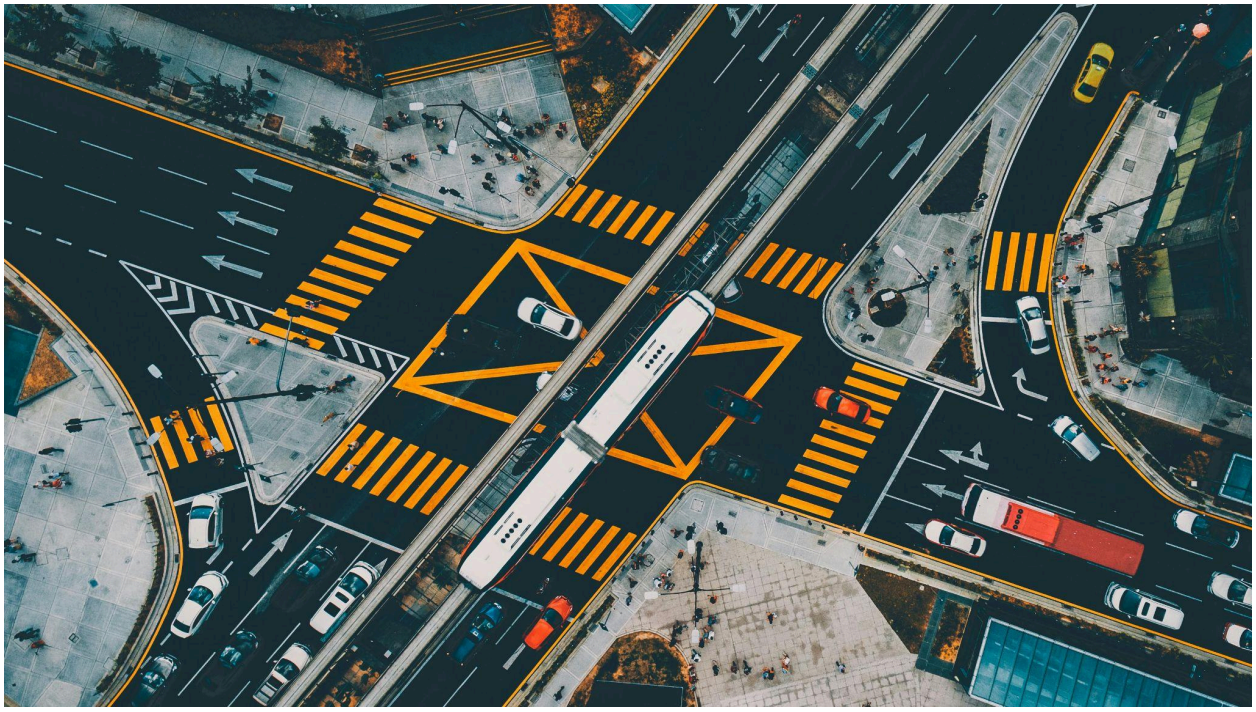
Traffic Troubles: A Data Detective Project

Project Overview:

Congratulations! You've been hired as a junior traffic analyst for the city. Your first task is to investigate traffic flow on two major routes, Route A and Route B. The city planner needs your expertise to analyze traffic data, draw conclusions, and make recommendations for improving traffic flow and reducing congestion.



Name: _____

Date: _____ Period: _____

1. Introduction and Background:

Letter from the City Planner

Dear Junior Traffic Analyst,

Traffic congestion has become a growing concern in our city, particularly on two major routes, Route A1 and Route B2. We need your help to analyze traffic data and identify solutions to improve traffic flow and reduce congestion during peak hours.

Your task is to analyze the provided data, draw conclusions about the traffic patterns on each route, and present your findings along with recommendations for improvement. Your analysis will play a crucial role in our city's transportation planning and improving the daily commute for our citizens.

Sincerely,

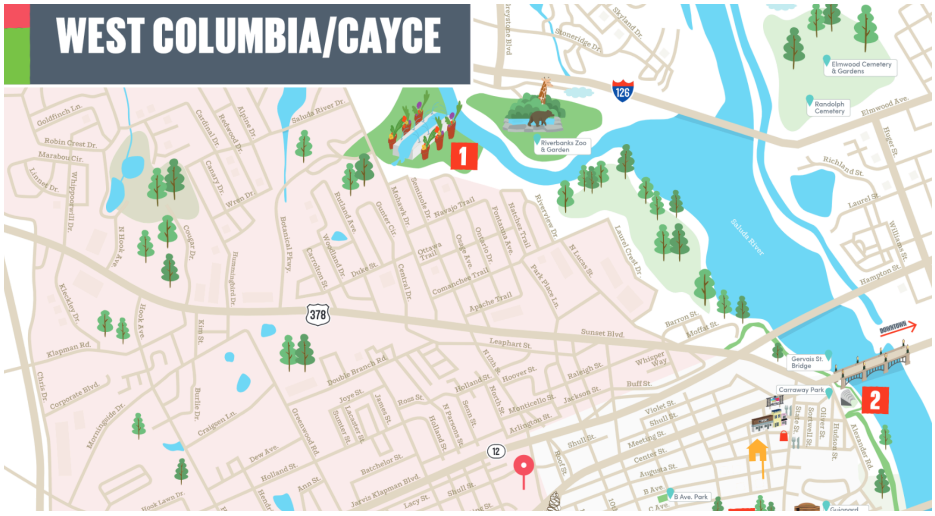
Your Teacher, City Planner

Background Information:

Traffic congestion occurs when the volume of traffic exceeds the capacity of the road network. This can lead to:

- Increased travel times
- Wasted fuel and increased pollution
- Frustration and stress for drivers
- Economic losses due to delays

Effective traffic management is crucial for a city's well-being. By analyzing traffic patterns, we can identify bottlenecks, optimize traffic flow, and implement strategies to reduce congestion and improve transportation efficiency.



2. Data Set:

Traffic Flow Data

The following table shows the number of cars passing a specific point on Route A and Route B every hour from 7:00 AM to 7:00 PM on a typical weekday. This data was collected using automated traffic counters.

	Route A (Cars per hour)	Route B (Cars per hour)
7:00 AM	150	120
8:00 AM	350	280
9:00 AM	420	310
10:00 AM	380	290
11:00 AM	300	250
12:00 PM	330	270
1:00 PM	310	260
2:00 PM	350	290
3:00 PM	450	380
4:00 PM	500	420
5:00 PM	550	480
6:00 PM	400	350
7:00 PM	250	200

3. Data Analysis Tasks:

Calculate Measures of Center:

- Calculate the mean, median, and mode for each route.
- Show your work and explain what these measures tell you about the typical traffic flow on each route.

Calculate Measures of Variability:

- Calculate the range, mean absolute deviation (MAD), and interquartile range (IQR) for each route.
- Show your work and explain what these measures reveal about the consistency and spread of traffic flow on each route.

Visualize Traffic Patterns:

- Create a dot plot or histogram for each route to visualize the distribution of traffic flow.
- Analyze the shape of each distribution (symmetry, skewness, outliers).
- Explain how the shape of the distribution relates to the measures of center and variability.

4. Comparison and Conclusions:

- Compare and contrast the traffic patterns on Route A and Route B based on your data analysis.
- Draw conclusions about which route experiences more congestion overall and during peak hours.
- Support your conclusions with evidence from your calculations and graphs.

5. Recommendations:

- Based on your analysis, provide at least three specific recommendations to the city planner for improving traffic flow and reducing congestion on Route A and/or Route B.
- Consider solutions such as:
    - Adjusting traffic light timing
    - Adding lanes
    - Creating alternate routes
    - Implementing carpool incentives
    - Encouraging public transportation use

6. Presentation:

- Prepare a brief presentation to deliver to the city planner (your teacher) summarizing your findings, conclusions, and recommendations.
- Use visual aids (graphs, charts, maps) to effectively communicate your analysis.

Assessment:

Your project will be assessed on the following criteria:

- **Accuracy of calculations:** Correctly calculating measures of center and variability.
- **Quality of graphs:** Creating clear and accurate graphs that effectively represent the data.
- **Depth of analysis:** Thoroughly analyzing and comparing the traffic patterns on both routes.
- **Validity of conclusions:** Drawing logical conclusions supported by evidence from the data.
- **Feasibility of recommendations:** Proposing realistic and practical solutions for improving traffic flow.
- **Clarity of presentation:** Communicating your findings and recommendations in a clear and organized manner.