PREPARATION READING:

Can Migration Be the Explanation?

LESSON TWO

First Moose Model

Key Concepts

Mathematical modeling process

Recursive and closed-form equations

Rate of change

Sensitivity analysis

Solving linear equations

Translations

Scale-change transformations

In Lesson One you were introduced to the moose in Adirondack State Park in upstate New York. As commissioner, you need to decide whether to spend money to move an additional 100 moose into the park. As the first step in the modeling process, the problem was defined in this way: How many moose will be in the park at the end of 20 years, if no additional moose (or 100 additional moose) are moved there? The model that you make will answer that question, and help decide whether the money needs to be spent.

The second step of the modeling process led you to choose between two basic approaches—migration and natural reproduction. You examined some moose facts and found that young males are more likely to wander. The population had been extinct for a long time, only to re-establish itself. The moose in the park had to come from somewhere else! It makes sense to explore the effect of a gradual increase in the moose population by migration as the first model. A migration model may be unrealistic, but it is simple and a good place to begin. There will be time enough to consider another key feature, if this is not the answer.

The facts are clear. There were between 15 and 20 moose in the park in 1988, and between 25 and 30 moose there in 1993. The model made by the environmentalists predicted that 1300 moose would be in the park by the year 2013. You need to understand how they arrived at that number. In this lesson, you will build a migration model, and tinker with it to see if that is what the environmentalists were using. In doing that, you will complete the first pass through the modeling process cycle.

DISCUSSION/REFLECTION

1. How will being able to predict the size of the moose population help you decide whether to spend the $1.3 million?
2. What does *migration* mean?
3. Why do you suppose a migration model is considered simple?