

# PBL Design Product

Unit Title: Crawling Through Traffic	Unit focus: Motion - Kinematics
Embedded Problem Analyze the movement of traffic and propose solutions that will increase average velocity	
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## Learning Experience Design

Learner Characteristics (pp.45-46) <ul style="list-style-type: none"><li>• intelligent, resourceful</li><li>• unmotivated to work on class work</li><li>• want immediate relevance of learning</li><li>• little ability or desire to work outside of class</li><li>• grade oriented, but unwilling to work for grade</li><li>• many lack organizational skills</li></ul>
Learning Outcomes (pp. 46, 50, 57) <ul style="list-style-type: none"><li>• identifying reliability of information</li><li>• designing and conducting experiments</li><li>• interpreting data and formulating conclusions based on data</li><li>• developing practical solutions</li><li>• communicating (presenting) effectively to various audiences</li><li>• analyzing their own thinking and working characteristics</li></ul>

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**DRAFT**

# Curriculum Outcomes

List specific curriculum outcomes students will achieve through the problem-based learning unit.

1. **Define** the terms accuracy, precision, hypothesis, law, and theory\*5.1-A, B
2. **Define** the terms motion, displacement, speed, velocity, acceleration, scalar quantity, and vector quantity. \*5.7-A
3. **State** some common examples that illustrate the meaning of and the relationships among displacement, velocity, speed, and acceleration. \*5.7-A
4. **Construct** graphs of position - time, speed - time, and acceleration - time. \* 5.7-A
5. **Solve** motion problems using graphs. \*5.3 –D, 3
6. **Solve** motion problems using the following equations: \*5.3-C
7. **Utilize** the concepts in this unit to investigate traffic patterns.
8. **Utilize** the concepts in this unit to determine the efficiency of a transportation system and/or models of transportation systems.

# Meet the Problem

Provide a description of the situation and role for the students as they meet their ill-structured problem for the first time.

## Role:

The students will take the role of residents who are affected by the traffic congestion in the city. Getting to and from school and around the city takes a large amount of time.

## Situation

Students enter class; are told their teacher is late and to the start assignment on board.

Teacher enters five minutes late and states that he/she got on a bus at Penn Station (1.7 miles away) and took 45 minutes to get to the school because of traffic.

Teacher directs discussion “what’s the problem?”; asks students where they live and how long it takes to get to school.

Students (in groups from different areas) relate and record individual experiences; then share with class.

Teacher leads know need to know: individuals and then groups develop lists of things they “know” and things they need to know; comprehensive lists placed on board

# Problem Statement

Record the anticipated problem statement, a statement of both the primary issue which students confront in their problematic situation and the conditions which must be considered in order to achieve a state of “resolution for this issue.

How can we:

improve the movement of people and vehicles in the city

In such a way that:

The average speed is within 80% of the posted speed limit and the decrease the travel time between any two points within the city limits, with a goal of 20 minutes.

# Performance Assessment

Describe the final performance assessment through which you will assess students' understanding of the problem, the knowledge, skills, and the dispositions you anticipate students will demonstrate, and how you will assess their performance (rubric, criteria, evidence).

Performance Assessment:

Students will produce either a written report or a PowerPoint presentation.

Criteria and specifications for final product and recommendations in attached rubric.