# Today:

## Chapter 9 – Work and Kinetic Energy

## Chapter 10 – Potential Energy and Energy Conservation

*Irish Phrasebook*

***auldfella and auld wan*** – *your father and mother*

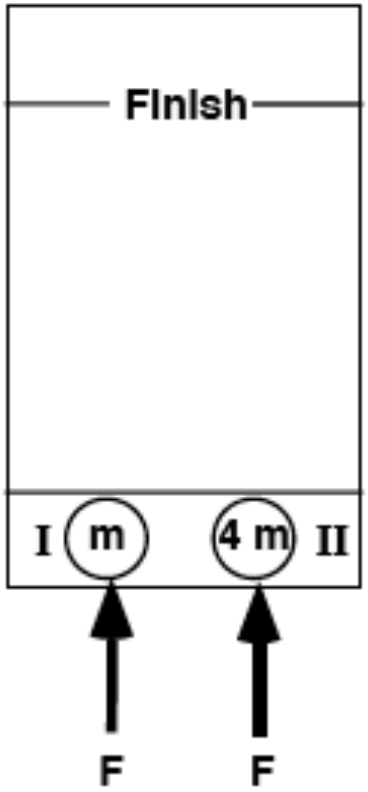
# Announcements

- LON-CAPA HW for Ch 9 & Ch 10 due Friday 20th
- On-paper HW due on Monday 23rd
  - This will help you prepare for Exam 3
- Studying for Exam 3
  - Previous Exam 2's have more questions to practice
  - Hands-on materials on angular momentum
- Extra Office Hours
  - Thursday 19th 5:30pm-8:30pm
  - Friday 20th 1:00pm-4:00pm

The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces.


Which puck reach the finish line first?

A. Puck I
B. Puck II
C. Both will have the same.
D. There is not enough information to decide.



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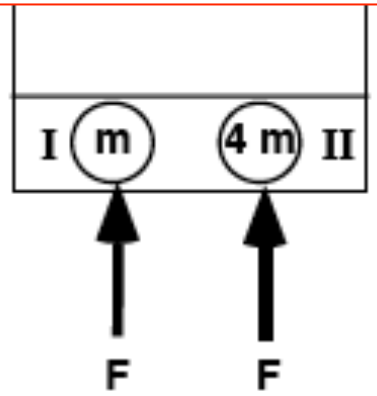
Since the force is the same, the acceleration of puck I is greater than the acceleration of puck II, which means it will cover the same distance in a shorter amount of time.



The diagram depicts two pucks on a frictionless table. Puck II is four times as massive as puck I. Starting from rest, the pucks are pushed across the table by two equal forces.


Which puck will have the greater KE upon reaching the finish line?

A. Puck I
B. Puck II
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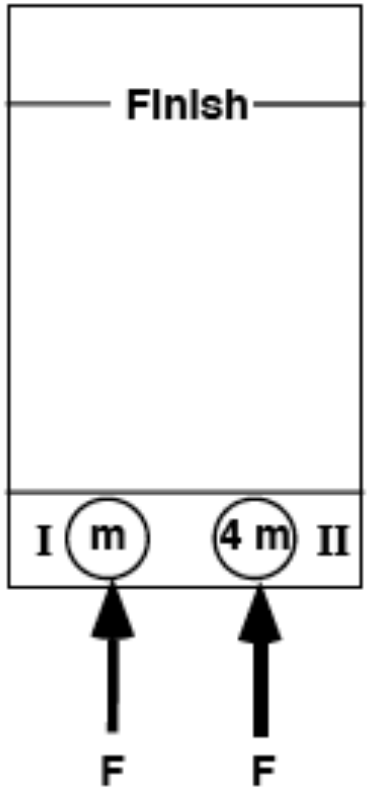

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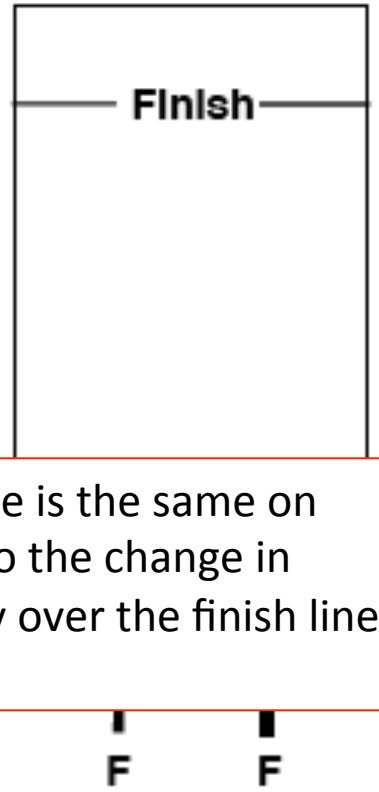
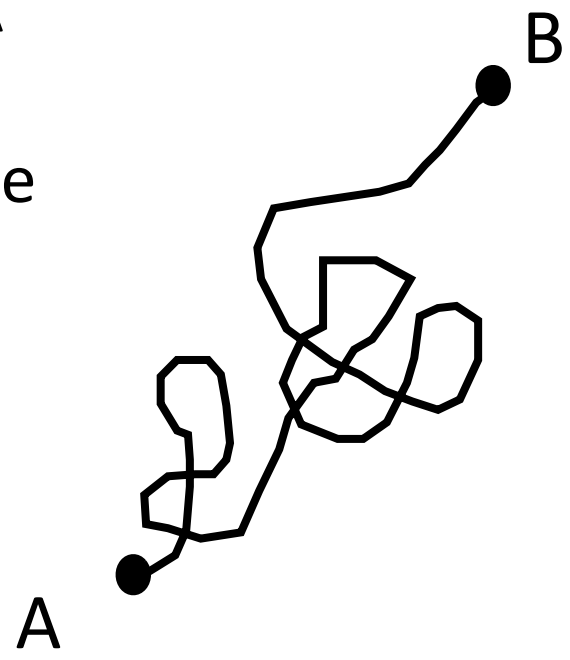



The work done is the same on both pucks. So the change in kinetic energy over the finish line is the same.

Consider an object moved from point A to point B, as shown. Gravity points down and exerts a constant force on the object. Which of the following statements is true regarding the work done **by gravity**?




A. The x component of the work is always zero, but the y component of the work may not be zero.
B. Gravity must do non-zero work when A and B are not coincident (meaning, not at the same point in space)
C. All that matters when calculating work is the net displacement in the y direction
D. None of the above is true **or** more than one of the above is true

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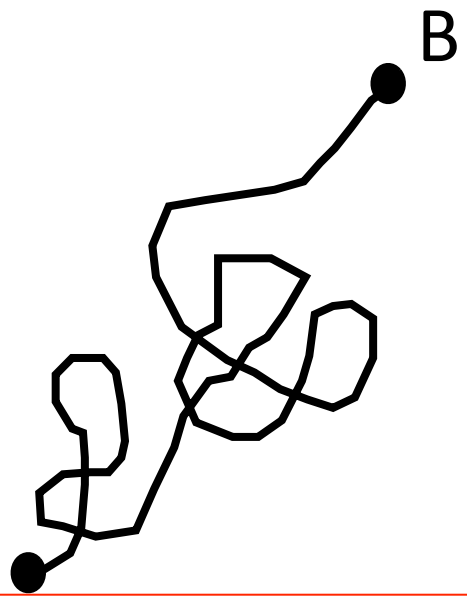


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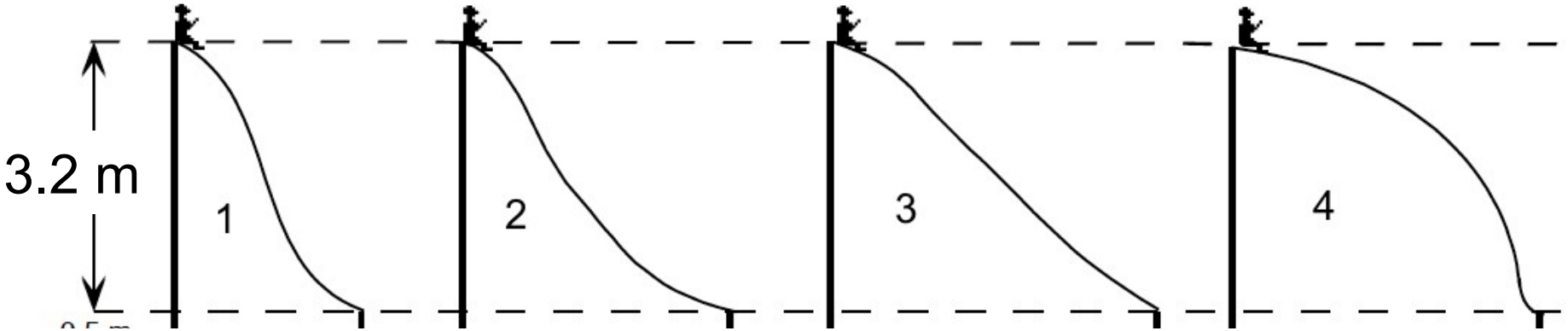
Work is not a vector, it is a scalar so it's not A.
If A & B are in the vertical plane B is true. (However, if A and B are in the horizontal plane gravity did not do work)
C is true because the work is calculated by the force that is parallel with the displacement, or the part of the displacement that is parallel to the force.

A young child wants to select one of the (frictionless) playground slides illustrated below to give her the greatest possible speed when she reaches the bottom of the slide. Which should she choose?




A. 1
B. 2
C. 3
D. 4
E. It doesn't matter. It would be the same for each.

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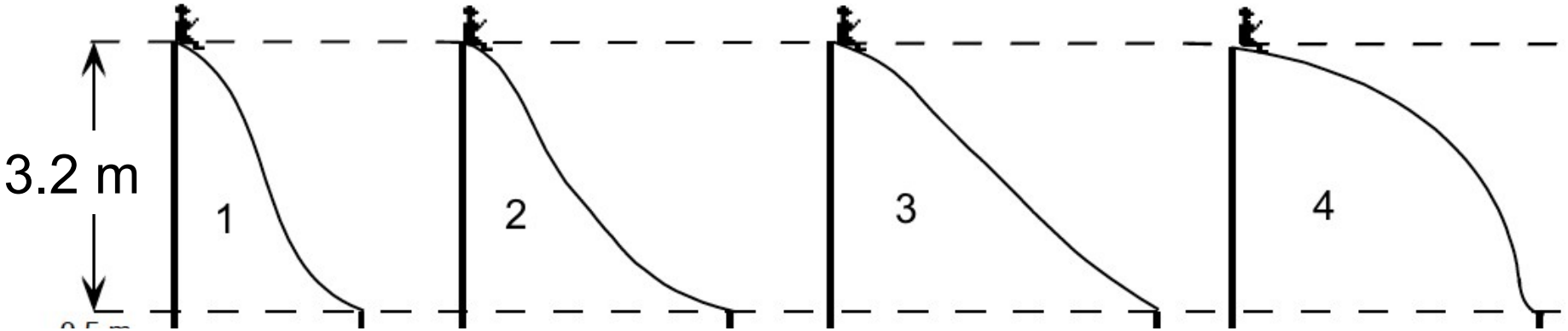
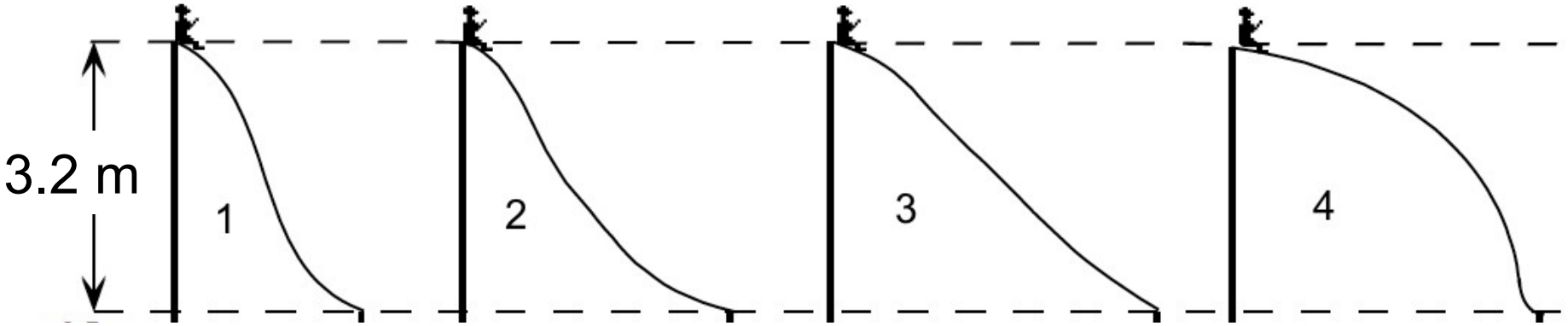



Since energy is conserved, all of the energy she has at the top of the slide will go to kinetic energy at the bottom of the slide (which will determine speed). Since all the slides are the same height the child as the same energy at the top of every slide.

E. It doesn't matter. It would be the same for each.

If the child starts from rest at the top of the slide, calculate her speed at the bottom of the slide




A. 16 m/s
B. 32 m/s
C. 8 m/s
D. 4 m/s
E. We don't have enough information to answer.

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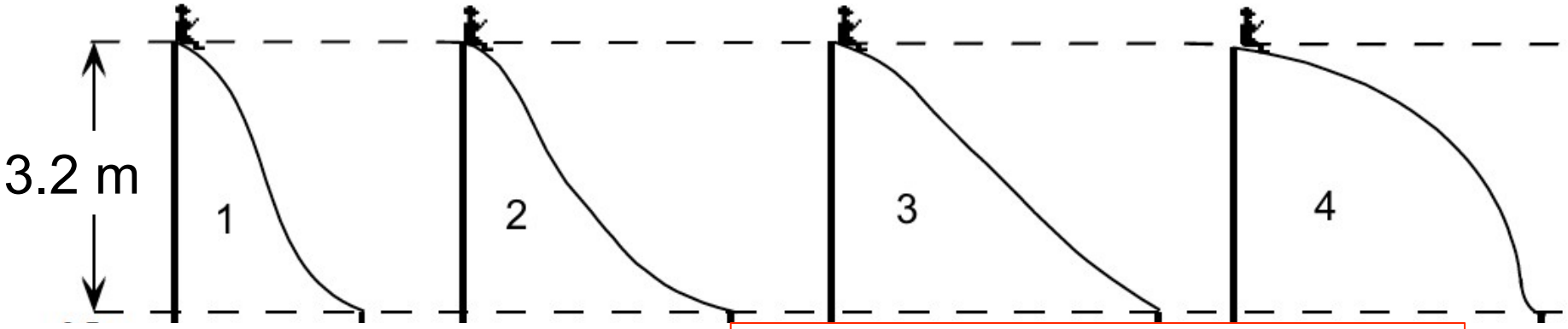


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$E_i = E_f$
The initial energy is all gravitational potential and the final energy is all kinetic energy.
$mgh = \frac{1}{2} mv^2$
So the mass cancels out and solving for v I get that v=8 m/s