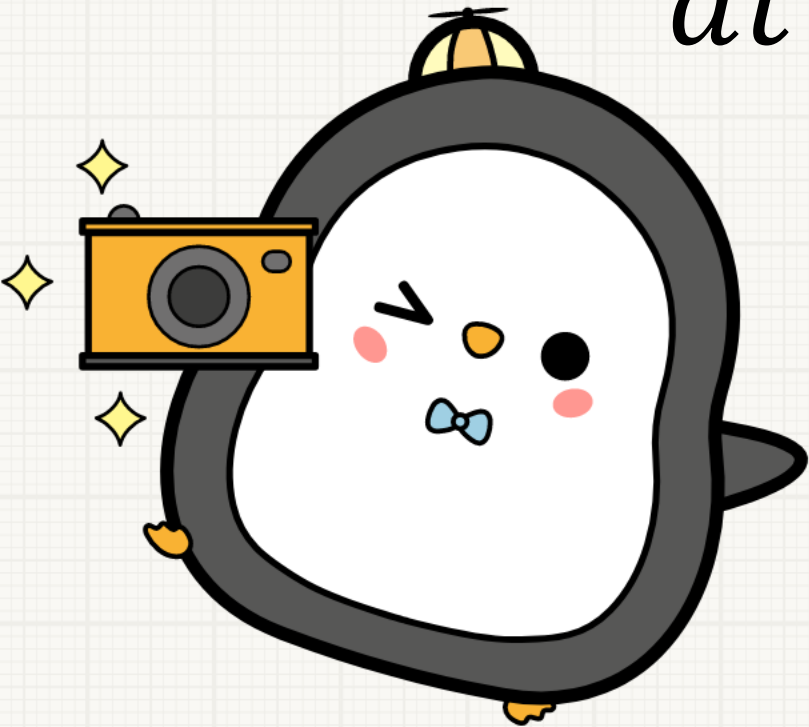
A graphic for 'AP Bio Math Mondays' on a light green grid background. The title is centered in a purple rounded rectangle. 'AP Bio' is in green, and 'Math Mondays' is in purple. Below it, 'Rate and Growth: Logistic Growth' is written in black. A cute penguin with a camera is on the right. The background is decorated with a DNA helix, a pencil, paper clips, and a notebook.

# AP Bio Math Mondays

Rate and Growth:  
Logistic Growth

# Logistic Growth

$$\frac{dN}{dt} = r_{max}N \left( \frac{K - N}{K} \right)$$



# Math Monday #4

## Logistic Growth

A population of penguins has a carrying capacity of 650 individuals. If the maximum rate of increase is 0.25 per individual per year and a population size of 500, determine the logistic growth rate to the nearest penguin.

### Logistic Growth

$$\frac{dN}{dt} = r_{max}N \left( \frac{K - N}{K} \right)$$



$r_{max}$  = maximum per capita growth rate of population

$N$  = population size

$K$  = carrying capacity

$$\frac{dN}{dt} = 0.25(500) \left( \frac{650 - 500}{650} \right)$$

# Math Monday #4

## Logistic Growth

A population of penguins has a carrying capacity of 650 individuals. If the maximum rate of increase is 0.25 per individual per year and a population size of 500, determine the logistic growth rate to the nearest penguin.

$$\frac{dN}{dt} = 0.25(500) \left( \frac{650 - 500}{650} \right)$$

$$\frac{dN}{dt} = 125 \left( \frac{150}{650} \right)$$

$$\frac{dN}{dt} = 125(0.231)$$

$$\frac{dN}{dt} = 28.85 = 29$$

# Example Problem

# Logistic Growth

A population of deer mice on an island has a carrying capacity of 350 individuals. If the maximum rate of increase is 1.0 per individual per year and the population size is 275, determine the logistic population growth rate to the nearest mouse.

## Logistic Growth

$$\frac{dN}{dt} = r_{max}N \left( \frac{K - N}{K} \right)$$



$$\frac{dN}{dt} = 1.0(275) \left( \frac{350 - 275}{350} \right)$$

$$\frac{dN}{dt} = 275 \left( \frac{75}{350} \right)$$

$$\frac{dN}{dt} = 275(0.214) \quad \frac{dN}{dt} = 58.92 = 59$$