Teaching Place Value and Developing Number Sense

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MAISD Regional Mathematics & Science Center

Agenda

- What does it mean to understand Place Value?
- Building Place Value by Counting
- Using Tools Strategically

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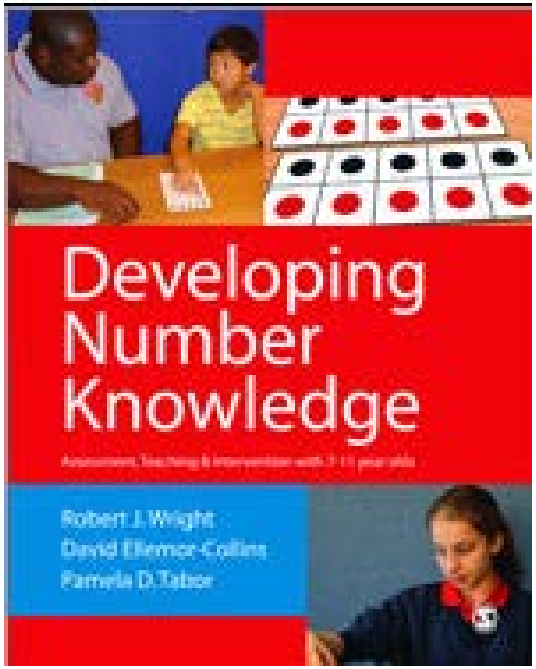

Children's Initial Understandings of Ten

Paul Cobb & Grayson Wheatley

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[Children] should recognize that the word ten may represent a single entity (1 ten) and, at the same time, 10 separate units (10 ones), and that these representations are interchangeable.

NCTM *Principles & Standards for School Mathematics*

Place Value

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Understand Place Value

2. Understand that the two digits of a two-digit number represents the amounts of tens and ones.

a. 10 can be thought of as a bundle of ten ones – called a "ten".

b. The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

c. The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

CCSS 1st Grade - NBT

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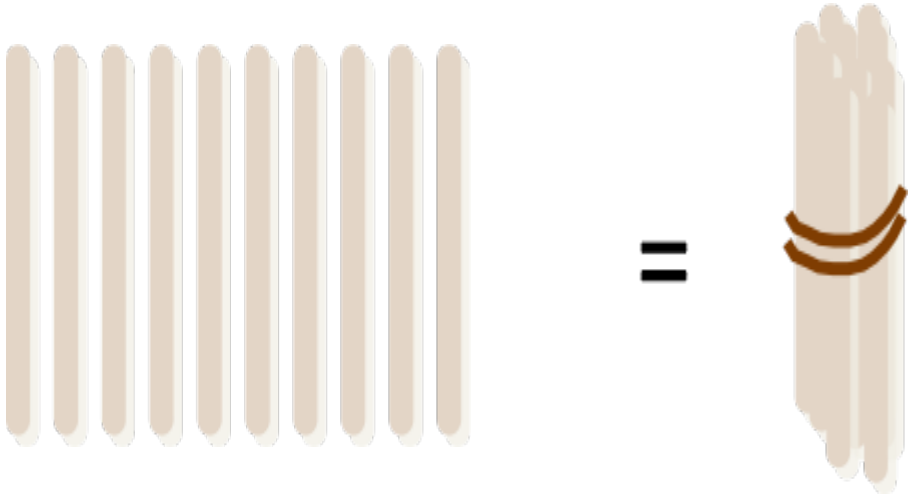
Students need to learn to think of ten as simultaneously, a unit of one ten, and a composite of 10 ones.



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Building Place Value Understanding Through Counting

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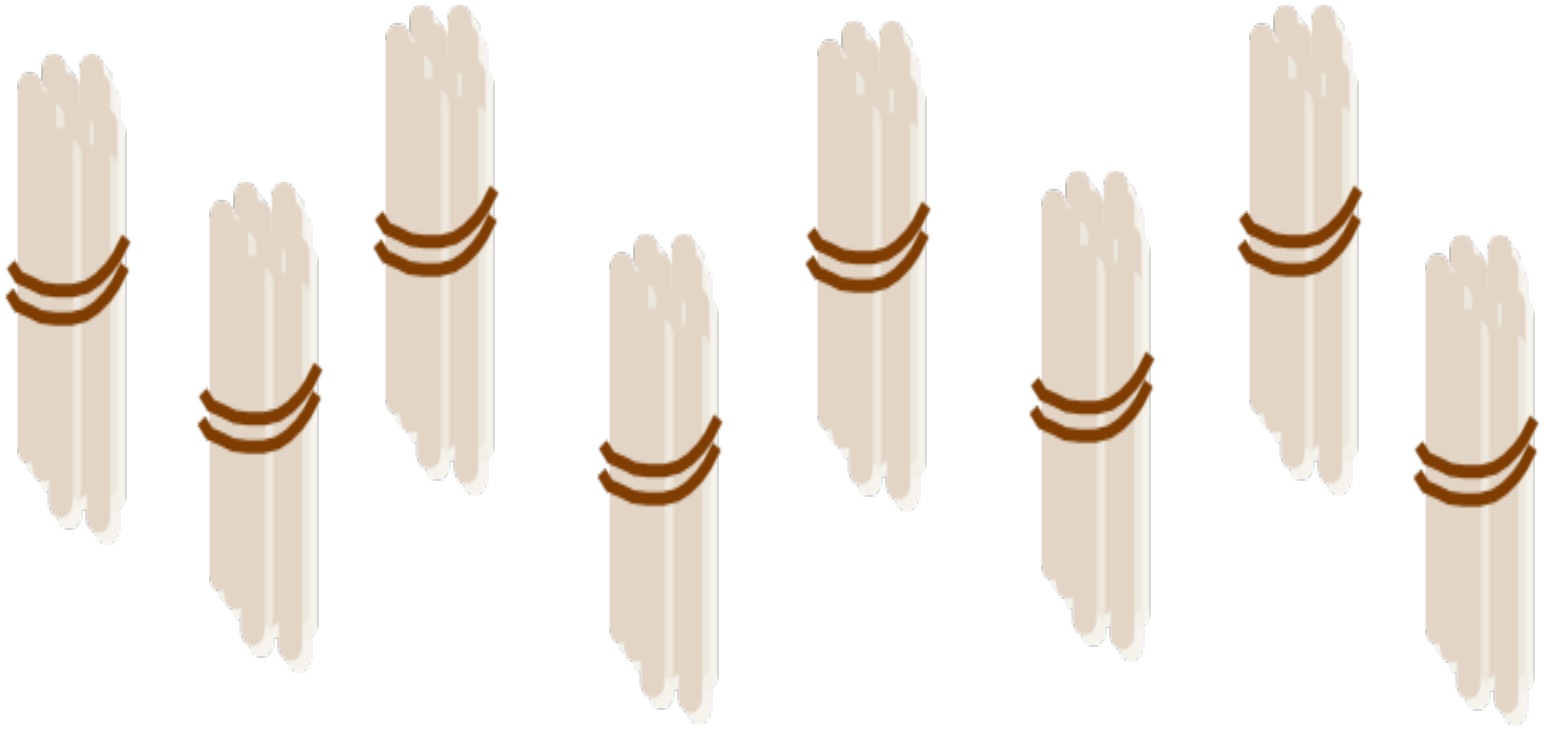
Incrementing/Decrementing by 10

Add Two 2 Digit Numbers without and with Regrouping

Subtract Two 2 digit numbers without and with regrouping



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Incrementing/Decrementing by 10

Incrementing/Decrementing by 10’s & 1’s

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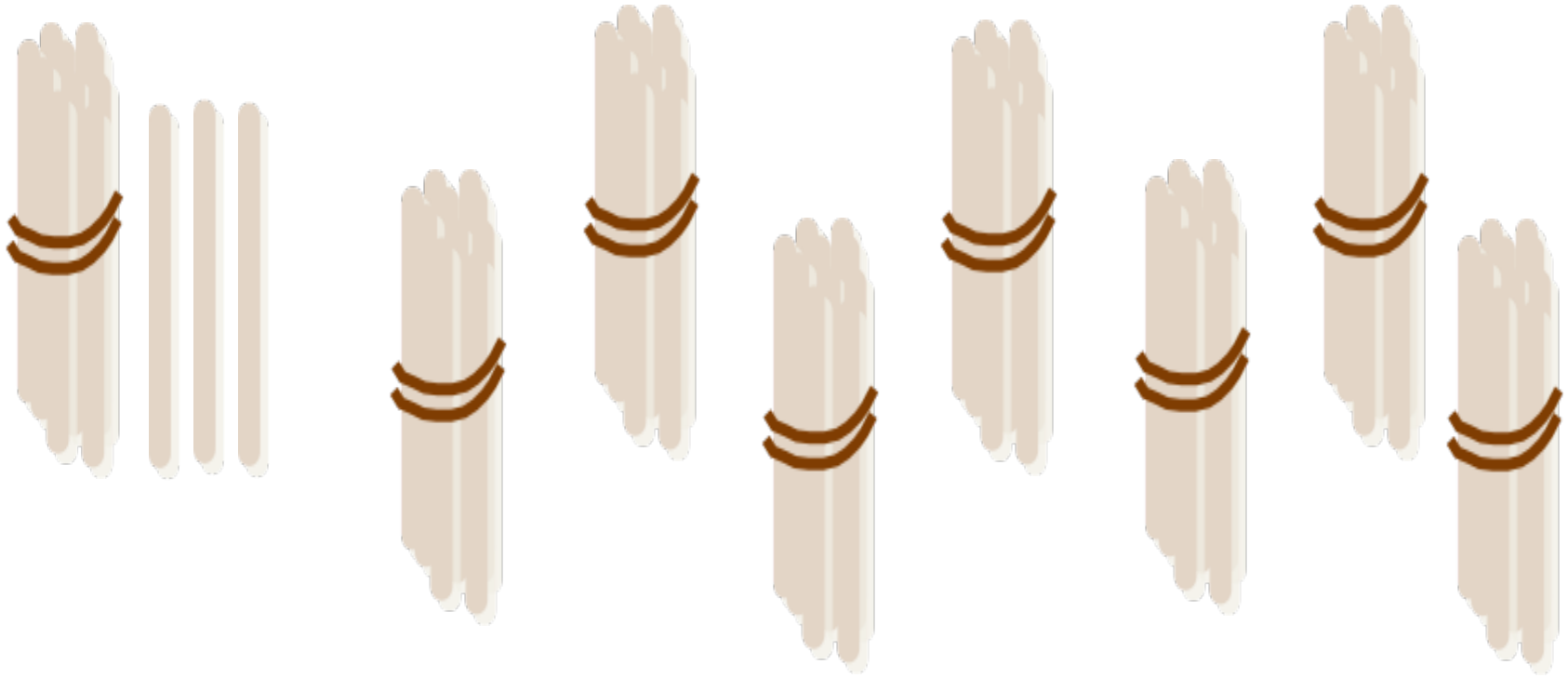

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USING TOOLS STRATEGICALLY

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Concrete

Representational

**Visualization

Abstract

Instructional Progression

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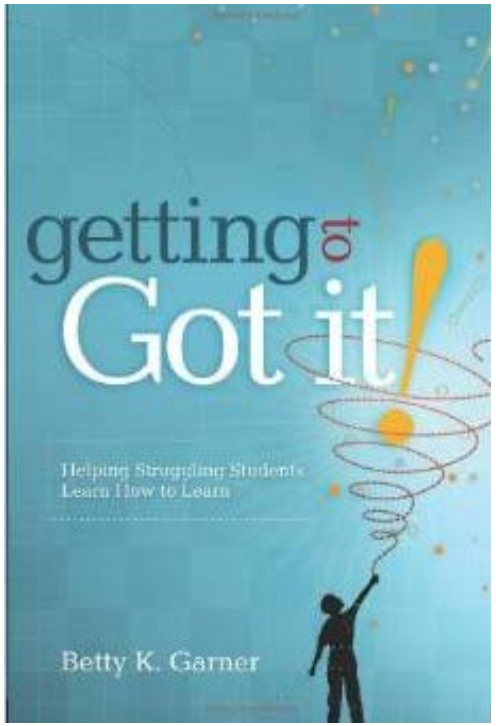
Cognitive structures are the basic mental processes people use to make sense of information



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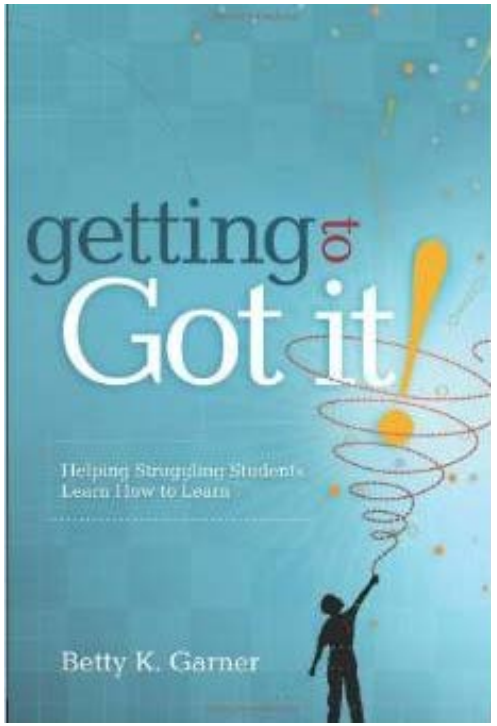
Students develop cognitive structures through *reflective awareness* and through *visualization*.



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Leveraging mental replays of past sensory experiences to facilitate counting acts help move children beyond physical interactions with materials toward more abstract, mental construction of quantity.

Use place value understanding and properties of operations to add and subtract.

5. Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

6. Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 (positive or zero differences), using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used

CCSS 1. NBT

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Incrementing/Decrementing by 10

Incrementing/Decrementing by 10's & 1's

Add & Subtract 10 to a 2-digit number

Strategies for Adding and Subtracting w/in 20

Add Two 2 Digit Numbers without and with Regrouping

Subtract Two 2 digit numbers without and with regrouping

Use place value understanding and properties of operations to add and subtract.

4. Add within 100 including a two-digit number and a one-digit number, and adding a two-digit number and a multiple of 10, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used. **Understand that in adding two-digit numbers, one adds tens and tens, ones and ones; and sometimes it is necessary to compose a ten.**

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What: *(what were some of your big ah-ha's?)*

So What: *(so what are you thinking now?)*

Now What: *(now what things might you try?)*

Organization and Integration

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