

Making Comparisons of Relative Size: A Secondary Topic Critical in College STEM Courses
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Many of the mathematical ideas that are foundational for collegiate STEM content are first learned in secondary school (ages 11 to 18). For example, much time is devoted to helping students make comparisons of the relative size of quantities in instruction on fractions, rate of change, percentages, rate of change functions, and unit conversions. Understanding new concepts taught in collegiate STEM courses often require fluency in making comparisons of relative size. For example, understanding differential calculus (commonly taught at US universities) requires understanding rate of change functions that give information about the relative size of changes of two quantities. Understanding rate of change functions in differential calculus is a critical foundation for making sense of differential equations. Essentially all science classes consider the rate of change of quantities and make comparisons of relative size. Finally, making comparisons of relative size is helpful for making decisions as a citizen. For example, citizens have to make decisions about the relative risks of various choices. This talk first presents evidence that many new college students and mathematics teachers struggle to make comparisons of relative size. Then, I share my experiences incorporating secondary mathematics into collegiate content in calculus courses for STEM majors and courses for pre-service mathematics teachers. Finally, I leave the open question for the audience of how collegiate teachers should balance our responsibilities to teach collegiate content with our responsibilities to support students in learning secondary content that is critical for citizenship and future studies.