Using the comparison method and the idea of a minimal class of functions, a logistic growth model—with applications in epidemiology, psychology, and many other scientific areas—is derived. Parameter estimation using the existing methods and the exploration of future methods that utilize the analytic properties of the model are discussed. Parameter bounds are established using bounds on the model expectation function and length of time to the proximity of the saturation level. Lastly, the model is applied to HIV prevalence, as a function of time. (Received September 17, 2013)