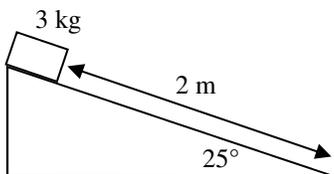
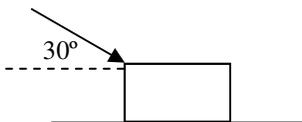


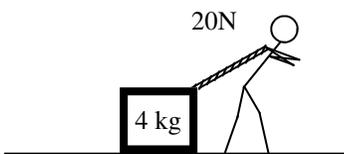
## 2012 PreAP Energy 2



1. A 3 kg object is 2 m up a ramp tilted at 25°.
  - A. What kind of energy does it have at the top?
  - B. What kind of energy is it gaining as it slides down?
  - C. \* Calculate its energy at the top, remembering that h must be vertical.



2. A 25 N force pushes a box 3.2 meters at an angle of 30° to the surface.
  - A. Which portion of the force moves the object: x or y?
  - B. As it moves because of work, the object gains what kind of energy?
  - C. \* Find the work done by this force, remembering that only the parallel part of the force does work.



3. Slim Jim pulls on a box with 20N for 15m. His force pulls at an angle of 40°.
  - A. \* Calculate the work done on the box.
  - B. So, how much kinetic energy must the box have afterwards, assuming no friction?
  - C. Calculate the final velocity of the box.

4. A 3 kg ball is thrown upward into the air. The ball reaches a height of 20 m.
  - A. What kind of energy does it have just after it is thrown (at the bottom)?
  - B. What kind of energy does it have after (at the top)?
  - C. Calculate the energy at the top.
  - D. \* How much PE did it have 3/4 of the way to the top?

*Power is how fast energy is transferred. If two forces transfer energy and one transfers it faster, the faster one uses more power.*

|   |       |       |                              |
|---|-------|-------|------------------------------|
| P | watts | Power | Rate (how fast) work is done |
|---|-------|-------|------------------------------|

$$P = \frac{W}{t}$$

5. Motor A has a rating of 300 W. Motor B has a rating of 200 W.
  - A. Which motor is more powerful?
  - B. \* How long would it take Motor A to do 6000 J of work?
  - C. How long would it take Motor B to do 6000 J of work?
  - D. Which motor did the work quicker?
  - E. Which motor did more work?

6. True or false (and why?): "A more powerful object does more work."

1C)  $h = 2\sin 25^\circ$

2C)  $F_x = 25\cos 30^\circ$

3A) 230 J of work.  $F_x = 20\cos 40^\circ$

4D) 3/4 way up means  $h = (3/4)20 = 15$  m

5B)  $P = W/t$ , so  $t = W/P$ , so  $t = 6000/300 = 20$  sec