Objective

By the end of this lesson, the student will understand how to create and interpret box plots (also known as box-and-whisker plots) using data related to bee pollen counts. They will also learn about the historical context of data visualization and the contributions of Mary Eleanor Spear and John Tukey to this field.

Materials and Prep

- Access to a computer or tablet with internet connection.
- Desmos graphing calculator (online tool).
- Data set on bee pollen counts (can be fictional or sourced from citizen science projects).
- Notebook for taking notes and reflecting on the lesson.
- Basic understanding of statistics (mean, median, quartiles).

Activities

1. **Introduction to Box Plots:**

   Begin by watching a short video or reading a brief article about box plots. Discuss what a box plot represents, including the median, quartiles, and outliers. This will set the stage for understanding how to visualize data effectively.

2. **Exploring Bee Pollen Data:**

   Using the provided data set on bee pollen counts, the student will input the data into Desmos to create a box plot. Encourage them to manipulate the data to see how changes affect the box plot.

3. **Historical Context:**

   Research the biographies of Mary Eleanor Spear and John Tukey. Create a timeline of their contributions to statistics and data visualization, discussing how their work has influenced modern practices.

4. **Citizen Science Project:**

   Explore how citizen science projects collect data on pollinators. Discuss the importance of this data and how it can be visualized using box plots to convey findings effectively.

Talking Points

- "Box plots help us visualize data in a way that shows us the spread and central tendency. It’s like getting a quick snapshot of the data!"
- "Did you know that John Tukey is one of the pioneers of exploratory data analysis? He believed that visualizing data is crucial for understanding it!"
- "Mary Eleanor Spear contributed significantly to the field of statistics, especially in understanding and analyzing ecological data. Her work helps us appreciate the role of bees in our ecosystem!"
- "Citizen science projects, like monitoring bee populations, allow everyday people to contribute to scientific research. This data can help scientists understand environmental changes!"
- "When we create a box plot, we can easily see the median, which tells us the middle value of our data. This helps us understand where most of our data points lie!"