

MATH 172 MATHEMATICAL MODELING PROJECT 1
(DRAFT VERSION: SEPTEMBER 22, 2011)

Due Date. In class on Thursday, 13 October. This should give you enough time to do a nice job, but don't let it take over your life – it's not a term paper! Recall that it counts for 26 points, so carries the same weight as about 3 1/4 quizzes or 1/4 exam. I will be available to give help on any aspect of the project (math, calculator, what I want for certain questions) until Thursday, 6 October; after that you are on your own. Get the project done early enough that someone can carefully proofread it; appearance, spelling, grammar, and of course correctness all matter.

Ground rules. Projects are best done in groups of 3 or 4; there are advantages to sharing ideas, questions, just plain proofreading, and so on, but of course there are the disadvantages of organizing yourselves, splitting up the work, and (this could be good or bad) sharing the grade. The groups do not have to be the same as in class. You may not consult with anyone other than me; in particular **groups must work separately**. You may use any text and your calculators. The reports should reflect a genuine team effort; do not parcel out bits and pieces of the project, but rather have each person contribute to every phase of the project. Teams of two will be OK, but four is the absolute upper limit. You may choose your group first and then select the project, or the project first, and I will help you find group partners.

What I expect. The quality of the presentation is extremely important. You should write the solution as if it were to be read by an intelligent person, but not necessarily an expert in calculus, modeling, ecology, or biology. The style should be as if you were writing a section of the textbook. This means that a clear formulation of the problem and the conclusions, must be given in complete English sentences; don't just give a bunch of technical calculations. Be sure to introduce the meaning of all the variables and parameters, and to clearly the ideas and methods used. Weave the mathematical work and formulas into your text in correct mathematical notation (not calculator notation); write them in by hand if necessary. Suppress tedious arithmetic and algebraic calculations if these don't add to the reader's understanding; however, you must supply adequate mathematical justification for your answers. Where appropriate provide carefully selected diagrams, tables, and graphs. I prefer that these also be woven into the text in the correct places, but these can be at the end of the report if they are carefully labeled and you refer to them in the text itself. Be sure everything is labeled and units are given! Your report should include answers to all the questions that are asked, but not as a checklist. Use them to give you a framework for the things that need to be discussed in the report, which should have an essay form.

Finally, you must ask and answer at least one "What if" type question. You must make some change or changes in the model (parameter values, form of the model, method of computation, etc.) and compare your old results with the new ones. Ultimately we want to know: was this change significant in the long run or not? If you end up needing some new calculation that you don't know how to do, just consult with me.