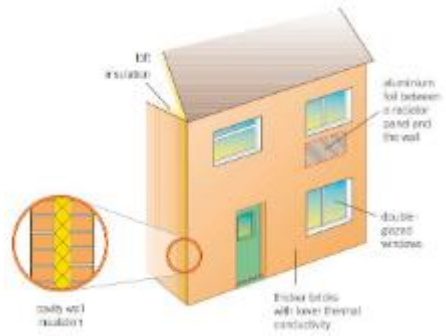
P2 Energy Transfer by Heating

Word	Definition
Thermal conductivity	Rate of thermal energy (heat) transfer through a material
Specific heat capacity	Energy needed to change the temperature of 1kg of a substance by 1°C
Cavity wall insulation	Insulating layer placed between outer and inner walls of a house
Continuous variable	A variable which can take any value e.g. temperature
Categoric variable	These have values which are names e.g type of material
Emit	*Give out (e.g. radiation)*
Absorb	*Take in (e.g. radiation)*
Black body	*A body that absorbs all the radiation incident on it*
Infrared	*Type of radiation given out by all objects because of their temperature*

Thermal insulators (e.g. bubble wrap) have low thermal conductivity
Thermal conductors (e.g. metals) have a high thermal conductivity

The rate of energy transfer from houses can be reduced using insulation (ideally thick layers of materials with low thermal conductivity)

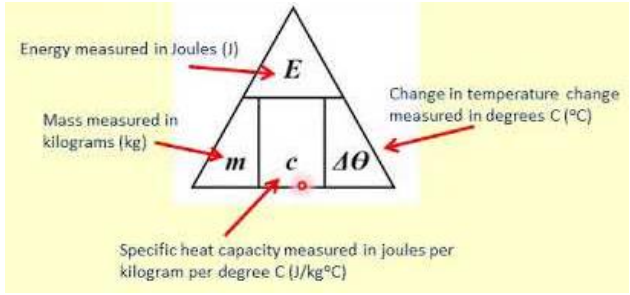


Equation for specific heat capacity (given in exam)

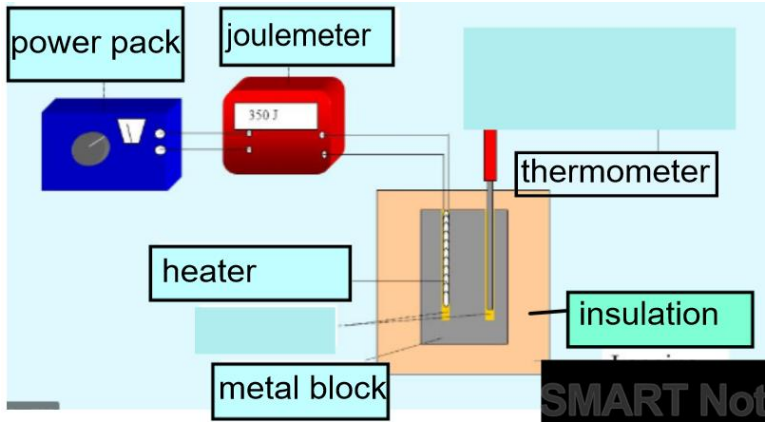
Energy transferred = mass x specific heat capacity x temperature change

$\Delta E = m \times c \times \Delta\theta$

Units:
Energy in joules (J)
Mass in kg
Specific heat capacity in J/kg°C



Required practical: measure specific heat capacity of a material



Can use voltmeter, ammeter and stopwatch to measure energy instead of joulemeter
Energy = V X I X t

Method
Measure mass of block using a balance
Measure start temperature using thermometer
Heat block for fixed time – then measure temperature at end
Calculate change in temperature (final temperature-start temperature)
Calculate energy supplied (directly from joulemeter or from voltmeter, ammeter and stopwatch)
Use equation to calculate specific heat capacity

Typical exam question: the value measured for specific heat capacity is higher than true value because some thermal energy spreads out into surroundings rather than heating the block