

Physics 121 – October 2, 2009

Today:

- Work, Energy, and Power
- Homework problems due today
Chap 6, # 13, 17, 20, 21, 22, 23, 27, 30
- Review for first exam

Next week:

- Exam on Monday, Oct 5 (Chap 1-5)
- Chap 7, Potential Energy
- Homework problems due Friday, Oct 9
Chap 6, # 34, 40. Chap 7, # 23, 24, 26, 27, 56, 59

Why do we care about work?

Work-energy theorem The change in an object's kinetic energy is equal to the net work done on the object:

$$\Delta K = W_{\text{net}} \quad (6.14)$$

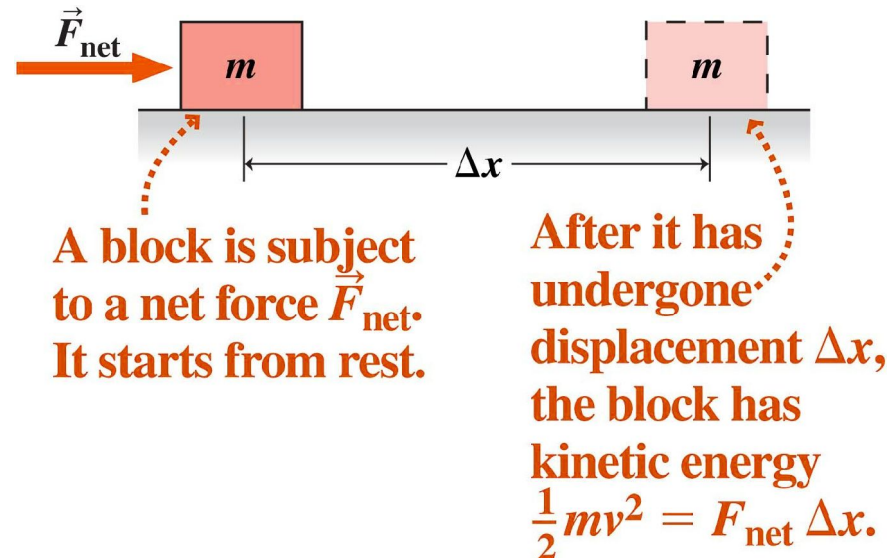
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OK, so what is kinetic energy?

The kinetic energy K of an object of mass m moving at speed v is

$$K = \frac{1}{2}mv^2 \quad (6.13)$$

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Yankees 3rd baseman Alex Rodriguez catches a fly ball of mass m that is moving toward him with speed v . While bringing the ball to rest, his hand moves back a distance d . Assuming a constant acceleration of the ball, what is the force exerted on the ball by his hand?

A. mv/d

B. mv^2/d

C. $2mv/d$

D. $mv^2/(2d)$

E. There is no force. A-Rod's huge arms are sufficient to stop the ball even without the use of steroids.

Exam Guidelines -- Physics 121-02 Fall 2009.

1. Name at top of exam. Write all answers and work in the exam. Scratch paper will be provided if necessary.
2. Try to sit as far apart from each other as possible (every other seat should be possible for 75 students).
3. One sheet of 8.5x11 paper allowed for equations and reminders. Calculator and pencil/pen **will** be needed.
4. Test begins at 9:00, ends at 9:55.
5. If you have a question, raise your hand or come to the front to ask.

Exam 1

Format:

1. About 8-10 multiple choice, conceptual problems.
 2. About 3-4 multiple choice, short numerical calculation.
 3. One multi-step, multi-concept numerical problem.
- (Plan on ~2 minutes per mult. choice, ~20 minutes for multi-step)

Topics:

- Motion in 1 and 2 dimensions
- Definitions of displacement, velocity, acceleration (derivatives, slopes of curves, etc.)
- Projectile motion (know the rules!)
- Vectors and vector components
- Newton's laws (lots of material here)
- Free body diagrams
- Know how to treat different kinds of forces: gravitational, normal, friction (kinetic and static), rope or string (tension), spring (Hooke's law), centripetal (mv^2/r), ...