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Carlos W Castillo-Garsow* (cwcg@k-state.edu), Department of Mathematics, 138 Cardwell Hall, Kansas State University, Manhattan, KS 66506. *What do we mean when we say we "want students to understand exponential growth?"*.

The exponential function is the most important function in mathematical biology, forming a foundation for differential equations, difference equations, and stochastic processes. However there is little research and only superficial agreement on how the subject of exponential growth should be taught. In order to investigate these issues, I preformed a teaching experiment in exponential growth with two high school students, leading up to the logistic differential equation model. During this experiment, both the students and I inadvertently used many different ways of thinking about change, rate of change, and exponential growth. Subtle differences in ways of thinking about exponential growth led to a great deal of miscommunication and incompatible – but not necessarily incorrect – results. In this paper. I highlight some of the ways of thinking used by participants in this teaching experiment. From these results I discuss how mathematicians teaching exponential growth make use of multiple contradictory ways of thinking, and the danger that these distinctions are not being communicated to students. (Received September 22, 2010)