Providing Early Math Opportunities

MAGIC 8 PROFESSIONAL DEVELOPMENT SERIES

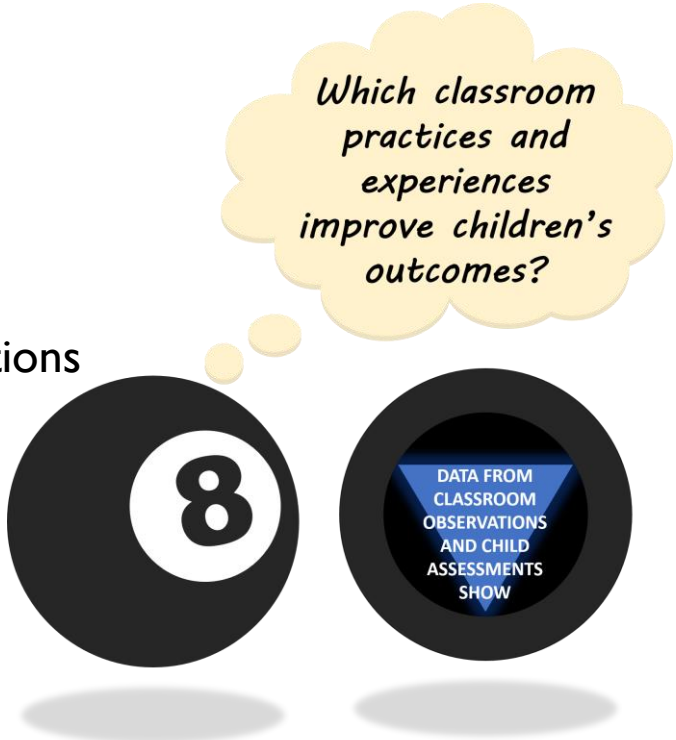
PEABODY research institute

METRO NASHVILLE PUBLIC SCHOOLS

THE "MAGIC 8" CLASSROOM PRACTICES

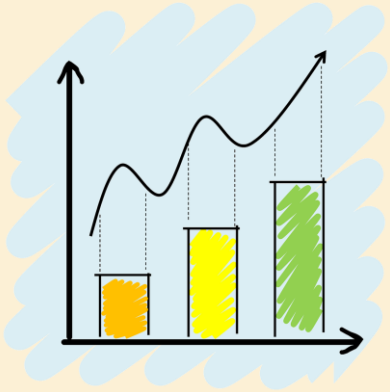
1. Reduce time spent in transition
2. Improving level of instruction
3. Creating a positive climate
4. Increasing teacher listening to children
5. Planning sequential activities
6. Promoting associative and cooperative interactions
7. Fostering high levels of involvement
8. Providing math opportunities

★ 2017-18 MNPS Initiative: Focus on Literacy ★



THE IMPORTANCE OF EARLY MATH

In a landmark 2007 study, Duncan and colleagues found that early childhood math knowledge and skills predict **BOTH** later **math** and **reading** achievement, while literacy skills only predicted reading.



Math skills are also related to children's **Executive Functioning** skills (attention, working memory, inhibitory control)

Children who participate in more math activities have stronger math gains.

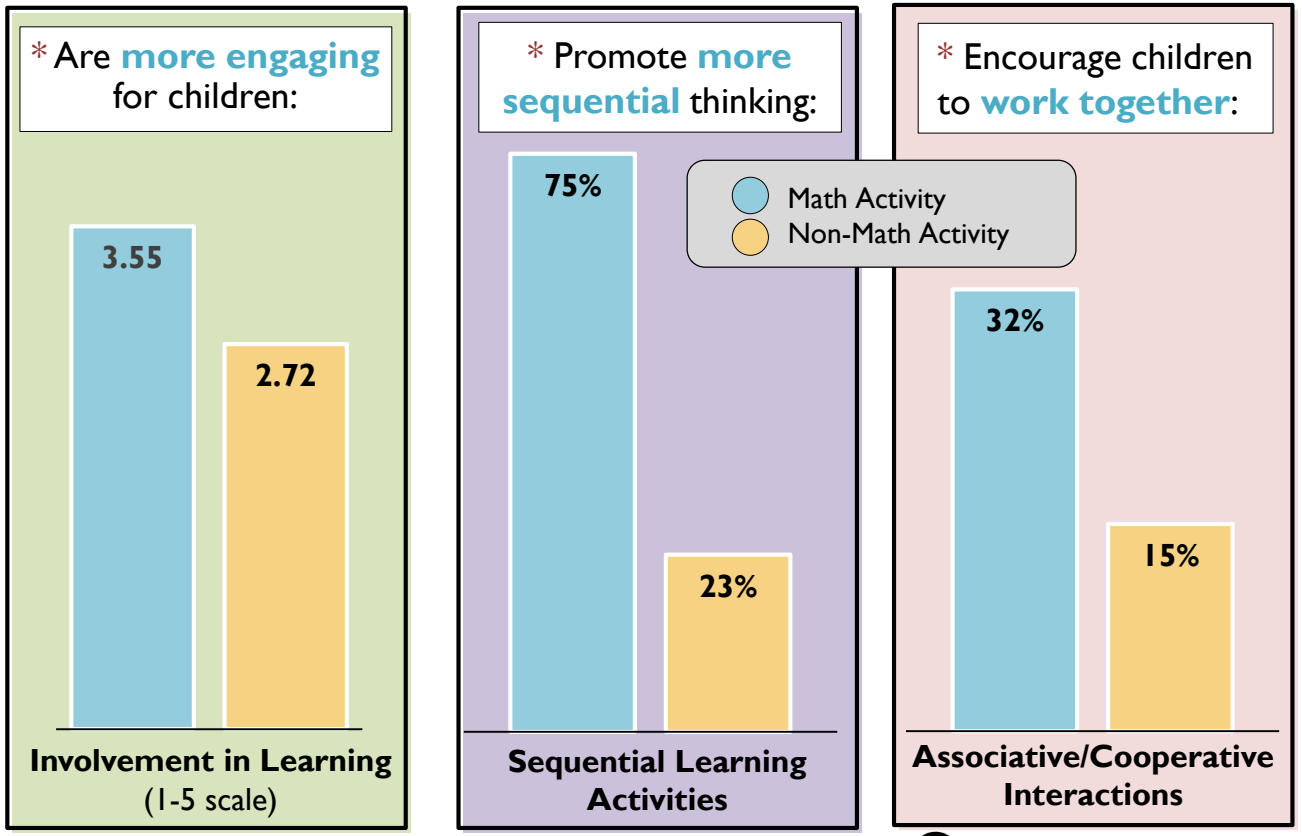
This difference was even more pronounced for children who started pre-k with weaker math skills.

BUT WAIT, THERE'S MORE!

- Math activities are "**sequential**" in nature – a series of steps; require children to plan
- Math activities can also encourage **associative** and **cooperative learning** among children by requiring them to work together to accomplish a task

MATH IN TYPICAL PRE-K CLASSROOMS

When compared with other content areas, Math activities…



Yet, children were only engaged in Math activities an average of **7 minutes a day**!

DISCUSSION POINT:

Why do we see so little math in Pre-K classrooms?

STRATEGIES FOR PROVIDING MATH OPPORTUNITIES

The Pre-K classroom offers opportunities to take advantage of children's natural curiosity to develop mathematical concepts and understanding. This involves…

1. **Understanding key math concepts for early childhood**
2. **Intentionally planning for math on a daily basis**
3. **Using manipulatives and hands-on activities to explore and extend children's math thinking**
4. **Embracing unexpected opportunities for math exploration**

DISCUSSION POINT:

Are there some math skills that you are more comfortable teaching than others?

1. KEY EARLY MATH CONCEPTS: MORE THAN COUNTING TO 10 (OR EVEN 100)!

Number & Operations

- Counting
- Quantity
- Comparison
- Order
- Numerals
- Operations

What number is two numbers AFTER 3?

What number comes right BEFORE 10?

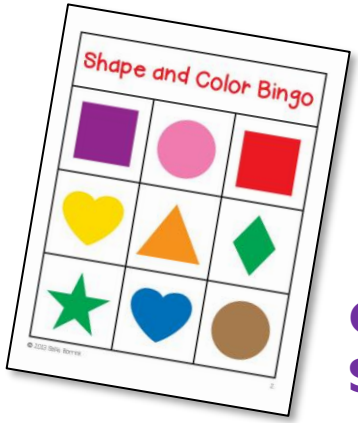
Data Analysis

- Sorting/Classifying
- Representing Data
- Describing Data

Patterns & Algebraic Thinking

Measurement

- Measurement Attributes
- Comparing & Ordering
- Behaviors & Processes



Geometry & Spatial Sense

- Shape & Space
- Transformations
- Visualization

WE'RE GOING ON A ~~BEAR~~ MATH HUNT…

DIRECTIONS & SCORING:

- Go back to your own classroom **-OR-** Divide into teams of 2-3 people each & visit a classroom
- Gather 5 different math materials in 6 minutes
- Calculate scores:

  + **1 point** for each math component area represented (number, geometry, measurement, etc.)
  + **1 bonus point** for each math material gathered from outside "toys and games" or "math" center
  + **1 bonus point** for unconventional math materials (e.g., art materials, books, dramatic)

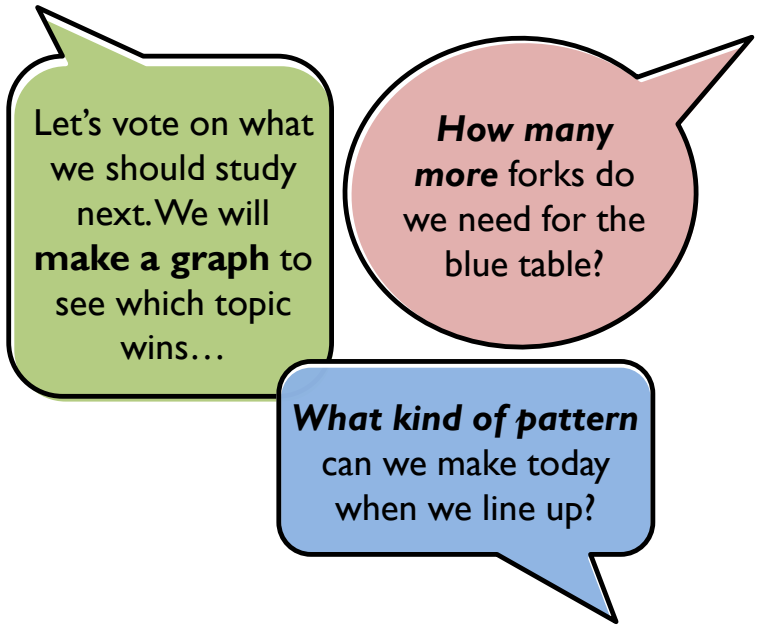
  Team with the highest total score wins!

Review the materials each team has gathered, and consider the following questions:

- How children typically use these materials in your classroom?
- Are there some materials that seem more engaging than others?
- How do you introduce/set up these materials in centers?
- Which math skills/components are promoted by these materials?

2. PLANNING FOR MATH EVERY DAY

- Daily routines (calendar, lining up, tallying votes or attendance)
- Spontaneous comments and conversations during center time
- Meal-time conversations
- Whole group lessons to model skills or introduce materials; asking children to share their work or strategies
- Small group lessons to teach specific concepts



DISCUSSION POINT:

How do you currently incorporate math content throughout the day?

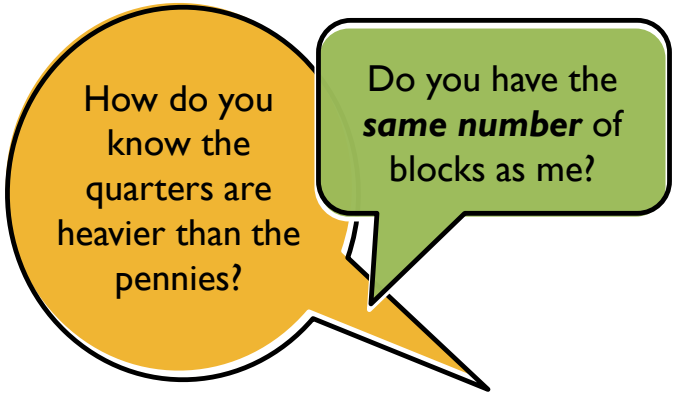
3. MANIPULATIVES AND HANDS-ON ACTIVITIES

Playing with manipulatives and talking about math provide experiences and insights for both the teacher and the child.

- **For children**, math manipulatives are objects that provide concrete opportunities for thinking out loud about math.
- **For teachers**, math manipulatives are tools to help foster and clarify a children's math understanding.

4. EMBRACING SPONTANEOUS MATH MOMENTS

- Keep your eyes open and your ears on!
- Provide math materials and encourage play in a "math-y" way
- Call attention to quantity in everyday interactions
- Talk with a child one-on-one to probe his/her thinking
- Discover what the child doesn't know



SAMPLE CLASSROOM VIDEO 1: SUPPORTING CHILDREN'S EXPLORATION DURING CENTERS

As you watch, consider…

- How do the materials support this interaction?
- How does the teacher build on the child's math exploration?
- How does the teacher support the child's understanding?
- What skills are being targeted here?
- Are there aspects of this interaction that could be helpful for you to try?

MNPS pre-k teacher Jessica Farmer supports a child's math exploration during free choice centers

Used with permission

SAMPLE CLASSROOM VIDEO 2: LINKING MATH AND LITERACY

As you watch, consider…

- What kinds of questions does she ask?
- How does she respond to children's contributions/attempts?
- How does the teacher support the child's understanding?
- How can you incorporate math into literacy or other activities in your classroom?

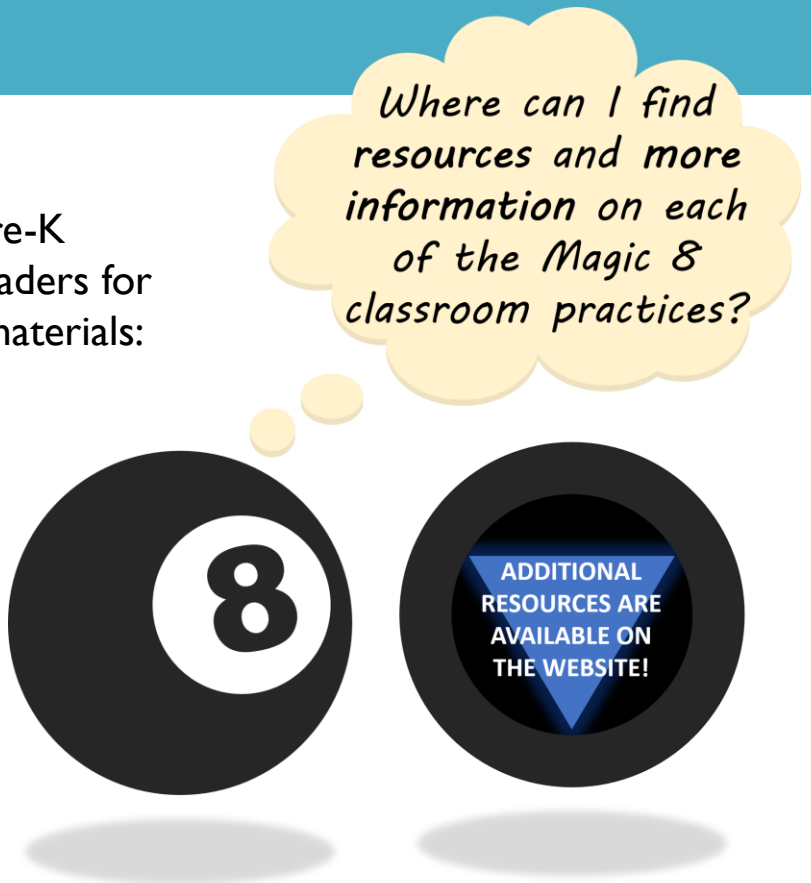
Pre-k teacher Cathy Foote uses a story book (*Goldilocks and the Three Bears*) to introduce a lesson on measurement

Let's Measure: In the Classroom | PBS KIDS Lab

SPECIAL THANKS & ADDITIONAL RESOURCES

We are grateful to the following MNPS Pre-K Instructional Coaches and Multi-Classroom Leaders for their invaluable feedback in developing these materials:

SeTara DeThrow
Carrie Head
Susan McClain
Stephanie Mullins
Holly Stone
Ashley Aldridge Wilson
Rhiannon Wilson



https://my.vanderbilt.edu/mnpspartnership/

INDIVIDUAL IMAGE SOURCES

FREQUENTLY USED IMAGES*

- Lightbulb | myiconfinder.com
- Designed by Vexels.com:
  - Hand drawn magnifying glass
  - Hand drawn bar graph
  - Pie chart hand drawn doodle
  - Hand drawn wall clock
  - Hand drawn cloud bubble
  - Hand drawn open book
  - Cog wheel hand drawn icon

*These graphics are used as icons throughout the series. For example this lightbulb clipart appears beside most "Discussion Point" questions.

ADDITIONAL IMAGE SOURCES

Slide 3: scribble chart | pixabay.com

Slide 6: bingo | weclipart.com

Slide 6: Geo blocks | unsplash.com

Slide 6: Scale model comparison | en.wikepedia.org

Slide 6: Sorting objects | unsplash.com

Slide 6: Block stack | freepik.com

Slide 6: Pattern | weclipart.com

Slide 6: Tangram | freepik.com

Slide 9: Jax pattern | freeimages.com

Slide 9: Buttons | flickr.com