

Miley Cyrus is suspended from a crane, hanging onto a window ledge as shown. She lets go without pushing. As she swings back, what will happen?

- A. She won't make it back to the building.
- B. She will come in like a wrecking ball, never hit so hard.
- C. She'll come back to exactly where she started.
- D. Need more information

Text 'PHYSJC' and your answer to 22333

# Exam #1

- Thursday, March 3. 5-7pm. CR 306
- Chapters 1-5
- Closed book. Calculators are allowed.
- 1 page of notes allowed (single-sided)
- **Review Session:** Wed 3/2 5-7pm, Enzi 195

# Lab This Week

- Bring a BLUE bubble sheet (FCI post-test)
- Turn in Lab 3
- Pre-lab for Lab 4 is due 3/9-10

# Ch 7.1: Energy Conservation

PHYS 1210 - Prof. Jang-Condell

## Goals for Chapter 7

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- To use gravitational potential energy in vertical motion
- To use elastic potential energy for a body attached to a spring
- To solve problems involving conservative and nonconservative forces
- To determine the properties of a conservative force from the corresponding potential-energy function
- To use energy diagrams for conservative forces

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# Potential Energy

- Energy of relative position between two objects
  - gravity
  - springs
  - electric charges
  - chemical bonds

# Energy Conservation

- Energy cannot be created or destroyed
- Energy is converted from one form to another



# Mechanical Energy

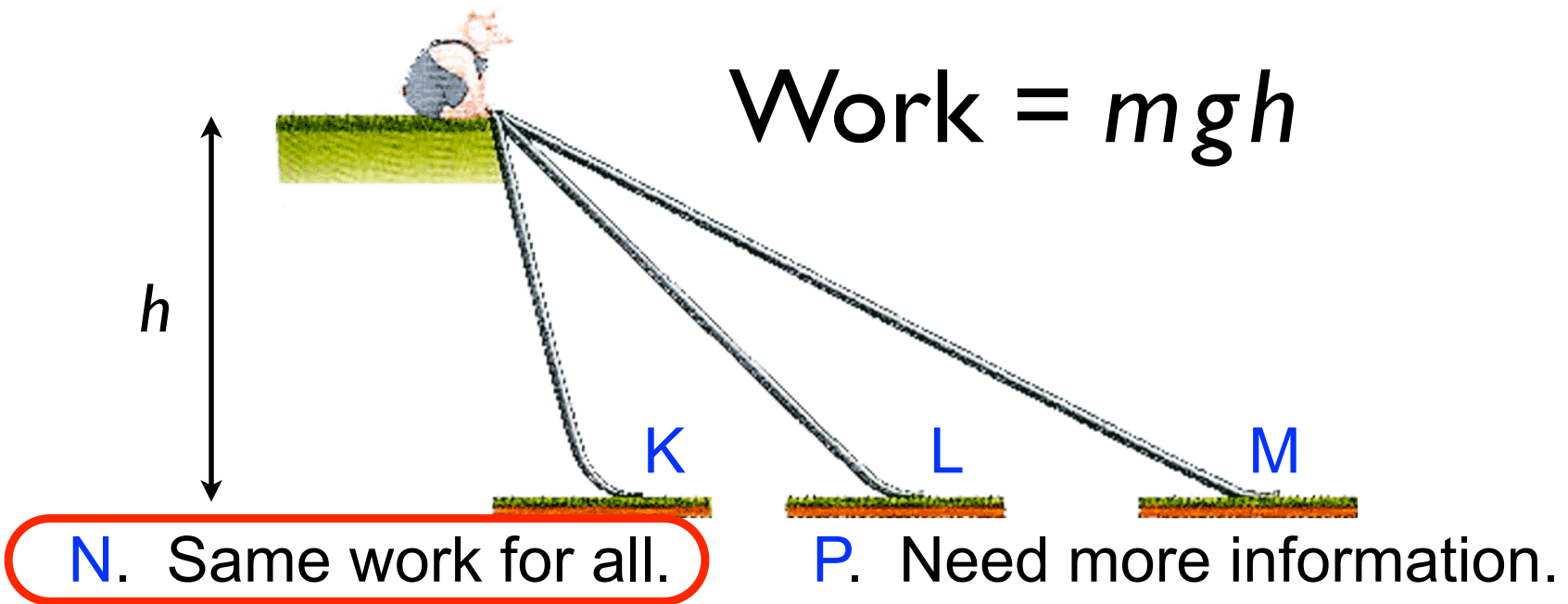
$$E = K + U$$

# Gravitational Potential Energy

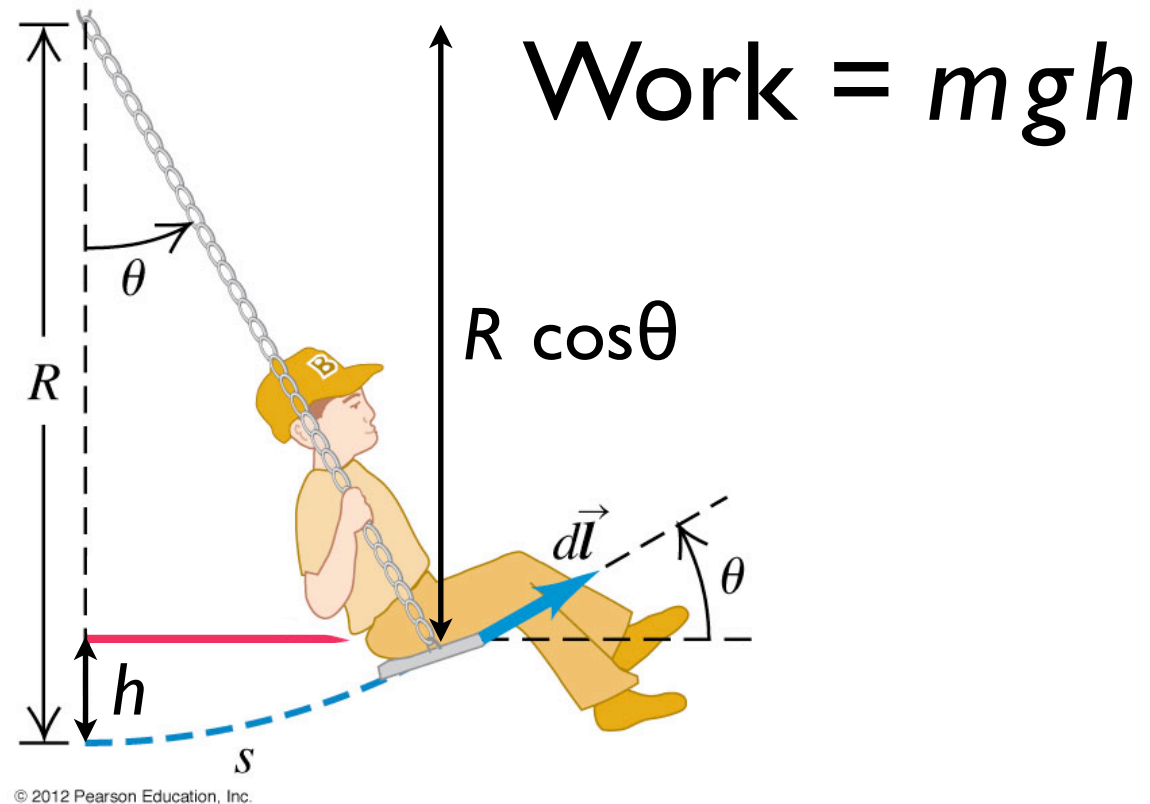
$$U_{\text{grav}} = mgy$$

# Work done by gravity

The piglet has a choice of three frictionless slides to descend. **Along which slide** would gravity do the **most work** on the piglet?

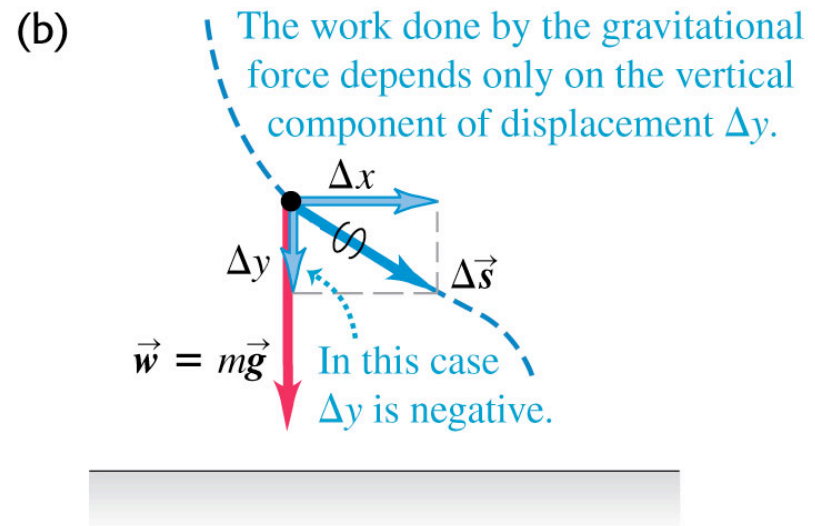
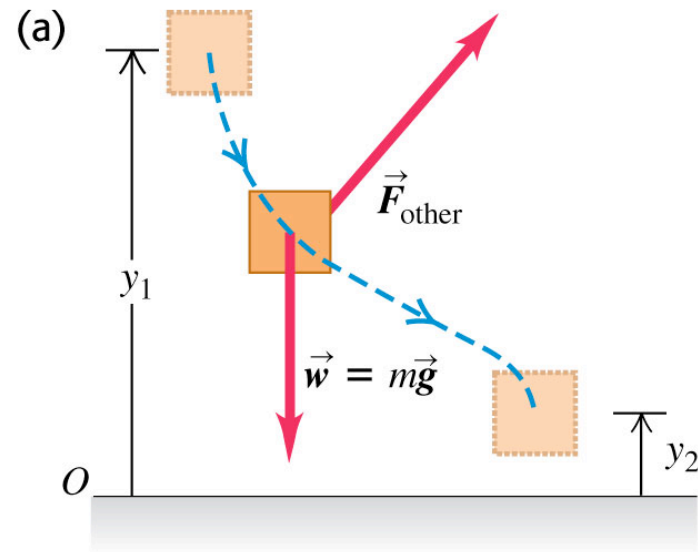


# Work done by gravity



# Work and energy along a curved path

- We can use the same expression for gravitational potential energy whether the body's path is curved or straight.



When a cat falls downward in free-fall:

F. Its gravitational potential energy increases

G. Its kinetic energy increases

H. Both F & G

I. Neither F nor G.

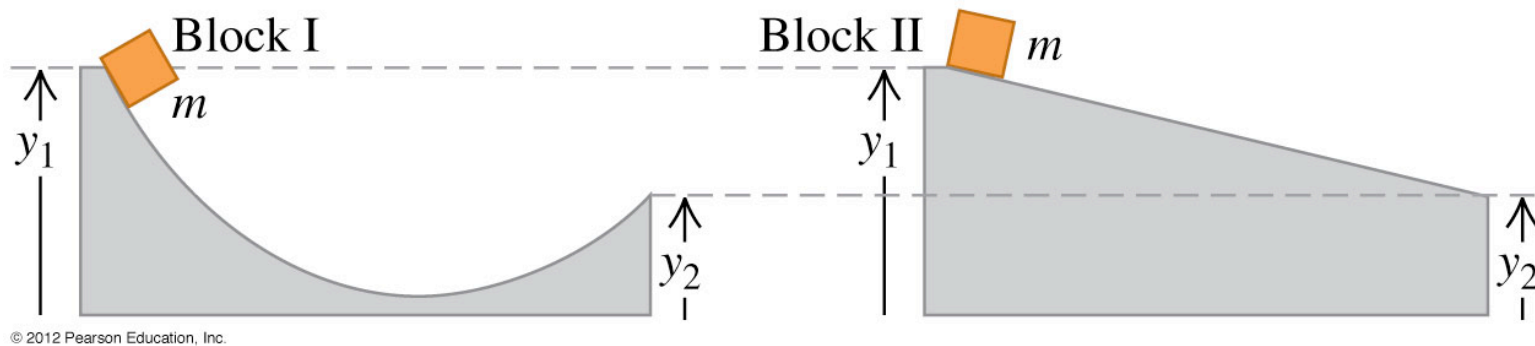
Text your answer to 22333.

# Demo: Pendulum

# Q7.4



The two ramps shown are both frictionless. The heights  $y_1$  and  $y_2$  are the same for each ramp. A block of mass  $m$  is released from rest at the left-hand end of each ramp. Which block arrives at the right-hand end with the greater speed?



K. the block on the curved track

L. the block on the straight track

M. Both blocks arrive at the right-hand end with the same speed.

N. The answer depends on the shape of the curved track.



# Demo: Loop-the-Loop

# Make a prediction

- In order for the ball to make a complete loop, at what height must it start?

# Demo: Skate park simulation

# Motion in a vertical circle with no friction

- Follow Example 7.4 using Figure 7.9.

