1014-Z1-841	**Joe T. Harris*** (`harrisjt@sapc.edu`), cøSAPC, 1700 Dogwood Mile, Laurinburg, NC 28352.
Population Models Which Take Into Account Decay of Resources and Accumulation of Waste. Preliminary report.

This talk presents a project the objective of which is to model the various phases of the life of a colony of bacteria in a nutrient solution. The biologists know well that the behavior of such a population is more complicated than a logistic model can describe; thus the student is faced with at least two problems: How do I set up a model for this population? And, given a plausible model, how do I fit that model to my experimental data?

Here is a simple model, which can be used as a jumping-off point for more complicated models:

$$\frac{dP}{dt} = \kappa P(L - P) - \alpha w P \tag{1}$$

$$\frac{dL}{dt} = -P \tag{2}$$

$$\frac{dw}{dt} = P \tag{3}$$

Here P is the population of bacteria, L is the maximum population which the available nutrients will support, and w is the amount of waste present. These equations form the starting point of the project; as part of the project, students are expected to learn plating techniques to measure bacteria populations, regression techniques to fit the model to their data, and to experiment in modifications of the model. (Received September 25, 2005)