Example

- How much ice (at 0 C) do you need to add to 0.5 liters of a water at 25 C, to cool it down to 10 C?

(L = 80 cal/g, c = 1 cal/g C)

Key ideas

1) Q leaving water goes into heating ice.

2) Final temps are same

$$Q_{\text{water}} = mc\Delta T$$
$$= (0.5kg)(1cal/gC)(15C)$$
$$= (7{,}500 \text{ calories})$$

$$Q_{\text{ice}} = mL + mc\Delta T$$

$$\frac{Q_{\text{ice}}}{L + c\Delta T} = m$$

$$m = \frac{7{,}500cal}{80cal/g + (1cal/gC)(10)}$$

$$m = 83.3 \text{ grams}$$