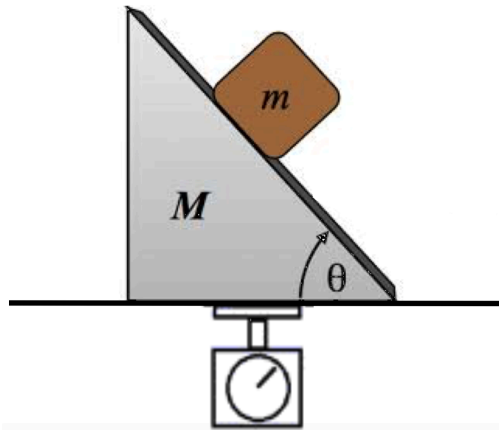


CSUC Spring Term 2020 Physics 204A [Portfolio Problem for Week 10:](#)
Due Monday, April 6 by Noon on our class Blackboard site: 202-PHYS204A-05-4569

Dear Class: This is the second (and Week10) Portfolio Problem. View this as a short exploratory paper utilizing everything we learned in the first half of the semester. You're exploring a situation with which you may not be completely comfortable. Some parts of it you may not be able to bring to full completion ... but you can still say something about them. I assure you that we actually *have* developed enough tools to complete this discussion ... but you'll have to use just about everything you know. I expect most of you will pound on this for about a week. Draw lots of pictures! Don't rush! The answer is deliciously simple – and you will have learned a ton about problem solving ... and Newton's laws. This is an open book and unlimited time exercise – I'm looking for clear reasoning, thorough understanding and creative solutions! Completeness and depth count!

The scenario we start with is a block of mass m sitting on a wedge of mass M and the whole is on a board which sits on a scale attached to the floor. We begin very simply and then start removing constraints ... each time asking what the outcome will be.



- 1) If the slanted surface of the wedge is frictionless but the wedge itself is firmly attached to the board ... and we release the block, we now ask:
 - 1) What is the acceleration of the block down the wedge ?
 - 2) What does the scale read as the block slides down the wedge?

- 2) Suppose now that the slanted surface of the wedge has a kinetic frictional coefficient μ_k with the block. If we release the block, it still slides down the wedge, but we still ask:
 - 1) What is the acceleration of the block down the wedge now ?
 - 2) What does the scale read as the block slides down the wedge now?

- 3) Suppose that we now remove the friction on the slope but then we also remove the friction between the wedge and the board. If we release the block, it still slides down the wedge only now ... the wedge moves to the *left* on the board too! We examined something like this in class.
 - 1) What is the acceleration of the block now ?
 - 2) What is the acceleration of the wedge ?
 - 3) What does the scale read as the block slides down the wedge now?