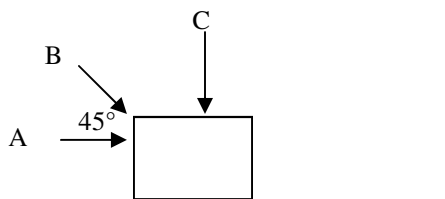
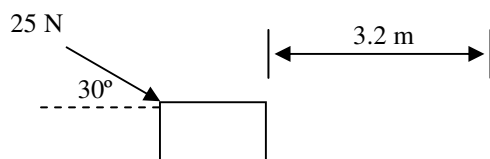


## 2008 Energy 2



- If the energy of an object changes \_\_\_\_\_ was done on the object.
- At the left is an object being pushed by three forces.
  - Will the object move in the x or y-direction?
  - Which does no work.
  - Which does only some work.
  - 100% of it does work.
  - The angle of Force C is \_\_\_\_\_
  - The angle of Force A is \_\_\_\_\_.
  - What % of Force B does work on the 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?
  - Find the work done by this force.

- Label the following as Due to motion. Work (W), Kinetic Energy ( $E_k$ ), Potential Energy ( $E_p$ ), Elastic Potential Energy (PE), or no Energy (N). *Remember: there could be more than one for each.*

- |  |  |
|--|--|
| A. _____ A car going 20 m/s.                     | G. _____ An object at rest on the ground.        |
| B. _____ A rubber ball is compressed.            | H. _____ A dish is at the edge of a 1.4 m table. |
| C. _____ An object at rest at the top of a hill. | I. _____ Friction acting on an object for 3 m.   |
| D. _____ Needs an elastic object.                | J. _____ Energy due to position.                 |
| E. _____ Due to motion.                          | K. _____ An object moving on a spring.           |
| F. _____ How forces transfer energy.             | L. _____ An object thrown thru the air.          |

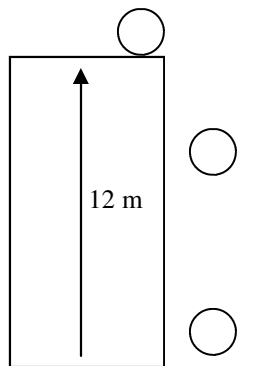
- How can you prove something has energy?

- +W, -W, or no Work?

- |   |   |
|---|---|
| A. _____ When the energy is just transferred. | H. _____ The sin component of a force.          |
| B. _____ When an object loses energy.         | I. _____ An object at rest on a hill.           |
| C. _____ When an object gains energy.         | J. _____ Compressing a spring.                  |
| 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.                |

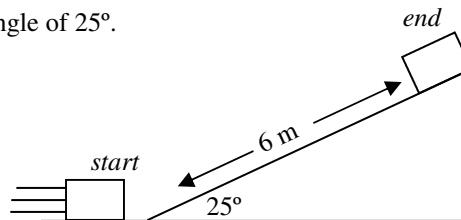
- For each of the pairs of objects, circle the one with the most energy.

- |   |  |
|---|--|
| A. A 2 kg object at rest or a 2 kg object moving. | C. A 3 kg object going 2 m/s; a 3 kg object going 6 m/s. |
| B. A 4 kg object 3 m up; a 6 kg object 3 m up.    | D. A full moving train or an empty moving train.         |



- A 3 kg ball is drops from a 12 m tall ledge.
  - What kind of energy does it have at the top?
  - What kind of energy is it losing as it falls?
  - What kind of energy is it gaining as it falls?
  - What kind of energy does it have half way down?
  - What kind of energy does it have at the bottom before it hits the ground?
  - When it hits the ground, is energy added or subtracted?
  - So, the ground does what?
  - Calculate the energy it had before it fell.
  - If there is no air friction as it falls, how much energy must it have at the bottom?

9. For potential energy,  $h$  must be  $v$  \_\_\_\_\_. (Using this knowledge, answer the following.)
10. A 2 kg object moves up a 6 m long ramp, which is tilted at an angle of  $25^\circ$ .
- What kind of energy did it start with?
  - What kind of energy did it end up with?
  - Calculate its final energy.



- If there is no friction on the ramp, how much kinetic energy did it have at the bottom?
11. Prove that a rolling ball has energy.
12. How fast you transfer energy to an object is called:
13. Two people decide to ride their bikes to work. Person A rides to work in 10 minutes. Person B takes 30 minutes to go the same distance.
- Which one did more work?
  - Which one is more tired?
  - Which one used more power?
14. Motor A has a rating of 300 W. Motor B has a rating of 200 W.
- Which motor is more powerful?
  - How long would it take Motor A to do 6000 J of work?
  - How long would it take Motor B to do 6000 J of work?
  - Which motor did the work quicker?
  - Which motor did more work?
15. True or false (and why)?: "A more powerful object does more work."
16. Mechanical, Chemical, Radiant, Nuclear, Electrical, or Thermal Energy?
- |  |                                       |
|--|---------------------------------------|
| A. ____ Runs your refrigerator.        | E. ____ A rolling object.             |
| B. ____ What a refrigerator removes.   | F. ____ Energy from eating.           |
| C. ____ Given off by a light bulb.     | G. ____ An atom bomb comes from this. |
| D. ____ What a space heater gives off. | H. ____ Stored in a spring.           |