WORK & POWER NOTES

What is work?

Work is the _____ that takes place when a _____ causes an

object to_____.

       work done is measured in _____

       force is measured in _____

       distance is measured in _____

       The formula for work is _____

Am I doing work?

In scientific terms, work is done when _____

_____.

Doing work: lifting a stack of books; Force exerted _____ books move _____

Not doing work: holding books: Force exerted _____ books move _____

Not doing work: Carrying books across the room: Force exerted _____ books move _____

Is work being done?

_____ Picking up a heavy box

_____ Doing pushups

_____ Leaning against the wall

_____ Pushing a child on a swing

_____ Sitting in a chair

Calculating work

Work = _____ (in _____) x _____ Moved (in _____)

Work is measured in _____ (_____), which is the same thing as a

scientific unit called a _____(___)

If you exert _____ of force to move an object _____, you have done _____ of

work.

Example: who is doing more work?

Same lifts a 100 N plant 0.5m from the ground onto a bench, while Eddie lifts a 75 N plant

1.0 m from the ground onto a table.

W=FD   W=FD
F= 100 N   F=75 N
D= 0.5m   D= 1.0 m
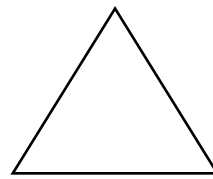

W=   W=

Calculating Unknown Quantities

You can use the magic triangle to calculate_____ and _____.

55,000 J of work is done to move a rock 25m. How much force is applied?

1 J =

W=

D=

$F = \dfrac{W}{D} =$

Work & Time = Power

The _____ done on an object is _____ by how long it takes to do the work; you will still do the same amount of work carrying a stack of books up the stairs if you _____ or _____.

_____ is the amount of work done on an object _____,

therefore the _____ applied to do work, _____ the work gets done.

Calculating power

Power is measured in _____, which is called a _____ (__)

_____ of power is used to exert _____ of force to move an object _____ in _____

   1W = _____

A watt is a _____ unit of power, so power is often measured in

_____ (_____)

   _____ W = 1 kW

   Electricity is billed in _____.

Engine power is measured in _____ (not a scientific unit.)

1 hp = _____ W; when the _____ was developed a contest was held that determined that it would take _____ to do the same amount of _____ as the engine could do _____.

Calculating Power

Power = _____   or Power = _____

a tow truck exerts a force of 11,000 N to pull a car out of a ditch. The car moves a distance of 5 m in 25 seconds. What is the power rating of the tow truck's winch?
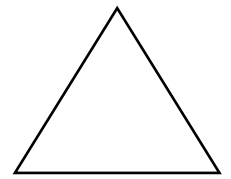
F=

D=

t=

P=

Calculating unknown Quantities

You can also use the magic triangle to calculate power

How much work is done by a 75 W hair dryer that is used for 25 minutes?

1 W =

P=

T=

Practice problems

A fork lift moves 34m pushing a 1023N box across the warehouse floor. How much work is done by the fork lift.

How much work is done by a person who uses a force of 27.5N to move a grocery buggy 12.3m?

You and 3 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?

A set of pulleys lifts a piano and does 3,356 joules of work. If the piano is lifted in 75 seconds, how much power is used?

How much work is done in order to cook a bag of popcorn in a 500 watt microwave oven for 5.5 minutes?

Sara and Josh do the exact same amount of work. Sara does the work in 2.3 hours and Josh does it in 2.5 hours. Who is more powerful? Explain