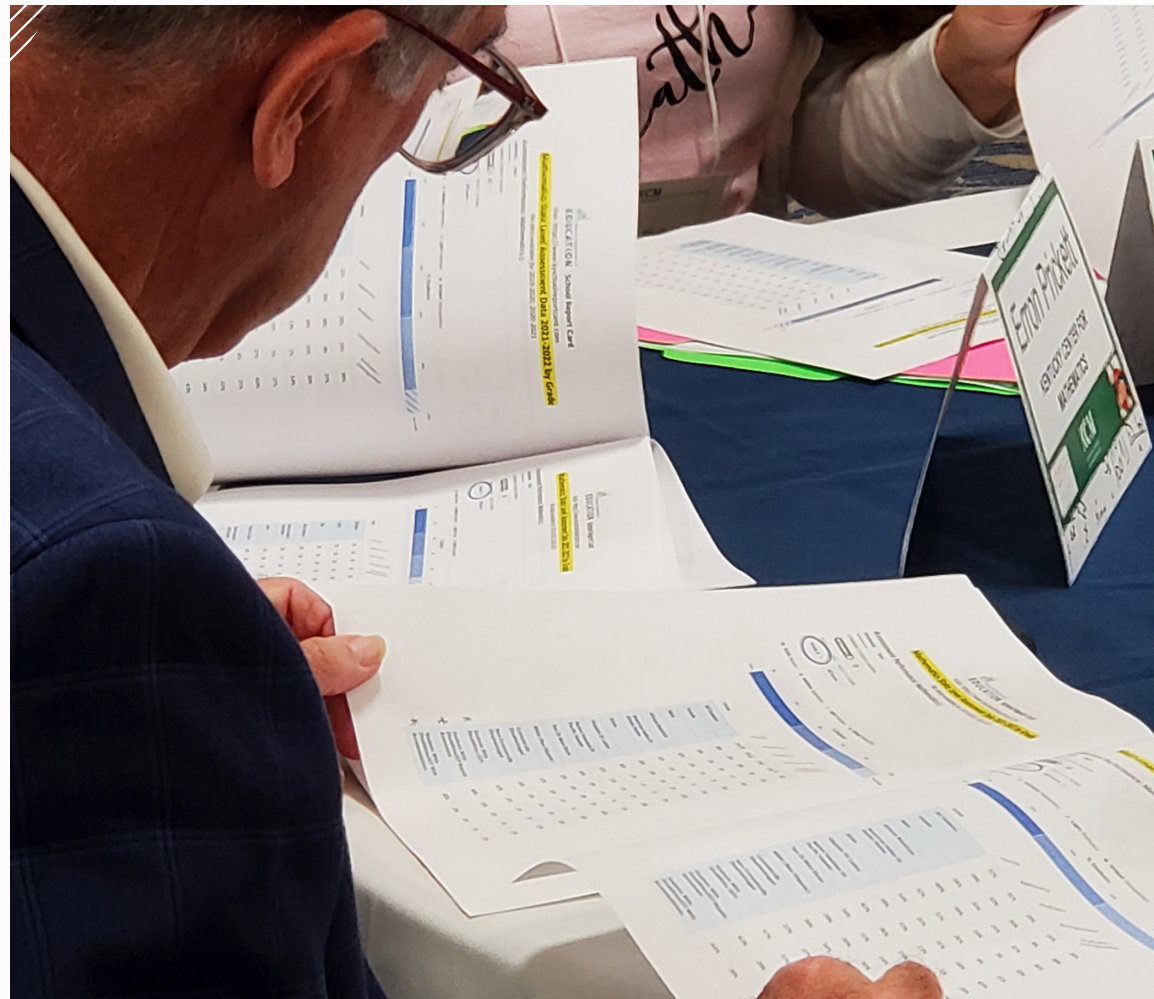
**40 Classroom Teachers**

**20 State-level Math Experts**

**11 University Faculty**

**18 KY Educational Cooperative Stakeholders**

# KY Math Summit Experts in Action



*KCM facilitated Kentucky math experts as they analyzed data and looked for trends.*



*KAMTE lead Kentucky math experts to give input on teacher preparation in our state.*



*KCTM guided Kentucky stakeholders as they shared their input on success in mathematics education.*

Full video of the KY Math Summit can be accessed at <https://www.youtube.com/watch?v=R3LWkYNbIk8>

# KENTUCKY MATH SUMMIT

Full Report can be found at <https://nces.ed.gov/nationsreportcard/pubs/stc2022/2023011.aspx>

Kentucky Complete Results

CHANGE TABLE FORMAT OPTIONS

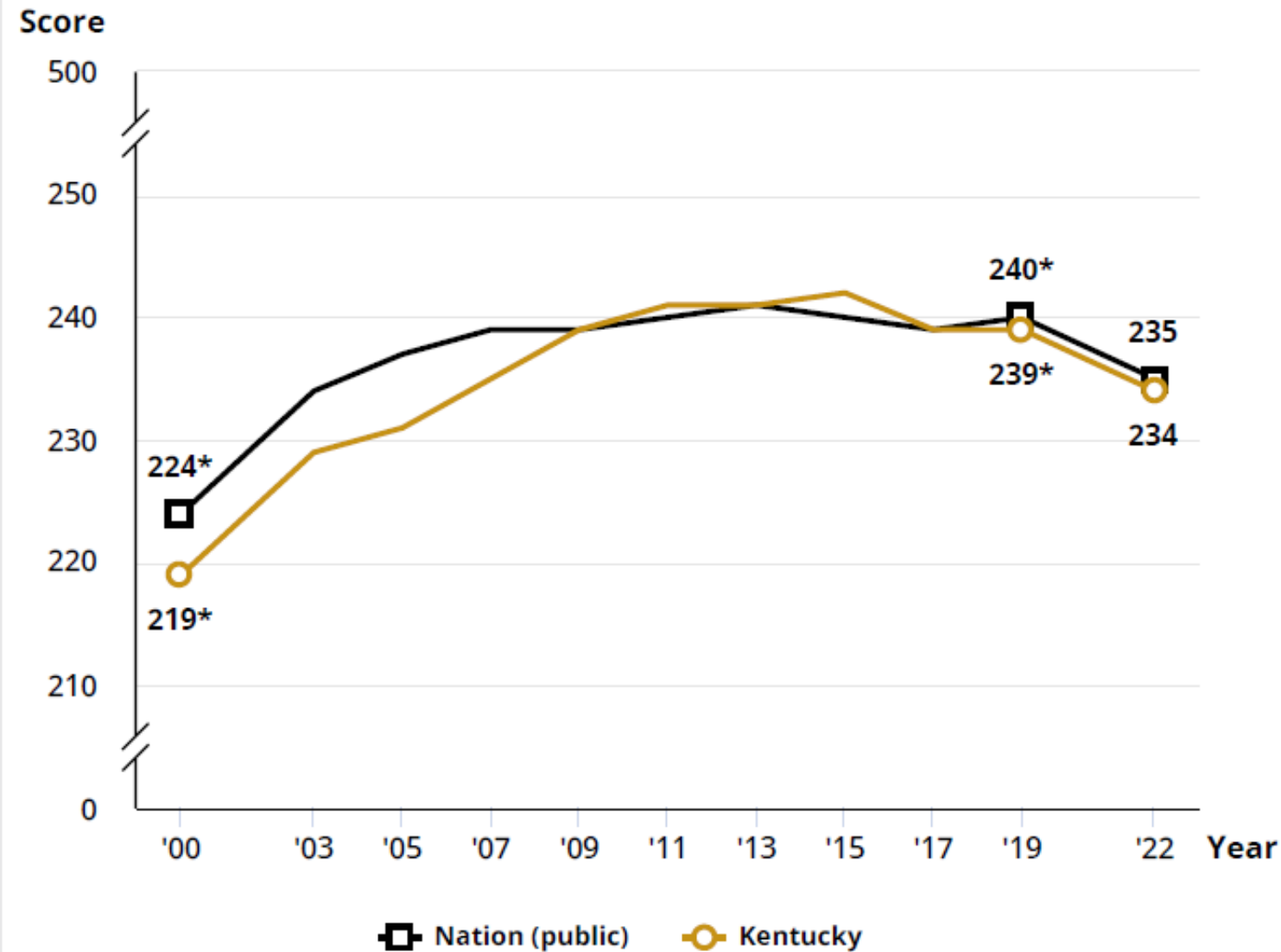
## ANALYSIS OF KY NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS (NAEP) DATA

Subject	Grade	Year	Average Score	Difference from National		Achievement Levels				
				Score	Percentage	At or above	Advanced	At	Advanced	
Mathematics (scale range 0-500)	4	2022	233.80	1.232	-1.06	75.08	1.434	32.59	1.711	5.57
		2019	239.31	1.061	-0.69	80.69	1.229	39.92	1.530	7.24
		2017	239.18	0.855	+0.02	80.09	1.026	39.78	1.365	6.51
		2015	241.73	1.118	+1.87	84.08	1.228	40.48	1.832	7.0

visit [www.nationsreportcard.gov](http://www.nationsreportcard.gov) to access all NAEP data

# LOOKING AT THE KY NAEP DATA

AVERAGE SCORES FOR STATE/JURISDICTION AND THE NATION (PUBLIC)



\* Significantly different ( $p < .05$ ) from 2022. Significance tests were performed using unrounded numbers.

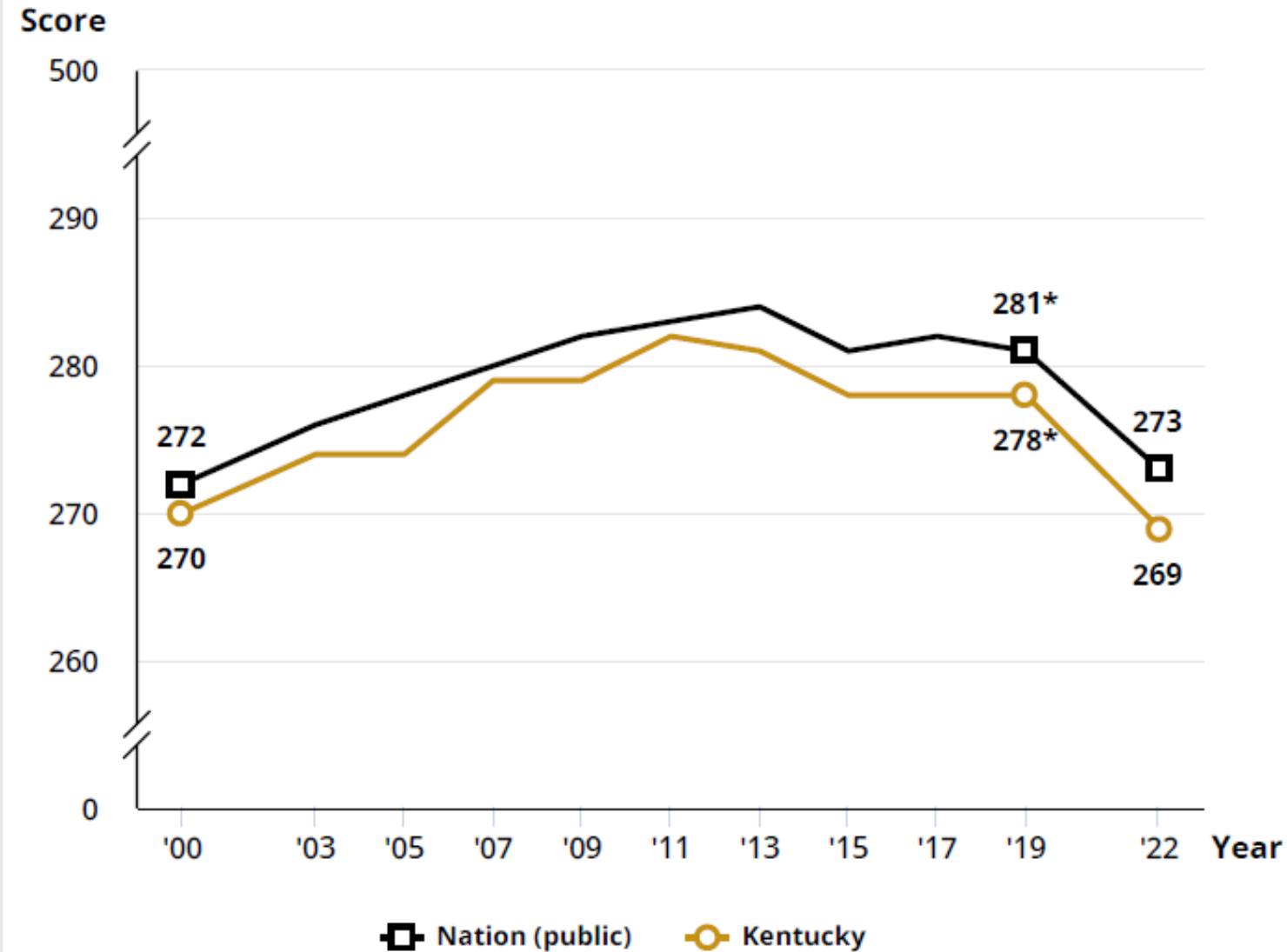
## OVERALL RESULTS

- In 2022, the average score of fourth-grade students in Kentucky was 234. This was not significantly different from the average score of 235 for students in the nation.
- The average score for students in Kentucky in 2022 (234) was lower than their average score in 2019 (239) and was higher than their average score in 2000 (219).
- The percentage of students in Kentucky who performed at or above the *NAEP Proficient* level was 33 percent in 2022. This percentage was smaller than that in 2019 (40 percent) and was greater than that in 2000 (17 percent).
- The percentage of students in Kentucky who performed at or above the *NAEP Basic* level was 75 percent in 2022. This percentage was smaller than that in 2019 (81 percent) and was greater than that in 2000 (59 percent).

Average KY vs National 4th Grade math scores

# LOOKING AT THE KY NAEP DATA

## AVERAGE SCORES FOR STATE/JURISDICTION AND THE NATION (PUBLIC)



\* Significantly different ( $p < .05$ ) from 2022. Significance tests were performed using unrounded numbers.

## OVERALL RESULTS

- In 2022, the average score of eighth-grade students in Kentucky was 269. This was lower than the average score of 273 for students in the nation.
- The average score for students in Kentucky in 2022 (269) was lower than their average score in 2019 (278) and was not significantly different from their average score in 2000 (270).
- The percentage of students in Kentucky who performed at or above the *NAEP Proficient* level was 21 percent in 2022. This percentage was smaller than that in 2019 (29 percent) and was not significantly different from that in 2000 (20 percent).
- The percentage of students in Kentucky who performed at or above the *NAEP Basic* level was 57 percent in 2022. This percentage was smaller than that in 2019 (67 percent) and was not significantly different from that in 2000 (60 percent).

Average KY vs National 8th Grade math scores



# SUMMIT KENTUCKY NAEP DATA NOTICINGS

## 4th Grade

- 4th Grade started below national average, but has been near or above national average since 2009
- Grade 4 scores peaked 2011-2015
- For elementary, we are still well above where we were in 2000s.
- KY mirroring the national trend in NAEP scores ( $\pm 2$  from national average)

## 8th Grade

- Grade 8 consistently below the national averages
- Grade 8 peaked in 2011 and has been in decline since
- Data comparison shows that the percentage of students on or above mathematics benchmarks (same cohort) decreases as they move from 4th grade to 8th grade.
- Post-COVID, scores were at the same levels they were in the early 2000s.
- KY mirroring the national trend in NAEP scores ( $\pm 4$  from national average)



# KENTUCKY MATH SUMMIT

## ANALYSIS OF KY SUMMATIVE ASSESSMENT (KSA) DATA

visit [kyschoolreportcard.com](https://kyschoolreportcard.com) to access all KSA data

2021-2022 KSA Mathematics Data  
Grade 4

Grade 4	Novice	Apprentice	Proficient	Distinguished	Proficient / Distinguished
Group					
All Students	32%	28%	29%	10%	39%
Female	34%	29%	28%	9%	37%
Male	31%	28%	30%	11%	42%
African American	57%	27%	14%	2%	16%
American Indian Or Alaska Native	31%	35%	21%	13%	35%
Asian	19%	22%	33%	27%	60%
Hispanic Or Latino	43%	29%	23%	4%	28%
Native Hawaiian Or Pacific Islander	44%	21%	31%	4%	35%
Two Or More Races	36%	29%	27%	8%	35%
White (Non-Hispanic)	28%	28%	32%	11%	44%
Economically Disadvantaged	41%	30%	24%	5%	29%
Non-Economically Disadvantaged	18%	25%	39%	17%	57%
Students With Disabilities (IEP)	54%	25%	17%	4%	21%
Students With Disabilities/IEP Regular Assessment	57%	22%	16%	4%	21%
Students With Disabilities/IEP With Accommodations	64%	20%	13%	3%	16%

Grade 8	Novice	Apprentice	Proficient	Distinguished	Proficient / Distinguished
Group					
All Students	37%	26%	27%	10%	36%
Female	36%	27%	28%	9%	37%
Male	39%	25%	26%	11%	36%
African American	61%	25%	12%	2%	14%
American Indian Or Alaska Native	55%	23%	18%	5%	23%
Asian	16%	19%	33%	32%	65%
Hispanic Or Latino	46%	27%	22%	5%	27%
Native Hawaiian Or Pacific Islander	43%	23%	17%	17%	34%
Two Or More Races	40%	28%	25%	7%	32%
White (Non-Hispanic)	33%	26%	29%	11%	40%
Economically Disadvantaged	47%	28%	21%	5%	26%
Non-Economically Disadvantaged	24%	24%	35%	17%	52%
Students With Disabilities (IEP)	63%	24%	11%	2%	13%
Students With Disabilities/IEP Regular Assessment	68%	20%	10%	2%	12%
Students With Disabilities/IEP With Accommodations	68%	20%	10%	2%	11%

2021-2022 KSA Mathematics Data  
Grade 8

# KSA 2022

## DATA NOTICINGS



### **Trends within sub-groups**

- Consistent trend of ~36-38% proficient or distinguished across grades 4- 8.
- Gap between proficient and not proficient students increases as grade levels increase.
- The gaps for sub-groups, specifically African-Americans, and students with disabilities are large and need further focus.

### **Comparison between sub-groups**

- Not hitting 40% proficiency OVERALL (subgroups are worse).
- Males and females have about the same proficiency.
- Students with disabilities are not making proficiency.
- No proficiency difference between students with disabilities with and without accommodations.
- Hispanic or Latino sub-group has greater than >70% scoring novice or apprentice.
- African-American students had an average score that was 27 points lower than White students.

# QUESTIONS GENERATED BY DATA

## **Trends within sub-groups**

- Is there a lack of High Quality Instructional Resources for instruction in KY schools? What HQIRs are showing promise in KY?
- How much time are students getting in on-grade level Tier 1 instruction? Is there too much pull-out?
- Are all KY educators interpreting the Kentucky Academic Standards consistently?
- Are all KY educators implementing the Kentucky Academic Standards to their full intent?
- Are students getting grade level instruction in pullout groups? Does this account for the learning gaps by subgroups?
- Is the online assessment a factor in student scores?



## **Comparison between sub-groups**

- Are the gaps in primary grades affecting higher grades? Is there a lack of foundational mathematics content?
- Is more mathematics specific professional development needed for primary teachers? Emphasis on KSA and SMPs.
- Is there a limited pool of mathematics certified teachers at the middle grades level?
- What Tier 2 resources and research-based strategies are used in middle school?
- Are students presented concepts with research-based pedagogy like CRA/CSA?



# TEACHER PREPARATION

## Constraints

What are the constraints (negatives) of the current university approach to teacher preparation

EX:

- a) content/multidisciplinary coursework
- b) pedagogical content knowledge development with field connection
- c) immersive field experience (i.e. student teaching)

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- c) immersive field experien teaching)

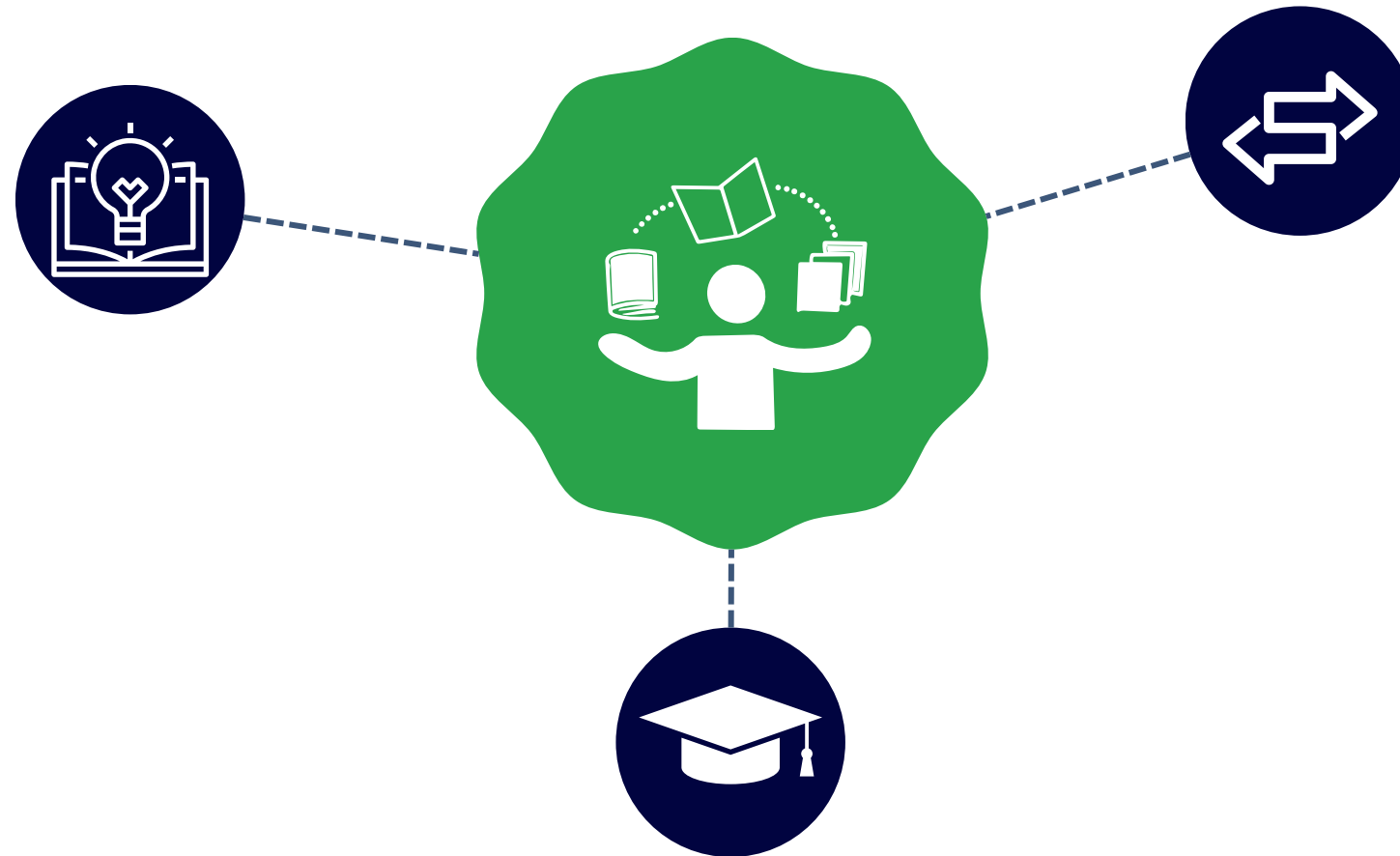
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# PRE-SERVICE TEACHER PREPARATION

## SUMMARY OF INPUT

### What are the affordances (benefits) of the current university approach to teacher preparation?

- Field experience from freshman year on allows pre-service teachers to gain valuable experience.
- There exists a community of learning within colleges of education.
- There is support of teachers in passing the Praxis for teacher certification.
- University-based teacher preparation provides connection between research and practice.
- University-based teacher preparation creates a productive tension between idealized instructional visions and the realities of our current system.



### Beyond the University

- Articulation of experiences that extend into Years 1-3 of teaching in Kentucky public schools.
- Acknowledge that teaching is a profession of apprenticeship and create structures to support new teacher development with focus on mathematics, in particular.

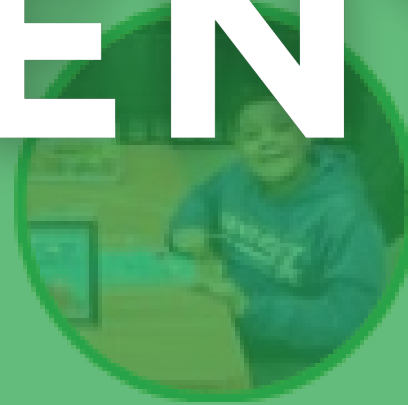
### What are the constraints (negatives) of the current university approach to teacher preparation?

- More hours of mathematics content and mathematics specific pedagogy are needed.
- There should be professional learning in MTSS.
- Ensure that supervising teachers have appropriate professional learning on how to supervise student teachers, including specific educative mentoring.
- Focus on Kentucky Academic Standards and Standards for Mathematical Practice.
- Fall student teaching experiences so as to start the school year with school, which is very important to pre-service teacher success.

**KY SOLUTIONS**

**FOR**

**KY STUDENTS**





# THANK YOU TO THE EDUCATORS FROM ACROSS OUR STATE WHO SHARED THEIR EXPERTISE AT THE KY MATH SUMMIT

Crystal Adams	Joy Campbell	Brack Herald	Leslie Lee	Kathy Price	Amber Snell
Julie Adams	Meredith Chandler	Brandon Hibbard	Christa Lemily	Erron Prickett	Joanna Stevens
Cindy Aosse	Erin Chavez	Blair Hicks	Kelly Lindsey	Micki Ray	Kelly Stidham
Karema Badouan	Brooke Coffman	Amanda Holbrook	Kate Marin	Nicole Read	Denise Strange
Amy Barlow	Dee Crescitelli	Sara Horn	Rick Matika	Pam Reichelderfer	Angie Stull
Jennifer Bay-Williams	Dana Cull	Cynthia Howe	Kimberly Mattingly	Lisa Riggs	Freddie Terry
Brittany Beal	Kelly DeLong	Stephanie Hurst	Kristie Mattingly	Jen Roederer	Jonathan Thomas
Jodi Blackburn	Lorie Estes	Dina Johnson	Krocket McClure	Chrystal Rowland	Ed Thome
AmyBland	Cathy Flora	Sean Jordan	Alise McCubbins	Julia Saderholm	Tim Truitt
Peggy Blankenship	Misty Frilling	Stacy Justus	Jamie-Marie Miller	Sarah Shaffer	Julian Viera
Drew Bredenber	Krystal Gatliff	Sandye Kablen	Heather Moore	Julie Shelton	Vickie Wampler
Tiffany Brock	Jane Goatley	Melinda Keiner-Rummel	Ally Niece	Laurie Shepherd	Rob Weber
Abby Brown	Ashlie Griggs	Stephanie Kidd	Bethany Noblitt	Thomas Shepherd	Alicia Whitworth
Robert Brown	Megan Hall	Steven Kissinger	Stephanie Overby	Katrina Slone	Duane Williams
Katie Buckman	Shasta Hensley	Holly Lawrence	Jamala Pelfrey	Sumer Smith	

***KCM, KAMTE, and KCTM appreciates the input from these KY mathematics stakeholders.***

***Each voice can be heard in the KY Solutions for KY Students summary statements in the following sections.***

# KENTUCKY SOLUTIONS FOR KENTUCKY STUDENTS

## VOICES FROM ACROSS OUR STATE



**Adam Smith**  
4th & 5th Grade Mathematics Teacher  
Chandler's Elementary  
Russellville, KY



**Ashleigh Roe**  
District-Based Instructional Coach - Middle School  
Fayette County Public Schools  
Lexington, KY



**CJ Fryer**  
Mathematics Teacher  
Beechwood High School  
Fort Mitchell, KY



**Katie Hilbert**  
Mathematics Teacher  
Notre Dame Academy  
Park Hills, KY



**Daria Johnson**  
Mathematics Instructional Coach  
Holmes Middle School  
Covington, KY

Videos of these amazing educators answering the three questions posed during the KY Solutions for KY Students section were shown during the KY Math Summit. Their answers launched the discussion of each question during the KY Math Summit.

We appreciate their heartfelt input.

# KY SOLUTIONS FOR KY STUDENTS



What are KY teachers doing **NOW** to influence student achievement?




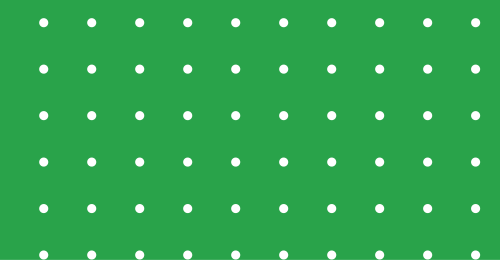
What can KY (teachers and administrators and legislators and others) do to **SCALE** these practices across the state?




What does KY (teachers and administrators and legislators and others) need to do **NEXT** in order to improve student achievement even more?



## What are KY teachers doing **NOW** to influence student achievement?

- Using High Quality Instructional Resources (HQIR) to support quality instruction.
  - Utilizing high-yield instructional strategies, including greater focus on vertical coherence.
  - Incorporating Standards for Mathematical Practice for students and Mathematical Teaching Practices for Teachers.
  - Effectively using data, both at the individual teacher level and in PLC, to make informed instructional decisions.
  - Intentionally differentiating (enrichment and MTSS) to meet the needs of all students.
- 
- 



What can KY (teachers and administrators and legislators and others) do to **SCALE** these practices across the state?



- Provide math coaching as a support for all teachers.
- Facilitate on-going and inclusive professional learning in the Kentucky Academic Standards and the Mathematics Teaching Practices for all educators.
- Support from state and local level leaders for professional learning, math coaching, and research-backed instructional supports.



What does KY (teachers and administrators and legislators and others) need to do **NEXT** in order to improve student achievement even more?

- Provide professional learning and financially support math coaches across districts and state.
- Improve coherence of mathematics instruction across the state.
- Increase collaboration of mathematics stakeholders across the state.
- Increase funding for professional learning, both pre-service and in-service educators.
- Provide professional learning that is content based and built into the school calendar.

# PRIORITIZED SUMMARY OF KY MATH SUMMIT

## 1. High Quality Instructional Resources and research-based instructional strategies

KY Math Summit experts highlighted the success of HQIRs and research-based instructional strategies as an indicator of success. This supports the Kentucky data that show a Tier 1 need due to high numbers of novice and apprentice student mathematics scores. Strong, high quality instruction in Tier 1 leads to student success.

## 3. High Quality Professional Learning

High Quality Professional Learning has proven to be effective in supporting teachers efficacy in teaching mathematics. The KY Math Summit highlighted the need for mathematics focused HQPL customized for:

- Pre-service teachers
- In-service teachers
- School administrators

## 2. Math Coaching

KY Math Summit experts unanimously point to emerging research on the effective use of math coaching in schools. Kentucky is a national leader in mathematics coaching. With researchers from the University of Louisville, KDE has developed an effective design for building capacity in schools through math coaching. KCM collects data on the MAF coaching. The results show great promise in increasing teacher efficacy. KY Math Summit experts highlight math coaching as a priority for funding.

## 4. Effectively use data at teacher and school levels to inform instruction

KY Math Summit experts provided many examples of how data was effectively used to inform instruction and increase student achievement. Data from sub-group populations in Kentucky show a need for scaling successful use of data at teacher and school levels to inform math instruction for diverse learners. There is much research on effective implementation of Multi-Tier System of Support.



What are the affordances (benefits) of the current university approach to teacher preparation

- EX:
- a) content/multidisciplinary coursework
  - b) pedagogical content knowledge development with field connection
  - c) immersive field experience (i.e. student teaching)

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# DATA ANALYSIS FROM NATIONAL IES MATH SUMMIT



# NATIONAL NAEP DATA ANALYSIS

In September of 2023, the Institute of Educational Studies, a national leader in educational policy, hosted a math summit much like the one in Kentucky. Below you will find summary information from Dr. Peggy Carr (Commissioner of the National Center for Educational Statistics) regarding reasons for the drop in mathematics NAEP test scores.

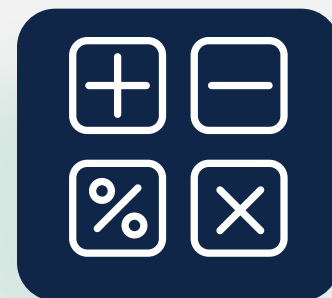
## Student Health and Well-being

School surveys show there is insufficient staff and inadequate funding for the needs of children's mental health issues. This is statistically shown as a cause.



## Confidence in Mathematics Skills

Students in most states showed significant decreases in math skill confidence from 2019. 80% of the 4th grade score decline was associated with drop in confidence. 50% of the 8th grade score decline was associated with drop in confidence.



## Community Health and Income Factors

Schools in counties with highest health and income profile (more community resources) saw less of a decline in their NAEP scores from 2019 to 2022. This data suggests that COVID's impact was more profound in some communities than others.



## Absenteeism

All states reported an increase in chronic absenteeism. Absenteeism accounted for 27% of the decline at grade 4 and 16% of the decline at grade 8.

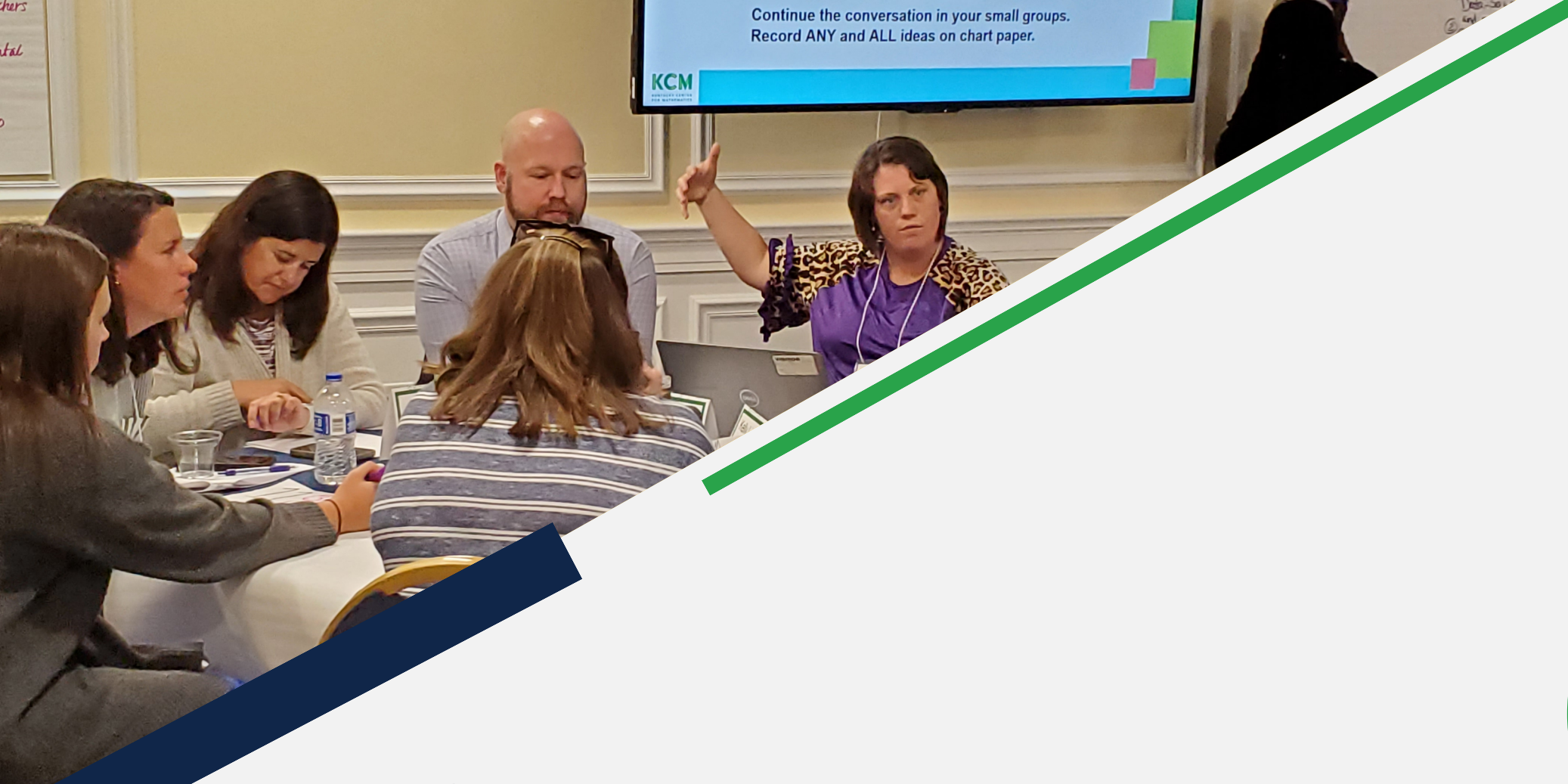


## Teacher Vacancies

16% of schools in high-poverty neighborhoods reported having at least 1 in 10 teacher vacancies, double that of low-poverty neighborhoods.



**ACTIONABLE  
NEXT STEPS**



# Actionable Next Steps



Updated report to Joint Interim Committee on Education.



Facilitate input from school superintendents, accountability experts and chief academic officers.



Facilitate another Kentucky Math Summit to increase voice for more stakeholders.



Reconvene to further analyze the Kentucky mathematics data with special emphasis on sub-groups.



# THANK YOU

## The Kentucky Center for Mathematics

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