Objective

By the end of this lesson, the student will understand how to create and interpret box plots (box-whisker plots) using data visualization software. They will also learn about the significance of citizen science in tracking pollinator populations, with a focus on bee pollen counts, while exploring the contributions of Mary Eleanor Spear and John Tukey to the field of data analysis.

Materials and Prep

- Computer or tablet with internet access
- Access to Desmos (a free online graphing calculator)
- Data set of bee pollen counts (can be found online or simulated for practice)
- Information on Mary Eleanor Spear and John Tukey (biographies and contributions)
- Notebook for taking notes and sketching plots

Before the lesson, ensure the student is familiar with basic graphing concepts and has access to the required software. Briefly introduce the concepts of box plots and their importance in data analysis.

Activities

- **Research Project:**

  The student will research Mary Eleanor Spear and John Tukey, focusing on their contributions to statistics and data visualization. They will create a short biography and present it to the teacher.

- **Data Collection:**

  The student will participate in a simulated citizen science project by collecting or using existing data on bee pollen counts. They will organize this data into a table for analysis.

- **Creating Box Plots:**

  Using the data collected, the student will learn how to create box plots in Desmos. They will analyze the box plots to identify median, quartiles, and potential outliers.

- **Discussion and Reflection:**

  The student will reflect on the importance of data visualization in understanding ecological data and discuss how citizen science contributes to environmental awareness.

Talking Points

- "Box plots are a great way to visualize data distribution. They show us the median, quartiles, and range of the data at a glance."
- "Mary Eleanor Spear was a pioneer in the study of pollinators and their importance in our ecosystem. Her work helped us understand how vital bees are to our food supply."
- "John Tukey introduced the box plot as a way to summarize data. His contributions to statistics have made it easier for us to analyze and interpret data."
- "Citizen science allows everyday people to contribute to scientific research. By collecting data on bee populations, we can help scientists understand trends and threats to pollinators."
- "Using tools like Desmos, we can create visual representations of our data, making it easier to communicate findings and insights."