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D. Brian Walton* (waltondb@jmu.edu), 60 Bluestone Drive, MSC 1911, Harrisonburg, VA 22807. *A Modeling Approach to Calculus: Using the framework of modeling in the motivation and development of calculus.* Preliminary report.

A significant number of students interested in STEM fields enter college with experience in pre-calculus and calculus but without adequate understanding or skills to succeed in a standard first semester calculus course. Sending these students to a traditional college pre-calculus course risks providing an experience in which the students' sense of familiarity prevents their addressing faulty cognitive models for understanding mathematics. An alternative is to use an approach where students encounter an unfamiliar paradigm and thereby work to address the dissonance between their thinking and the challenge presented. The author is developing a two-semester course designed to address these needs by integrating learning objectives from pre-calculus and calculus (differentiation and integration) where the motivation and the development of the mathematics are centered on the process of mathematical modeling. This report will include the organization of the course, examples of activities in which students engage in the modeling process, a discussion of how communication is emphasized as a part of modeling, and observations about outcomes and challenges. (Received September 22, 2015)