

# Scientific Thought and Method

SM 101  
Course Manual  
2<sup>nd</sup> Edition - Version I  
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## Introduction

Welcome to *Scientific Thought and Method!* These course materials have been created as part of a grant from the National Science Foundation to increase student success and retention in the sciences. As a result, the entire course has been modeled after research-based *best teaching practices* and will likely be very different from other science courses you have taken. The course is taught in an integrated lecture and lab format in two 2.5 hour blocks of class time each week. Components of the course are activity- and discussion-based with minimal lecture. A large portion of class time will involve students working in cooperative learning groups through activities as outlined in the text.

The course framework is driven by a set of scientific reasoning and math skills that are necessary for success in the sciences. In particular, the curriculum will target skills associated with conservation of mass and volume, proportional thinking, ability to control variables, probabilistic reasoning, correlational thinking, and hypothetico-deductive reasoning. *Explicit* instruction in these ability domains will be followed by multiple opportunities for students to apply and practice these skills in various science contexts.

Throughout the course students will engage in all aspects of the scientific investigation process including hypothesis writing, experimental design, data collection and analysis, and the drawing of conclusions. Emphasis will be placed on the writing of lab notes during the investigations themselves and the writing of lab reports afterwards.



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The joy of discovery is certainly the liveliest that the mind can ever feel.  
~*Claude Bernard (1813-78) French physiologist*