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Physics, Math, and Making Sense: Understanding how brains learn science

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Recent developments in neuroscience, cognitive science, and behavioral science are helping physics education researchers develop a theoretical understanding of physics teaching and learning. This understanding helps in two ways. 1). We can make sense of the way students respond (often inappropriately) to our instruction. 2). We can learn to appreciate the difficulties we have as instructors in unpacking and identifying critical components of our own knowledge. Building on observations of student learning in introductory and advanced physics, I identify critical components for teaching physics with math that are often overlooked in traditional instruction.