Lesson Plan - Cumulative Frequency Distribution: A Close Look at Neighborhood Data

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Subject/Grade level: Mathematics / 6-12

Materials:
- Computers/Laptops/IPads
- Worksheet
- Graphing Calculators

Essential Question(s):

- How do we analyze data and construct cumulative frequency tables using traffic volume count?

Key Vocabulary:

- Frequency, Cumulative frequency table, Median, Quartiles

Essential Standards:

Algebra I NGSS:

S-ID.A. Summarize, represent, and interpret data on a single count or measurement variable

Statistics Standards:

- Students will create a frequency distribution graph by hand and with technology.
- Students will recognize patterns, describe and draw conclusions about a frequency distribution.
- Students will create a cumulative frequency distribution graph by hand and using technology.

Lesson objective(s):

Students will demonstrate understanding or learning around the following Big Ideas:

- Teaching statistical methods using traffic volume count data
- Students will use the data to graph the traffic volume count using a cumulative frequency graph.

Objectives:

➔ I will be able to construct frequency distribution graph
➔ I will be able to construct a cumulative frequency distribution graph.

Differentiation strategies to meet diverse learner needs:

- Student choice - Locations they want to choose to construct a cumulative frequency distribution graph
- You can have students observe traffic patterns in different/own boroughs in the city.
- List of boroughs or streets that work for students that might get stuck

- Specific data in an Excel file for students that need scaffolding.

- Student Lesson Scaffold (Re-engagement of topic)

ENGAGEMENT (Anchoring Phenomenon)
- Students engage in a Do Now going over the experiences they have with traffic in the city
- Students will then make predictions about traffic during peak and off-peak times

Teacher will conduct a mini lesson on Introduction to traffic volume
- How traffic volume data is collected?
- What patterns do you notice?

EXPLORATION
- Students will use the following website:
- https://data.cityofnewyork.us/Transportation/Automated-Traffic-Volume-Counts/
- https://opendata.cityofnewyork.us/data/

and perform an experiment gathering traffic volume count data during different times of the day.
- You will be collecting data such as: location, time, number of vehicles passed during that specific time.
- Students will give a rationale for the reason behind their choice of location and the predominant cultures in that area
- Record the data shown on the website during specific times and then repeat for other times of the day

- We will show the class one example together.

- You will then find the patterns between different times of the day.

EXPLANATION
- What have you noticed about the trend in your table and graphs?

ELABORATION
- Students will combine their data on a Google Sheets and then as a class find and discuss procedure to graph a cumulative frequency distribution

EVALUATION
Students will discuss the following questions:
- What did you learn from the data related to traffic count? What was surprising?
- Do you feel the data is valid (reliable and accurate)? Why or Why not?
- If you had the chance to redo the task, what changes would you make? How would you improve it? Explain.

- What new questions did the task generate? Explain.

HOMEWORK

- Only fill out if applicable

POSSIBLE LESSON VARIATIONS/EXTENSIONS

- Students will choose a location whose data surprised them and do research on the infrastructure of the place to find potential reasons for the findings.
- Ask students to paste all their data into one class google sheets to find a more accurate depiction of the relationships between the variables.
    - Lead a discussion on the data generated