



KENTUCKY CENTER
FOR MATHEMATICS

KCM Favorites

Routines for Reasoning:

Fostering the Mathematical
Practices in All Students

Grace Kelemanik/Amy
Lucenta/Susan Creighton

Welcome!



Your host

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KCM Website

www.kentuckymathematics.org



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GOOD NEWS

KCM Launches Multi-Series Virtual PD

Find out more in this month's article!



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.](#)

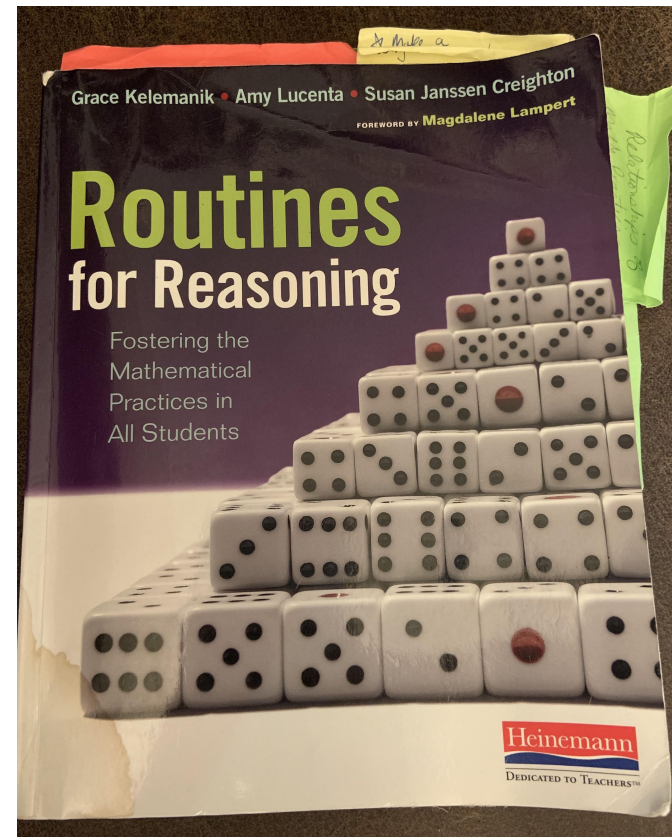
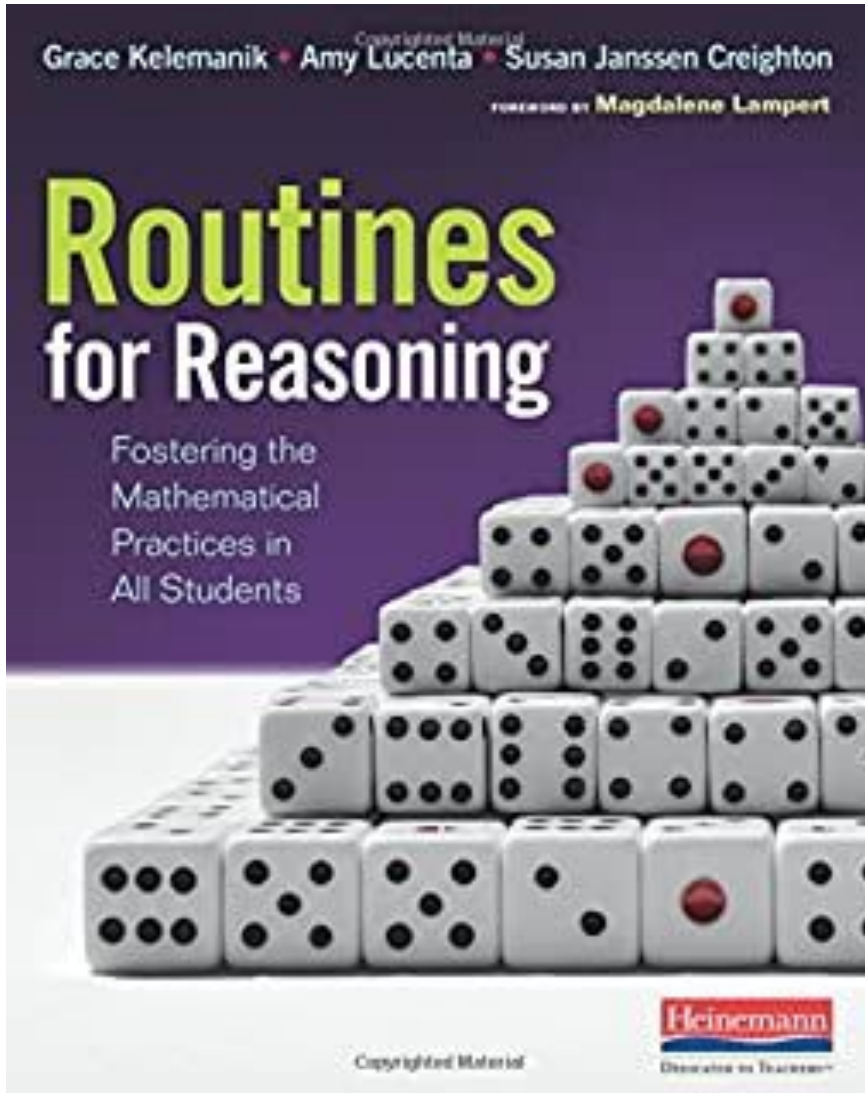
[Elementary: Make 'n Take Supporting Number Sense and Fluency - Mar. 23-27](#)

[Middle: Fractions, Decimals & Percents - Mar. 30-Apr. 3](#)

[High: Algebra & Geometry - Thursdays, Mar. 26 - Apr. 16](#)

KCM Favorite

Mine is well-loved!



Why I Love This Book

**How many Student
Math Practices can
you name off the top
of your head?**

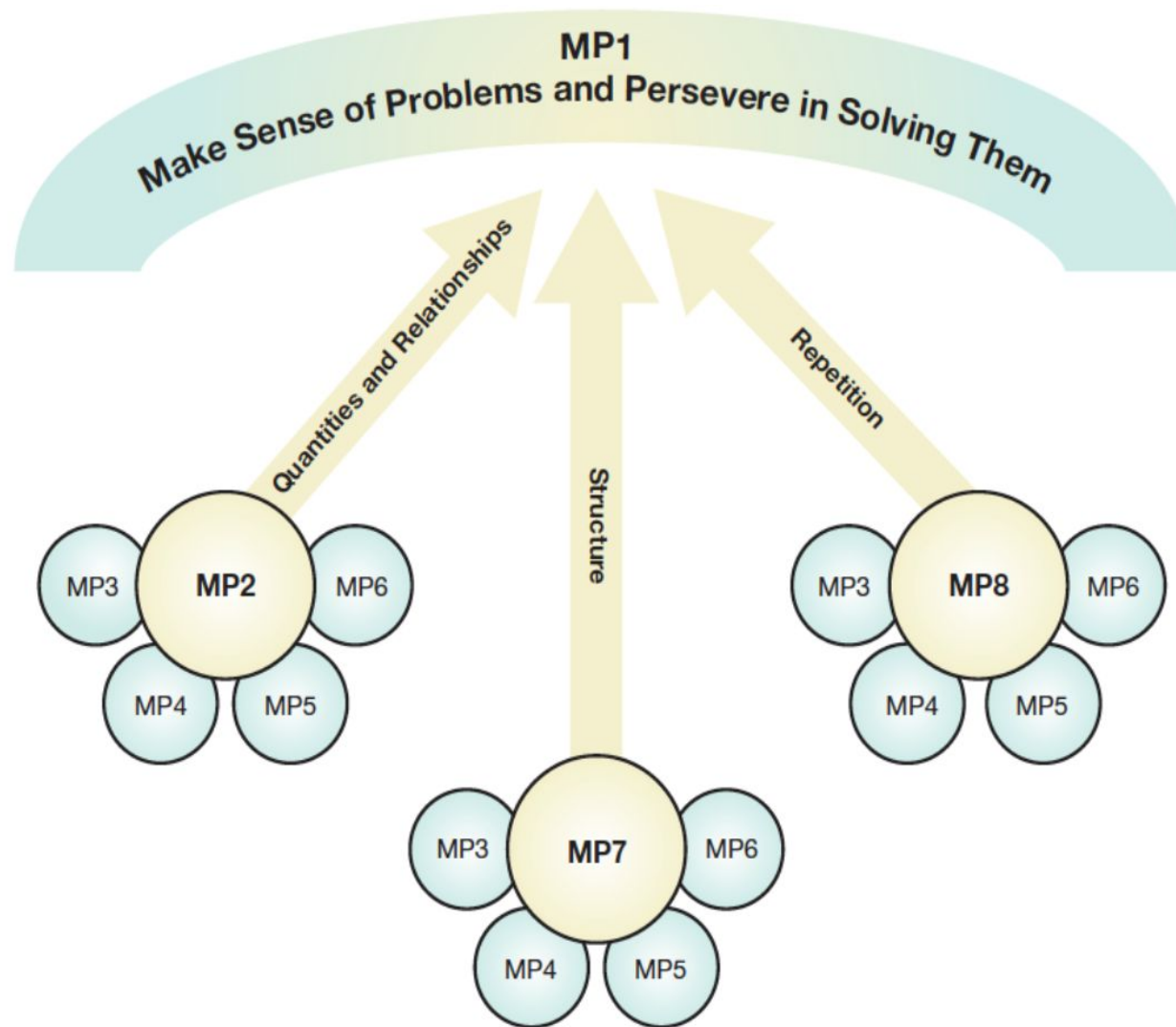


Why I Love This Book

Avenues of Thinking!

- **MP1 Make Sense of Problems & Persevere in Solving Them**
- **MP2 Reason Abstractly & Quantitatively**
- **MP7 Look for & Make Use of Structure**
- **MP8 Look For & Express Regularity in Repeated Reasoning**

Why I Love This Book



About the Authors



Grace Kelemanik



Amy Lucenta

Susan J. Creighton



Why Routines?



Core Elements

- 1) articulation of a math practice goal
- 2) individual think time
- 3) partner work
- 4) full-group discussion of ideas
- 5) final math practice reflection
- 6) access through multiple modalities
- 7) liberal use of math practice-focused prompts

Guiding Principles

“This focus on mathematical reasoning brings to life two of our guiding principles for math practice development: the regular use of cognitively demanding work, and fostering a view of mathematics as interconnected, making sense and doable with effort.”

(p. 22)

Routines for Reasoning

Capturing Quantities



1

Launch
Routine



THINKING GOAL
Reasoning quantitatively

2

Identify
Quantities &
Relationships

Individual Think Time



Pairs



Share, Discuss, & Annotate



3

Create
Diagrams

Individual Think Time



Pairs



4

Discuss
Diagrams

Individual Think Time



Pairs



Share, Discuss, & Annotate



5

Reflect
on Your
Thinking

Individual Write Time



Pairs



Share & Record



MP2:
Reasoning
Abstractly and
Quantitatively

Routines for Reasoning

MP7: Look For and Make Use of Structure

Connecting Representations



1

Launch
Routine



THINKING GOAL
Reasoning structurally

2

Make
Connections



3

Share and
Study
Connections



Share, Discuss, & Annotate



4

Create
Representations

Individual Think Time



Pairs



Share, Discuss, & Annotate



5

Reflect
on Your
Thinking

Individual Write Time



Pairs



Share & Record



Routines for Reasoning

Recognizing Repetition



MP8:

Recognize
and Express
Regularity in
Repeated
Reasoning

1

Launch
Routine



THINKING GOAL
Reason with repetition

2

Notice
Repetition

Individual Think Time



Pairs



Share



3

Generalize
Repetition

Individual Think Time



Pairs



4

Discuss
Generalization

Individual Think Time



Pairs



Share, Discuss, & Annotate



5

Reflect
on Your
Thinking

Individual Write Time



Pairs

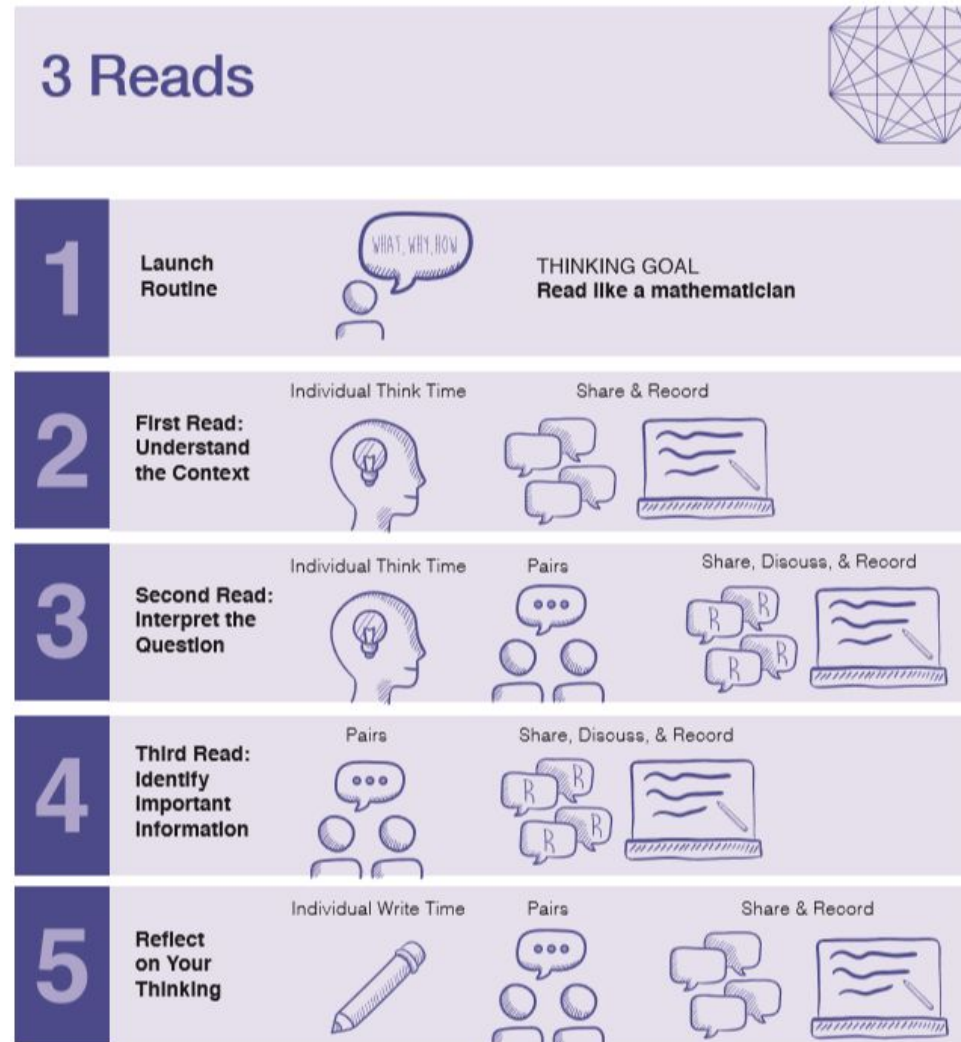


Share & Record



Routines for Reasoning

Enter a
Problem and
Sustain
Thinking



Essential Instructional Strategies

❖ **Ask-yourself Questions**

❖ **Annotation**

❖ **Sentence frames and
sentence starters**

❖ **The Four Rs – repeat
rephrase reword, record**

How do you use the 4Rs?



If it's possible that not everyone heard a response...

...then the teacher has one or two students **repeat** what was said.

If

- the idea is a key part of the lesson, **or**
- The teacher wants to check to see if students understand what was said, **or**
- The teacher isn't sure what a student has responded...

...then the teacher has a few students **rephrase** the idea using different words.

How do you use the 4Rs?



If there is specific language students can use to express this idea more precisely...



...then the teacher prompts students to **reword** the idea using more precise language.

If there are important ideas, words, or images being shared that students would benefit from seeing visually...



...then the teacher should **record** these ideas to help students process or remember key concepts and participate in the conversation.

And the 5th strategy is ...
Make it Routine!

Website Support



[Avenues of Thinking](#) [Special Populations](#) [Routines for Reasoning](#) [Related Resources](#) [What We Offer](#) [Q](#) [≡](#)



“ Teaching students to think and reason is perhaps the greatest challenge we face as math educators, and these routines provide clear pathways to do so. ”

Handouts

Making Sense of the Math Practices

We should use this practice **ALL THE TIME!**

**MP1: Make sense of problems
and persevere in solving them**

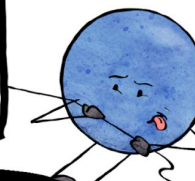
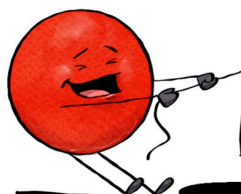


Use these practices to **ENTER A PROBLEM**

**MP2: Reason
abstractly &
quantitatively**

**MP7: Look
for and make
use of
structure**

**MP8: Look for
and express
regularity in
repeated
reasoning**



Use these practices while **WORKING THROUGH A PROBLEM**

**MP3: Construct
viable arguments
and critique the
reasoning of others**

**MP4: Model
with
mathematics**

**MP5: Use
appropriate
tools
strategically**

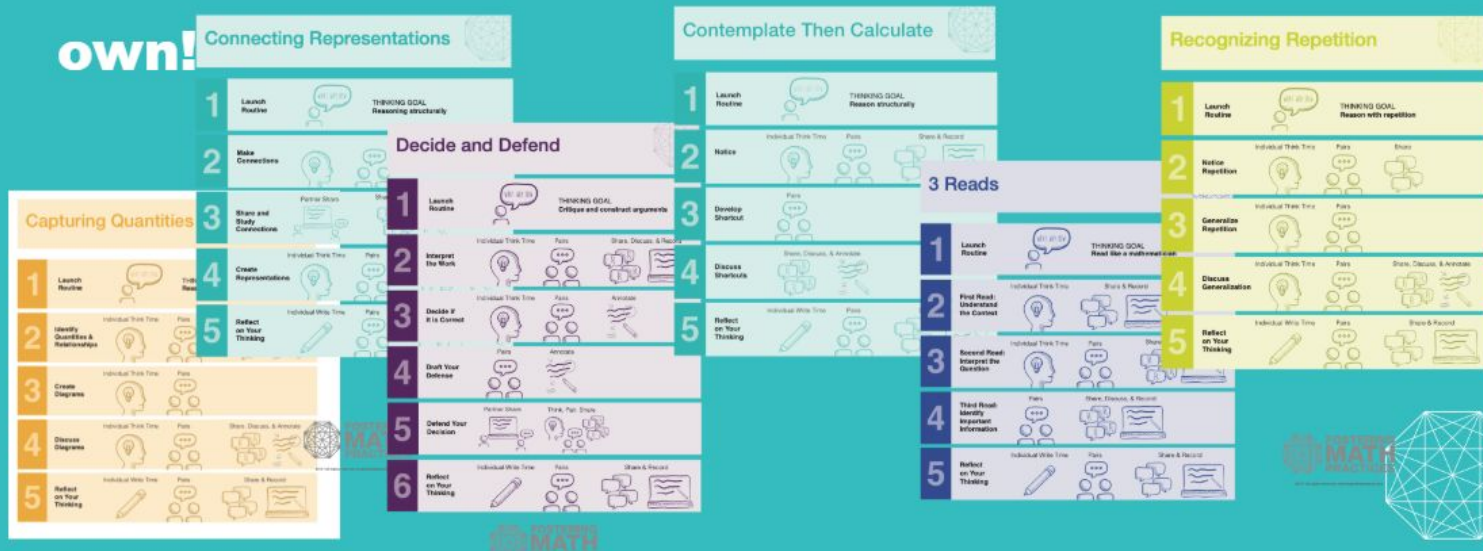
**MP6: Attend to
precision**



Handouts

Infographics – purchase & download to print your

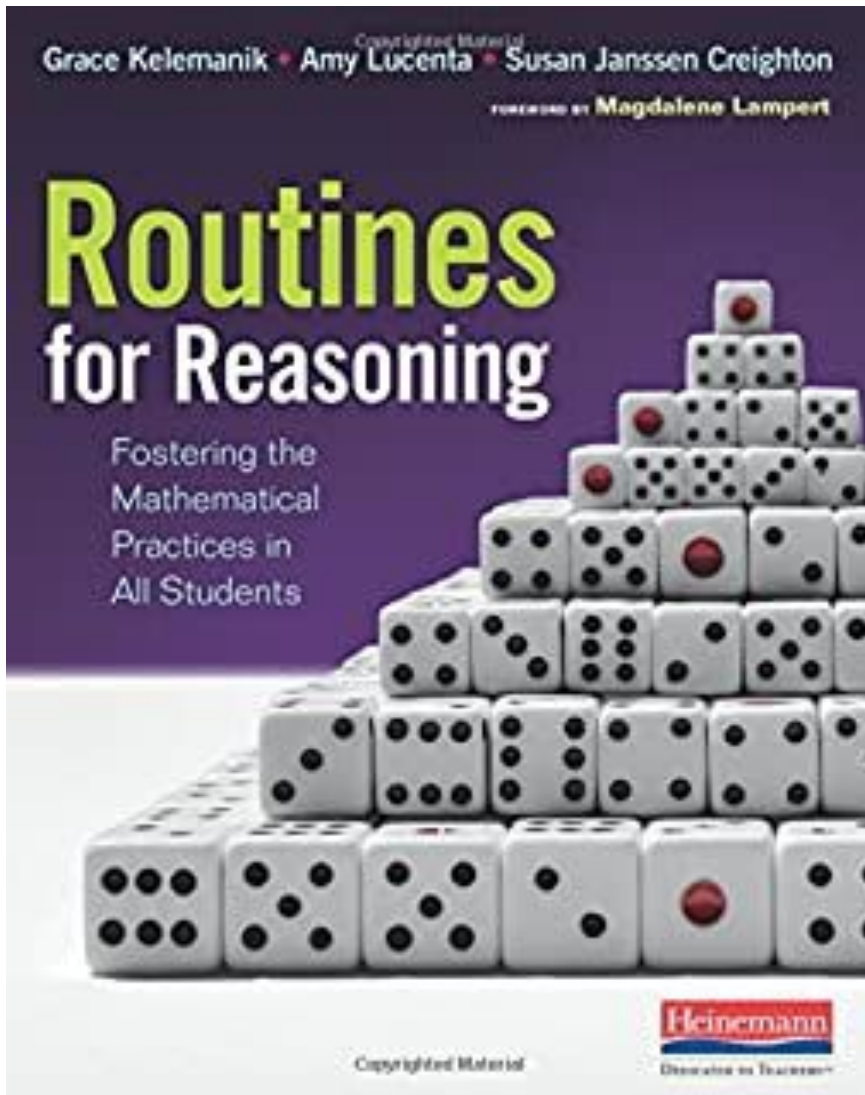
own!



FOSTERING
MATH
PRACTICES

All of these are part of your handout packet!

KCM Favorite



[Heinemann](#)

[Amazon](#)

KCM Favorite

APRIL 20 - 24
2:00-2:30 PM EST



KCM Favorites!

w/ KY Math Leaders

Monday, April 20 - Thinking Together- 9 Beliefs for Building a Mathematical Community

Tuesday, April 21 - Routines for Reasoning: Fostering the Mathematical Practices in All Students

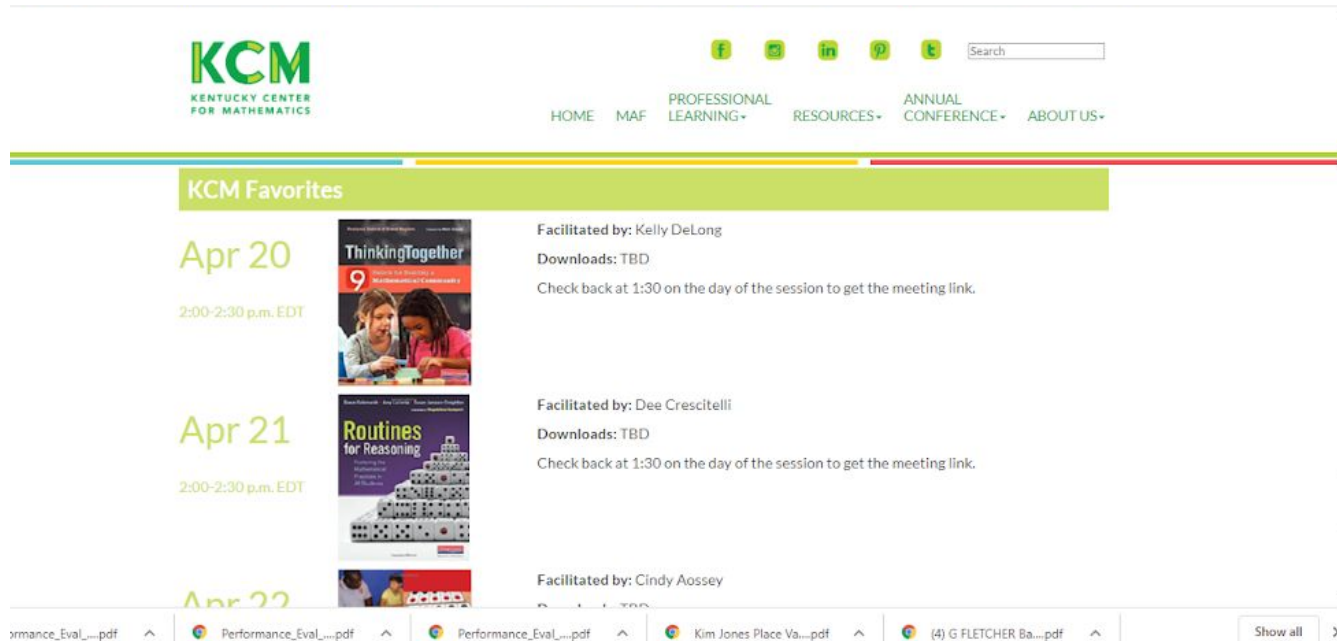
Wednesday, April 22 - Developing Number Knowledge

Thursday, April 23 - Math Fact Fluency

Friday, April 24 - Taking Action Implementing Effective Mathematics Teaching Practices Grades 9-12

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@KyCenterforMath

KCM is here to support you!



Contact me

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