

Exploring Numeracy Throughout the Day

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Agenda

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Part Two: Numeracy Explorations

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- *Centers
- *Games
- *Intervention

Part Three: Results

- *End-of-Year Results
- *Wrap Up

Objectives

In this presentation, participants will:

- *Become familiar with the Common Core Math standards required for K- 2 students (specifically number sense)
- *Discover the concepts, skills, and relationships students need in order to have a full understanding of number
- *Learn strategies and activities to help students gain proficiency with the standards
- *Understand how to use a variety of materials to support student learning of the standard

Number Sense Is . . .

Howden (1989) described number sense as a "good intuition about numbers and their relationships. It develops gradually as a result of exploring numbers, visualizing them in a variety of contexts, and relating them in ways that are not limited by traditional algorithms."

Targeting Specific Concepts

Determining which concepts/skills individual students need is critical.

Sources to determine which concepts/skills students need to work on:

- *Standards
 - *Elementary and Middle School Mathematics (Van de Walle)
- *Add+VantageMR or Math Recovery assessments
- *Math Recovery LFIN
- *Math Curriculum and Calendar Curriculum
- *Observation/anecdotal notes
- *Formative and summative assessments

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Common Core Math Standards

K-2 Domains with a Focus on Number

The ideas and materials shared today support the Common Core Math Standards for number sense (numeracy) in the following domains:

- *Counting and Cardinality (K only)
- *Operations and Algebraic Thinking
- *Number and Operations in Base Ten

Focus Areas

Activities and explorations in each of the following areas are important:

- *Number words, numerals, and counting
- *Number structures/relationships
- *Strategies

Unitary and Composite Strategies

- *Unitary Strategies (count by one)
- *Composite Strategies (non-count by one)

"It is critical that students' early arithmetical thinking progresses from being based on counting by ones to being based on structuring numbers."

Robert J. Wright, et al., 2012, Developing Number Knowledge

To develop composite strategies, students need many experiences with numbers.

Math Path

- *Numeral writing and recognition
- *Relationships of more, less, and the same
- *Subitizing numbers up to 5
- *Combining and partitioning 5
- *Counting forward and backwards by ones, tens (on and off decade), fives, and twos
- *One and two more, one and two less
- *Recognizing spatial relationships up to 10
- *Combining and partitioning numbers up to 10 (5 plus, doubles, and near doubles)
- *Combining and partitioning 10
- *Combining and partitioning numbers up to 20 (10 plus, 9 plus, doubles, and near doubles)
- *Understanding place value

Research to Consider

Three aspects of number that children need to develop (Wright, et.al., 2004):

1. Verbal
2. Symbolic
3. Quantitative

Three instructional techniques to promote imaging and reflection (Wright, et.al., 2004):

1. Screening
2. Color-coding
3. Flashing

Goal

In addition to helping students learn skills/concepts, our goal is for students to develop strategies for solving mathematical problems. We can help students accomplish this goal by providing students with:

- *Experiences with numbers
- *Problems to be solved
- *Questions to explain their thinking

“A strategy is most useful to students when it is theirs, built on and connected to concepts and relationships they already own.”
(Van de Walle, 2004)

Calendar

Research shows:

1. Children need to learn mathematics incrementally, giving them the opportunity to develop understanding over time.
2. Visual models help children visualize and verbalize number relationships.

Focus on:

- *Counting
- *Structuring of number
- *Providing focus concepts
- *Setting the stage for explorations during the day

“Those children who cannot conceptually subitize are likely to have problems learning basic arithmetic processes. Can this innate ability of subitizing be strengthened through practice? The answer is yes.”

David A. Sousa in *How the Brain Learns Mathematics*

Empty Number Lines

A number line with no numbers or markers is a visual representation for recording and sharing students’ thinking strategies during the process of mental computation.

Prerequisite Skills:

- *a secure understanding of numbers to 100
- *prior experiences counting on and back using number lines
- *recall of addition and subtraction facts for all numbers to ten
- *the ability to add/subtract a multiple of ten to or from any two-digit number

Information from: K-5 Math Teaching Resources, <http://www.k-5mathteachingresources.com/empty-number-line.html>

Transitions and Explorations (Trex Activities), Centers, and Games

Participants engage in a variety of activities

Intervention

A classroom teacher can be doing intervention with a small group while other students are working at math centers, doing Flip Flop Tabletop activities, or playing math games.

Intervention Ideas

Small group interventions

You can find many ideas for interventions in:

- * Developing Number Knowledge (red book)
- *Teaching Number in the Classroom (purple book)
- *Elem. And Middle School Math (Van de Walle)
- *Websites listed on Resource page

Quickinterventions

Another way to intervene is through quick interventions that might last only two to three minutes several times a day.

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