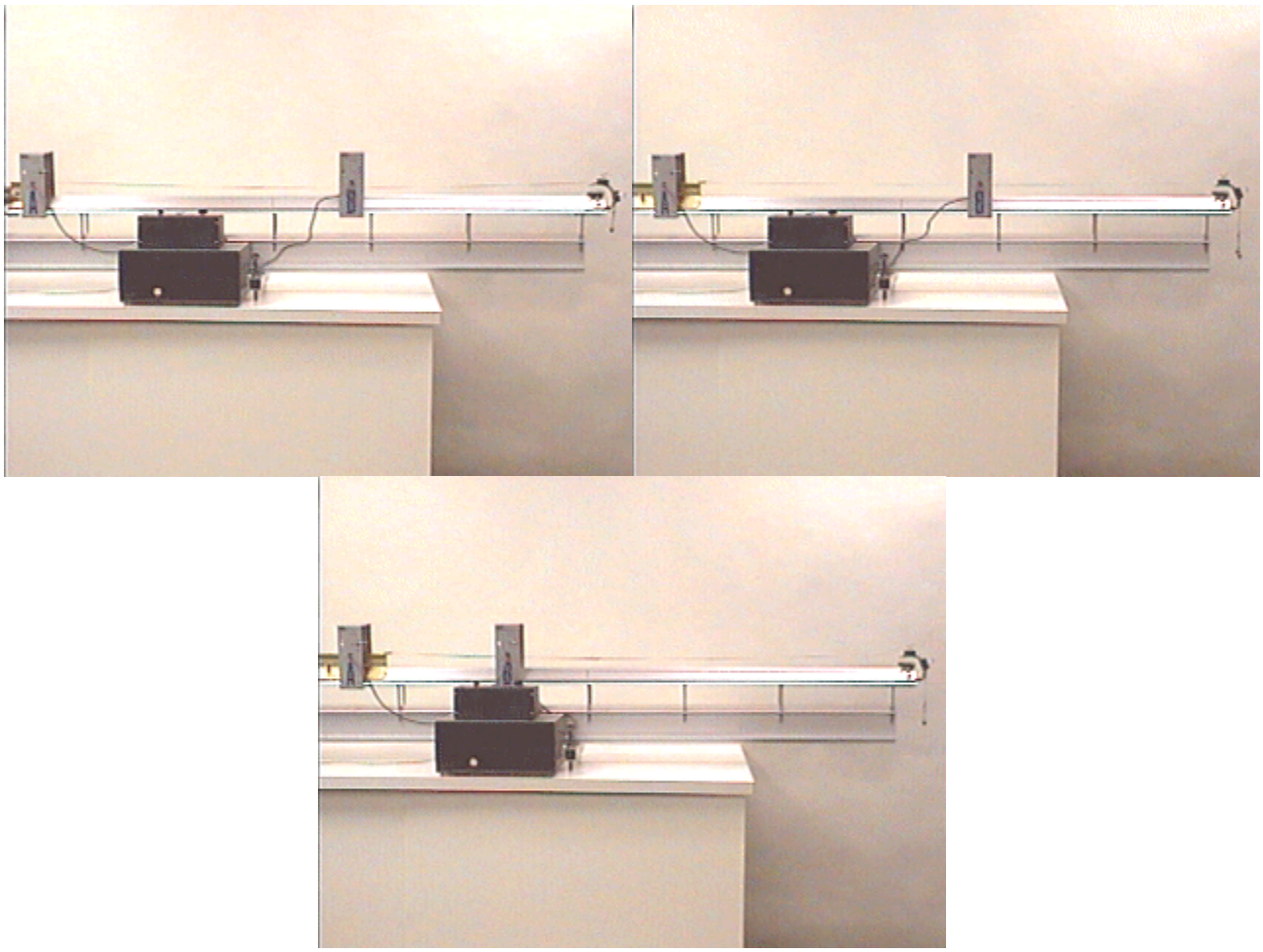
Question #135

This week's question is a two-part follow-up to Questions of the Week #119 and #123.

A mass *M* on a level air track is connected by a string passing over a pulley to a much smaller mass *m*<<*M*, as seen in the photograph at the left below.



Releasing *M* allows *m* to accelerate it along the air track. The timer measures the time taken for a flag on the top of the air track glider to travel from photocell gate "A" to gate "B," which turns out to be exactly 2.00 seconds. See a video of the action by clicking your mouse on the photograph above.

Part 1:

Suppose that the same experiment is performed with both mass *m* increased to 2*m* and mass *M* increased to 2*M*, as seen in the photograph at the center above. How long will the glider take to travel from photocell gate "A" to gate "B"?

The time taken for mass 2*m* to accelerate mass 2*M* a distance of *D* from A to B will be:

- (a) 4 seconds.
- (b) 2.83 seconds

- (c) 2 seconds (the same).
- (d) 1.41 seconds.
- (e) 1 second.

Part 2:

Now suppose that the same experiment is performed with mass *M* increased to 2*M* and distance *D* decreased to *D*/2, as seen in the photograph at the right above. How long will the glider take to travel from photocell gate "A" to gate "B"?

The time taken for mass *m* to accelerate mass 2*M* a distance of *D*/2 from A to B will be:

- (a) 4 seconds.
- (b) 2.83 seconds
- (c) 2 seconds (the same).
- (d) 1.41 seconds.
- (e) 1 second.

Click here for Answer #135 after January 20, 2003.

Question of the Week

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For questions and comments regarding the *Question of the Week* contact Dr. Richard E. Berg by e-mail or using phone number or regular mail address given on the Lecture-Demonstration Home Page.