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# **1.9 Million Hits and Counting: An Investigation of the Cognitive Alignment of Hundred Boards for Subtraction Thinking**

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## **Abstract**

The primary numerical activities in kindergarten through third grade are aimed at developing an understanding of the structure of base-ten numbers and learning to add and subtract with increasingly larger numbers. Many students in the U.S. continue to find this difficult. Thus, the most common instructional tools intended to support childrens learning of these ideas should be analyzed for their cognitive alignment and, if needed, redesigned for optimal learning. This study reports the findings from a study examining the cognitive alignment of a standard hundred board for the more difficult subtraction operation. Additionally, we investigate whether redesigning the hundred board such that addition goes up and subtraction goes down is more optimal for subtraction.