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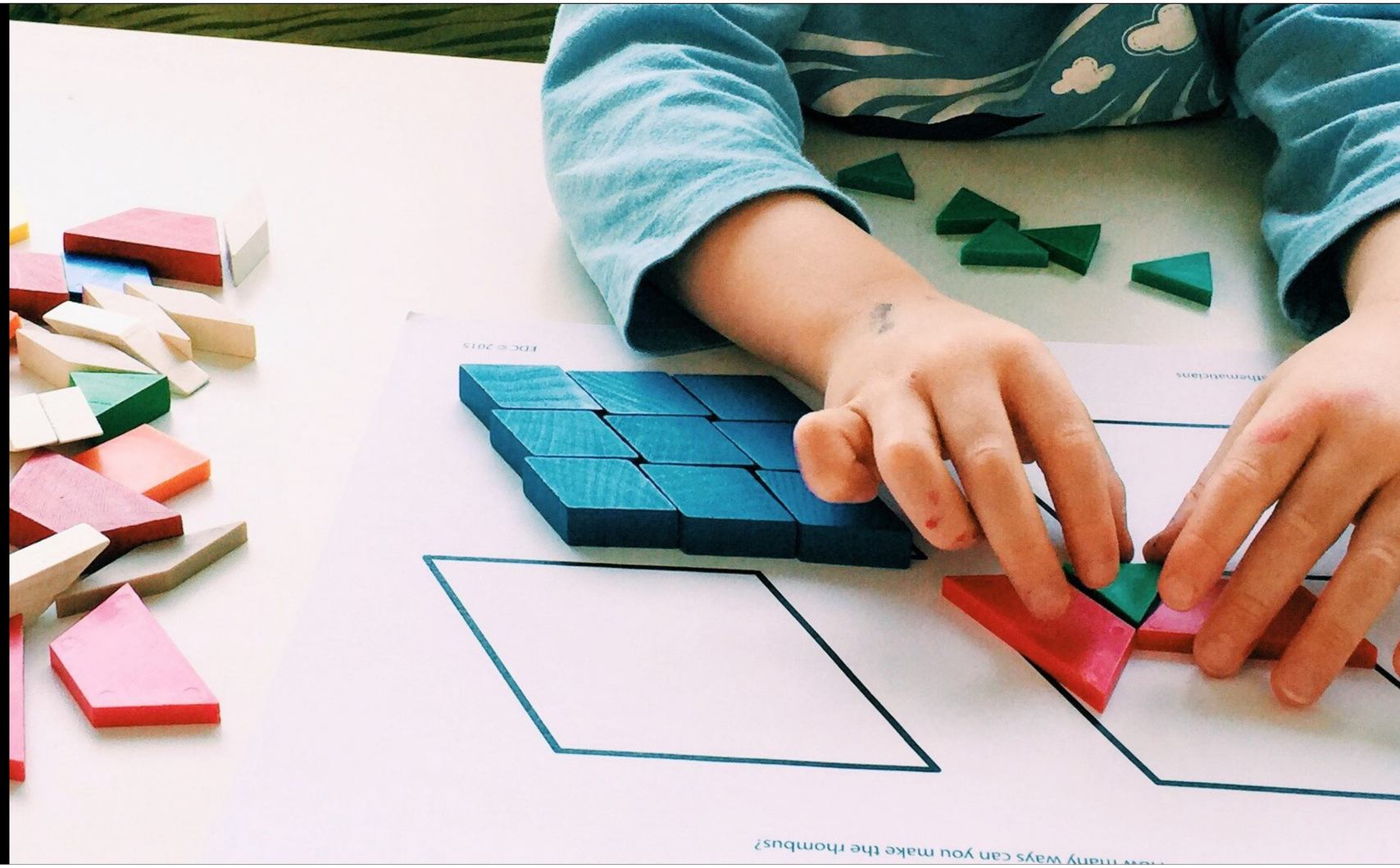
It All Adds Up!
How Librarians Can Support Math Literacy for Children and Families

Imagine what a library can be

DISCOVER



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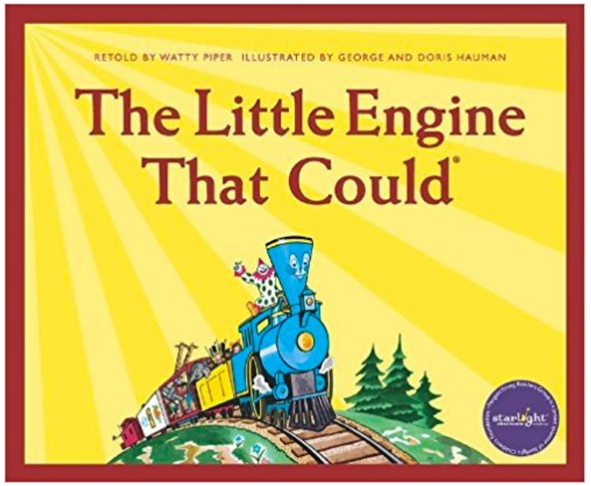
Which book title best describes your experience **as a learner** of mathematics?



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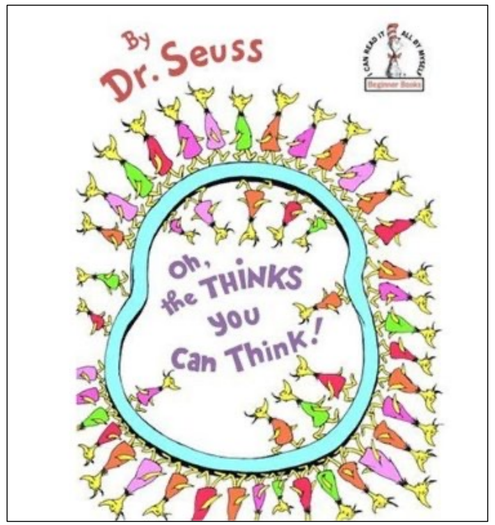

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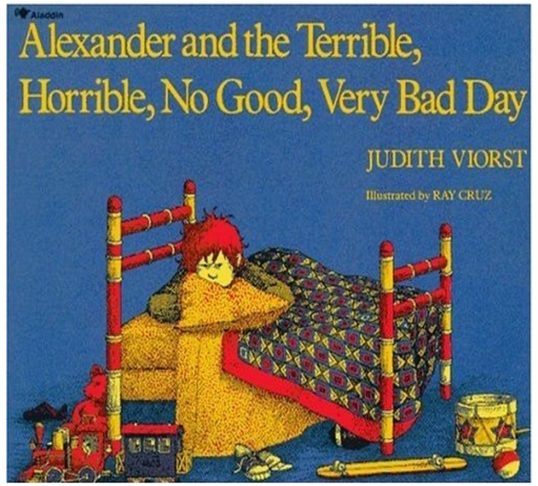

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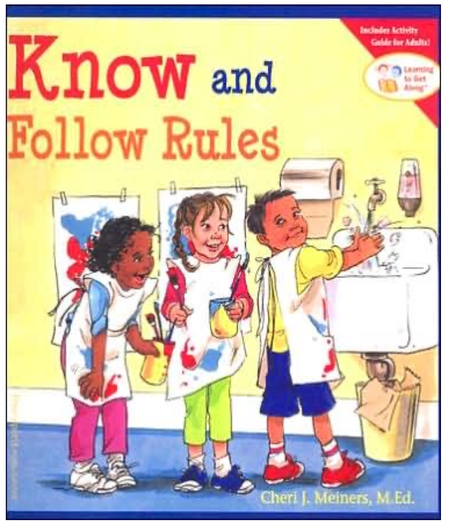

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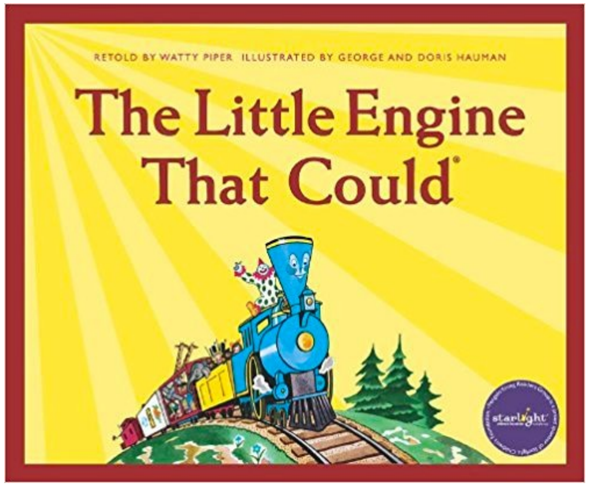
How do we want children and families to feel about math?



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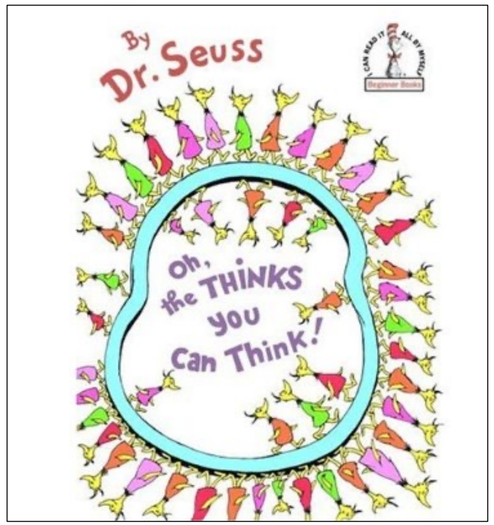

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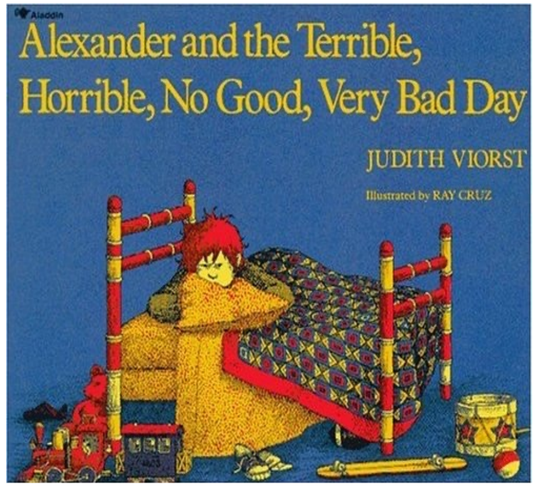

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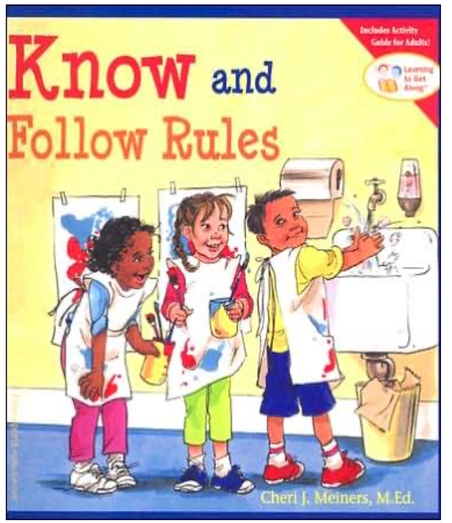

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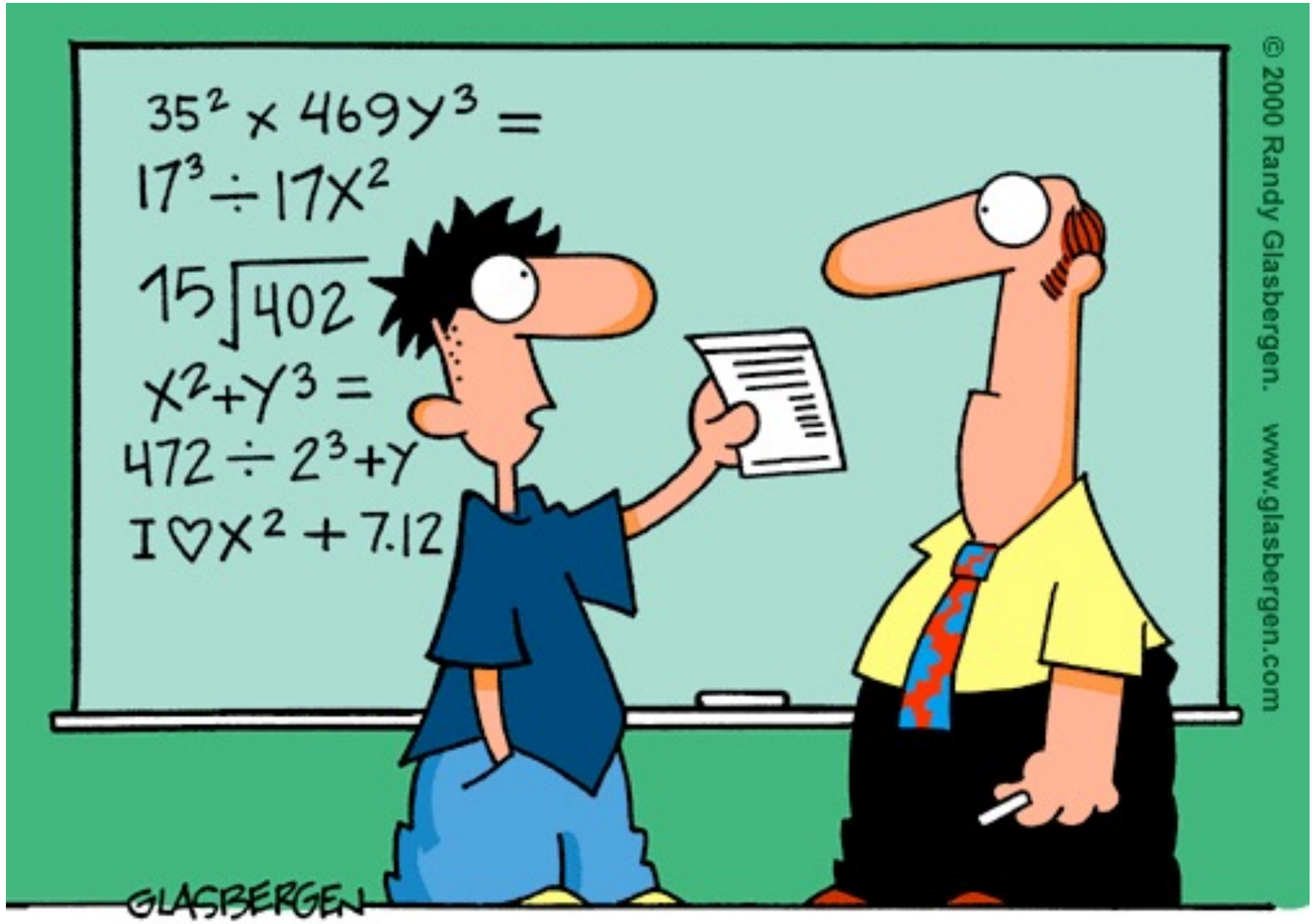
Agenda

- Adult Attitudes Matter
- Why Early Math?
- Math Books and Games in the Library
- Q&A Discussion

This work is supported by the National Science Foundation (DUE-1348564, DRL-1907904), Heising-Simons Foundation (2016-133, 2015-023, 2019-1396), and Overdeck Family Foundation (2019-1396). *Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.*

Adult Attitudes and Beliefs about Math Matters

Math Messages

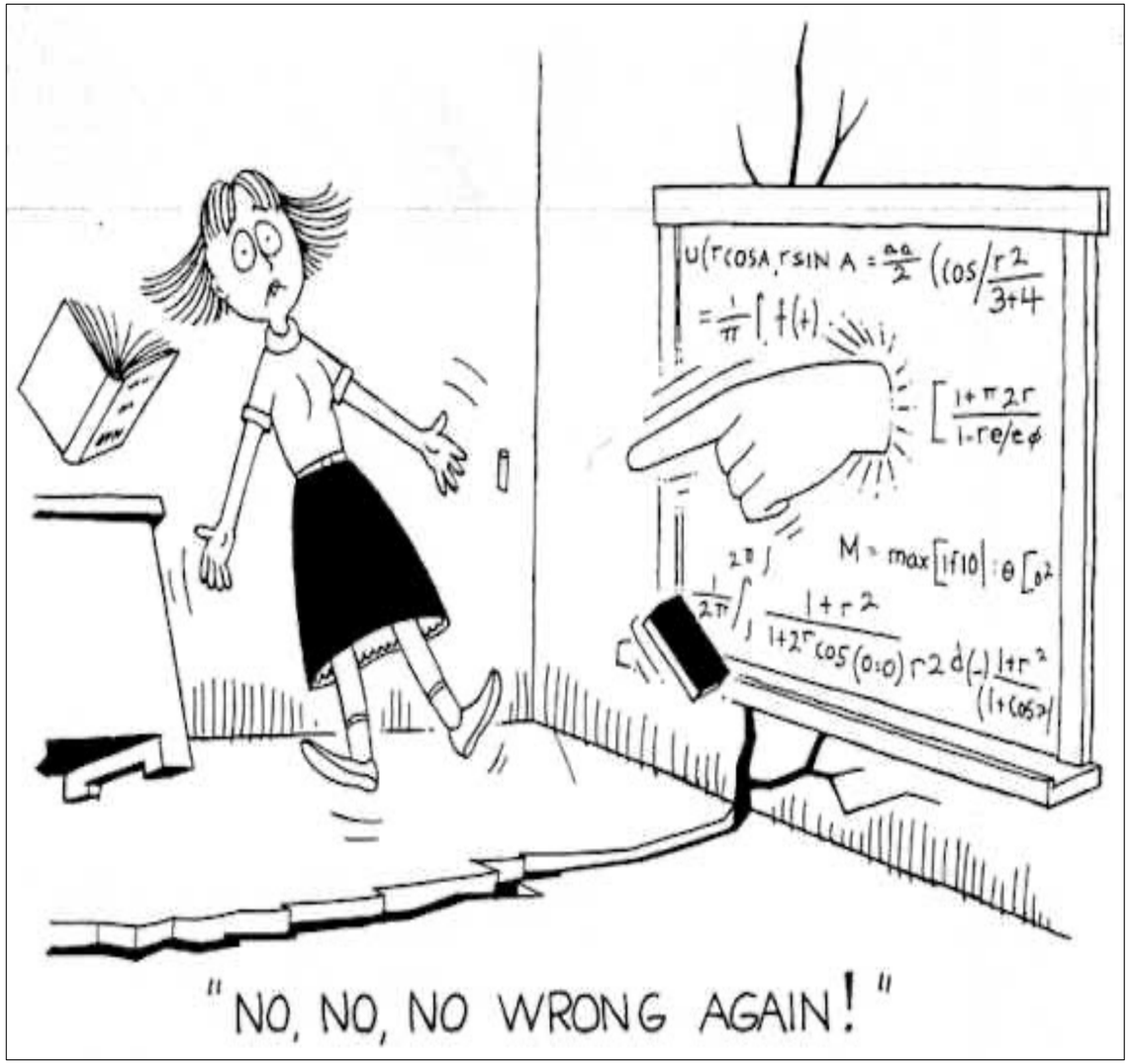


"I HAD MY DOCTOR DO A D.N.A. BLOOD ANALYSIS. AS I SUSPECTED, I'M MISSING THE MATH GENE."

Math anxiety is…

“a feeling of tension, apprehension, or fear that interferes with math performance”

Mark Ashcraft – Math Anxiety: Person, educational, and cognitive consequences (2002)



What *not* say to influence children's attitudes toward math…

I hate math

I'm not a math person

Don't worry, I'm not good at math either

Math makes me nervous

Math myths are everywhere!

What can we do to foster positive attitudes toward math?

Adopt a positive math attitude!

Replace math anxiety with motivation, persistence, and positive messages:

- Math is fun!
- I love puzzles because I like
- to problem-solve!
- I’m so excited to play a math game!

Engage in everyday math to develop preschoolers' math knowledge!

- Count and label objects
- Talk about and compare shapes
- Use spatial language
- Read math books

When parents talk with their child about math—even just once a week—it improves math achievement!

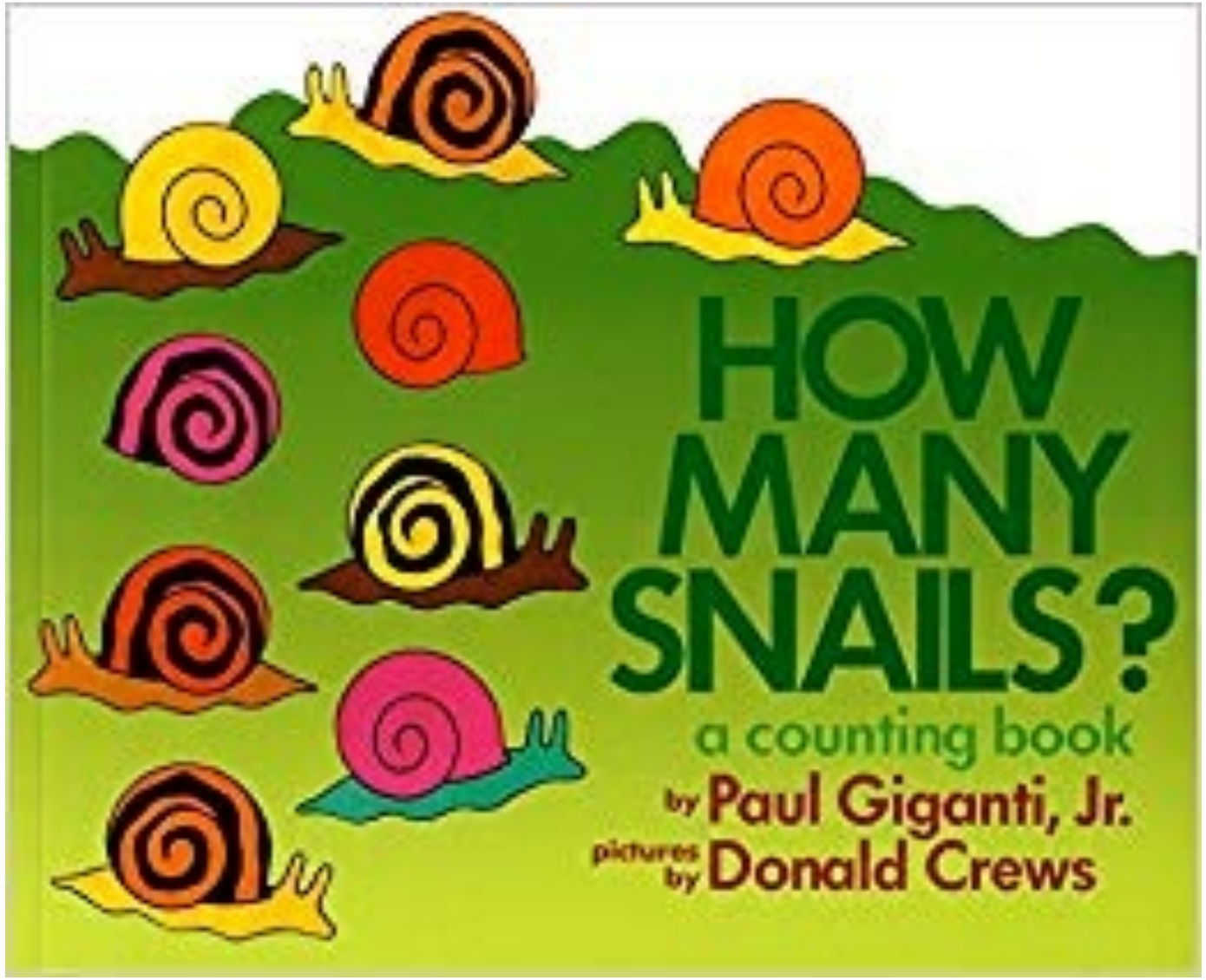
Math Literacy


Let’s Do Some Math!

What do you notice?

I went walking to the meadow
and I wondered:
How many flowers were there?
How many flowers were yellow?
How many flowers were yellow
with black centers?

Literature Connections



What is early math?

- Sorting and Attributes
- Patterns
- Shapes and Geometry
- Spatial Reasoning
- Number: Counting and Cardinality
- Number Operations
- Measurement
- Data Collection and Analysis

What is mathematical thinking?

- Persisting at challenging tasks
- Using precise language
- Problem-solving
- Finding patterns
- Using logical reasoning
- Using tools (number path, numberline, rulers, graphs)

Talking About Math

- Build enthusiasm and excitement about mathematical ideas
- Build confidence about math abilities
- Strengthen awareness of math concepts

This is fun, I can do this, I see math ideas in my world.

Why Early Math?

Early math . . . Matters!

Early mathematics understanding prior to school entry significantly predicts later school achievement *over and above* reading skills and even attention skills[1].

This finding held for both boys and girls and for children from high and low SES backgrounds.

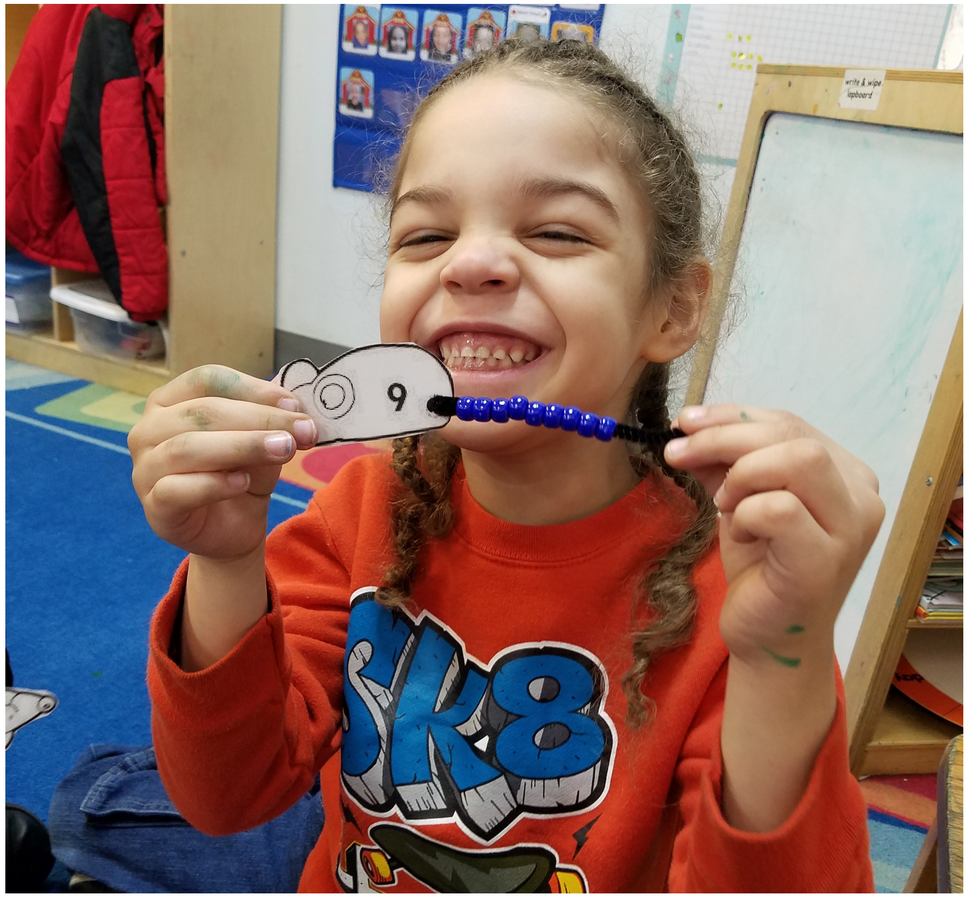
[1]Duncan et al., 2007

Why focus on early math?

Long term academic success!

Early math skills are a key Predictor of graduating from high school.

Children who do well in math are also more likely to attend college.



Clements et al., 2020; Dumas et al., 2019; McCoy et al., 2017; Sarama, Lange, et al., 2012 , Watts, et al., 2014

Children are born mathematicians!

Young children have the capacity and interest to learn meaningful mathematics, but children need "*adult support to build and extend their early knowledge and learn to focus on and elaborate the mathematical aspects of everyday situations—to mathematize*" (p.334).

[1]Hachey, 2013; Sarama & Clements, 2009; [2] *Mathematics Learning in Early Childhood: Paths Toward Excellence and Equity* (2009)

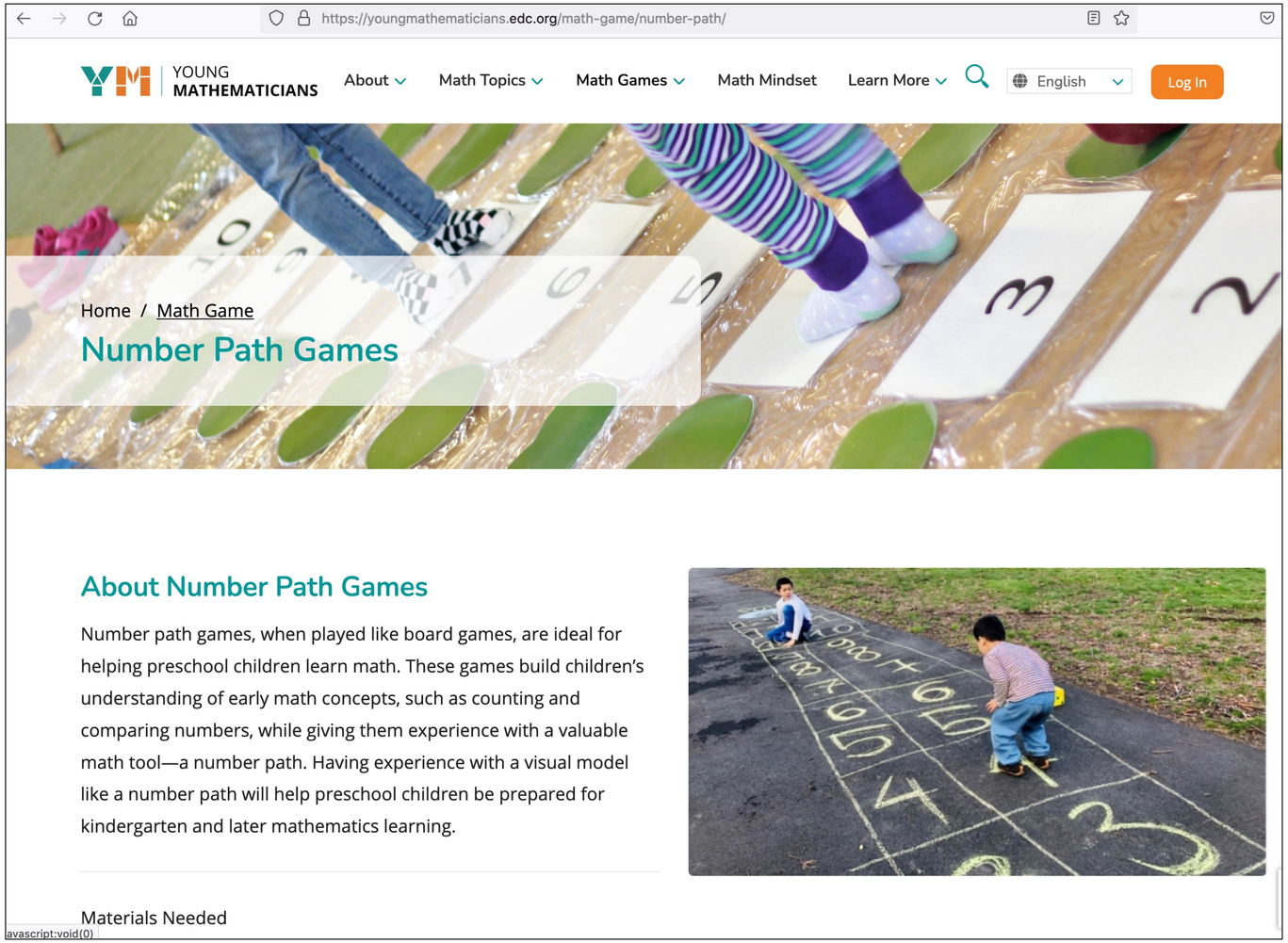
How do we support families in early math?

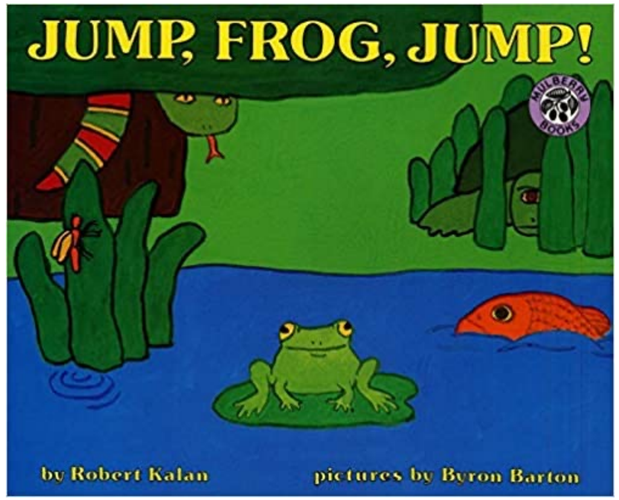
Now more than ever children need family math opportunities to grow mathematically.

Let’s Do Some Math!


Number Paths

Number Path Game





EDC Young Mathematicians Website

Number Path at Home

https://vimeo.com/478974702

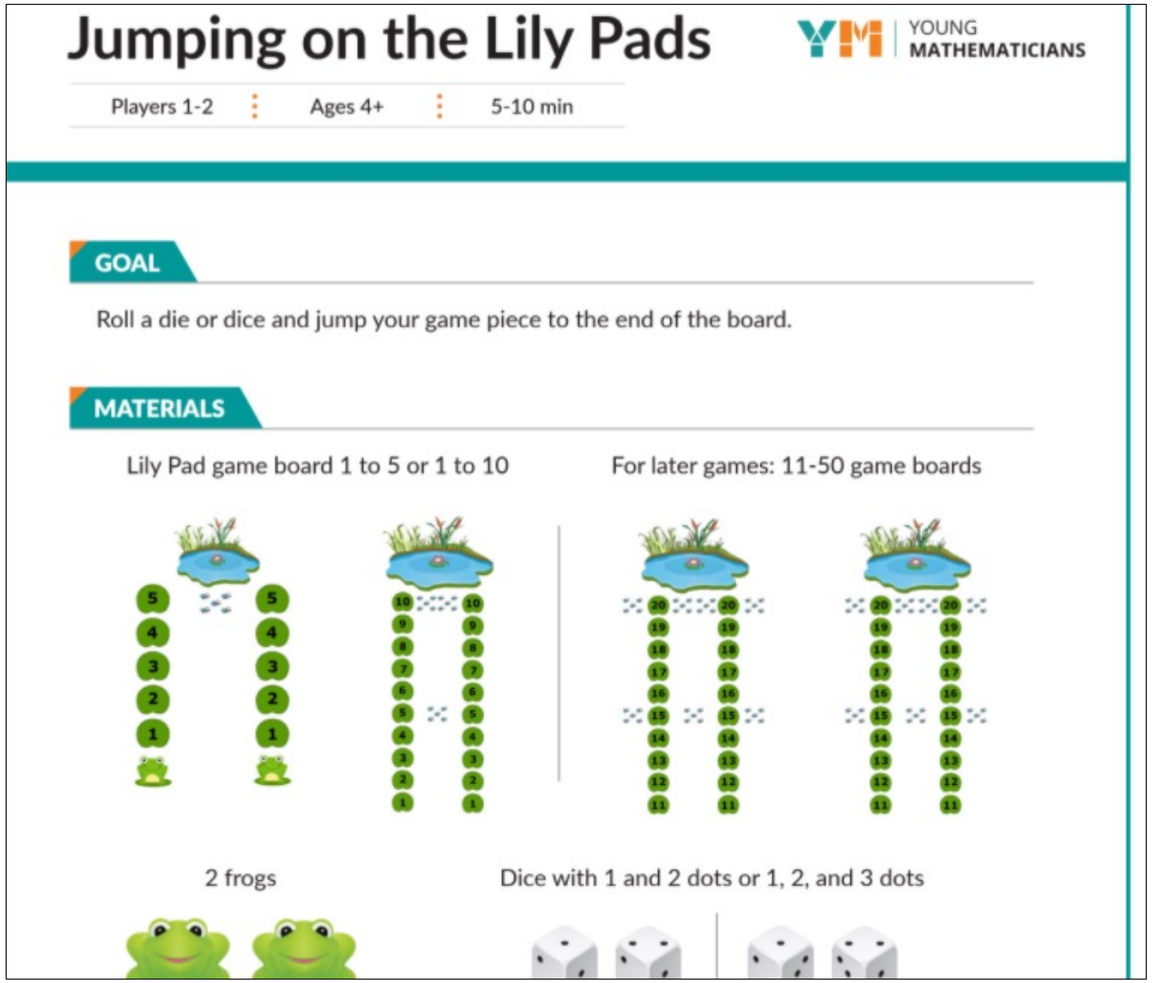
Math in Number Path Games

- Recognize written numerals
- Number order (1, 2, 3, 4, …)
- Numbers that come before and after
- One-to-one correspondence when moving on the board
- Recognizing the number of dots on the dice
- Number magnitude: How big is 10?
- Vocabulary: closer, farther, more, less, before, after
- Game Playing Skills

Play Games, Learn Math!
Number Path Games article
from NAEYC's *Teaching Young Children*

EDC Young Mathematicians Website

Spanish and Portuguese versions coming soon



Jumping on the Lily Pads

YOUNG MATHEMATICIANS

Players 1-2 | Ages 4+ | 5-10 min

GOAL

Roll a die or dice and jump your game piece to the end of the board.

MATERIALS

Lily Pad game board 1 to 5 or 1 to 10

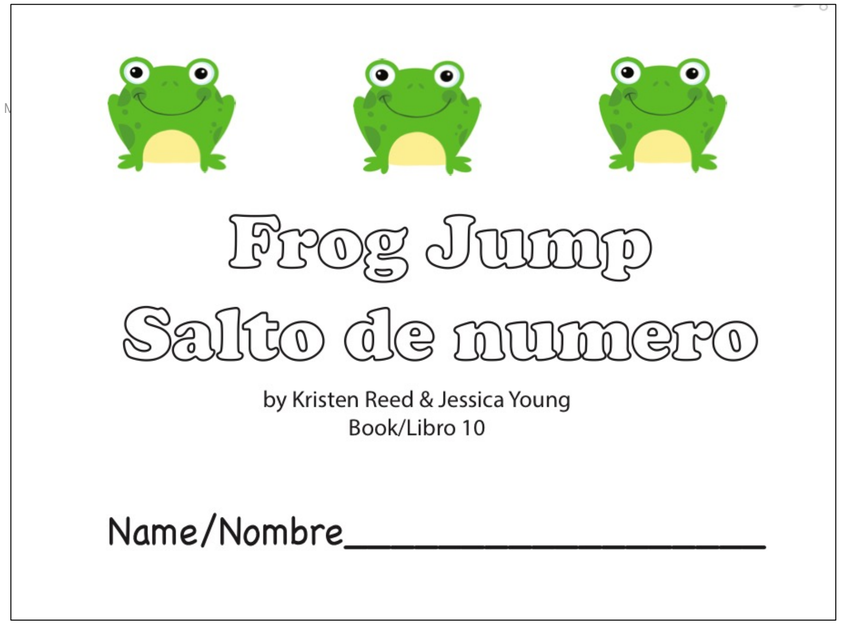
For later games: 11-50 game boards

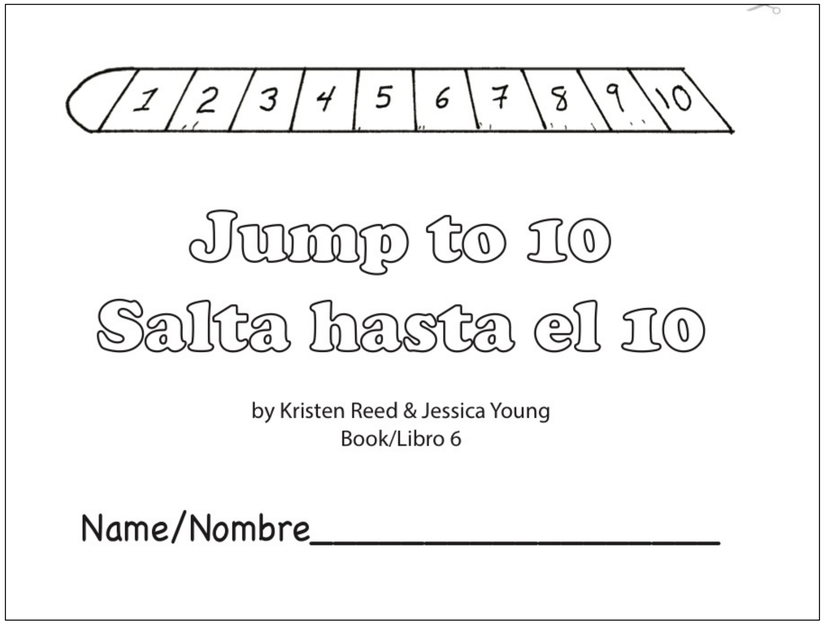
2 frogs

Dice with 1 and 2 dots or 1, 2, and 3 dots

EDC Young Mathematicians Website

Family Math mini-books



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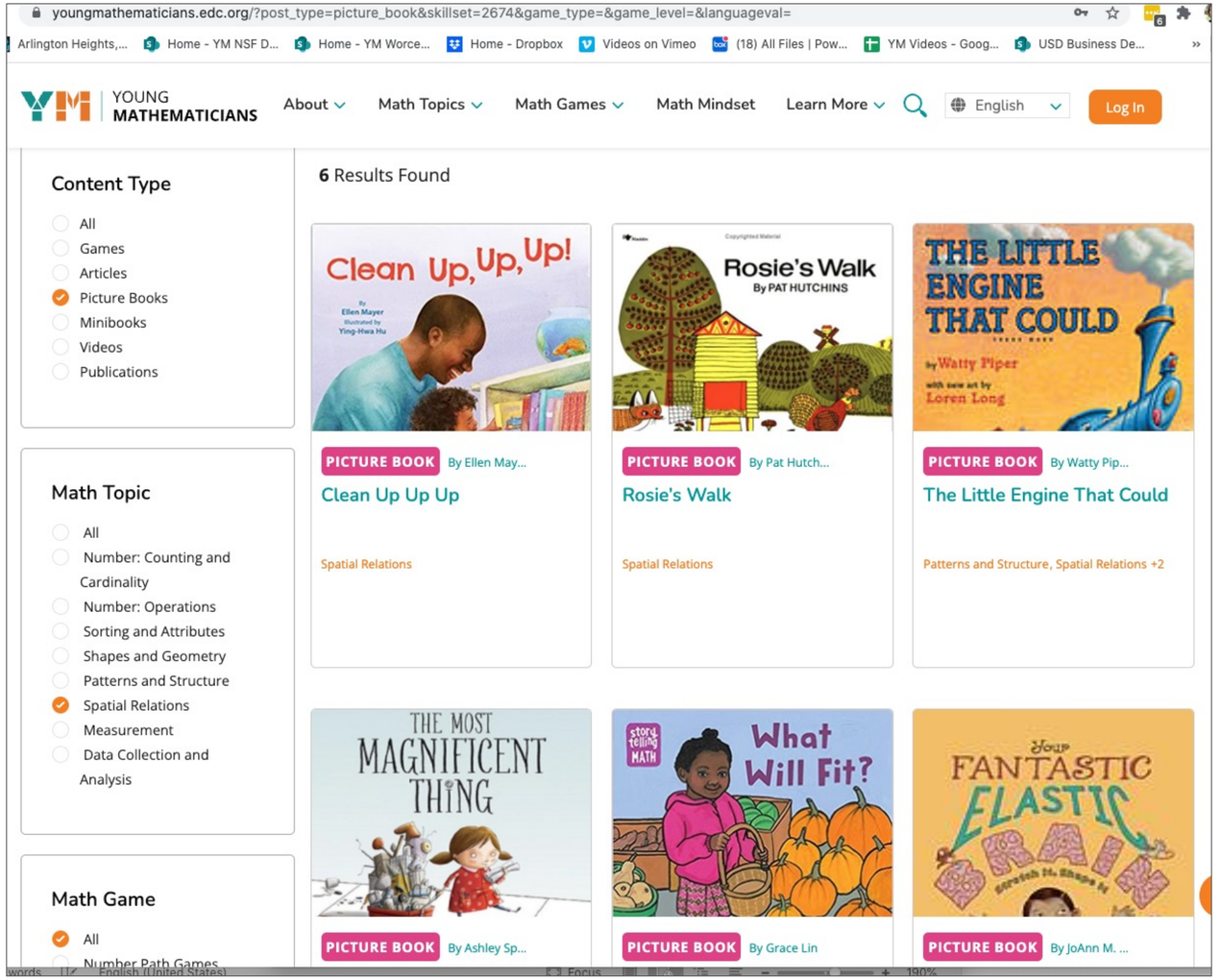
CANDY LAND
LOLLIPOP WOODS
PEANUT ACRES
GUMDROP PASS
PEPPERMINT FOREST

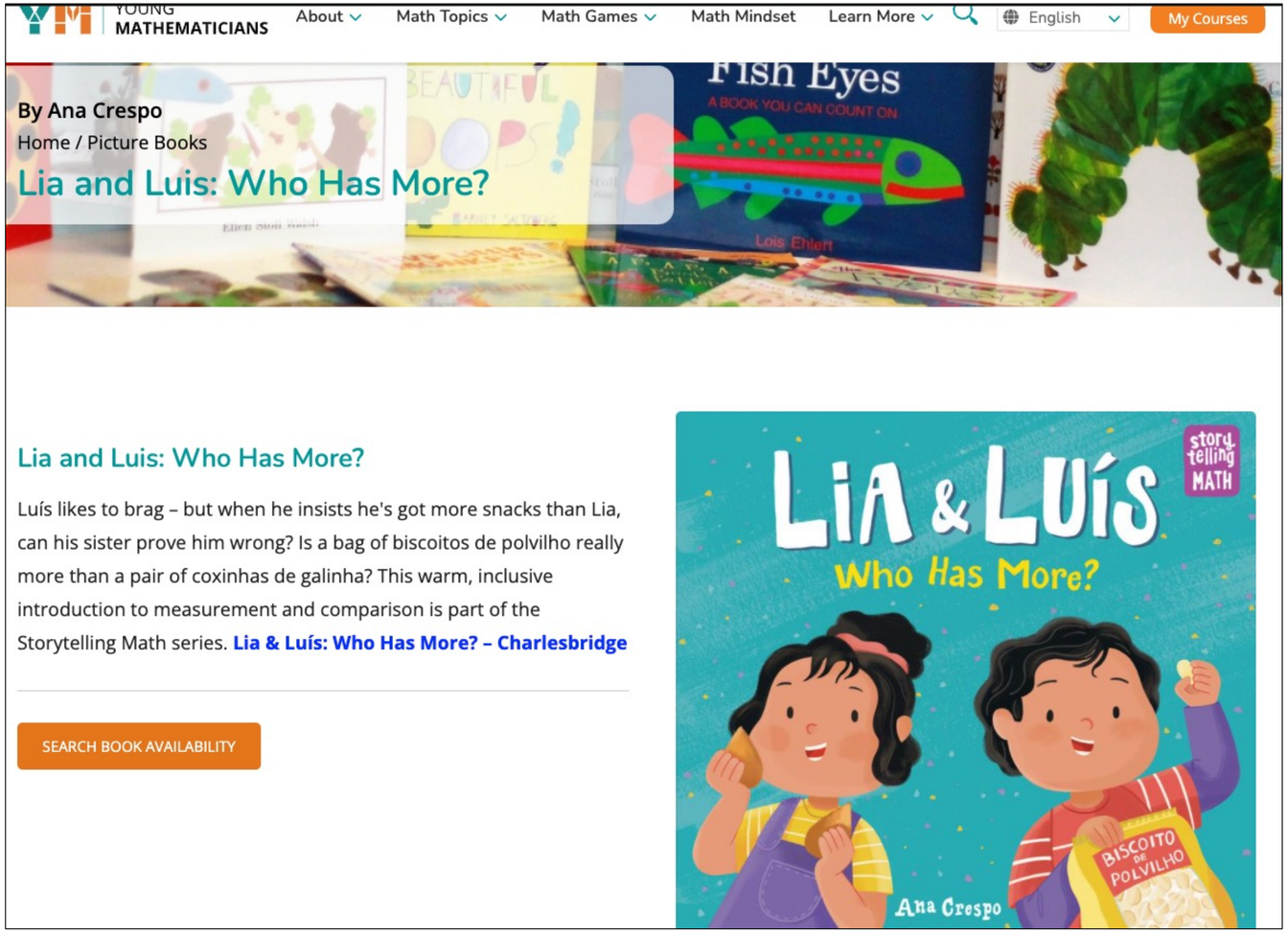

Chutes and Ladders

Resources

Young Mathematicians Website



Young Mathematicians Website



Join the Family Math Movement

NAFSCE
NATIONAL ASSOCIATION FOR FAMILY, SCHOOL, AND COMMUNITY ENGAGEMENT

https://nafsce.org/page/FMsignup

EDC Education Development Center

Visit YM.edc.org

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Questions and Discussion

One last thing

If you could give just one tip, action step or piece of advice for all the librarians out there, what would it be?

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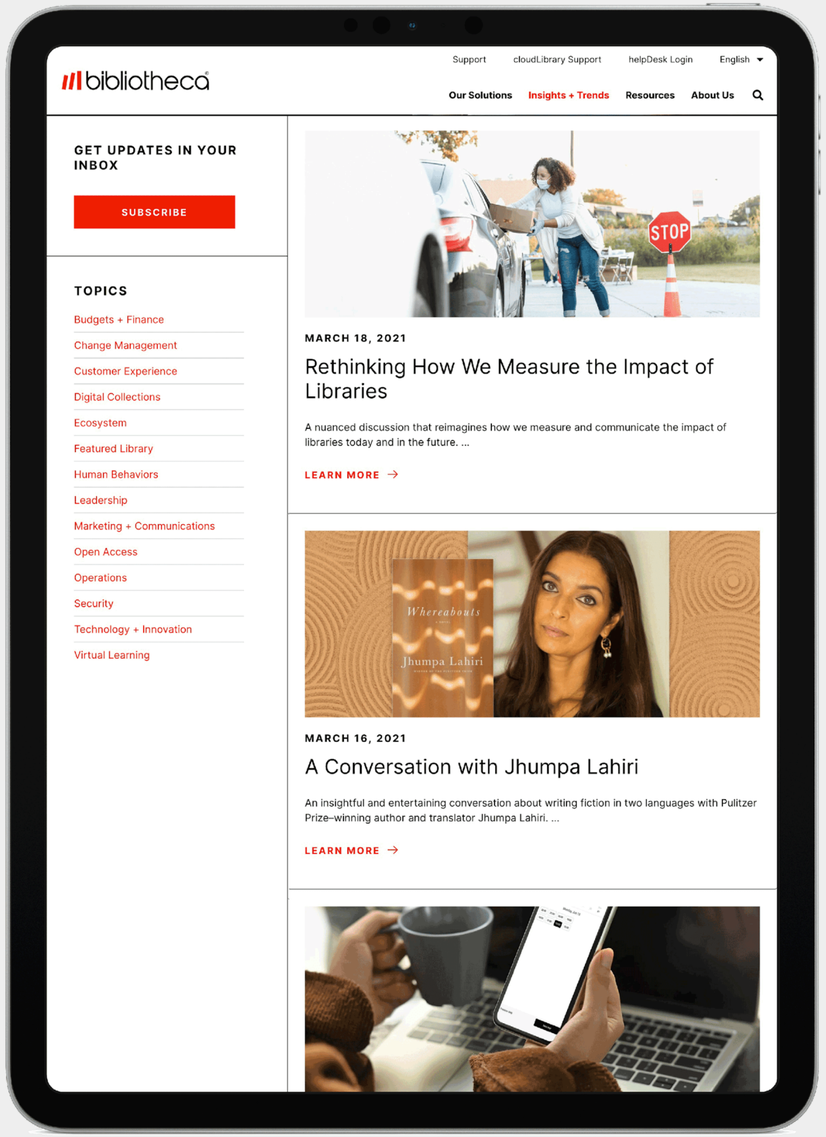
“This is my second webinar from your site and I really look forward to them. You include interesting speakers and topics and I wish the presentation didn’t have to end. Thank you!

Webinar attendee, 2020



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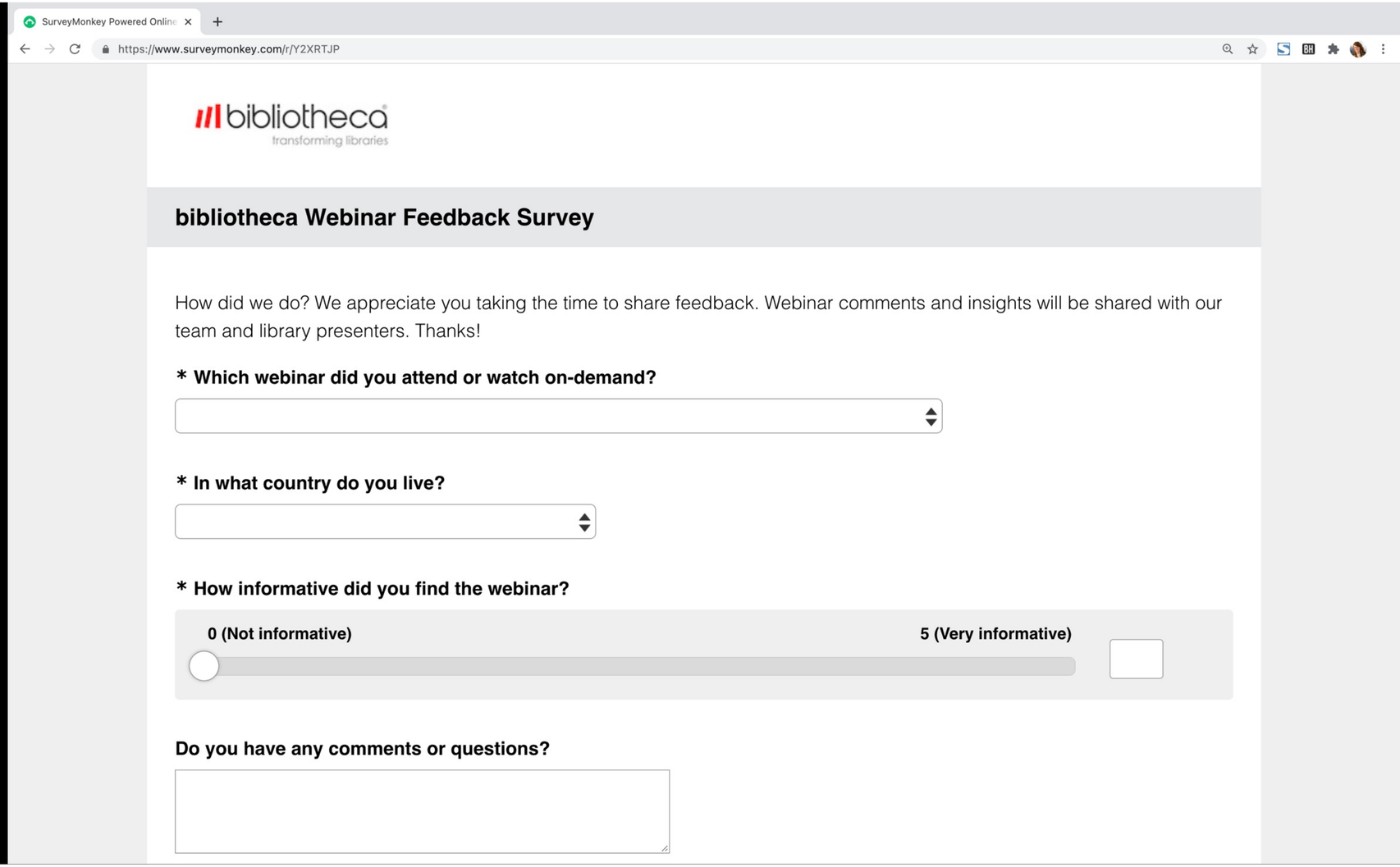

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