

MS1: BIOMAAP: Tackling Biology students' math attitudes and anxiety with easily-adoptable materials

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The gaps between the requisite quantitative skillsets of modern professional scientists and the methods of instruction at the undergraduate level continue to widen, despite numerous calls for reform. These gaps are particularly acute in biology, a major which attracts many students interested in science but fearful of math. Students' mathematics anxiety and lack of confidence can lead to decreased performance, in a cycle where students with negative math experiences are then reluctant to engage with new quantitative content, leading to further negative experiences. Fortunately, explicit strategies to increase student comfort with quantitative content can help students successfully engage with that content.

We will present a variety of short, easily adoptable materials to address mathematics attitudes in biology students by increasing students' expectations of success. These materials were developed for the NSF-funded Biology Students Math Anxiety and Attitudes Program (BIOMAAP). The general approaches include fostering a growth mindset, using metacognition (thinking about their own process of doing math) to refine student efforts, avoiding stereotype threat, and developing foundational numeracy skills. We will also provide a brief background on the different approaches and current evidence of their effectiveness. The materials are targeted at introductory undergraduate biology courses, but are not content-specific and are thus appropriate for a range of biology courses. Materials include both out-of-class and in-class activities that can be led by an instructor or peer mentor, and actively engage students in reducing their own mathematics anxiety and improving their attitudes toward mathematics.