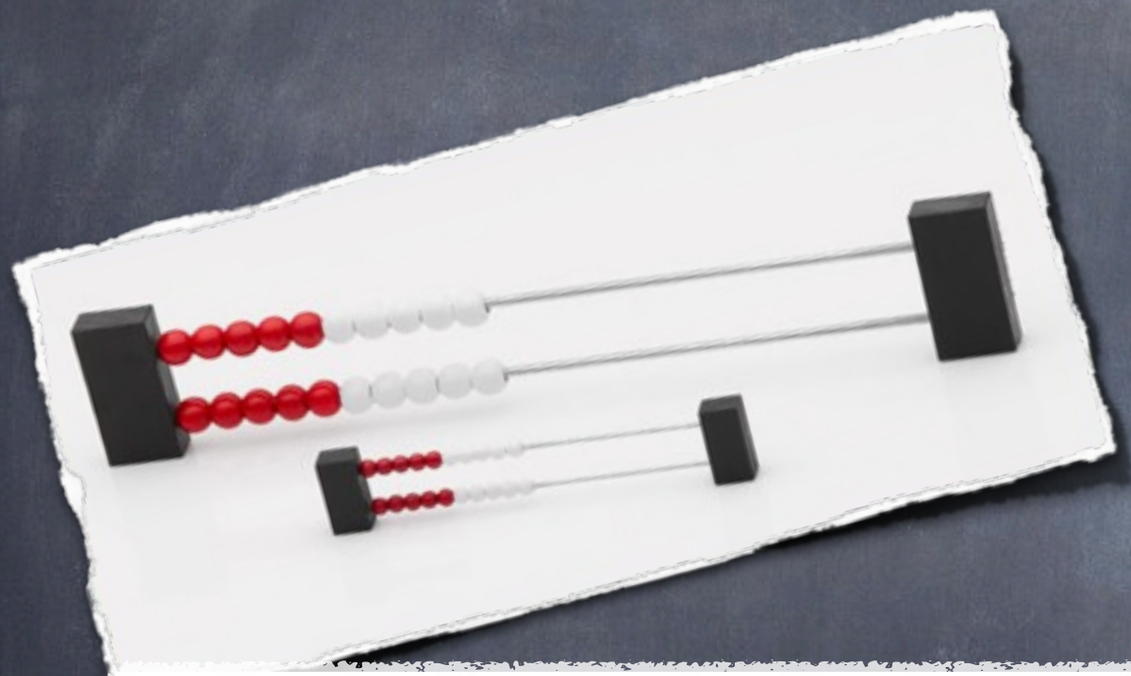
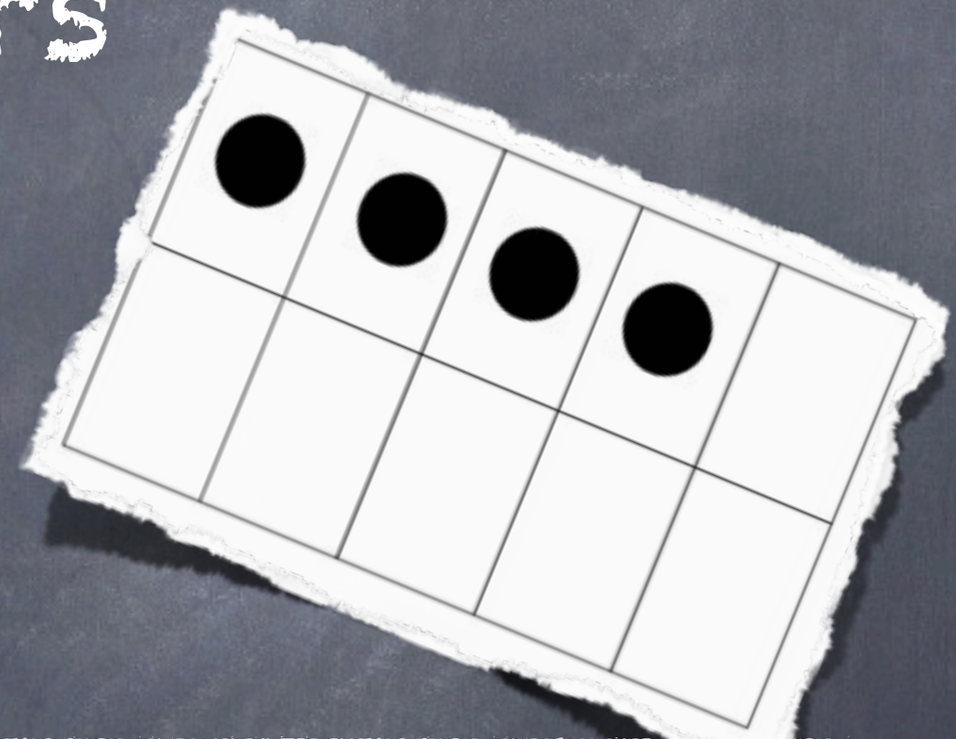
Four Types of Addition Facts That Help Develop All Others





1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

For a copy of this presentation visit:
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What is Fluency?

- What is something you are fluent at?
- Fluency has three components:

1. Accuracy - when speaking another language

2. Flexibility - when cooking and you don't have a needed ingredient, do you know an alternative?

3. Efficiency - when driving we want the most efficient route

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In This Session

- How children solve addition and subtraction problems.
- What understandings children need before they can progress to more advanced & efficient strategies.
- Activities using the MathRack (a.k.a Rekenrek), Ten Frames, & Number Path

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Student Strategies

How have you seen children solve problems like this:

8 + 7

13 - 6

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Children's Strategies

Cognitively Guided Instruction

- Direct Modeling-needs both sets and counts starting at one
- Counting - holding one number in their head and counting on
- Derived Fact- using facts they know to figure out facts they do not know

--Carpenter, et.al. 1999

Math Recovery

- Perceptual Counter-can only solve the problem when the collections are visible
- Figurative Counter - counts all, from one, when items are not visible
- Counting-on - says the amount in the first collection and counts on from that amount
- Non-count-by-ones - adding groups instead of one-by-one

--Wright, et.al. 2011

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How we Learn

- You will have three seconds to memorize this ten digit number:

3711151923

- Now, this time, look for a connection within the numbers.

3 7 11 15 19 23

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+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

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What if I can't remember 7+8?

- 7+7+1
- 8+8−1
- 7+3+5
- 5+2+8
- 2+5+5+3

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+	0	1	2	3	4	5	6	7	8	9	10
0	0	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10	11
2	2	3	4	5	6	7	8	9	10	11	12
3	3	4	5	6	7	8	9	10	11	12	13
4	4	5	6	7	8	9	10	11	12	13	14
5	5	6	7	8	9	10	11	12	13	14	15
6	6	7	8	9	10	11	12	13	14	15	16
7	7	8	9	10	11	12	13	14	15	16	17
8	8	9	10	11	12	13	14	15	16	17	18
9	9	10	11	12	13	14	15	16	17	18	19
10	10	11	12	13	14	15	16	17	18	19	20

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watch the video at http://factfluency.com/Addition_Strategies.html

Doubles

watch the video at http://factfluency.com/Addition_Strategies.html

watch the video at http://factfluency.com/Addition_Strategies.html

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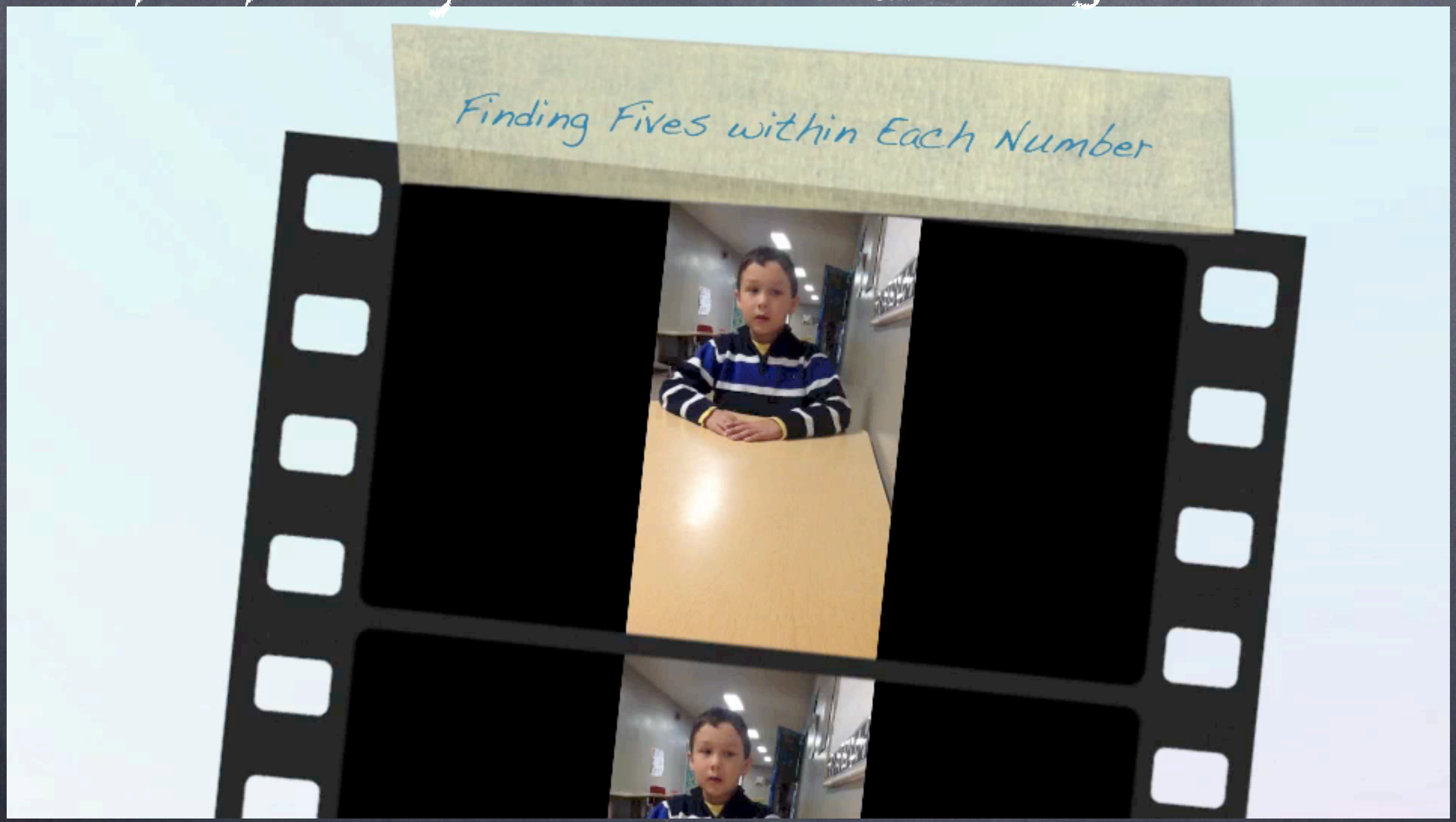

Essential Number Relationships

- Spatial Relationship - having a visual to go along with the numeral
- One/Two More or Less - knowing which numbers are one/two more or less than any given number
- Benchmarks of 5 & 10 - how any given number relates to 5 and 10
- Part-Part-Whole - ability to conceptualize a number as being made up of two or more parts

Van De Walle, 2006

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Why Tools Matter

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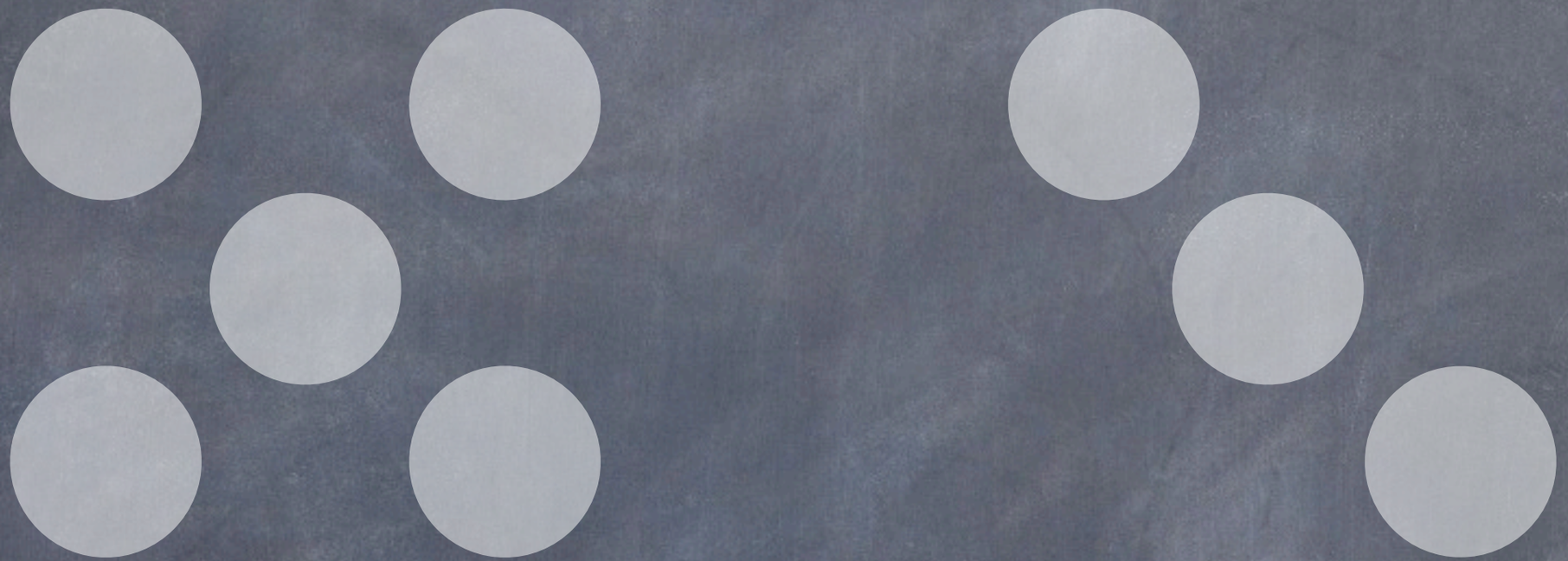
Why Tools Matter



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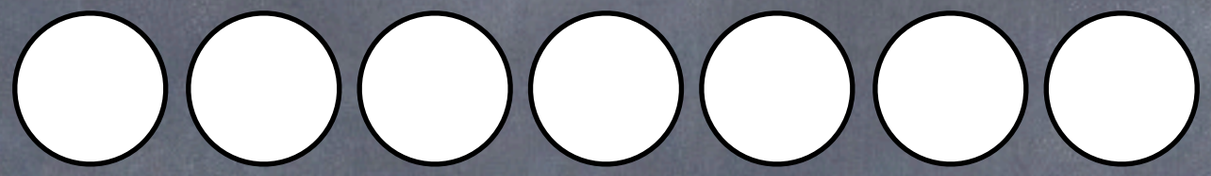
Why Tools Matter



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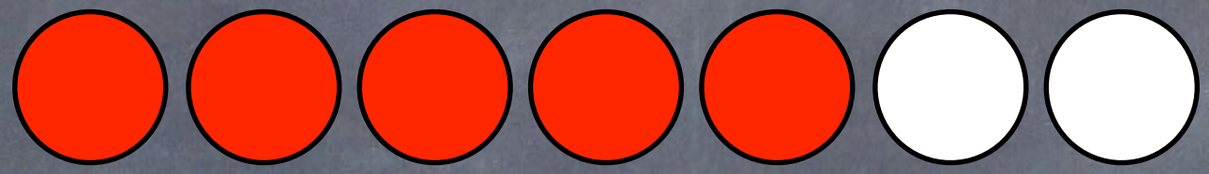
Why Tools Matter



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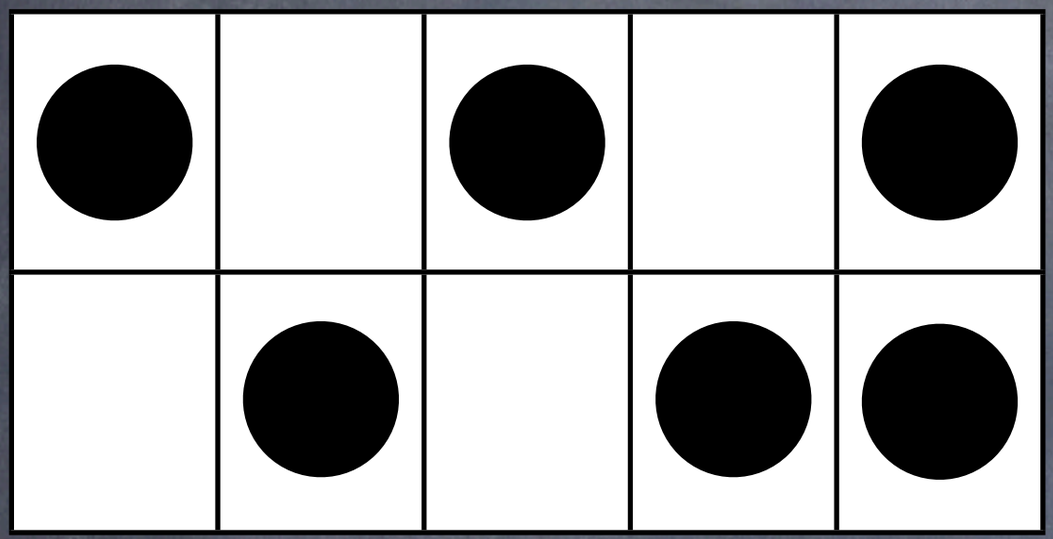
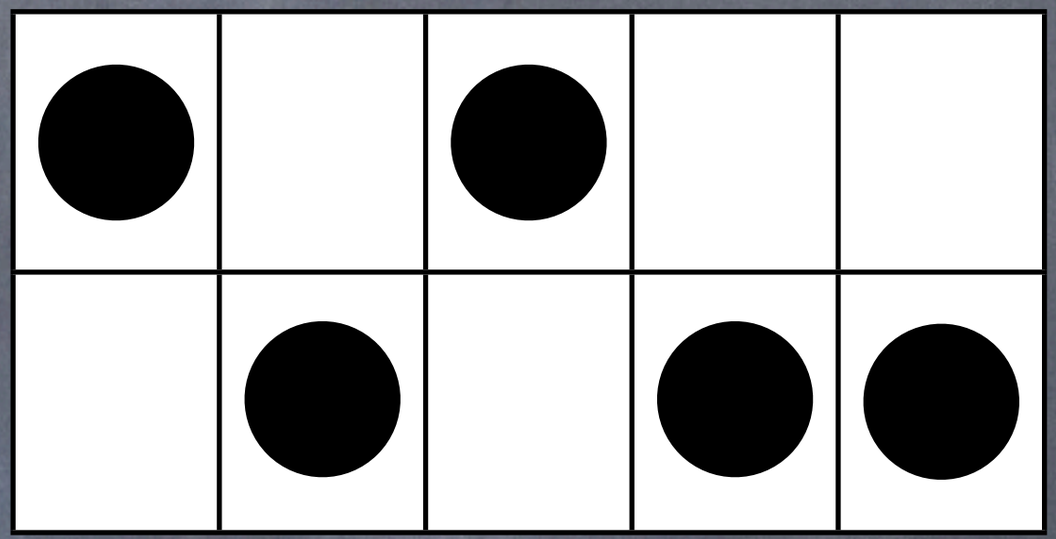
Why Tools Matter





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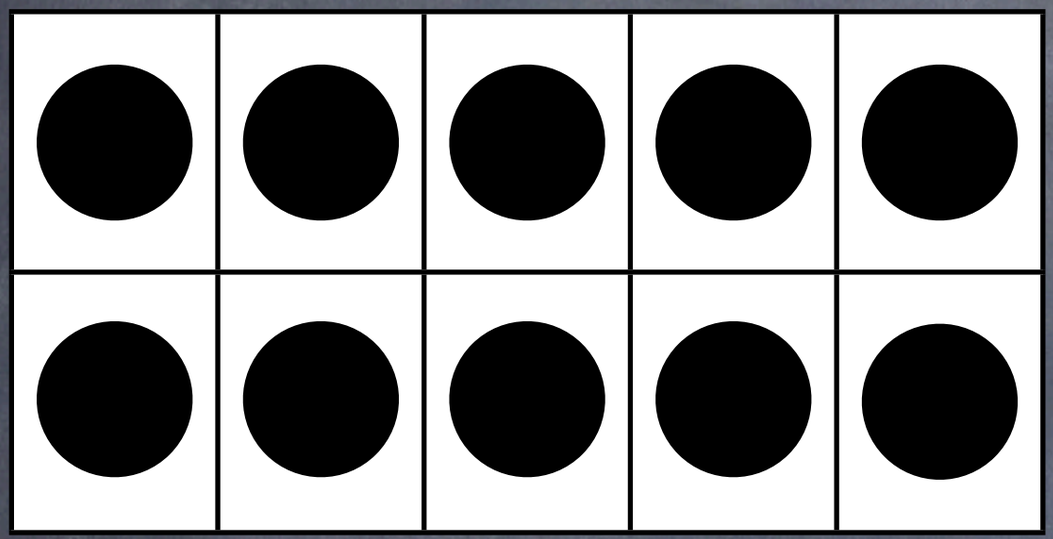

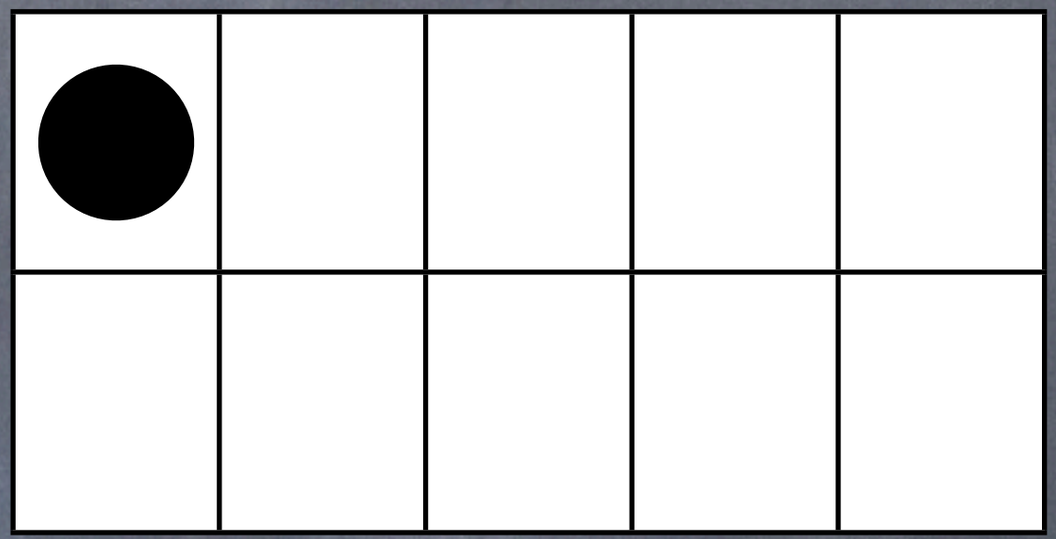

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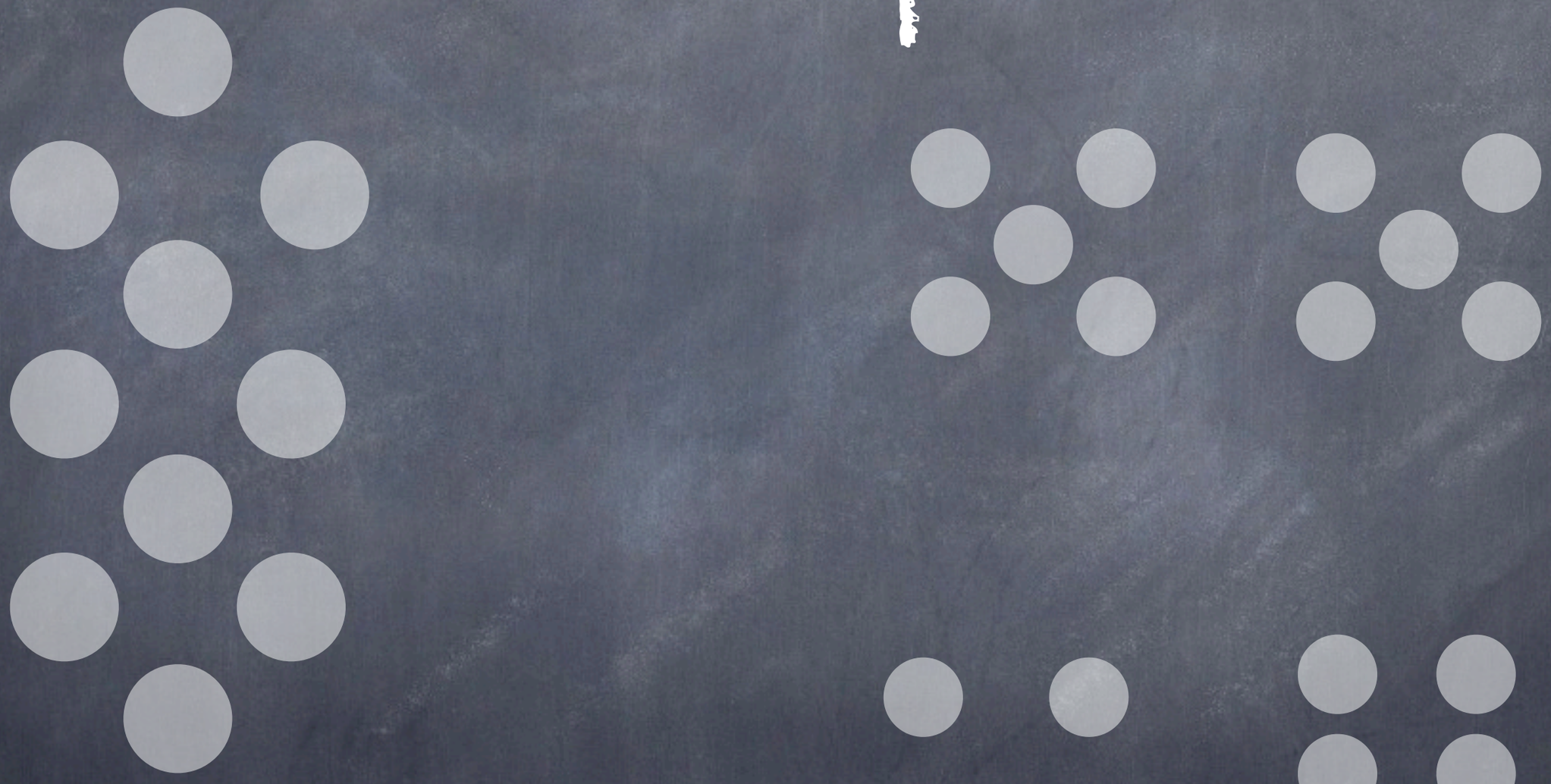
The Power of Groups



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Counting vs. Collections

"Tasks that encourage students to think in collections provide rich opportunities for them to construct abstract mathematical relationships and become powerful problem solvers."

--Wheatley & Reynolds, 2010

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Tools Make the Difference

- Show me and Flash Forward "Show me __," (if using MathRack only use one row). Once children become more confident with the tool, show a certain number on the MathRack for a few seconds and have them determine which number was flashed.
    - builds Spatial and Benchmarks of 5 & 10
- Just One More show a certain number and have kids build theirs to show "one more," "two less," etc.
    - builds One/Two More or Less
- Show Me using two rows on the MathRack or two Ten Frames, "Show me ____."
    - builds Part-Part-Whole
- Peek-a-Boo cover the right side of the MathRack, push some beads over "in play" and ask how many beads are hiding, or cover the empty slots on the ten frame and ask kids how many are slots you are hiding.
    - builds Part-Part-Whole (is a Missing Part activity) and Benchmarks of 5 & 10

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Using The Number Path

- Show 8 + 7 on your MathRack
  - Model what you did on your Number Path
  - Write down a number sentence that represents how you determine the total number of beads shown

- Show 9 + 8 on your MathRack
  - Model what you did on your Number Path
  - Write down a number sentence that represents how you determine the total number of beads shown

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Concrete-Representational-Abstract

MathRack ⟷ Number Path ⟷ Number Sentence

Do all 3 in the same activity, not separately

Using The MathRack to Subtract

- Show 15 - 9 on your MathRack
  - Model what you did on your Number Path
  - Write down a number sentence that represents how you determine the total number of beads left

- Show 16 - 7 on your MathRack
  - Model what you did on your Number Path
  - Write down a number sentence that represents how you determine the total number of beads left

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Why Strategies Matter

9 + 7
9 + 6
9 + 8
19 + 7
39 + 7
59 + 17
299 + 17
3998 + 176
3.99 + 0.17

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Resources

- www.MathRack.com
- www.mathematicallyminded.com
- www.factfluency.com
- Teaching Student Centered Mathematics PreK-2
  by John Van de Walle
- Mastering the MathRack to Build Mathematical Minds
  by Christina Tondevold
- It Makes Sense! Using Ten Frames to Build Number Sense
  by Melissa Conklin

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