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Understanding proportionality: from children's qualitative intuitions to quantification.

Lindmeier, Anke M. (ed.) et al., Proceedings of the 37th conference of the International Group for the Psychology of Mathematics Education "Mathematics learning across the life span", PME 37, Kiel, Germany, July 28–August 2, 2013. Vol. 3. Kiel: IPN–Leibniz Institute for Science and Mathematics Education at the University of Kiel (ISBN 978-3-89088-289-5). 289-296 (2013).

Summary: We report on 20 elementary school children (ages from 8 to 11) who made significant progress in understanding proportionality in the context of quantifying relationships among weight, volume, and density. We compare the pre- and post-performance for the whole sample and we examine transcripts from two students whose responses typify those of many of the participant children. We attempt to show how the particular materials used (cylinders of different materials, an unconventional scale, and an unconventional ruler) and the design of the tasks supported the emergence of proportional reasoning based on ratios among measures.

Classification: F82 F72
Keywords: proportionality; qualitative intuitions; quantification; weight; volume; density; proportional reasoning; ratio