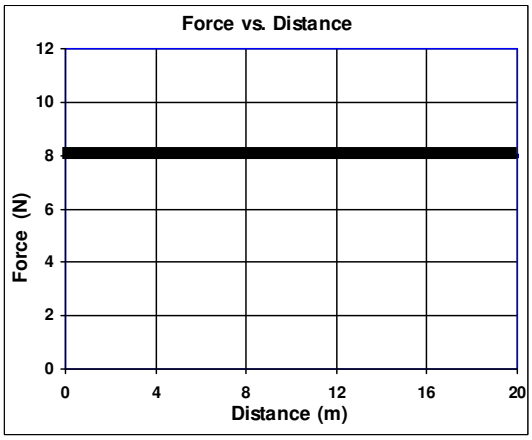
A-Day Due Thur., Dec 3
B-Day: Due Fri., Dec 4

2009 Energy 6



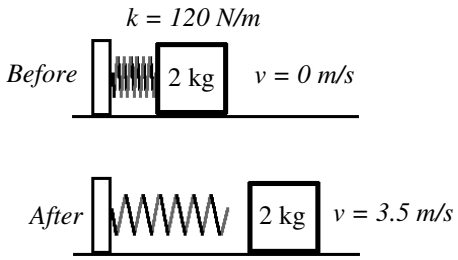
1. The black line on the graph shows the force acting on an object.
   A. How big is the force?
   B. For how much distance does the force act (the whole graph)?
   C. Calculate the work done by the force.

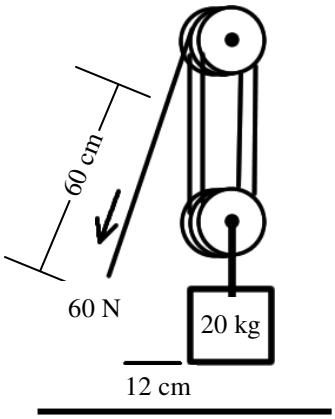
   D. If the force lifts a 5 kg object, how high is the object lifted?

   E. If the object is lifted in 1.5 seconds, how much power was used to lift the object?

2. A spring is compressed 0.6 m and has a spring constant of 120 N/m. When released, a 2 kg object slides over a surface that has friction.
   A. Calculate W_{in}?
   B. Calculate W_{out}?
   C. Calculate the efficiency.

   D. How much energy was lost (amount, not %)?





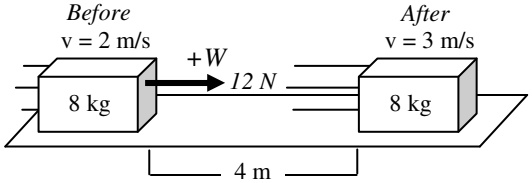
3. A pulley system lifts a 20 kg object 12 cm off the ground.
   A. What is the weight of the object?

   B. Remembering to use meters, calculate W_{in} =

   C. Calculate W_{out} =

   D. Calculate efficiency.

4. What is the biggest efficiency that can exist in an energy transfer?



Ek_{before} = W = Ek_{after} =

5. An 8 kg object is pushed by a 12 N force to accelerate it from 2 m/s to 3 m/s.
   A. BELOW THE DIAGRAM calculate the kinetic energies before and after and the work done.

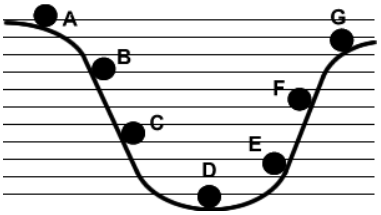
   B. How much energy was gained by the object (using the two kinetic energies)?

   C. How much energy was given to the object (work)?

   D. Calculate efficiency.

NOTE: W_{out} is NOT the final energy (though sometimes it is). W_{out} is the energy gained by the object. W_{in} is the energy given to the object. If these are the same, then the energy transfer is 100% efficient.

6. A rock is dropped from 25 m. Using Conservation of Energy, how fast is it going just before it hits the ground?



7. A ball is released from position A. It rolls down the hill and up the other side to position G. Give the letters from greatest to least kinetic energy.

8. A 3 kg object is moving 2 m/s.
   A. Calculate its kinetic energy.

   B. The same 3 kg object is accelerated so that its speed is doubled, how fast is it moving?
   C. Calculate its new kinetic energy.

   D. So, if the speed doubles (increases by a factor of 2) the kinetic energy _____ (increases by a factor of _____.)

9. Fill in the following table.

	Symbol	Atomic Number	Valence Electrons	# of protons	Oxidation #	Metal/ Nonmetal	# electrons gained or lost
Magnesium							
Oxygen							
Helium							
Potassium							

10. A. Using electron arrows, combine Potassium and Oxygen. (Example below)

    B. Give the formula for Potassium Oxide:

11. Using electron arrows, combine Calcium and Nitrogen.

    B. Give the formula for Calcium Nitride:

Electron Arrows — An easy visual aid.

<u>The Symbols</u>

→ Losing 1 electron

≻ Gaining 1 electron

⟶ An ionic bond

Magnesium loses 2 electrons

Mg^{2+} ⟶ ⟶

Chlorine gains 1 electron

≻ Cl^{1-}

Magnesium will combine with 2 Chlorines

Mg^{2+} ⟶≻ Cl^{1-}
⟶≻ Cl^{1-}

Magnesium Chloride: **$MgCl_2$ (a 1:2 ratio)**

Magnesium Sulfide: **MgS**

Mg^{2+} ⟶ ⟶ *Loses 2*

≻ S^{2-} *Gains 2*

Mg^{2+} ⟶≻ S^{2-} **MgS**

formula