Sometimes, Yes! When disease starts affecting a population, governments and doctors want to know the best way to control that disease. Should they vaccinate, and who is it most important to vaccinate? Should they quarantine? Mathematics, and calculus in particular, is used to predict the outcomes of different choices.

A mathematical model of infectious disease: “SIS” stands for “Susceptible, Infected, Susceptible”, and captures the idea that some diseases run in cycles. People go from being healthy, and Susceptible to the disease, to possibly getting Infected, in which state they might transmit the disease to someone else, and potentially recover to once again be Susceptible. The rates at which transmission and recovery occur determine whether the disease eventually affects the whole population, or dies out, or becomes endemic, i.e. persists in some proportion of the population in the long term.

Different models, different predictions: Realistic models mean realistic predictions. The best predictions are most helpful in designing effective control measures. Below are predictions described in worksheets accompanying this poster. The first diagram shows how many people get infected when we assume that infection is going on at a constant rate. The second shows the effect of assuming that the more sick people there are about, the higher the chance of more infections occurring.

In the worksheets you’ll explore the differences between these assumptions and why they’re important.