

Mathematical modeling is the process of translating real-world problems into mathematical language. In this section, we will explore how first-order differential equations are applied across population growth, radioactive decay, and Newton's law of cooling. One of the most common applications of first-order differential equations is in modeling population growth or decline. It is represented by the differential equation: The models provide insights into how populations change over time due to births, deaths, immigration, and emigration. The simplest model for population growth is the Exponential Growth Model, which assumes an unlimited resource environment. This involves formulating, developing, and rigorously testing models to represent and solve complex issues.