


HANDOUT 7:

Learning Trajectory: Subitizing

Learning Trajectory for Recognition of Number and Subitizing

Taken from Doug Clements' & Julie Sarama's research

REVISED March 2012

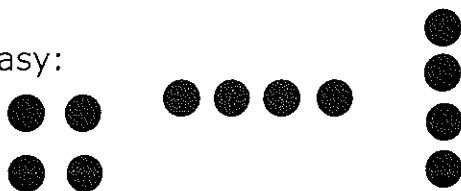
Age	Developmental Progression	Instructional Tasks
0-1	Pre-Explicit Number: Within the first year, child does not have explicit, intentional knowledge of number. Infants have a rigid understanding of one – meaning they recognize “one” object or “more than one”.	Use words such as “more” and provide actions of adding objects to direct attention to comparisons.
1-2	Small Collection Namer: Names groups of 1 to 2, sometimes 3. (When shown a pair of shoes, says, “Two shoes.”)	<p>Show small groups of objects (1 & 2, when ready then do 3) and tell how many objects are in the group (done through just daily interaction). Eventually ask “how many?”.</p> <p>Also provide non-examples (“This is not two. It is three.”)</p> <p>Make groups in different configurations and see how fast children can name the set (children are subitizing). Example: 3</p> 
3	Maker of Small Collection: Nonverbally makes a small collection (no more than 4) with the same number as another collection (not necessarily matching – for that process see Compare Number).	<p>Ask children to get the right number of something (crackers, pencils, etc.) for a small number of children.</p> <p>Layout a small collection of blocks and show the children. Hide them. Ask children to make a group that has the same number of blocks as your group has. After they have finished, show them your group and ask if they are the same. Name the number. (Called “Snapshots” in Clements book <u>Learning and Teaching Early Math: The Learning Trajectories Approach</u>.)</p>

Perceptual Subitizer:

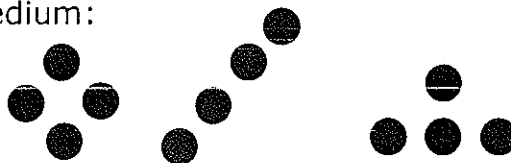
Instantly recognizes collections up to 4 (briefly shown) and verbally names the number of items.

Play "Snapshots" with collections up to 4 objects, arranged in a line or other simple arrangements, asking children to verbally say the number name. (Can use manipulatives, set configuration cards, five frames, dominoes, etc.) Start with the smaller numbers and easier arrangements, moving to those of moderate difficulty only as children are fully competent and confident.

Easy:

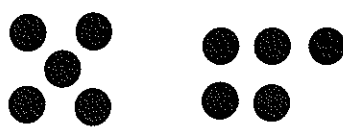
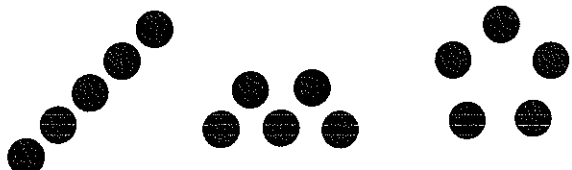


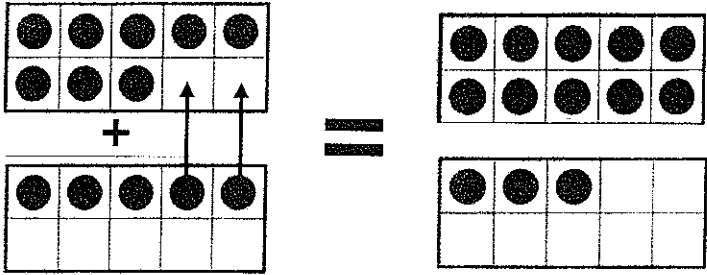
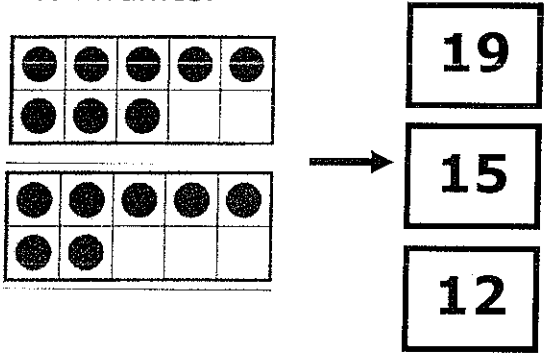
Medium:



Difficult:



5	<p>Perceptual Subitizer to 5: Instantly recognizes briefly shown collections up to 5 and verbally names the number of items.</p>	<p>Play "Snapshots" with matching dots to numerals with groups up to and including 5.</p> <p>Play "Snapshots" with dot cards, starting with easy arrangements, moving to more difficult arrangements.</p> <p>Easy: (including in a vertical or horizontal line)</p>  <p>Medium:</p>  <p>Difficult: Any random arrangement</p>
5	<p>Conceptual Subitizer to 5: Verbally labels all arrangements to about 5, when shown only briefly.</p>	<p>Use different arrangements of the various modifications of "Snapshots" to develop conceptual subitizing and ideas about addition and subtraction. The goal is to encourage students to "see the addends and the sum as in 'two apples and two apples make four apples'"</p> <p>Use five frames.</p>
5	<p>Conceptual Subitizer to 10: Verbally labels most briefly shown arrangements to 6, then up to 10, using groups. (Example: In my mind, I made two groups of 3 and one more, so 7)</p>	<p>Play "Snapshots" with matching dots to numerals.</p> <p>Use ten frames.</p>

6	<p>Conceptual Subitizer to 20: Verbally labels structured arrangements up to 20, shown only briefly, using groups.</p>	<p>Use five and ten frames to help children visualize addition combinations, but also move to mental arithmetic.</p> 
7	<p>Conceptual Subitizer with Place Value and Skip Counting: Verbally labels structured arrangements, shown only briefly, using groups, skip counting, and place value. (Example: I saw groups of tens and twos, so 10, 20, 30, 40, 42, 44, 46 . . . 46!)</p>	<p>Play "Snapshots" matching dots to numerals but with larger numbers.</p> <p>Use ten frames.</p> 
8	<p>Conceptual Subitizer with Place Value and Multiplication: Verbally labels structured arrangements shown only briefly, using groups, multiplication and place value. (Example: I saw groups of tens and threes, so I thought, 5 tens is 50 and 4 threes is 12, so 62 in all.)</p>	<p>Play "Snapshots" with structured groups that support the use of increasingly sophisticated mental strategies and operations, such as asking children how many dots in the picture below.</p> 