

A Day in the Life of John Henry, Traffic Cop: Instructor Guide

Title

A Day in the Life of John Henry, Traffic Cop

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Discipline

Physics and Astronomy

Target Audience

Introductory, majors and nonmajors

Keywords

Car accident, conservation of momentum, forces, friction

Length of Time/Staging

About one week

Abstract

This problem introduces students to conservation of momentum while working through a two-dimensional automobile accident.



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Format of Delivery

This problem takes about one week to ten days. It is used to introduce conservation of momentum in an introductory physics course.

Student Learning Objectives

1. Use an understanding of the principles of forces, motion, and energy to design a plan to reconstruct a car accident.
2. Explain how frictional forces related to varying surfaces affect the motion of an object.
3. Calculate the velocities of two vehicles before and after impact using physics principles, such as forces, motion, mechanical energy, and conservation of momentum.
4. Evaluate real world data related to a car accident in order to make a judgement about the faults of the drivers.
5. Find and use appropriate learning resources to aid in reconstructing the accident.

Student Resources

[National Highway Traffic Safety Administration](#)

[Custom Design & Consultation:](#)

[Accident Reconstruction Resources](#)

[National Association of Investigative Specialists:](#)

[Links related to accident investigation, highway safety, and accident reconstruction](#)

[Texas Association of Accident Reconstruction Specialists:](#)

[Hot links to related sites](#)

[PBS Nova Online: Escape!:](#)

[Car Resources](#)

Instructor Resources

Same as the students' resources.

In addition, Larabee, D. Car collisions, physics, and the state highway patrol, *The Physics Teacher*, 38, 334-336.

Author's Teaching Notes

Students will have to make certain assumptions in order to develop the information they need to solve the problem. For example, they are not given the distance that vehicle one rolled before



coming to a stop by the house. But they are given the distance that the other vehicle traveled before coming to a stop. Using that distance, they can assume that the vehicle one traveled approximately three times farther.

In working through the problem, one group of students may make assumptions different from the ones made by others. They need to be reassured that if reasonable assumptions are made based on physics principles, the path to a solution will be valid.

Assessment Strategies

I usually ask students to write up a summary of the problem to hand in for grading.