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An exponential growth learning trajectory.

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. 2. Kiel: IPN–Leibniz Institute for Science and Mathematics Education at the University of Kiel (ISBN 978-3-89088-288-8). 273-280 (2013).

Summary: Exponential functions are an important topic in school algebra and in higher mathematics, but research on students’ thinking suggests that understanding exponential growth remains an instructional challenge. This paper reports the results of a small-scale teaching experiment with students who explored exponential functions in the context of two continuously covarying quantities, height and time. We present a learning trajectory identifying three major stages of conceptions about exponential growth: pre-functional reasoning, covariational reasoning, and correspondence reasoning. The learning trajectory identifies relationships between these conceptions and the nature of the tasks that supported their development.

Classification: I20 C30 E50

Keywords: exponential functions; exponential growth; learning trajectory; reasoning; instructional challenge