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**Award Abstract #1140398**

### An Informed Approach to Improving Quantitative Literacy and Mitigating Math Anxiety in Undergraduates through Introductory Science Courses

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**NSF Org:** [DUE](#)  
[Division of Undergraduate Education](#)

**Initial Amendment Date:** August 30, 2012

**Latest Amendment Date:** August 30, 2012

**Award Number:** 1140398

**Award Instrument:** Standard Grant

**Program Manager:** Duncan E. McBride  
DUE Division of Undergraduate Education  
EHR Directorate for Education & Human Resources

**Start Date:** September 1, 2012

**Expires:** August 31, 2015 (Estimated)

**Awarded Amount to Date:** \$199,535.00

**Investigator(s):** Donald McCarthy dmccarthy@as.arizona.edu (Principal Investigator)  
Katherine Follette (Co-Principal Investigator)  
Erin Dokter (Co-Principal Investigator)

**Sponsor:** University of Arizona  
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**NSF Program(s):** TUES-Type 1 Project

**Program Reference Code(s):** 9178, SMET

**Program Element Code(s):** 7513

#### ABSTRACT

**Intellectual Merit:** The project is developing a two-fold approach to the improvement of quantitative literacy in undergraduate students by (1) studying how students' quantitative literacy can be assessed and improved through the introductory sciences, and (2) educating other university faculty about the need to improve quantitative literacy while training them to address the problem in their own classrooms.

While numeracy is essential to understanding science, there are no data on whether introductory science can be used to improve students' numerical ability during a

one-semester course. Beginning with the general-education introductory astronomy course, in partnership with Pima Community College, this project is investigating how introductory science classes for non-majors can be used to improve students' comfort and ability with numbers and mathematical reasoning skills. Such skills include graph reading, proportionality, percentages, probability and number sense. This research is important in understanding where basic quantitative literacy among college students is insufficient, and whether literacy can be improved and skills established through science courses.

Broader Impacts: The project is taking advantage of extensive teaching experience - in formal and informal settings, from junior high to adult learners, and in a variety of scientific disciplines - and educational research to develop a workshop for instructors of introductory science courses. This workshop provides the methods, curricular materials, and educational tools faculty need to help improve quantitative literacy in their classrooms. By increasing awareness regarding the life consequences of quantitative illiteracy and by providing tested curricular materials and practical ideas designed to help develop quantitative skills, the project is encouraging an emphasis on numeracy in the science classroom that serves students well by itself and also helps them learn the science.

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