



Mobility Reliability of Transportation Systems

Lesson Preparation

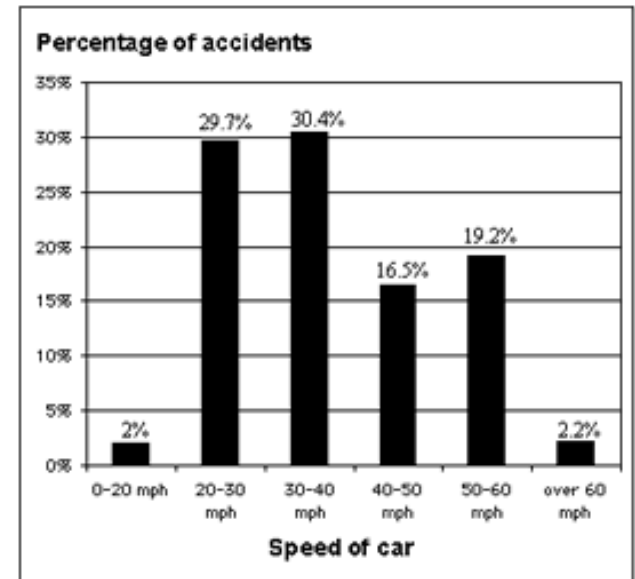
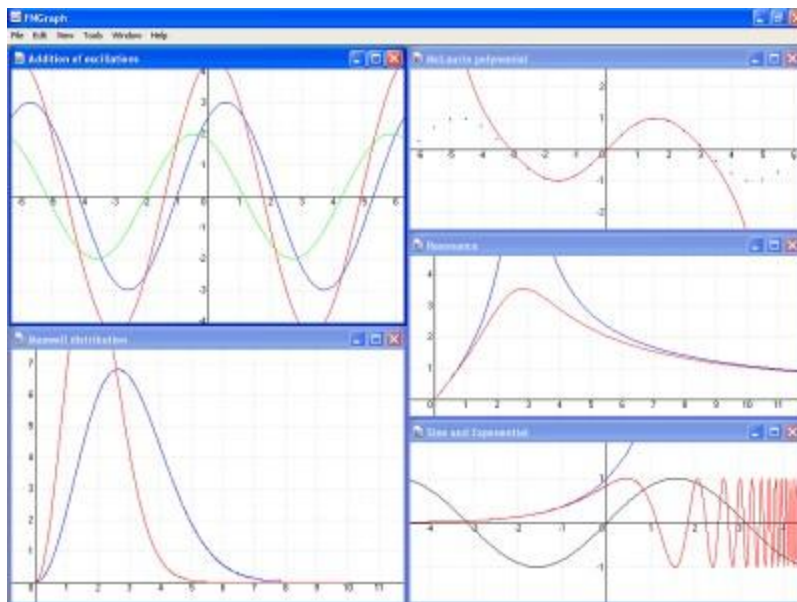


Brad Hunt, Norwood High School
Kate Kulesa, Mason Intermediate

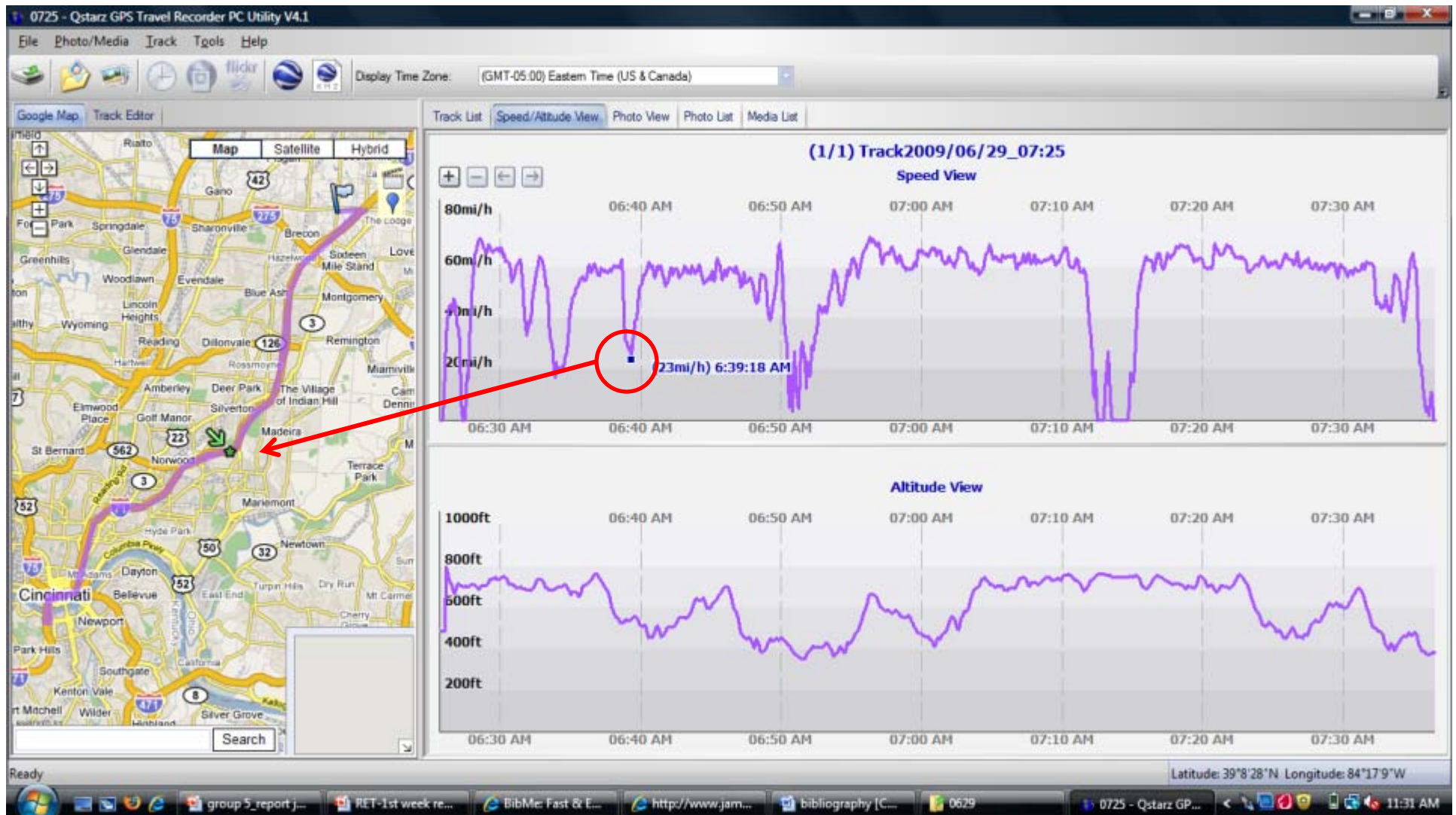


Applicable Strands and Benchmarks

- Strands
 - Data Analysis and Probability
 - Measurement
 - Patterns , Functions and Algebra
 - Mathematical Process



Overall Theme: Graphs

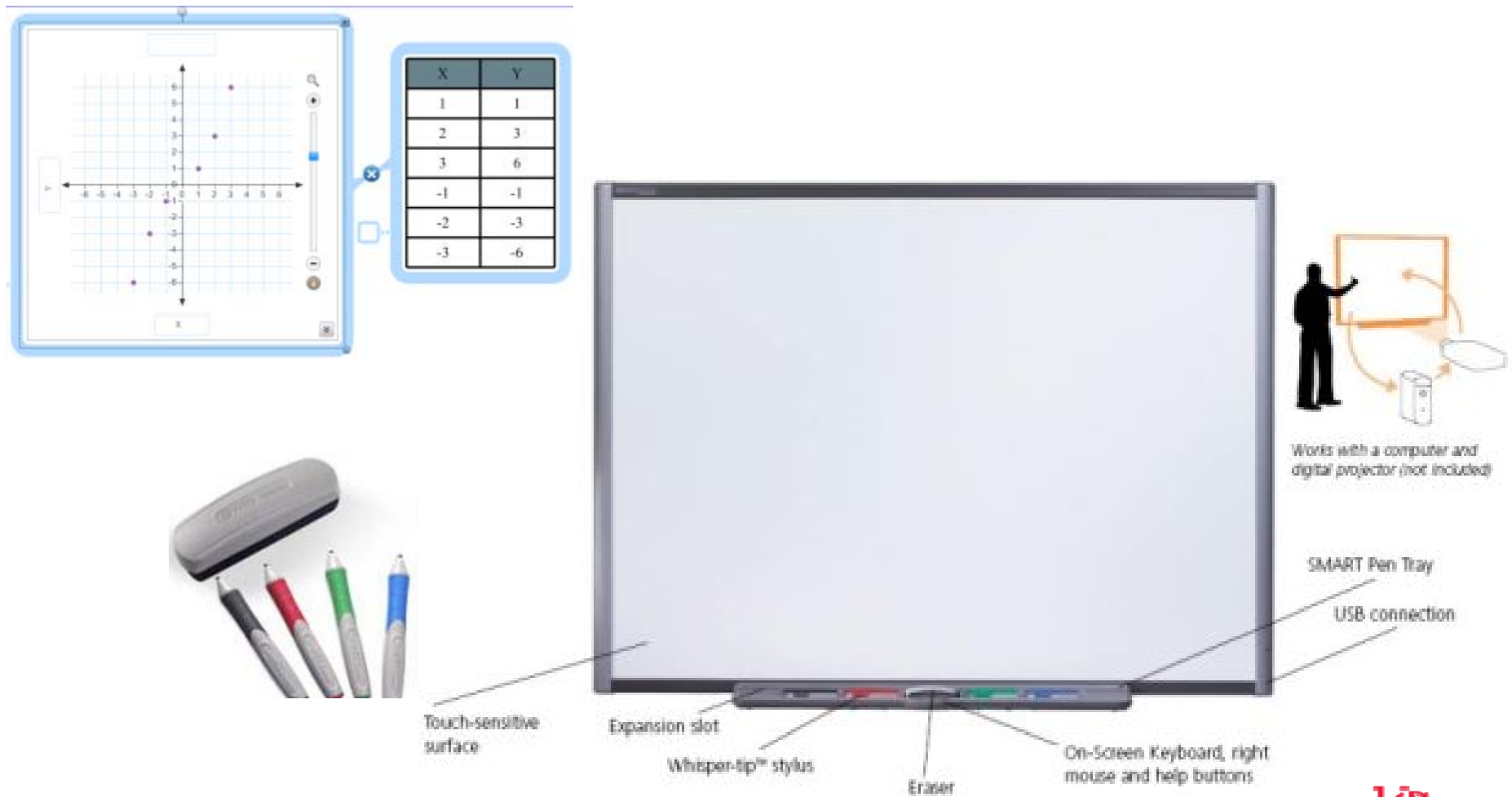


Patterns, Functions and Algebra

5th Grade

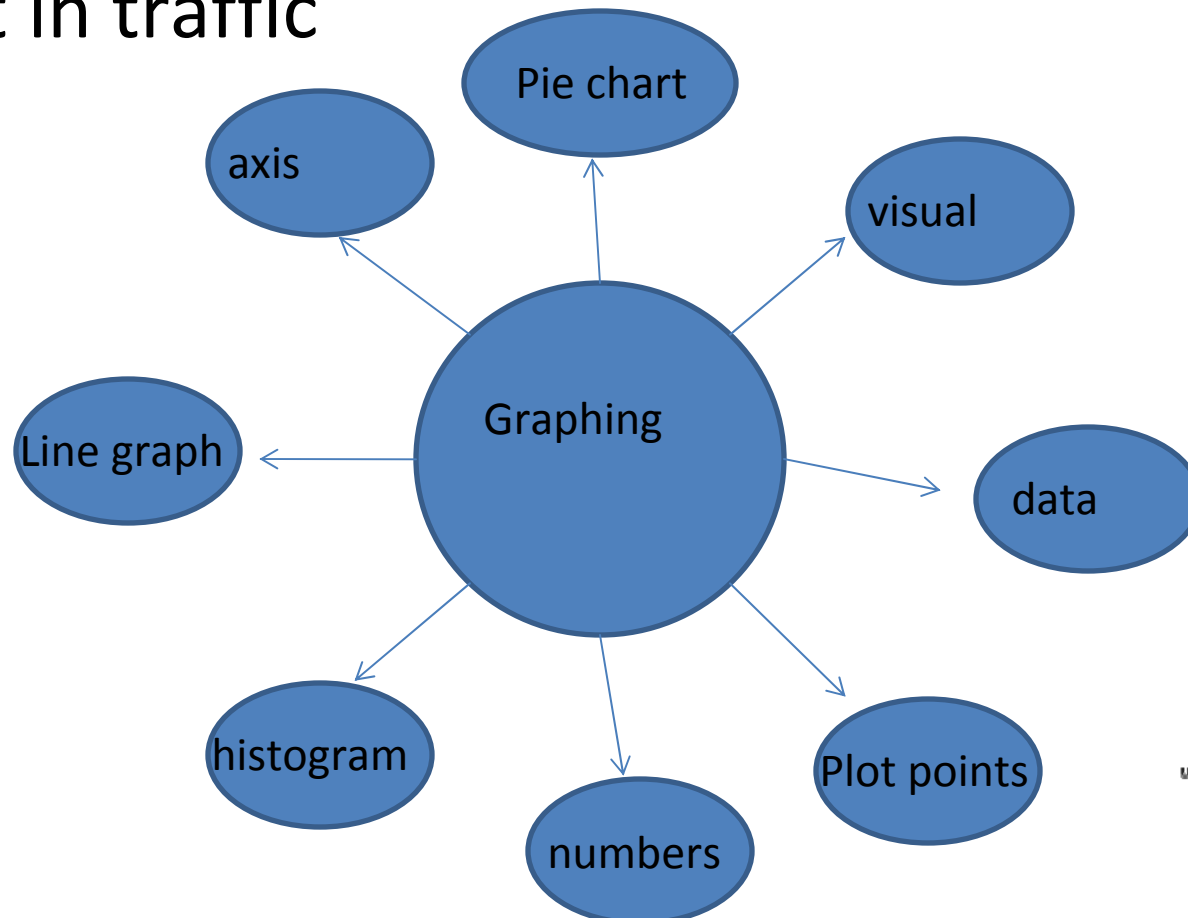
- Represent, analyze and generalize a variety of patterns and functions with **tables, graphs, words** and symbolic rules.
- Use rules and variables to **describe patterns**, functions and other relationships.
- Use **representations, such as tables, graphs** and equations, to model situations and to solve problems.

Smart board



Engage

- Concept map
- Calculation of how much time in a lifetime will be spent in traffic

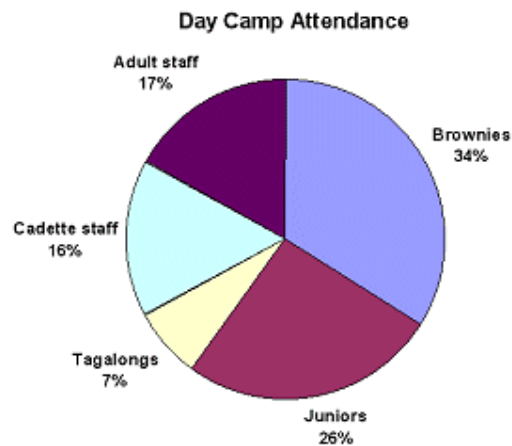


Explore

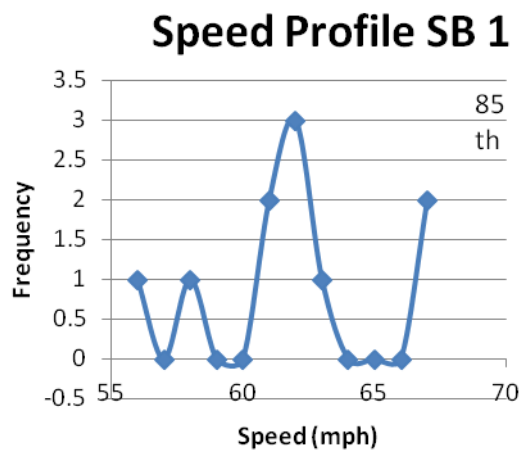
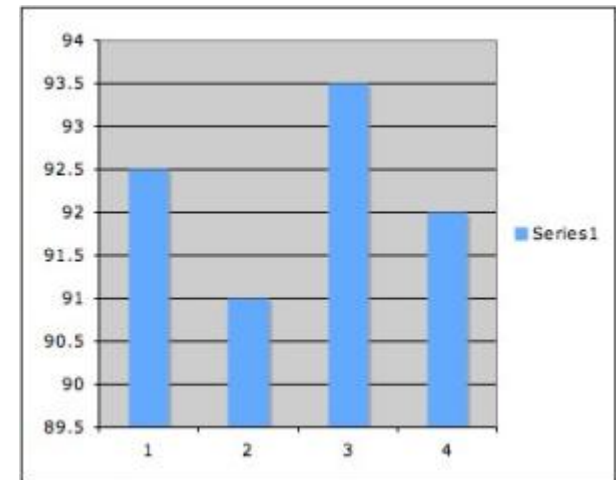
- Walking in the hallway
 - Simulation of traffic
 - Entering and exiting classrooms
 - Traffic jams
- How can we record the data?



Excel and Graphs



What type of visual best displays our data?



Comparison and Questioning

Speed	Frequency
58	1
59	0
60	0
61	3

Formative and Summative Assessments

Have a checklist for each group, with subsections for individuals: Are students:

Cooperative Learning

- All contributing to the work?

Comprehension

- Individually providing a verbal explanation of the problem?

Graphing

- Can the student explain what a point is in terms of the coordinates and in the context of the problem?

Measurement

12 Grade

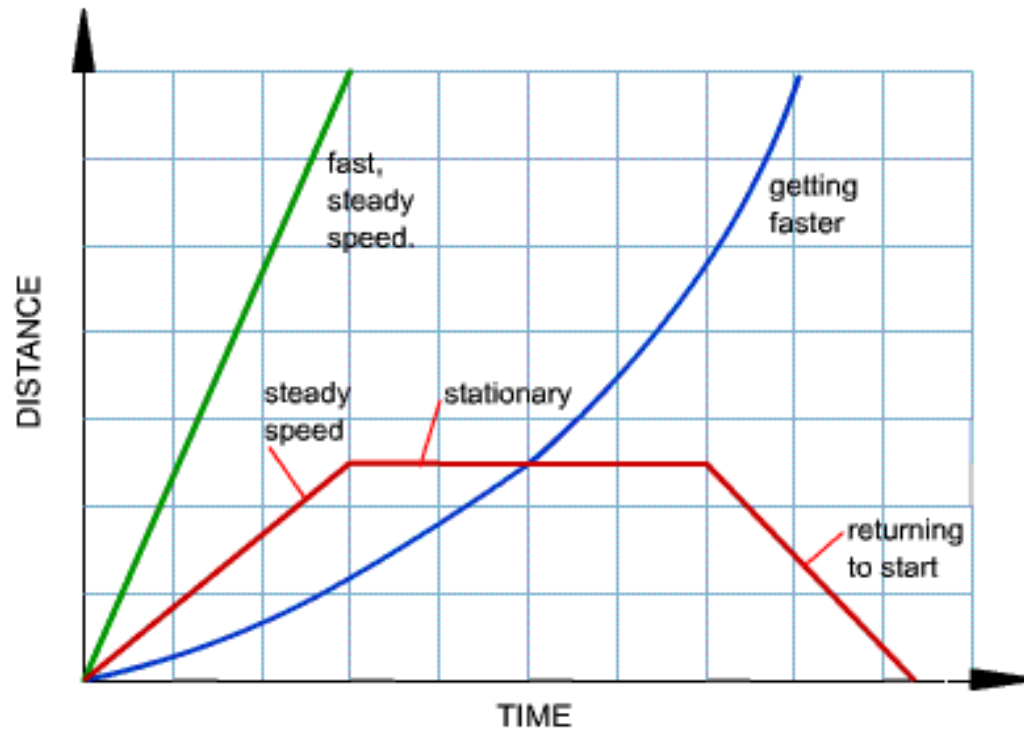
- Explain differences among accuracy, precision and error, and describe how each of those can affect solutions.
- Apply various measurement scales to describe phenomena and solve problems.
- Solve problem situations involving derived measurements.



Patterns, Functions and Algebra

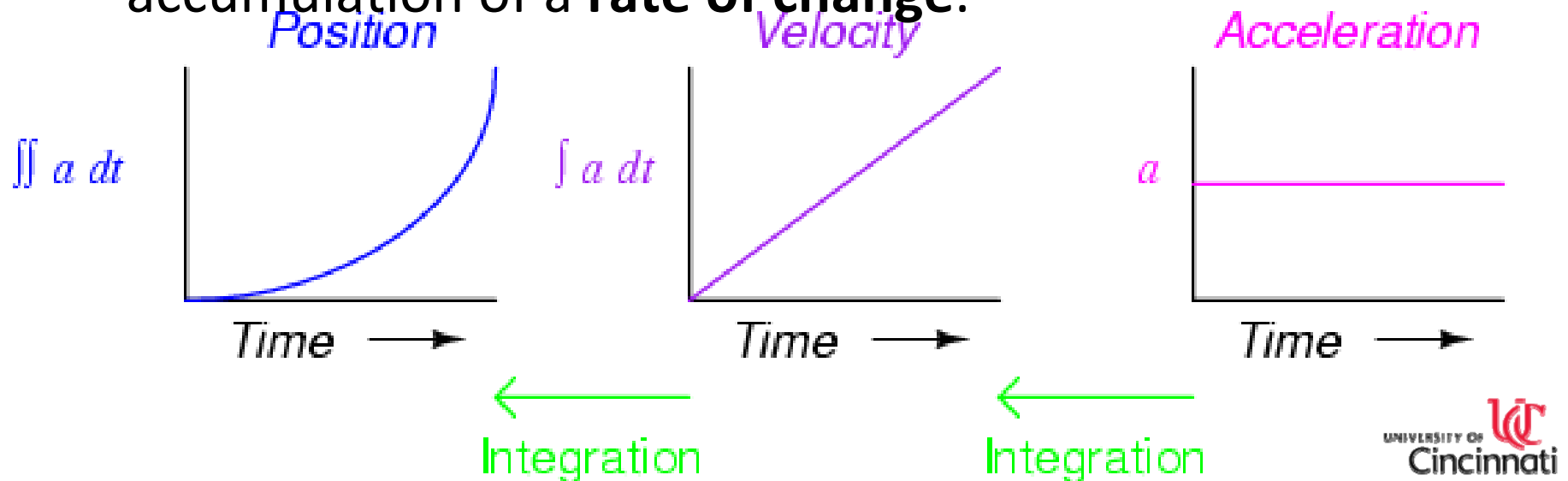
12th Grade

- Analyze functions by investigating rates of change, intercepts, zeros, asymptotes and local/global behavior.



Calculus Lesson Objectives

- Students will be able to:
- graph a function from the **graph of its derivative**.
- graph a derivative from the **graph of its function**.
- graph the derivative of a function given **numerically with data**.
- interpret the **area under the graph** as a net accumulation of a **rate of change**.



Lesson Overview

- Engineering is the application of science for daily use.
- Transportation is one such field where decisions influence people directly.
- What kinds of problems occur on our highways?
- How long are you on the highway?



Field Trip to ARTIMIS

- Students will collect data in route

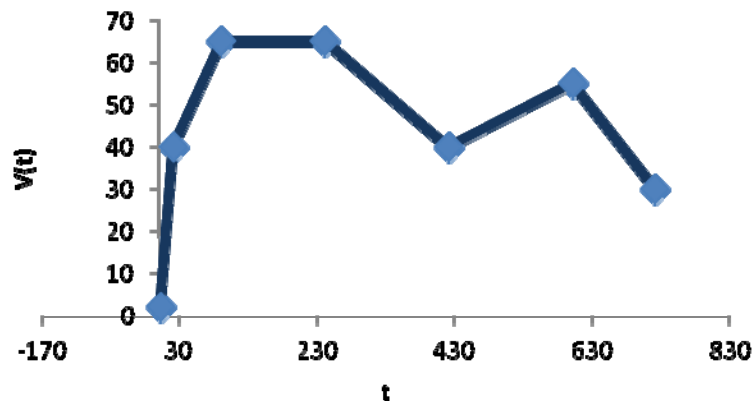


Determine rates of change in the traffic patterns

Analyze traffic graph and area beneath

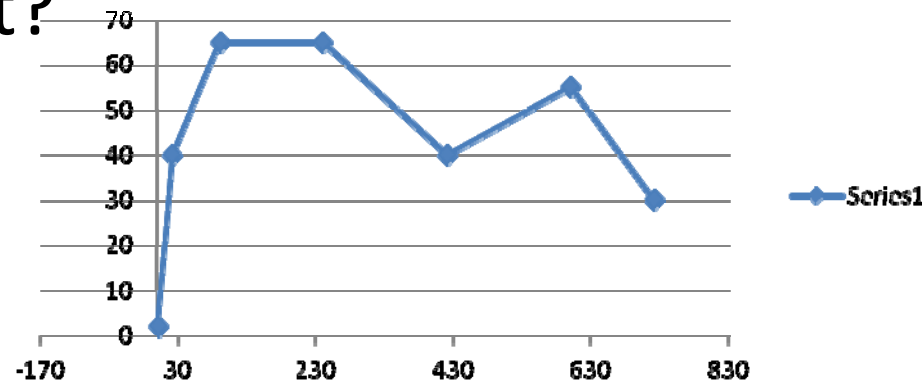
Opening Activity

- Using Excel or a graphing calculator students will develop a time/velocity graph of a car trip from Norwood to the Kenwood Mall.
- Students will determine their own time intervals.

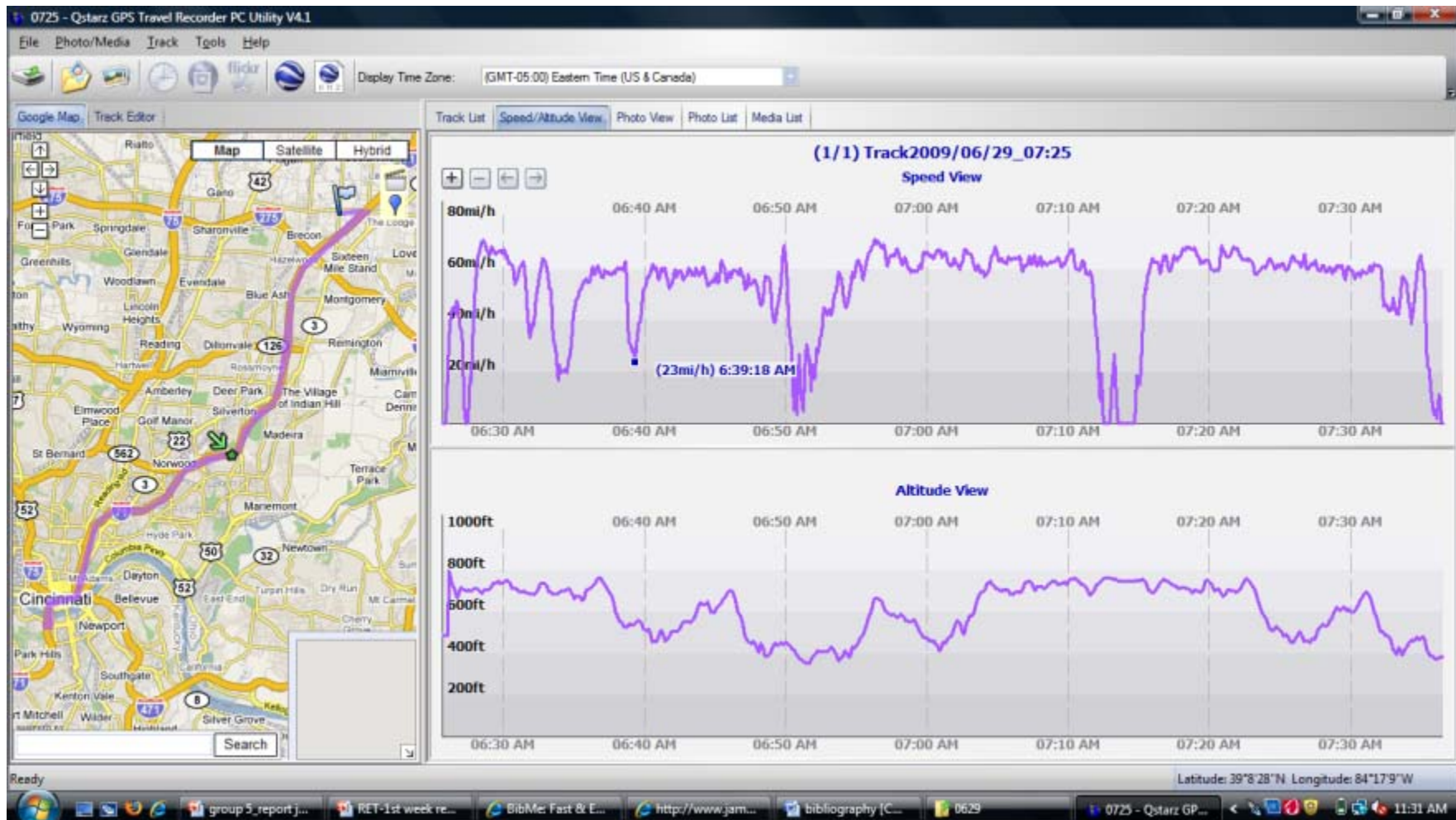


Graph Discussion

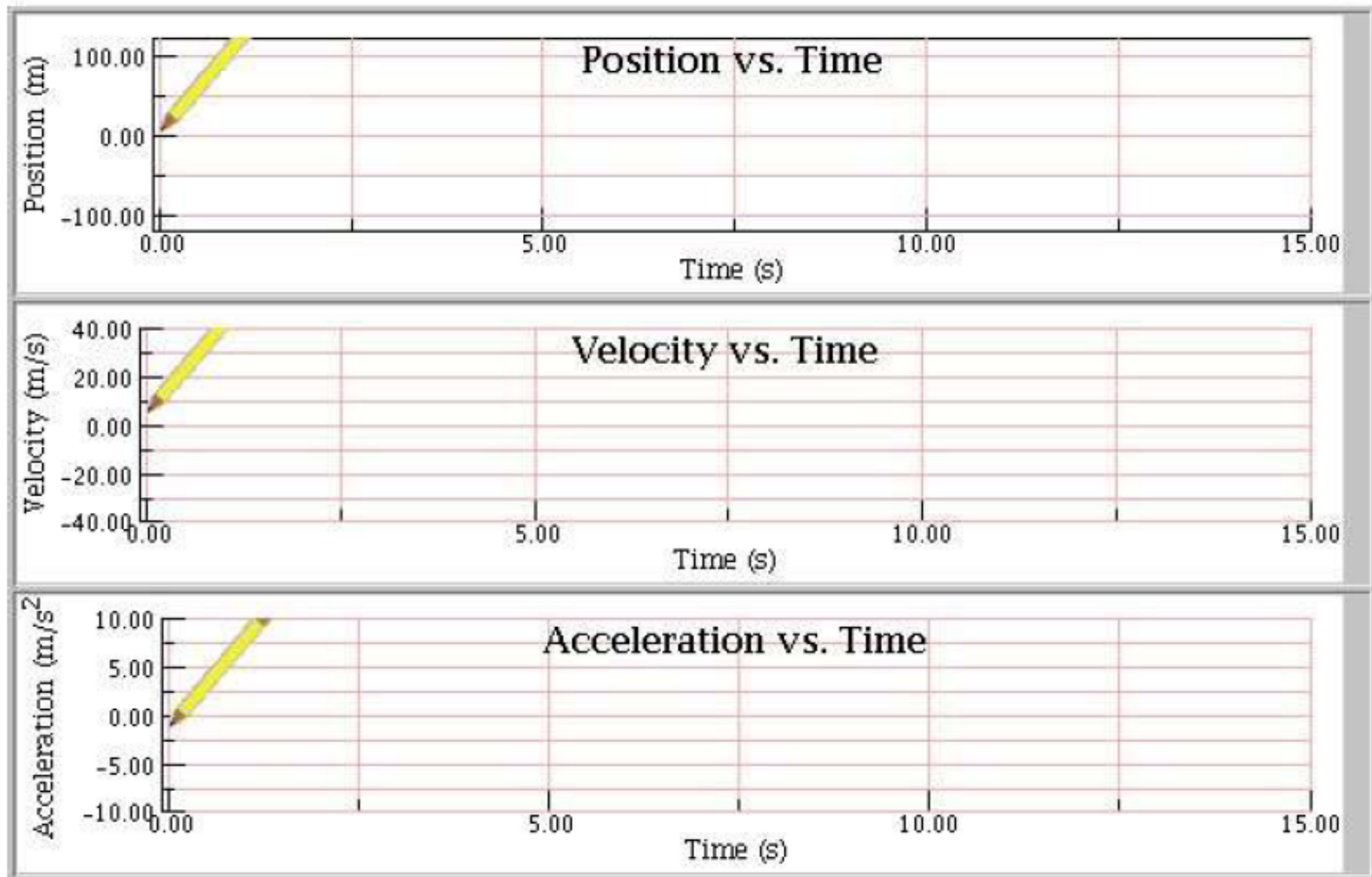
- What does the slope of each segment represent?
- When is the slope positive and negative?
- What does the area under the graph represent?



A “Real Trip”



Group Activity



Why is this important?

S 75 CLOSED
DOWNTOWN
AT WESTERN-EX 2A