Ekici, Celil and Chris Plyley. 2019. Inquiry-Based Modeling of Population Dynamics With Logistic Differential and Difference Equations. *PRIMUS*. 29(6): 553-570. Freely available at the Mathematical Association of America Membership Portal.

See https://www.maa.org/press/periodicals. Accessed 8 March 2023.

Abstract: Following a modeling-first approach to differential equations, inquiry-based learning activities on modeling and controlling the growth of locally relevant species, such as lionfish or sea turtles, are developed by the authors. Emerging exemplary practices are presented, building towards a balanced teaching of differential equations involving multiple mathematical perspectives, representations, and intra-disciplinary and interdisciplinary mathematical connections. This innovative approach is an effort towards realizing the MAA's *Common Vision* for Undergraduate Mathematical Sciences programs in 2025. Discrete and continuous approaches are used simultaneously, while numerical and graphical methods are used to build connections between logistic differential and difference equation models. The resulting chaotic behavior of the solutions is also emphasized. We suggest that this enhancement of the *Doing the Math* phase of modeling outlined in SIAM's 2016 *Guidelines for Assessment and Instruction in Mathematical Modeling* offers a wider access to deeper mathematics, and helps to foster complementary disciplinary perspectives in mathematics.

Keywords: Inquiry-based modeling, IBL, differential equations, difference equations, population dynamics, logistic growth