



Making Sure Children Are Learning the Mathematics They Need to Know

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Starting Strong Annual P-3rd Grade Institute

Critical Learning Phases

“Critical Learning Phases are the understandings that must be in place to ensure that children are not just imitating procedures or saying words they do not really understand. They are milestones or hurdles in children’s growth of understanding; they are insights rather than facts or procedures. p. xi

Counting Objects

- Counts one item for each number (one-to-one correspondence)
- Keeps track of an unorganized pile
- Spontaneously checks by recounting to see if the result is the same
- Knows “how many” after counting
- Notices when recounting a group results in a different number
- Is bothered when counting a group results in the same number after some have been added or taken away
- Gets a particular number without counting past it p. 6

One More/One Less

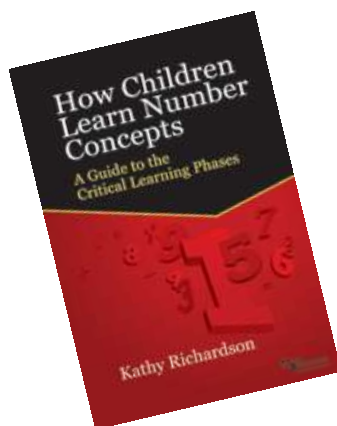
- Knows “one more” in sequence without counting
- Knows “one less” in sequence without counting
- Notices if a counting pattern doesn’t make sense p. 7
- Knows one more without counting when numbers are presented out of sequence
- Knows one less without counting when numbers are presented out of sequence p. 7

Changing One Number to Another

- Changes a number to a larger number by counting on or adding on a group
- Changes a number to a smaller number by counting back or removing a group p. 25

Identifying Parts of Numbers

- Recognizes groups of numbers to 5 in a variety of configurations
- Recognizes and describes parts contained in larger numbers
- Knows the amount is not changed when a number is broken apart and recombined in various ways p. 50



The information above is from the book, *How Children Learn Number Concepts: A Guide to the Critical Learning Phases* by Kathy Richardson. Math Perspectives Teacher Development Center, Bellingham, WA Publisher. www.mathperspectives.com

The importance of Block Play

The research on block building is surprising. Preschool children who are able to build complex structures with blocks have a better chance of mathematical success in middle and high school, even taking into account students' IQ levels, social class, and gender (Wolfgang, Stannard, and Jones 2001). The positive impact of early skill at block building emerges in seventh grade and continues through high school, resulting in higher mathematics grades and test scores.

The Power of Block Building. Contributors: Barbara Bobb - author, Beth Casey - author. Teaching Children Mathematics. Volume: 10. Issue: 2. Publication Date: October 2003. : 98+. COPYRIGHT 2003 National Council of Teachers of Mathematics.

“Children need what we rarely give them in school-time to build up in their minds without hurry, without pressure, ... a mental model of the territory before they start trying to talk about it. We teachers like to think we can transplant our own mental models into the minds of children by means of explanations. It can't be done.” -John Holt, *How Children Learn*, p. 222

It is critically important that we acknowledge and support each child's level of thinking and understanding. ... being a good teacher is not about getting all your students to perform at a particular level at a particular time. Being a good teacher is about knowing what your students already know and what they are still grappling with. It is valuing where each child is on his own personal journey rather than comparing him to someone else. *Developing Math Concepts in Pre-Kindergarten*, by Kathy Richardson. Math Perspectives Teacher Development Center, Bellingham, WA Publisher. p. 26

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