5. We use the following relation derived in Sample Problem 21-2:

$$\Delta S = mc \ln\left(\frac{T_f}{T_i}\right) .$$

(a) The energy absorbed as heat is given by Eq. 19-14. Using Table 19-3, we find

$$Q = cm\Delta T = \left(386 \frac{\text{J}}{\text{kg}\cdot\text{K}}\right)(2.00\,\text{kg})(75\,\text{K}) = 5.79 \times 10^4 \text{ J}$$

where we have used the fact that a change in Kelvin temperature is equivalent to a chance in Celsius degrees.

(b) With $T_f = 373.15$ K and $T_i = 298.15$ K, we obtain

$$\Delta S = (2.00\,\text{kg})\left(386 \frac{\text{J}}{\text{kg}\cdot\text{K}}\right) \ln\left(\frac{373.15}{298.15}\right) = 173 \text{ J/K} .$$