

Work, Rolling Friction, & Spring Potential Energy

Introduction

It's time we began to put all these work concepts together. Be sure to put down all measurements in a nice, neat table. In this lab you work for a unscrupulous toy manufacturer who wishes to copy a competitor's new toy and manufacture it in China and make millions. So, among other things, we must obtain the spring stiffness constant for the spring used to propel the toy truck.

Objective

The objective of this lab is to take the data and make the calculations necessary to obtain the spring stiffness constant of the spring in the toy. One requirement is that we do this without dismantling the toy.

The Plan: Well, that is part of the job. You have to design and carry out an experiment that will enable one to determine the spring stiffness constant for any toy of this design.

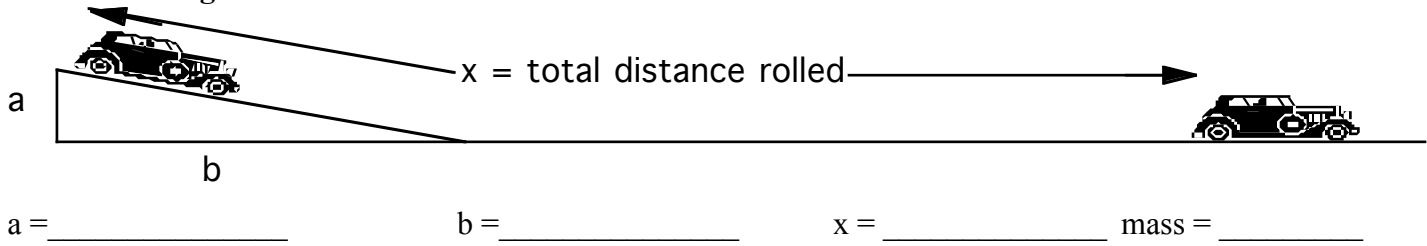
So, how can we check our answer to see whether or not we are correct?

The Proof: We will build a ramp. Its height and length will be known. We will calculate, according to the spring stiffness constant we have obtained, where on the ramp the toy should be placed, and how much its spring should be compressed, so that when released, the toy should stop right at the top of the ramp!

Good Luck, measure carefully!

The Plan, Expanded

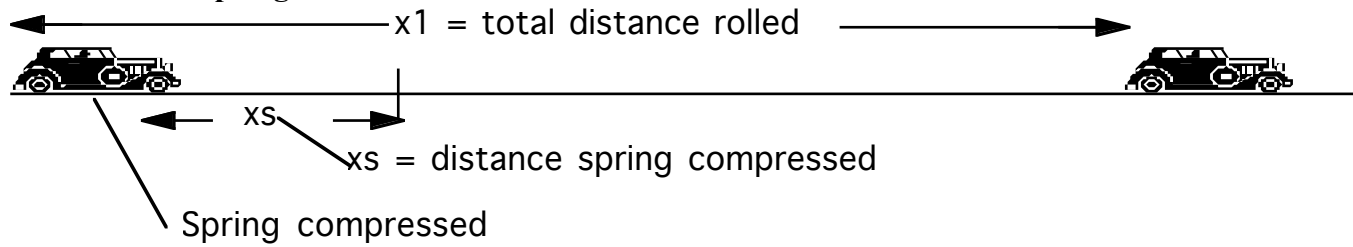
I. Find Rolling Friction Force



Equation

$F_R =$ _____

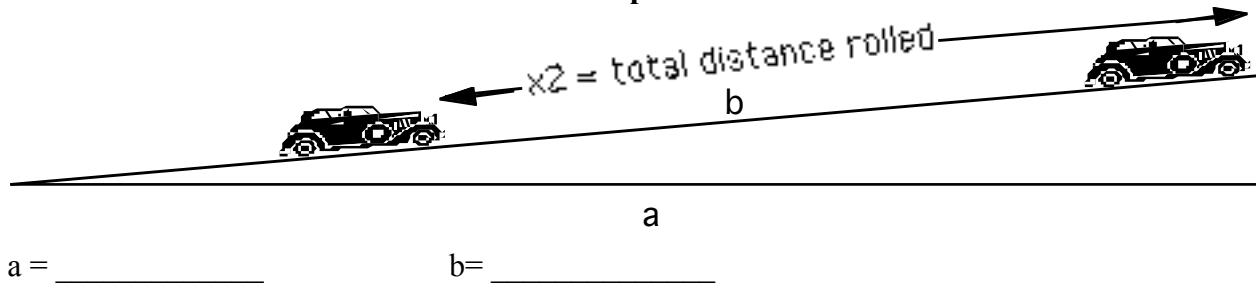
Part II. Find Spring Stiffness Constant



Equation

$k_s =$ _____

Part III. Calculate Predicted location on ramp.



Equation

$x_2 =$ _____