

## **Selection of Surveillance Centers for Foot and Mouth Disease: Wisconsin Dairy Farms**

by Kim A. S. Factor

### **Abstract**

This module investigates the use of dominating sets to determine testing sites for Foot and Mouth Disease (FMD) in dairy cows. It is intended to be used for early warning. An optional section is included for those wishing to expand the mathematical approach to include some computer science. Dairy cattle are susceptible to a highly contagious disease known as Foot and Mouth Disease. Although it is not currently within the United States, it could be reintroduced at any time. Once it has been identified within an animal population such as dairy cattle, all of the cattle must be euthanized. Additionally, susceptible animals in neighboring areas are also eliminated in order to avoid spreading the disease. The loss of animal life and the economic devastation to the community can be great. It is, therefore, desirable to find places where animals can be tested at regular intervals so that FMD can be identified at the earliest possible time.

The intended target audience is sophomore college students who are in their first "proofs" class and/or a discrete mathematics class. It provides a project that will allow the student to personalize their research, make decisions about measurement values, support the decisions in a manner compatible with the material they have been learning in class, and conduct group research into a new area. This is also appropriate for the same level of computer science students who are taking a discrete mathematics course, and suggestions for expanding to this audience are included.