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Epidemics, exponential functions, and modeling.

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Summary: The phenomenon of outbreaks of dangerous diseases is both intriguing to students and of mathematical significance, which is exactly why the authors engaged eighth graders in an introductory activity on the growth that occurs as an epidemic spreads. Various contexts can set the stage for such an exploration. Reading adolescent literature like *The eleventh plague* (Hirsch 2011), viewing a movie such as “Contagion”, and describing the history of London’s Great Plague during the 1600s are all possibilities. The activity presented in this article was created for eighth-grade students as a way to simulate a rapidly spreading epidemic in today’s society, while providing a visual model that conceptually demonstrates to students the power of exponential growth. After conducting a classroom simulation, the authors asked questions about multiple representations of exponential functions, comparisons in characteristics of different types of functions, applications to new scenarios, and real-life considerations regarding variables that affect the spread of epidemics. The activity was taught in two classes of eighth-grade students. This activity addresses several of the Common Core State Standards for Mathematics at both the eighth-grade and high school level in the Functions domain. Specifically, this activity closely aligns with the clusters to construct and compare linear, quadratic, and exponential models and solve problems as well as to interpret expressions for functions in terms of the situation they model. Additionally, the activity addresses modeling with mathematics, as students work with exponential models within the context of epidemics and use appropriate tools, because students considered the advantages as well as the limitations of using such technology as a graphing calculator. (ERIC)

Classification: M63 I23

Keywords: modeling; epidemics; exponential functions; exponential growth

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