What Does Rigorous and Responsive PreK-3rd Look Like?

A Case Study in Early Mathematics Education

Jie-Qi Chen

Classroom Images

1. What kind of shoes are you wearing today?
2. If we made a book about the kinds of shoes in our class, how could we organize all the shoes?
Classroom Images

1. Who is doing the thinking?
2. What are they thinking about?
3. How did the teacher promote mathematical thinking?
Who is doing the thinking?

**Children**
- Drawing
- Constructing
- Counting and comparing
- Predicting

Learn math with hands, eyes, ears, and mouth.

**Teacher**
- Goal Setting
- Materials Selecting
- Grouping
- Math Talk

Is purposeful, thoughtful and planful in teaching.

What are they thinking about?

**Big Mathematics Ideas**
- Identify, describe, and organize data by attributes (e.g., shoes with strings, zippers, or straps)
- Count and compare data on a graph to answer questions (e.g., which category has the most?)
- Understand that data analysis is specific to situation or questions (e.g., how will the graph look on a hot day?)
- Mathematize the situation and solve problems (e.g., building mathematical problem situations into the fabric of children’s lives)
How did the teacher promote mathematical thinking?

- Make connections from concrete to pictorial to abstract understanding in mathematics (e.g., real shoe graph, pictograph, prediction)
- Ask meaningful questions to promote mathematical understanding (e.g., will the graph look same on a hot day?)
- Make suggestions to guide children in mathematical thinking (e.g., make sure you draw the strap, let’s count to find out which category has the most.)

Early Mathematics Education Project

**2007-2011 PreK-K CPS Teachers**
- 150 schools
- 291 teachers
- 9,312 students served/year

**2011-2015 PreK-3rd CPS Teachers**
- 8 schools
- 154 teachers
- 4,620 students served/year
Narrowing the Achievement Gap

- Curriculum and standards are the means, rather than the goal of education.
- We teach children, not the curriculum.
- We use standards to help children grow, not to ignore their developmental needs.

Rigor—Curriculum Standards

- No Intervention
- Erikson Early Math
- National Norms