**Steps for Calculating Work!**

Remember:

**Work** (W) = force x distance Work is measured in **Joules** or **J** for short.

We measure force in **Newtons** or **N**. Distance is measured in **meters** or **m**.

![C:\Users\ljlab\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\8RDLC9JX\MC900187423[1].wmf]()Always write the unit (**N**, **m**,or  **J**) for every answer!

Tip: work in a step by step manner and write each step out!

**Problem**: a fork life moves 34m carrying a 1023N box across the

warehouse floor. How much work is being done by the fork lift?

Step 1: Write down the equation needed to solve the problem.

Step 2: Insert all the known measurements into the equation.

Step 3: Solve. Carefully enter numbers into your calculator.

Work = force x distance

Work = (1023N) x (34m)

W = 34,782J.

The forklift does 34,782 joules of work.

Notice all the numbers have their correct unit labeled (N, m, or J).

**Problem #1**: how much work is done by a person who uses a force of 27.5N to move a grocery cart 12.3cm?

Step 1: Write down the equation needed to solve the problem.

Step 2: Insert all the known measurements into the equation.

Step 3: Solve. Carefully enter numbers into your calculator.

\_\_\_\_\_\_**w = f x d**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_W = (**27.5N) x (12.3m)**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**\_\_\_\_W = 338.25 J**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

![C:\Users\ljlab\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\8RDLC9JX\MC900281333[1].wmf]()**Problem #2**: 55,000J of work is done to move a rock 25 m.

How much force was applied?

Note: now you know the measurement of work and distance,

but you need to find the force!

You can rearrange your equation to solve for that.

Force **x**

Distance

Work =

 Work

Distance

Force =

Step 1: Write down the equation needed to solve the problem.

Step 2: Insert all the known measurements into the equation.

Step 3: Solve. Carefully enter numbers into your calculator.

Force = work / distance

F = 55,000J / 2 m

F = 2,200J

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**Problem #3**: You and three friends apply a combined force

of 489.5N to push a piano. The amount of work done is 1762.2J.

What distance did the piano move?

Note: now you know the work and force, but you need to find the

distance!

You can rearrange your equation to solve for that!

Force **x**

Distance

Work =

 Work

Force

Distance =

Step 1: Write down the equation needed to solve the problem.

Step 2: Insert all the known measurements into the equation.

Step 3: Solve. Carefully enter numbers into your calculator.

\_\_\_\_\_Distance = W / F\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_D = 1762.2J / 489.5 N\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_D = 3.6 m\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Using the steps above, solve the questions and show your answers.

1. Calculate the amount of work done when moving a 567N crate a distance of 20 meters.
2. If it took a bulldozer 567.6 joules of work to push a mound of dirt 30.5 meters, how much force did the bulldozer have to apply?
3. A frontend loader needed to apply 137N of force to lift a rock.  A total of 223J of work was done.  How far was the rock lifted?
4. A boy applied a force of 2,550N on his St. Bernard dog who is sitting on the boy's tennis shoes.  He was unable to move the dog.  How much work did he do trying to push the dog? (Hint: distance = 0)
5. If a long distance runner with a weight of 596.82 Newtons does 35,674.7 joules of work during a portion of a race, what distance will she cover during that portion? (Remember weight is a force!)

Work = Force x Distance

W = (576N) x (20m)

W = 11,340 J

Force = Work/Distance

F = (567.6J/30.5m)

F = 18.61N

Distance = Work/Force

D = (223J) / (137N)

D = 1.63m

Work = Force x Distance

W = (2,550N) x (0m)

W = 0

Distance = Work/Force

D = (35,674.7J/596.82)

D = 110m