

**COMPILATION: AP PHYSICS - layering labs**

Date: Thu, 13 Jan 2000

From: Allen Pickel <pickelc1@TEN-NASH.TEN.K12.TN.US>

This was the first year I tried using modeling in AP Physics and I ran into a problem. About 1/2 of my students took advanced physics from me last year and had already been exposed to many of the activities we used and complained about having to do them again. Effort was minimal. This is a common pattern for me. *Most years about half of my AP class is composed of advanced students from the previous year and about half are first year students (with a very strong math background). Does anyone have any suggestions on how to deal with this?* (Our scheduling is done by computer and the person in charge is unwilling to do what is necessary to separate the students into two different classes - partly because class size might be too small - 10 - 15 per class)

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Date: Thu, 13 Jan 2000

From: Joseph Vanderway <jvanderway@CSUN.EDU>

Hello Modelers -

Well, I'm sure glad to know that I'm not the only one who has this problem! Any help would be appreciated.

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From: "Richard J. McNamara" <richmcn@EARTHLINK.NET>

Are you doing B or C? *One option is to make regular physics a prerequisite for AP physics. The second option is to add a layer to the lab activities.* For example:

While the first year students are doing the battery powered car lab, the second year student's could be doing a lab on relative motion. The lab I use in this case involves two battery powered cars and two pieces of poster sized card board taped together to form a moving track. One car travels across the floor and is used to pace the person pulling the track so that the track travels with a constant velocity. The other car travels on the moving track. In the analysis, the student's compare the change in position of the car on the track with respect to the ground to the sum of the displacement of the track with respect to the ground and the 2nd car with respect to the track.

In the acceleration unit, first year students could be doing the ball and ramp lab. The second year students could be doing a lab that simulates the derivative process. I have students place two photogates equal distance above and below the center point of the track and compute an average velocity. Then the distance from the midpoint is decreased in a step by step fashion until it is too small to measure. I then have the student's plot the velocity vs. the delta t used to compute the velocity. I have them compare the intercept of this graph to the instantaneous velocity at the midpoint of the track based on kinematic equations for uniform accelerations.

In the unit on Newton's 2nd law, first years can do a modified Atwood's machine while the 2nd year students do a real Atwood's machine.

*In each unit, a richer lab can be done by the second year group that uses the same model/assumptions as the first group. In general the 2nd year labs are more focussed on validating previous findings than on discovering new models.*

I have Word'97 files with the handouts I used to use (before I began modeling) for the two labs mentioned above. If you'd like copies of the files, email me directly and I'll send you the copies.