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To encourage independent thought and inquiry, we have designed many in-class projects for several courses that involve various levels of mathematical modeling. Most courses with this modeling-based approach have been applied mathematics courses, but we have also implemented them in a more theoretical course as well. In this talk we share some of these projects and their successful implementation.

The projects are designed to reinforce material covered in class, show real-life applications in a variety of fields, and are research-like in nature. In particular, the answers are not readily available, have not been thoroughly investigated, or present open-ended questions whose answers may lead students down different paths of discovery. Each project can also serve as a starting point for an undergraduate research project. We highlight many real-world applications that do not involve high-level mathematical theory and are accessible to students at many levels.

This modeling-based approach has had very positive results. Student project groups have gone on to present posters at local and regional conferences. Several students have won awards and many have changed their major to mathematics or changed their track within mathematics as a result of these projects. (Received September 20, 2011)