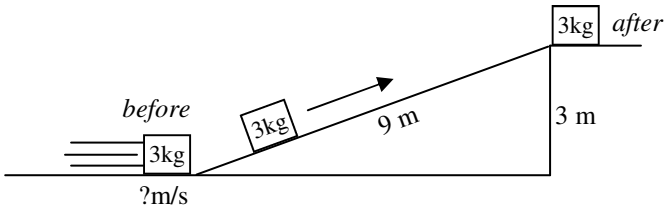
**A-Day Due Tues., Dec 1**
**B-Day: Due Wed., Nov 30**

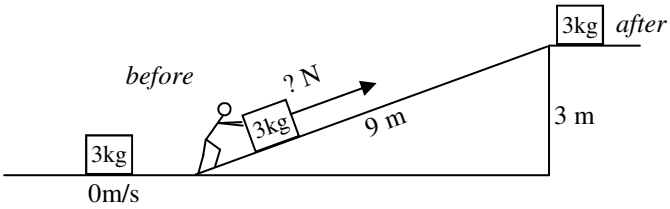
# 2009 Energy 5

*Some of you are still having trouble recognizing when work is done. The two examples below should help.*

1. To simplify our discussion, let's assume the ramp is frictionless, but that Slim Jim can still apply a force.
   A. What kind of energy does the object have at the top of each ramp?
   B. Calculate the energy the object has at the top of each ramp.

   C. If the left example, what kind of energy does the object have before?
   D. In the right example, what kind of energy does the object have before?
   E. So, in which example was work done: left or right?



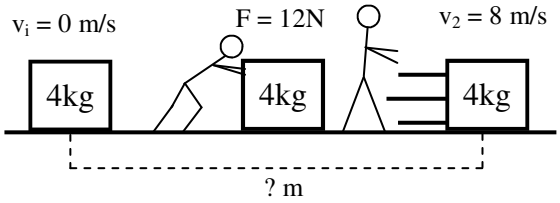



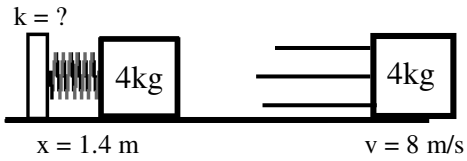

2. For the left ramp…
   A. Conservation of Energy Equation:

   B. Solve for how fast the object was moving at the bottom of the ramp.

3. For the right ramp…
   A. Give the Conservation of Energy Equation:

   B. Solve for the force Slim Jim used to push the box up the ramp.



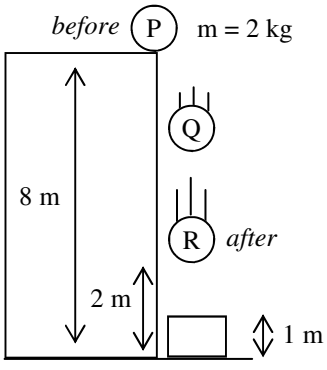

*So, if the energy is just transferred, no work is done. OR no work is done if the energy of the system does not change.*

4. A. What kind of energy does the left object start with?
   B. What kind of energy does the object end with?
   C. Was work done or was energy just transferred?
   D. Give the Conservation of Energy Equation:

   E. Calculate the distance Slim Jim pushed.

5. A. What kind of energy does the right object start with?
   B. What kind of energy does the object end with?
   C. Was work done or was energy just transferred?
   D. Give the Conservation of Energy Equation:

   E. Calculate the spring constant of the spring.



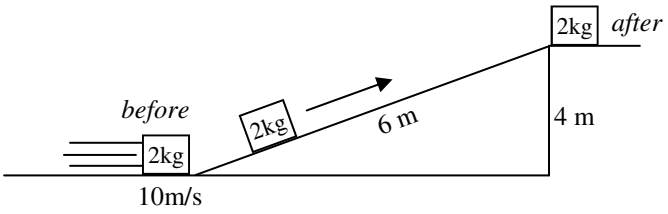

6. A 2 kg ball is dropped from an 8m tall ledge. How fast is it going when it is still 2 m above the ground?
   A. $E_{before}$ = _____ B. Work? = _____ C. $E_{after}$ = _____
   D. Conservation of Energy Equation:

   E. Solve for how fast is it going at R.

   F. If it then crushes a box to stop at the bottom, how much work is done on the box?

*From the "Efficiency" notes*:

7. Where is most energy lost in energy transfers?
8. What are the units for efficiency?
9. What is work in?
10. What is work out?
11. An object is given 120J of energy, but ends up with only 95 J of energy.
    A. How much energy was lost in the transfer?
    B. How efficient was the transfer?




12. A. What kind of energy is work in?
    B. Calculate it.

    C. Calculate work out.

    D. How much energy was lost?
    E. Calculate the efficiency of this transfer.

13. For each of the following elements tell me how many electrons they gain or lose. The first one is done for you. (*Big Hint: think Oxidation Numbers*)

A. _*G 1*_ Chlorine
B. _____ Oxygen
C. _____ Sodium
D. _____ Argon
E. _____ Nitrogen
F. _____ Calcium

***Electron Arrows — An easy visual aid.***

**The Symbols**

→ 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**

14. Using electron arrows make ionic bonds for the following:

    A. Lithium and Oxygen

    B. Calcium and Fluorine.