Work!

You need some spending money. You find an add for temporary work stocking shelves. The boss offers to pay you $100 to stock about 25 boxes on a shelf. Easy money! But wait!? The boxes won't budge. They must be 200 kg each. No matter how hard you try, you can't lift the boxes. After an hour the boss returns to check on you.

"It's been an hour, and you haven't done any work!" he bellows.

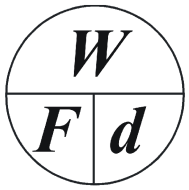
"Are you kidding?!"you moan. "I've been killing myself trying to move these boxes for the last hour."

"Too bad," says the boss. "You don't get paid for effort. You get paid for actual work."

To do actual work on something, you have to make it move. The further you move it, the more work you do. The heavier it is, the more work you do moving it. The amount of work done is the product of the applied force and the distance through which the applied force operates.

$W = F \times d$

- W = work (J)
- *F* = force (N)
- *d* = distance (*m*)



Sample Problem

How much work is done lifting a 30 N object a distance of 1.5 m?

W = F × d
W = (30 N)(1.5 m)
W = 45 N•m = 45 J

Answer the questions below based on the reading above and on your knowledge of physics.

1. How much work is done lifting a 25 N box and placing on a 1.5 m high shelf?

2. If 60 J of work are required to slide a box a distance of 5 m, what is the force of friction?

3. How high does a 1.42 N baseball go if 21.32 J of work are done tossing it in the air?

4. How much work is done attempting to slide a crate to a doorway 3 m away with a force of 50 N if static friction is 86 N?