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## West Nile Virus and Lyme Disease: Making Sense of the Numbers

Guide for Curriculum Unit 09.05.06  
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This is a cross-discipline mathematics unit, designed for students in Algebra 2 or beyond. It incorporates functions with statistics to illuminate the useful nature of functions in translating data into models. It is application-driven. The unit's areas of focus are two emerging diseases: West Nile fever and Lyme disease. Both have important links to New Haven. We will examine the history and epidemiology of the diseases and use evolutionary principles as well as primary source data to lead us to questions and predictions, best modeled through math.

Math can help us study the process of evolving diseases. The engine of evolution is random mutation, mimicked by probability. The pressure of environment leads to success or failure of a mutation. Statistics helps us look at variation and possibilities and find patterns. Through our study of data and statistical analysis, we may find patterns created by that data. Writing a function that emulates the data we have collected is a powerful tool, known as modeling. When we discover correlations between variables such as environmental influences and populations, we can explore these relationships through linear functions. Modeling, combined with evolutionary prediction and analysis can help us to understand and reduce the risk of diseases.

(Developed for FST, grade 12; recommended for Mathematics, grades 9-12)

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