Developing Symbol Sense in Early Childhood: Maintaining Meaning and Enhancing Early Number Learning

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NCTM Annual Conference, PreK-2 Session
April 4, 2019

Session Overview

- Symbol Sense: Building Number System Knowledge
- Activities to Develop Symbol Sense
  - Counting Collections
  - Quick Images
  - Writing About Quantities
- Summary and Questions

Grades K-2 Number Sense

Intuitive Number Sense:

Magnitude, quantity discrimination, subitizing, preverbal arithmetic

Symbolic Number Sense:

Cultural symbols represent quantities (numerals, number names), counting, computation, place value

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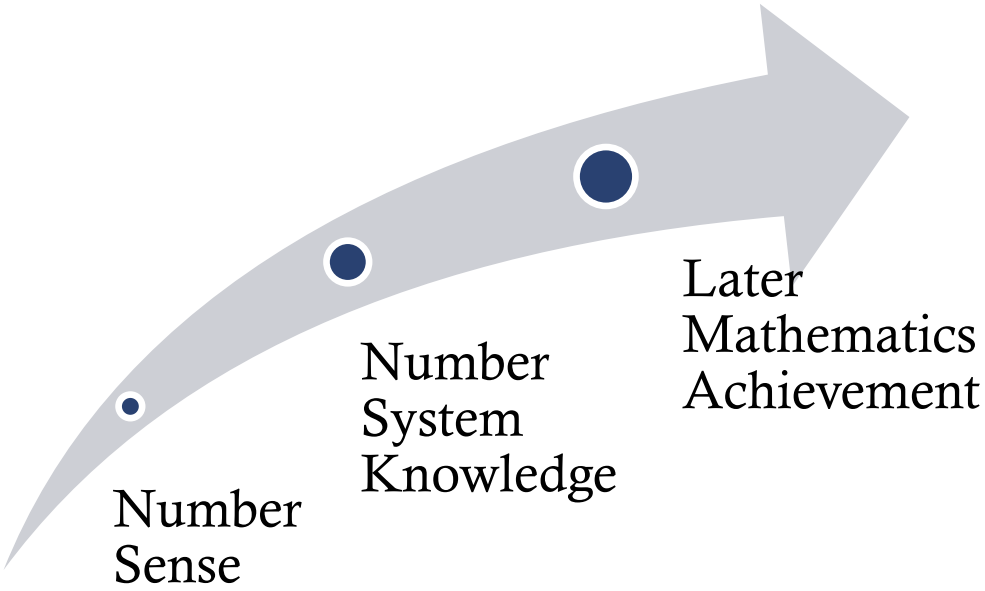
Why Symbol Sense?



- Number system knowledge is the ability to relate quantities to their respective numerical representations, understand relations among those numbers, and use that knowledge to manipulate quantities through operations (Geary et al., 2013).

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Mathematical Language In Counting Collections

- Number words
- Number words attached to objects (1-to-1)
- Number word represents a quantity (cardinality)
- When given a number word, make a collection represented by that amount.
- Counting collections: using number words to organize and describe quantities; using number words to discuss part-whole ideas

K.CC.B.4

- Understand the relationship between numbers and quantities; connect counting

K.OA.A.3

- Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (.g., 5 = 2 + 3 and 5 = 4 + 1).

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Quick Images Routines

- Building visual understandings of quantities
- Recognizing and using groups to know an amount
- Comparing quantities
- Understanding part-whole relationships
  - Numbers are composed of smaller parts
  - Grouping ideas (unitizing)
  - Using a number's relationship to benchmark numbers (like 5 or 10)

1.OA.B.4

- Understand and apply properties of operations and the relationship between addition and subtraction.
- 4. Understand subtraction as an unknown-addend problem. For example, subtract 10-8 by finding the number

2.OA.A.1

- Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns

Writing About Quantities and Equations

- If there are 12 dots on this domino, how many are covered up? Explain your thinking.

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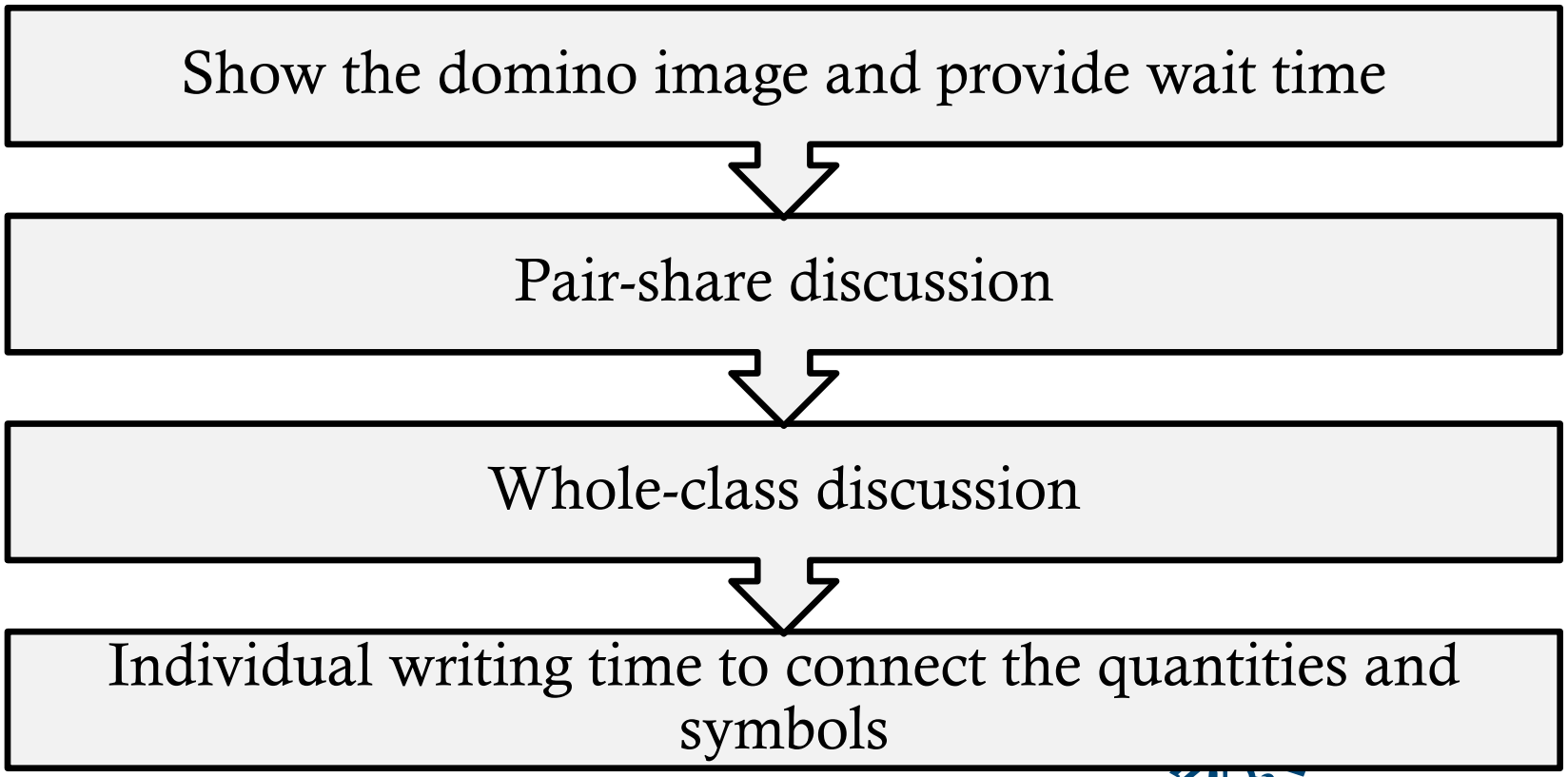
Writing About Dominoes Activity



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Writing to Learn

1. Exploratory

- Making Sense of it

2. Informative/ Exploratory

- Clarifying to Others

3. Argumentative

- Making Your Case

4. Mathematically Creative Writing

- Thinking Beyond Boundaries

http://www.ascd.org/publications/educational-leadership/feb17/vol74/num05/Why-Should-Students-Write-in-Math-Class%C2%A2.aspx

Developing Symbol Sense

- Counting Collections, Quick Images and Writing About Dominoes activities can help students more fluently compose/decompose amounts, extend their part-whole understandings, and use familiar grouping ideas (like 4s, 5s, or 10s) to make problems easier to solve.
- These activities can be used to help students link quantities with the numerals and equations that represent them through:
  - Classroom discussion
  - Teachers purposefully linking numerals/equations and quantities
  - Students' writing about images of quantities

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Thanks for Attending!

We are members of the
Early Mathematics
Research Group
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