

Number Sense:  
Bring it Back through  
Strategy Sharing!



*Alissa Murray*  
*Dr. Jennifer “Filly” Fillingim*  
*Dr. Elizabeth Wells*  
*Pamela Rayburn*  
*Patti Swan*

# About Madison County

- 4 Elementary → Middle → High School “zones”
  - 11 Elementary Schools, 4 Middle Schools, 5 High Schools, and 2 others: Madison Career and Technical Center and the Academic Options Center
- ~ 13,000 students
- 5 members of Math Specialist Team
  - We organize our collaborations with teachers based on grade bands and/or math content more than by specific schools.

# How Our Number Talks Conversation Started

- As part of ongoing professional development and providing CEU opportunities, our district offers “book studies” throughout the year.
- One of the most frequent comments from our teachers that fall had been students’ “lack of number sense.”
  - This project was motivated by teacher-driven needs.
- And Alissa found...

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# MAKING NUMBER TALKS MATTER

Developing  
Mathematical  
Practices and  
Deepening  
Understanding,  
GRADES 4-10

**CATHY HUMPHREYS & RUTH PARKER**

FOREWORD BY JO BOALER

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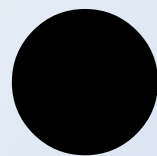
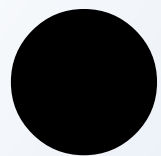
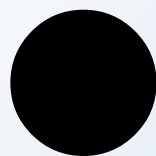
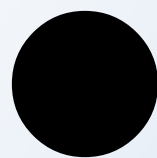
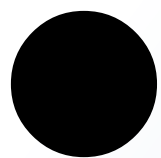
# What We Liked About the Book...

- The book was very accessible for teachers at different points in their teaching careers.
- The book offered multiple examples of number talks to try and how to use them in the classroom.
- The book addressed how to anticipate challenges or “bumps in the road” and strategies for how to handle them.
- Our Associate Superintendent over Curriculum agreed to buy the books for the participants.

What /s a Number Talk?

Let's Do One Right Now!



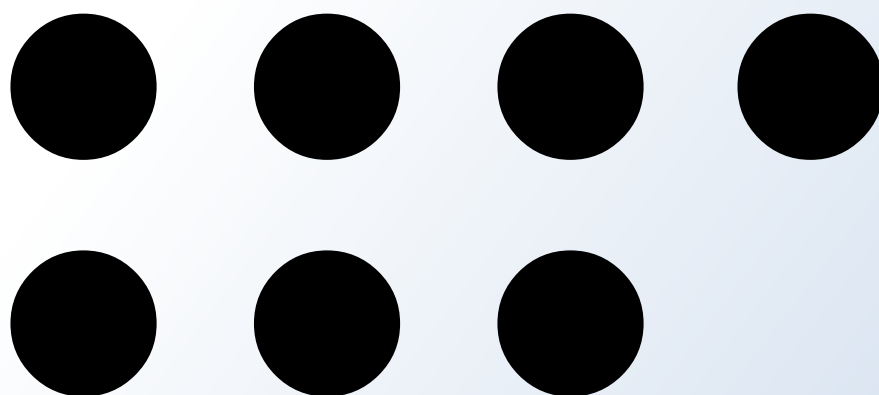




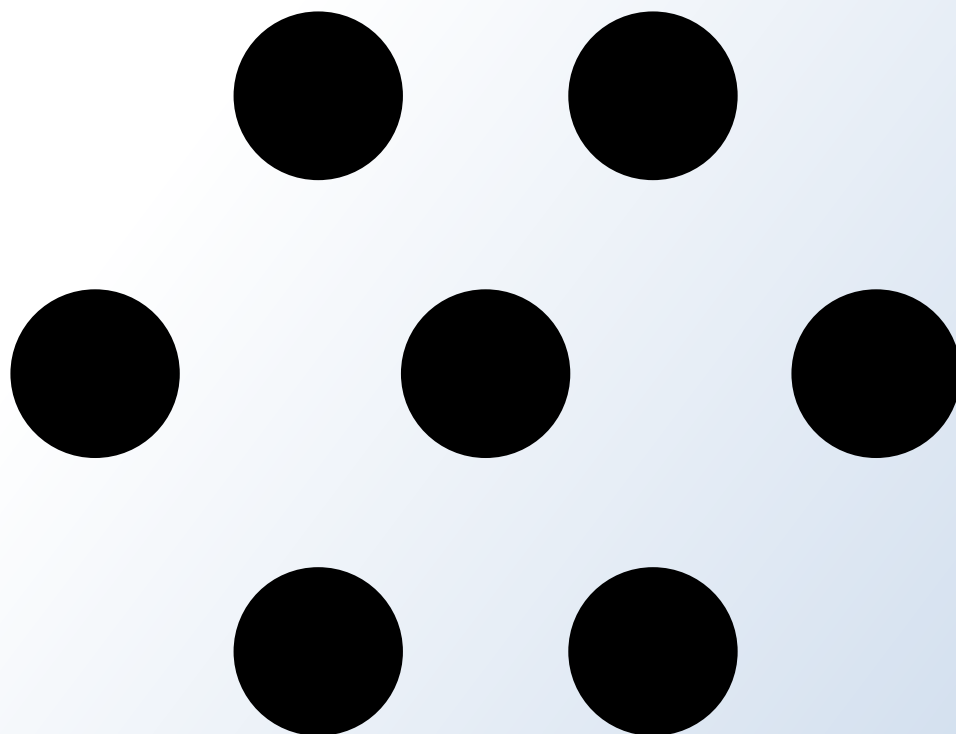














# Why Start with Dots and Thumbs?

- The dots level the mathematical playing field.
  - This isn't about computational fluency or speed.
  - Something so “simple” can reveal so many different ways of thinking about numbers.
  - “Facts” and “numbers” have meaning.
- The thumbs create a safe and non-intimidating way for everyone to participate.
  - Different personalities and confidence levels
  - Gender equity
  - ELL/ESL students



# Design of Our Book Study

- We have had two iterations of the book study.
- After each book study session, we debrief as a team.
- With each book study we surveyed the participants.

# Book Study No. 1

## How We Organized the Book Study

- We met once a month (Jan – April) at our Central Office. Teachers had to attend all four sessions to get the CEUs.
  - We also had two makeup sessions.
- We had a “schedule” of chapters we would discuss at each meeting.
- Teachers were asked to read the chapters and *try* the Number Talks in their classrooms.

# Book Study No. 1

## At the Book Study Meetings...

- We tried to set up a fun “coffeehouse” vibe.
- We started off as a whole group and then split into grade bands for closer conversations.
- We collaborated as a team to plan for each book study meeting, based on the needs and questions we saw arising within the grade bands of teachers.

# Book Study No. 1

## At the Book Study Meetings...

- We shared videos of number talks and samples of number talks we had used.
  - We wanted to encourage buy-in from teachers: “We can do this!”
  - We used these as opportunities to prompt group discussions: “What would *you* do here?”
- We modeled number talks with our teachers.
  - Our teachers needed opportunities to experience the challenge of uncertainty and flexible thinking from a “student” perspective.

# Book Study No. 1

## At the Book Study Meetings...

- We worked to create a “safe place” to address fears and uncertainties.
  - “What challenges do you anticipate facing or *are* you facing, and how can we address that?”
- We created tasks to facilitate discussions of “good” number talk prompts.
- We shared helpful organizational strategies.
  - Instructional Planning/Reflection Template
- Our confession...

# Making Number Talks “Real”

- Some of our teachers embraced the idea of Number Talks and began trying them – some with adjustments, based on their students’ needs.
- Mrs. Katie D. Video
  - 7<sup>th</sup> Grade Math Teacher

# Book Study No. 1

## Things We Observed

- We noticed some of our teachers seemed hesitant to try Number Talks in their classrooms.
- We did an anonymous survey at one of our meetings.
  - What are some challenges you face with Number Talks?
  - Would you like for us to come and offer support while you do a Number Talk?
  - Would you like for us to model a Number Talk with your students?

# Book Study No. 1

## Open-Ended Survey Responses

Question	Responses
<i>What did you find most valuable about the book study? What are some recommendations that you would like to make for the next book study?</i>	<ul style="list-style-type: none"><li>• <i>"I loved the discussion time."</i></li><li>• <i>"the break off sessions"</i></li><li>• <i>"Talking with other teachers in the district."</i></li><li>• <i>"Collaborating with colleagues"</i></li><li>• <i>"New ideas"</i></li><li>• <i>"Other teacher experiences"</i></li><li>• <i>"discussions and real classroom examples we can actually use"</i></li></ul>



# Book Study No. 1

## Open-Ended Survey Responses

Question	Responses
<i>What would you need to assist you with implementing Number Talks in the classroom?</i>	<ul style="list-style-type: none"><li>• <i>“It would be great to see it modeled in my classroom.”</i></li><li>• <i>“someone to model different strategies to be used”</i></li><li>• <i>“modeling”</i></li><li>• <i>“planning”</i></li><li>• <i>“conversation starters”</i></li><li>• <i>“Model the strategy”</i></li><li>• <i>“Some one modeling it would be helpful...”</i></li></ul>

*What would you need to assist you with implementing Number Talks in the classroom?*

# Book Study No. 1

## Survey Responses

- Statement: I would be more willing to implement Number Talks in my classroom if I saw someone model this with my students.
  - Approximately 50 percent agreed or strongly agreed.
- Statement: I would like to facilitate Number Talks in my classroom.
  - Almost 92 percent agreed or strongly agreed.

# Book Study No. 2

## At the Book Study Meetings...

- Changed the structure of the book study
  - Met each Tuesday during the month of February and once in March
  - Incorporated completion of 2 in-class teacher-led Number Talks
- Changed the way readings were assigned
- Support we provided for our teachers
  - We shared a guide for getting Number Talks started.
  - We shared helpful organizational strategies.
- We had some veterans! 😊


## Example of Planning Template from the Book

<p><b>Anticipate different strategies students might use for solving the problem (or how they might “see” a dot card).</b></p>	<p><b>How will you record each of these strategies?</b></p>
<p><b>What questions might you ask to fully understand and represent students’ thinking and/or method?</b></p>	<p><b>In reflecting on this Number Talk, what do you want to remember, what problem might you do next, and why?</b></p>

## Number Talk Template

<b>Problem/Topic:</b>	<b>Follow- up Problem(s):</b>
<b>Potential Strategies:</b>	<b>Facilitator Notes and Questioning Prompts:</b>

# Instructional Planning/Reflection Template

<b>24 + 67</b>	<u>Round and Adjust</u> $24 + 70 = 94$ $94 - 3 = 91$	<u>Take and Give:</u> $24 + 67$ (Take 4 from the 24 and give it to the 67) $20 + 71 = 91$
<u>Start from the Left:</u> $20 + 60 = 80$ $4 + 7 = 11$  $80 + 11 = 91$	<u>Break One Addend Apart:</u> $24 + 60 = 84$ $\quad + 7$ $\quad \underline{91}$	<u>Add Up:</u>  

# Book Study No. 2

## In-Class Number Talks...

- We did a pre-brief and a debrief with our teachers for each Number Talk that they completed.
- This video is part of a debrief with a high school teacher after a number talk.
- She teaches Geometry and Algebra III.

# Book Study No. 2

## Open-Ended Survey Responses

Question	Responses
<i>What did you find most valuable about the book study? What are some recommendations that you would like to make for the next book study?</i>	<ul style="list-style-type: none"><li>• “Leading number talks at the meeting and developing one with a partner.”</li><li>• “The team support. I felt supported and encouraged.”</li><li>• “Being able to practice with guidance was the most valuable because I was able to receive feedback immediately after implementing a Number Talk.”</li></ul>

*What did you find most valuable about the book study? What are some recommendations that you would like to make for the next book study?*

- “Leading number talks at the meeting and developing one with a partner.”
- “The team support. I felt supported and encouraged.”
- “Being able to practice with guidance was the most valuable because I was able to receive feedback immediately after implementing a Number Talk.”



# Challenges

What do you think???

# Challenges Through Our Teachers' Eyes

## **Book Study No. 1 Responses**

- *"Time is always a challenge..."*
- *"Time!!"*
- *"Keeping the number talks going."*
- *"Having time..."*
- *"Time management"*
- *"Time"*
- *"time"*
- *"Finding the time to do number talks between everything else..."*

## **Book Study No. 2 Responses**

- *"How to represent students thoughts on the board."*
- *"The problem I had was I did not start until [the] end of year and a few students were not as excited."*
- *"Time constraints?"*

# How Do We Address That Challenge?

- The students in this video are 8<sup>th</sup> Graders.
- This is the teacher's fifth year teaching at this middle school and second year working with the Number Talks book.
- The student population at this middle school is approximately 4% ELL and 71% free and reduced lunch.

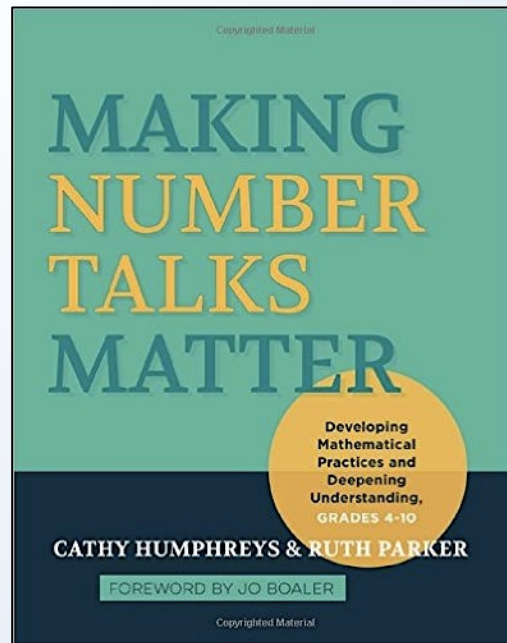
# Let's Watch a Number Talk

# Lessons Learned for us as “Coaches”

- There were various implementation styles of Dot Talks.
  - These are an important part of getting students started with Number Talks.
  - How can we strengthen implementation of Dot Talks in a classroom?
  - Change our structure for in-class Number Talks

# Wrapping Up...

- For the remaining time, we will be here to answer questions.
- But before you go...



# Thank You!

- Contact us:
  - [amurray@madison-schools.com](mailto:amurray@madison-schools.com)
  - [jfillingim@madison-schools.com](mailto:jfillingim@madison-schools.com)
  - [ewells@madison-schools.com](mailto:ewells@madison-schools.com)
  - [prayburn@madison-schools.com](mailto:prayburn@madison-schools.com)
  - [pswan@madison-schools.com](mailto:pswan@madison-schools.com)



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If there is time...



# Learning how to Think This Way Builds Across Grade Levels

3<sup>rd</sup> Grade

Is  $\frac{1}{8}$  larger than  $\frac{1}{3}$ ? How do you know?

Algebra I

Below are the slopes of two lines. Determine which line is steeper. Justify your response without using the words “rise over run.”

$$m_1 = \frac{2}{3} \text{ and } m_2 = \frac{2}{8}$$

# Learning how to Think This Way Builds Across Grade Levels

## Calculus

Find each of the following limits.

$$a. \lim_{x \rightarrow \infty} \frac{1}{x}$$

$$b. \lim_{x \rightarrow 0} \frac{1}{x}$$