

## Heat Calculations

Example: liquid water (50.0g)<sup>m</sup> is heated and its temperature increased from 23.2°C to 48.9°C. How much heat was added?

$$\begin{aligned}
 m &= 50.0 \text{ g} \\
 T_i &= 23.2^\circ\text{C} \\
 T_f &= 48.9^\circ\text{C} \\
 c &= 4.18 \frac{\text{J}}{\text{g}\cdot^\circ\text{C}} \\
 Q &= ? \text{ J}
 \end{aligned}$$

$$Q = mc\Delta T$$

$$Q = mc(T_f - T_i)$$

$$Q = (50.0 \text{ g}) \left( 4.18 \frac{\text{J}}{\text{g}\cdot^\circ\text{C}} \right)$$

$$Q = (50.0 \text{ g}) \left( 4.18 \frac{\text{J}}{\text{g}\cdot^\circ\text{C}} \right) (48.9 - 23.2)^\circ\text{C}$$

$$Q = +5371.3 \text{ J}$$

$$Q = +5.37 \times 10^3 \text{ J}$$

$$Q = +5.37 \text{ kJ}$$

↑ increase in  
Temp / heat absorbed