

Traffic and Data Analysis

Grade Level: 5

Subject: Math

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Duration: 2-3 classes

Materials Needed

Tape, available hallway, interactive white board (Smartboard), graphing software (Excel)
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Analyze Learners

Overview & Purpose

Overview:

A: Application

Anyone who is traveling from one point to another might be concerned with how long it will take. If you are going to work in the morning, and you encounter an accident, you could be late for work and suffer the consequences. How does congestion on the roads affect the traffic flow?

Data collection and the process of the scientific method is something that is very important in research fields. The process of recording data is something that is very applicable and important, and students get to see this as they are acting like scientists.

Graphing is applicable in many fields. After data collection in the research fields the results can be graphed and a best fit line is found. Extrapolation on graphs is a concept which can be used in many fields such as how to predict how a substance might react with continued addition of heat,

C: Career

Researchers and scientists use the scientific method and very meticulously organize and record their data. Mathematics careers, as well as a variety of general careers use graphs to easily display data.

S: Society

If students can understand and apply the scientific method, such as analyzing the problem, recording data, and discussing results, they can easily share their results with others. This creates the opportunity to share information in professional publications. When they can publish their results, they can inform the general public and create discussion among society.

Education Standards Addressed: Ohio Academic Content Standards

Mathematics:

Measurement Standard:

Grade Level Indicator 5: Make conversions within the same measurement system while performing computations.

Patterns, Functions, and Algebra

Grade Level Indicator 5: Model problems with physical materials and visual representations, and use models, graphs and tables to draw conclusions and make predictions.

Grade Level Indicator 6: Describe how the quantitative change in a variable affects the value of a related variable; e.g., describe how the rate of growth varies over time, based upon data in a table or graph.

Data Analysis and Probability

Grade Level Indicator 1: Read, construct and interpret frequency tables, circle graphs and line graphs.

Grade Level Indicator 6: Determine and use the range, mean, median and mode, and explain what each does and does not indicate about the set of data.

Select Goals and Objectives	Teacher Guide	Student Guide	Assessment
Goals and Objectives	<p>Goals: Teacher will engage students and provide a question to intrigue students so that they will brainstorm a method to collect data.</p> <p>The teacher will encourage students to think of an organized way to record the data. The teacher will scaffold students to analyze and compare the results from the data in graphical form.</p> <p>Objectives: Students will organize recorded data into a chart, or something similar. Students will interpret graphs by reading specific points on the graph, as well as creating points on the graph. Students will create a graph of their recorded data. Students will determine the mean, median and mode of their data.</p>	<p>Students will work cooperatively in groups. Students will organize recorded data into a chart, or something similar.</p> <p>Students will interpret graphs by reading specific points on the graph, as well as creating points on the graph.</p> <p>Students will create a graph of their recorded data.</p> <p>Students will determine the mean, median and mode of their data.</p>	<p>Have a checklist for each group, with subsections for individuals</p> <p>Are students:</p> <p>Cooperating in groups?</p> <p>All contributing to the work?</p> <p>Individually providing a verbal explanation of the problem?</p> <p>and methodology?</p> <p>Producing a written summary of the problem?</p> <p>Drawing a picture to help solve the problem?</p>
Select Instructional Strategies – Information	<p>Engage:</p> <p>Ask students how much time they think they spend in traffic on the way to school each day?</p> <p>Review through a presentation, such as PowerPoint, to show my RET experience, and the process of research and analysis.</p>	<p>Have students brainstorm a way to calculate time spent in traffic.</p> <p>Calculate: time they spend in traffic each week, each quarter, each year, up until fifth grade, and from K-12th grade.</p>	
Utilize Technology	videos, PowerPoint, graphing software (Excel), interactive white board (smartboard)	Students use charts, data tables, and graphing tools to organize and analyze data.	Other Resources (e.g. Web, books, etc.) NCTM: Illuminations

<p>Require Learner Participation</p> <p>Activity</p>	<p>Explore:</p> <p>Have students walk in the hallway. Teacher causes a disturbance in the flow of students (obstacle blocking hallway)</p> <p>Ask students what this is similar to? (traffic...)</p> <p>Pose a word problem. Example: We need to figure out how long it will take our class to walk to specials. If we encounter another class blocking the hallway, will it slow us down? (Incorporate specific distances to the destination).</p> <p>Ask students to draw a picture they can use to help to visualize and solve the problem. Have students write a few sentences that will summarize the problem in their own words.</p> <p>Discuss with students possible ways to segment the trip. While students are performing trials, provide some obstacles during some of the trials. The teachers can simulate wrecks, construction, lane closures, bad weather using boxes or people as obstacles.</p> <p>Explain:</p> <p>The class can compare data recorded using the Smartboard in Excel. Did the groups record similar data? What could account for the differences?</p> <p>Have groups plot duration and distance. Discuss and interpret the overall graph and various points (using one example on a smartboard).</p> <p>Ask students what could simulate entering and exiting ramps (classrooms) onto the highway (hallways).</p> <p>How easy is it to move around? Did anything make it harder to move around? Have students categorize this with a scale from 1-4. One being the easiest to move around, and four being very difficult to move.</p> <p>Expand:</p> <p>Have students interpret some of my (simplified) speed graphs from research.</p> <p>Talk to students about highway level of service, how they are built, and the volume of traffic.</p> <p>Have students create other types of graphs to display their data.</p>	<p>Explore:</p> <p>Students connect simulation to traffic</p> <p>students brainstorm how to record data</p> <p>draw a picture of the problem</p> <p>summarize problem in their own words</p> <p>segment the hallway</p> <p>time how long it takes to pass specific marks</p> <p>Explain:</p> <p>compare and discuss the class's data</p> <p>plot duration and distance</p> <p>discuss the relative ease of movement in the hallways</p> <p>Expand:</p> <p>interpret some of my speed graphs</p> <p>create other types of graphs</p>	<p>Assessment</p> <p>Are the groups participating in comparing the data with the class?</p> <p>Are students contributing to the discussion?</p> <p>Can the student verbally explain the different types of graphs?</p> <p>Can the student explain what a point is in terms of the coordinates and in the context of the problem?</p>
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Evaluate (Assessment) (Steps to check for student understanding) – See Objectives above	Evaluate: Using a Rubric Student graphs (majority of points) Data points, labeling, title, craftsmanship Summary and picture of the problem Exit slip Completion of questions (assess responses)		Additional Notes
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Important Attachments:

1. Pre-Post Assessment
 - a. Sample concept web, and exit slip
2. Worksheets
 - a. Data tables
3. PowerPoint
4. Reflection after lesson