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**Count on it: congruent manipulative displays.**

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Summary: Representations that create informative visual displays are powerful tools for communicating mathematical concepts. The National Council of Teachers of Mathematics encourages the use of manipulatives. Manipulative materials are often used to present initial representations of basic numerical principles to young children, and it is through these early developmental experiences that children frequently receive their first introduction to formal mathematics. Manipulative displays are well suited to serve as proxies for real-world problems, taking on the role of representing quantities. Teachers intuitively assemble manipulative displays to construct such representations, often attaching language to scaffold the real-world connections they are trying to portray. Many children prosper from the interaction; however, others do not. For the latter, confusion can result when the arrangement of the display is not clearly connected to the concept being taught. The aims of this article are to: (1) identify the rationale for using manipulative displays as tools for communicating concepts; (2) describe the desired attributes teachers should consider when selecting and implementing manipulatives; (3) define conceptual congruence; and (4) offer some suggestions for helping teachers achieve greater congruence between the numerical concepts and procedures they are teaching and the manipulative displays they are using to represent them. The authors also present an example of a  $1 \times 10$  ten-frame display to use as a tool to facilitate conceptual congruence. (ERIC)

*Classification:* F20 F30 U60

*Keywords:* mathematical concepts; manipulative materials; concept formation; number concepts; visual representation; hands-on representation; number sense

<http://www.nctm.org/Publications/teaching-children-mathematics/2015/Vol21/Issue6/Count-On-It.-Congruent-Manipulative-Displays/>