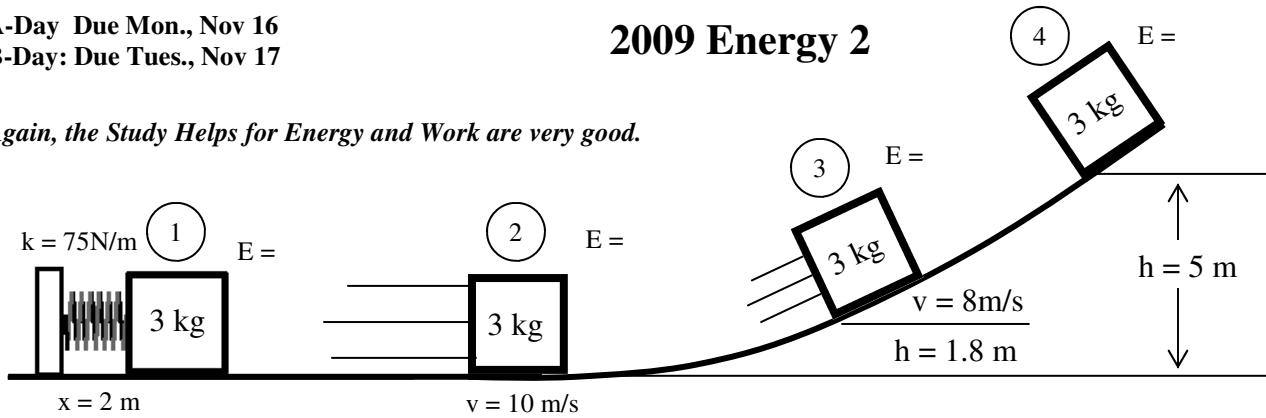


2009 Energy 2

Again, the Study Helps for Energy and Work are very good.



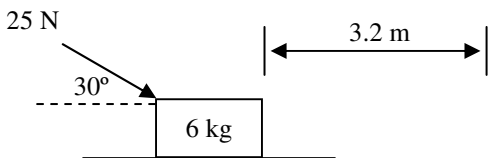
- A 3 kg object is against a compressed spring. When released the object moves up a ramp until it stops. Assume there is no friction on the surface.

 - What kind of energy does the object have at
 Position 1: _____ Position 2: _____ Position 3: _____ Position 4: _____
 - Label the above diagram with the kind of energy it has at each position.
 - Calculate the energy at position 1: _____
 - Calculate the energy at position 2: _____
 - Calculate the energy at position 3: _____
 - Calculate the energy at position 4: _____
 - Label the amount of energy at each position on the diagram above.
 - How does the energy compare at each position?
 - The energy of the object is not gained or lost, just t_____.
 - So does the energy of the system change?
 - If there was absolutely no friction on the surface or in the spring, how long would the mass go up and back?
 - If there was friction, how would the final height of the object change?

If the energy of an object is just changing to different kinds, the energy of the system stays the same. To change the energy of system requires an outside force like friction, which is work.

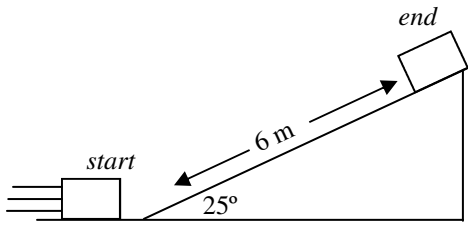
- +W, -W, or no Work?

A. _____ When the energy is just transferred.	H. _____ An object at rest on a hill.
B. _____ When an object loses energy.	I. _____ Compressing a spring.
C. _____ When an object gains energy.	J. _____ Sitting on an object.
D. _____ When energy doesn't change.	K. _____ Lowering an object down to the ground.
E. _____ An object slows down.	L. _____ Speeding up an object.
F. _____ An object is raised up.	M. _____ Friction acting on an object.
G. _____ An object rolls down a hill.	N. _____ Holding onto an object.



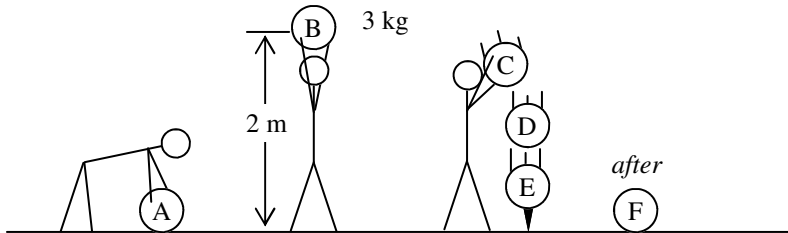
- A 25 N force pushes a box 3.2 meters at an angle of 30° to the table

 - Is it the x or y-component that moves the object?
 - Calculate the work done by this force.
 - What kind of energy does the object gain?
 - How much energy does it have afterwards?
 - Calculate the final speed of the object.



4. A 2 kg object moves up a 6 m long ramp, which is tilted at an angle of 25°.
 - A. What kind of energy did it start with?
 - B. What kind of energy did it end up with?
 - C. Calculate its final energy.

- D. If there is no friction on the ramp, how much kinetic energy did it have at the bottom?



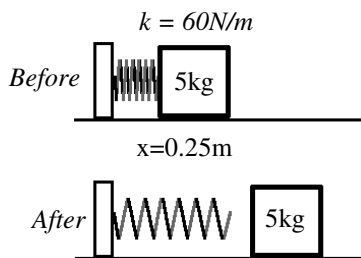
5. Slim Jim lifts a 3kg ball from the ground. He lifts it above his head and drops it onto a spike.
 - A. What kind of energy does the ball have:

At A:	At B:
At C:	At D:
At E:	At F:

- B. Calculate the energy the object has at position B.

- C. How much energy must the object have at E just before it hits the spike?

- D. Where does all the energy go?



6. A 5kg object compresses a spring 0.25m.
 - A. Calculate the energy it has when the spring is compressed.

 - B. What kind of energy does the object have when released?

 - C. If there was no friction on the surface, how much energy does the mass have after released?

 - D. Calculate the velocity of the object afterwards.