All of the AQA science revision sheets at www.tes.com/teaching-resources/shop/teachsci1

$$Efficiency= \frac{300}{500}=0.6 or 60\%$$

Eg. calculate the efficiency of a motor that has a power of 500W and transfers 300W usefully.

**Power**This is the rate of doing work (per second) in watts.
1 watt = 1 joule of energy transferred per second.

eg. calculate the power of a motor that uses 6000J of energy to lift an object for 20 seconds.

A more powerful devise can transfer more energy in a given time, or, will transfer the same amount of energy in a faster time.

For example, two identical cars but one with a more powerful engine race. The more powerful one will finish first – it will have transferred the same amount of energy but in a quicker time.

$$P= \frac{6000}{20}=300W$$

$$Efficiency= \frac{useful power output}{total power input}$$

$$Efficiency= \frac{useful energy output}{total energy input}$$

**Efficiency**An efficient device wastes less energy than a less efficient device. It can be calculated as a decimal, or multiplied by 100 to give a percentage.

* **Cavity wall** insulation fills the air gap between the inner and outer wall reducing heat loss by convection.
* **Loft** insulation reduces heat loss by convection.
* **Double glazing** creates an air gap between the two panes of glass to reduce energy loss by conduction.
* **Draught excluders** reduce energy loss by convection when placed around windows and doors.
* Reducing the temperature difference between the inside and outside will also reduce energy transfer.

**Convection**When particles are free to move (in a liquid and gas) an increase in their kinetic store causes them to **move faster**.
This means the **space** between the particles **increases**, so the **density** of the area being heated **decreases**.
The warmer less dense region **rises** and the cooler, more dense regions fall.

**Reducing Wasted Energy
Friction** between two moving objects causes energy to be dissipated to the thermal store. It can be reduced by lubrication.

**Insulation** reduces energy transfer by heating. This is useful in our homes to reduce heating costs:

**Conduction**This occurs in solid objects. Whenan object is heated thermal energy istransferred to the **kinetic store** of the **particles**. This causes them to **vibrate more** and **collide** with other particles, so energy is **transferred** between the kinetic stores.

time (s)

Energy transferred (J)

Work
done (J)

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

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

**Conservation of Energy**Energy can be transferred, stored or dissipated but never created or destroyed.

All energy is never transferred usefully. Some is always wasted (dissipated). For example, energy is transferred electrically to a laptop but some is dissipater to the thermal store of the laptop.

**Conservation of Energy**