Example 2

Mix 0.17 kg of 12°C milk into 0.75 kg of 95°C coffee. Both are essentially water with a specific heat capacity of 4186 J/(kg C°). What is the **equilibrium temperature?**

	milk	coffee
m	kg	kg
c	$Jkg^{-1}{}^{\circ}C^{-1}$	$Jkg^{-1}{}^{\circ}C^{-1}$
θ	$^{\circ}C$	$^{\circ}C$

$$Q_{loss} = Q_{gained}$$

$$Q_{coffee} = Q_{milk}$$

$$m \, c \, \Delta\theta = m \, c \, \Delta\theta$$

$$(\quad)(\quad)(\quad - \theta_f) = (\quad)(\quad)(\theta_f - \quad)$$

$$(\quad - \theta_f) = (\theta_f - \quad)$$

$$- \quad \theta_f = \theta_f -$$

$$\theta_f =$$

$$\theta_f = \underline{\qquad}$$

$$= \qquad ^{\circ}C \; \#$$

Example 3

What is the final temperature of 0.47kg of ice at 0°C added to an insulated container filled with 3.75 kg of water at 22°C? (c_{ice} = 2090 J/kg°C)

	ice	water
m	kg	kg
c	$J kg^{-1} °C^{-1}$	$J kg^{-1} °C^{-1}$
θ	°C	°C

$$Q \; loss = Q \; gained$$

$$Q_{water} = Q_{ice}$$

$$m \; c \; \Delta\theta = m \; c \; \Delta\theta$$

$$(\quad)(\quad)(\quad -\theta_f) = (\quad)(\quad)(\theta_f - \;)$$

$$-\quad \theta_f = \quad \theta_f$$

$$\theta_f =$$

$$\theta_f = \underline{\qquad}$$

$$= \quad °C$$

Example 4

A, B and C are the type of liquid which mass A is 8 kg and mass B is 22 kg. The initial temperature of liquid A is 65°C, liquid B is 45°C and liquid C is 15°C. The final temperature when all the liquid mixed is 40°C. If the specific heat of A, B and C are 2.1×10^3 J/kg°C, 3.3×10^3 J/kg°C and 4.2×10^3 J/kg°C, calculate the mass of the liquid C.

	A	B	C
m	kg	kg	
c	$J\,kg^{-1}\,°C^{-1}$	$J\,kg^{-1}\,°C^{-1}$	$J\,kg^{-1}\,°C^{-1}$
θ	°C	°C	°C

$$\theta_{final} \;=\; {}^{\circ}C$$

$$Q_{loss} \;=\; Q_{gained}$$

$$Q_A + Q_B \;=\; Q_C$$

$$m_A\,C_A\,\Delta\theta_A + m_B\,C_B\,\Delta\theta_B \;=\; m_C\,C_C\,\Delta\theta_C$$

$$(\quad)(\quad)(\;-\;) + (\quad)(\quad)(\;-\;) = m(\quad)(\;-\;)$$

$$+ \qquad\qquad = m(\quad)$$

$$\therefore \quad m \;=\; \underline{\qquad}$$

$$=\qquad kg \;*$$