Towards Mastery:

**Calculation Checklist**

1. Write the values you’re given.
2. Check the values are in SI units.
3. Write the equation you will use.
4. Substitute in the values you know.
5. If necessary, re-arrange the equation.
6. Calculate your answer.
7. Write your answer – don’t forget the units!

Specific Heat Capacity Calculations

[Learning]

*This is what you really need to be able to do – use the equation exactly as it is given to you, substitute in the values you are given in the question and calculate the kinetic energy. Show all your working out.*

1. Calculate the change in energy for an object of mass 4kg, specific heat capacity 500J/kg⁰C that has had a change in temperature of 15⁰C.
2. What is the change in energy if an object with a specific heat capacity of 1200J/kg⁰C and mass of 15kg increases in temperature by 20⁰C ?
3. An object changes temperature by 10⁰C, it has a specific heat capacity of 1000J/kg⁰C and a mass of 10kg. Calculate the change in energy of the object.
4. Calculate the change in energy for an object of mass 1kg, specific heat capacity 2000J/kg⁰C that has had a change in temperature of 2⁰C.

[Challenge]

*These are the more difficult questions – you will need to substitute and then rearrange these equations – if you can do these then you are really starting to grasp these calculations. Show all your working out.*

1. Calculate the change in temperature of an object if the change in energy is 400J, mass is 3kg and specific heat capacity is 1000J/kg⁰C.
2. What is the mass of an object if the change in energy is 100J, change in temperature is 20⁰C and specific heat capacity is 500J/kg⁰C.
3. An object has a mass of 0.5kg, it has had 400J of energy transferred to it and has changed temperature by 25⁰C. Calculate the specific heat capacity of the object.
4. Calculate the change in temperature of an object if the change in energy is 2000J, mass is 5kg and specific heat capacity is 500J/kg⁰C.

[Extreme]

*These are the most difficult questions – you will need to convert the units, substitute your values and then rearrange the equations – if you can do this you are well on your way on the journey to mastery of these calculations. Show all your working out.*

1. A block of mass 2kg has a temperature of 20⁰C. The specific heat capacity of the block is 1000J/kg⁰C. A heater transfers 400J of energy to the block. What is the final temperature of the block?
2. A block of mass 1.5kg has a temperature of 30⁰C. The specific heat capacity of the block is 2kJ/kg⁰C. A heater transfers 10kJ of energy to the block. Calculate the final temperature of the block.
3. A kettle heats a liquid from 30⁰C to 40⁰C. The mass of the liquid is 0.5kg. The kettle transfers 0.4kJ of energy to the liquid. Calculate the specific heat capacity of the liquid.
4. A heater heats a liquid from 10⁰C to 15⁰C. The mass of the liquid is 300g. The kettle transfers 0.1kJ of energy to the liquid. Calculate the specific heat capacity of the liquid.