### **Analyzing the Discovery of a New Antibiotic-Resistant Bacterial Species**

#### **Story:**

Scientists in a remote research lab have recently discovered a new bacterial species named *Bacterium X*. This species shows unpredictable growth patterns and alarming resistance to antibiotics. Your task as a data analyst is to help the research team by analyzing the growth patterns of *Bacterium X* under different environmental conditions and antibiotic treatments. They hope your findings will guide future experiments and treatment strategies.

### **Objectives:**

* Analyze time-series data for bacterial growth
* Perform basic statistical analysis on treatment results
* Visualize trends to derive biological insights
* Make actionable recommendations for further lab work

**Columns:**

* Time (hrs): Time since the experiment began
* Temperature (°C): Temperature in which the bacteria were grown
* pH: Acidity level of the growth medium
* Antibiotic (mg/L): Concentration of the antibiotic added
* Bacterial Growth (CFU/mL): Colony-forming units per milliliter

### **Tasks:**

1. **Data Cleaning:**
   * Identify and handle missing values
   * Convert time to a numerical format for analysis
2. **Exploratory Data Analysis:**
   * Plot bacterial growth over time
   * Analyze the effect of temperature and pH on growth
   * Compare bacterial growth under different antibiotic treatments
3. **Statistical Analysis:**
   * Perform correlation analysis between antibiotic concentration and bacterial growth
4. **Data Visualization:**
   * Create line plots for growth trends
   * Generate scatter plots to visualize antibiotic effectiveness
5. **Report Findings:**
   * At what temperature and pH does *Bacterium X* grow the fastest?
   * What concentration of antibiotics shows the most growth inhibition?
   * Provide recommendations for future experiments