

EVENT MATERIALS

Succeeding in Introductory Physics: Building math fluency in a physics context

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Need: Students often struggle with relatively basic mathematics used in introductory physics courses. This project is aimed at investigating the nature and extent of these difficulties, and using those findings to guide development of online learning tools to improve students' mathematics skills in the context of physics. **Guiding Question:** (1) What is the nature and extent of mathematics difficulties of students enrolled in introductory college physics courses? (2) What are the impacts of these difficulties on students' course performance? (3) How may we use our findings to guide development of online learning tools to improve students' mathematics skills and ultimately impact their course performance? **Outcomes:** (1) We have administered a mathematics diagnostic test to over 7000 students at four universities to document the nature and extent of mathematics difficulties of students enrolled in introductory physics courses; (2) We have documented a link between performance on the diagnostic test and students' course performance; (3) In ongoing collaboration with Ohio State University, we are using our findings to inform development and testing of an online learning tool designed to improve students' mathematics skills. **Broader Impacts:** This project has the potential to (1) inform physics instructors of the nature and extent of students' mathematics difficulties, along with implications for instruction and related recommendations for improving the effectiveness of that instruction; (2) measurably improve physics students' performance in introductory courses nationwide with a research-based intervention that is both economical and logistically simple to implement. We believe that both our research findings and research-based learning tools may have particularly great impact in assisting underprepared students to succeed and continue in physics and other STEM courses.

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