Pre-K Math: Practicing Basic Skills While Introducing More Challenging Concepts

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About Me

• Classroom Teacher, Here in D.C.
• E. L. Haynes Public Charter School
• 11 years of teaching Pre-K, various curricula
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Agenda

- State of Pre-K as it pertains to math education
- Basic Pre-K Math Skills
- More Advanced Math for Pre-K
- Science and Math Connections for Pre-K
Expectations

• Questions or comments: raise a hand
• Disagreement is okay. Skepticism in encouraged.
• Respect diverse perspectives, especially from people who represent marginalized populations
"The natural man inevitably rebels against mathematics, a mild form of torture that could only be learned by painful processes of drill."

-Woodrow Wilson
Academics Vs. Play: A False Dichotomy

• Small, daily doses of high quality academic instruction increases the quality of play.

• My goal: constructivist learning
  o Give students some base knowledge, then let them play with it.

Basic Pre-K Math

What’s on your list of basic math skills for Pre-K?
Basic Pre-K Math: My List

- **Counting**: rote counting, one-to-one correspondence, cardinality
- **Number Recognition**
- **Subitization**
- **Spatial Reasoning & Geometry**
- **Patterning**
- **Sorting**
High Expectations

• Pre-K students can acquire a broad range and depth of math skills.
• Pre-K students can think abstractly.
• We can teach more advanced math skills while still developing mastery of the more basic skills.
• Further reading:
$3 + 5 = 8$
Addition & Subtraction

- Start with manipulative toys: something to see and to hold.
- Start with very small numbers: numbers children can subitize.
- Give children freedom to make choices
Addition & Subtraction

- I teach both pretty early in the school year.
- Addition: “More” or “Put Together”
- Subtraction: “Less” or “Take Away”
Addition & Subtraction

• We are practicing basic skills.
• Many young children can follow these steps, even though they struggle to count items accurately.
Add With Fingers

- More abstract
- Often, we solve it with manipulatives after we use our fingers.
One More, Two More...

- “Counting on” from a number
- Requires quick subitizing
- Demonstrate w/ manipulatives, too
- **Sports scores**: a fun way to practice.
Number Lines

• Explain numbers line arrangement.
• Which way are the numbers more/bigger?
• Again, demonstrate with manipulative toys, too.
Part-Part-Whole

- Break Numbers Apart,
- Put them back together
- Start with small numbers that children can subitize.
Tens & Fives Frames

- Part-Part-Whole With 5 and 10
- More subitizing practice
Number Stories

• Full group or small groups many times.
• Then have students try it.
• What is your story about?
• How many are there?
• Then were there more or less?
• Why? What happened?
6 - 3 = 3
10 - 2 = 8
Number & Quantity Comparisons

• Make it fun and meaningful
  o Two cookie jars.
  o Bugs bites
  o Candies

• Negotiating Prices
  o I use a number line for reference when I do this.

• Number guessing game.
  o Tell whether it’s bigger/more or smaller/less
  o Again, I use a number line.
Data and Graphing

- Pre-K students do quite well understanding simple comparison graphs.
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Surveying Each Other
Data Across Time
• Introduce the concept of units in measurement.
• Pennies, paper clips, cups, beads, etc.
The BLOCK is 9 long.
Place Value
Spatial Reasoning
Multiplication
Probability
Math and Science: A Perfect Match

• Inquiry-based
  o Avoid one-off demos
  o Stretch explorations over the course of weeks or months
  o Allow children to make decisions.
  o Adapt to children’s interests
Tools To Have: Scales
Tools to Have: Timers
Sorting, Categorizing

- Clouds
- Rocks
- Seashells
- Animals

- Begin to understand that categorizing is an active process; it’s not handed down from on high.
Physics: Cars & Ramps

• How many dimes do we have to put in the cup to make the car go up the ramp?
How many dimes did it take to make the car go up the ramp?

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[Diagram with red and blue markings on the chart, indicating the number of dimes required.]
Questions?

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