

Incline Motion

Introduction

It is known that a small ball rolling without slipping is approximately the same motion as the same ball sliding on a surface without friction. Using this knowledge we will investigate the motion of an object going down an incline.

Equipment List

Power Macintosh or Windows PC
Vernier Logger Pro
Ruler
Ball

Photogates
Ramp
Books

Experimental Procedure

1. Measure the distance the ball will travel (the track length) and the height of track
2. Using the software record the final velocity of the ball
3. Repeat this for the various different inclinations (# of books used)
4. Calculate the acceleration for each case
5. Use these acceleration values to calculate the angles of inclination

Results

Data using ball					
Number of books	Height of books, h (m)	Length of incline, x (m)	Final Velocity (m/s 2)	acceleration (m/s 2)	sin(θ)
1					
2					
3					
4					
5					

Analysis

1. What are the forces acting on the car while it is in motion? Give a brief explanation of the forces.
2. What is the relationship between the angle between the table and the track (also called the angle of inclination) and the average acceleration of the car? Explain it in a few sentences.
3. Draw the “free body” diagram for the car in motion. Label every force appropriately and determine the correct orientation of the forces (meaning make sure the forces you draw are going in the right direction)