

Challenge Activity: Newtonian Physics

Overview

This activity will allow students to practice applying Newtonian physics to a system of masses and cars.

Time allotted: 1 class period

Grade level: 9-12

PA State Standards

- 3.2.10.B1 Analyze the relationships among the net forces acting on a body, the mass of the body, and the resulting acceleration using Newton's Second Law of Motion.

Objectives/Learning Goals:

- To apply understanding of Newton's Laws and forces

Materials needed (either one for the entire class or per student group):

- Weights, cars, pulleys, etc. to recreate the apparatus pictured in the handout

Materials needed (per student group):

- Protractor
- 12" ruler and meter stick
- Calculator

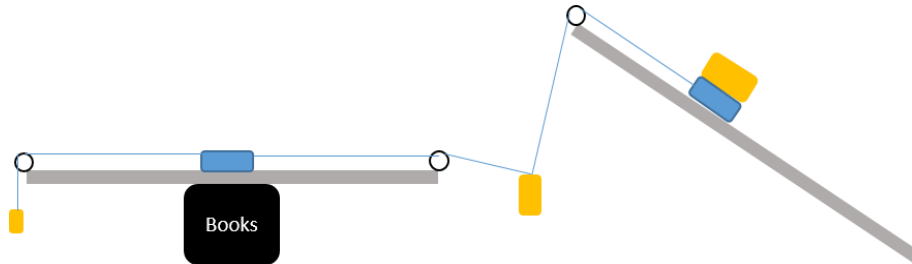
Note to teachers:

We did not write in any masses or labels for the masses on the handout. Different physics classrooms have different supplies with different masses, so teachers will need to determine how to adjust the setup to work for the supplies in their lab and which mass will be m_4 .

Name: _____
Partner(s): _____

Date: _____

AP Physics I CHALLENGE PROBLEM: Newton



Objective: To apply understanding of Newton's Laws and forces

Materials: Protractor, ruler, meter stick, calculator

You will find an apparatus as diagramed above with knowns marked. Friction is negligible. Be careful to not disturb the carts or hanging masses!

Challenge:

Each pair of partners will have 10 minutes to gather information on the apparatus. This includes writing down the knowns and any measurements you feel may help you in solving the problem. Once finished, you and your partner will work together in answering the following question:

What is the mass of m_4 ?

Be sure to write down all calculations. When the challenge is completed, pairs will calculate the percent error between the mass they found and the actual mass. The smallest percent error will win the challenge.