

Name _____

Healing Equations: How Differential Equations Shape Biology and Medicine

Open-Ended Response Answer Key

1. The logistic growth equation describes how populations grow initially, then stabilize as resources become limited. Ecologists use this equation to predict population growth and develop conservation strategies.
2. Neuroscientists use the Hodgkin-Huxley model to simulate the behavior of neurons and study phenomena such as action potentials and synaptic transmission, contributing to our understanding of brain function and neurological disorders.
3. Epidemiologists use differential equations to model disease spread and predict factors such as transmission rates, population immunity, and the effectiveness of interventions, guiding public health policies and disease control measures.
4. Pharmacologists use pharmacokinetic models to simulate drug absorption, distribution, metabolism, and excretion in the body, allowing them to optimize drug doses and dosing regimens for individual patients, maximizing therapeutic benefits while minimizing side effects.

