
*Remember to show all your work and always check your answer for correct sig figs and units.
Feel free to use your textbook or the internet to find any missing information or equations you may need.*

Part A: Heat capacity

- 1) The specific heat capacity of water is $4.184 \text{ J/g}^\circ\text{C}$ while the specific heat capacity of ice is $2.03 \text{ J/g}^\circ\text{C}$.
 - a) Without doing any calculations, do you expect it would take more energy to raise the temperature of a sample of ice or a sample of water? Briefly explain how you came up with your answer.

 - b) Verify your answer to question 1a by calculating the heat needed to raise the temperature of 5.0 g of water and 5.0 g of ice each by 2.0°C .

- 2) What is the specific heat capacity of silicon if it takes 192 J to raise the temperature of 45.0 g of silicon by 6.0°C ?

- 3) After adding 57.0 calories to a lead block, the temperature of the lead increases from 53°F to 79°F . What must be the mass, in g , of the lead block?

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- 4) You and a friend are going on an overnight camping trip and need to decide how much propane fuel to bring. First you decide how much water you plan to heat for the dinner you will be making and then you consider the amount of heat the fuel can provide:
- a) How much heat (in kilojoules) is needed to bring the 2.5 L of water from room temperature (25°C) to its boiling point?
- b) If each gram of propane can generate 29.5 kJ of heat, what volume (in mL) of propane should you bring camping? The density of propane = 0.79 g/mL

Part B: Calorimetry

- 5) A 110.0 g piece of molybdenum metal is heated to 100.0°C and placed in a calorimeter that contains 150.0 g of water at 24.6°C. After reaching equilibrium, the final temperature of the metal and the water is 28.0°C. Based on this data, what is the calculated specific heat capacity of molybdenum?

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- 6) A 20.0 g sample of iron is heated to 215 °C and dropped into 90.0 g of water at 25.0 °C. What is the final temperature of the water (to 3 sig figs)?

- 7) The combustion of 1.00 g of cornflakes in a calorimeter is found to raise the temperature of 100.0 g of water from 30.0°C to 50.0°C. How many Calories are there in a 20.0 g serving of cornflakes?