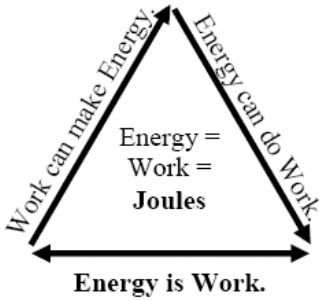
Work, Power, Energy Worksheet

Energy and work are interconnected—one can make the other.

Energy

Energy is stored work.
A battery can store energy to make things work whenever you want.

Energy can cause forces, which can cause motion, which can do work.



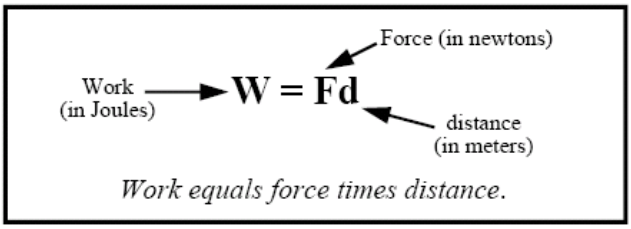
Work

Work uses energy.
It takes energy to move things.
Energy can make things work.

Work can create energy.
A generator uses work to make energy, which can be stored to do more work.

Work

Work is defined as a force applied (moved) through a distance.



If you push harder (**more force**) you do **more work**.

If you push longer (**more distance**) you do **more work.**

1) A go cart engine applies a force of 888N and moves the cart forward 22m.
   a) How much work is done?

   b) What is doing the work?

   c) If the driver wants to go further will the amount of work increase or decrease? Do you need a bigger engine to go further?

   d) We put on a bigger engine (1111N) but the cart still moves forward 22m. How much work is done now?

   e) Why would you put on a bigger engine if you are still moving 22m?

   f) Work requires a change in energy, which engine uses more gas to go 22m?

   g) Even an empty semi truck uses much more gas than a car. Why?

2) Calculate the work done by a 47 N force pushing a pencil 0.26 m._____

3) Calculate the work done by a 2.4 N force pushing a 400 g sandwich across a table 0.75 m wide._____

4. How far can a mother push a 20.0 kg baby carriage, using a force of 62 N, if she can only do 2920 J of work? _____

Power

How fast you do work is called **power**. If you work faster, you use more power.

Power (in watts) → $P = \frac{W}{t}$ ← Work (in joules); Time (in seconds) ←

Power equals work divided by time.

Putting in the work equation: $P = \frac{Fd}{t}$

A machine that **works faster** (in less time) is **more powerful**.

A **more powerful** light bulb gives off the **same** amount of light (**work**), it **just** does it **faster**.

6. If a small motor does 520 J of work for 10seconds, how much power is exerted?_____

7. A girl pushes her little brother on his sled with a force of 300 N for 750 m.
   a. How much work is this? _____
   b. How much energy is used?_____
   c. How much power does she use if it takes her 25s?_____
   d. How much power does she use if she runs and complete the 750m in 10s?_____

8. A 75.0 kg man pushes on a 500,000 kg wall for 250 s but it does not move.
   a. How much work does he do on the wall? _____
   b. How much energy is used?_____
   c. How much power is exerted?_____