

Cooling Act

During a tough work out, your body sweats (and evaporates) 1 liter of water to keep cool (37 C). How much water would you need to drink (at 2C) to achieve the same thermal cooling? (recall $C_v = 4.2 \text{ J/g}$ for water, $L_v = 2.2 \times 10^3 \text{ J/g}$)

A) 0.15 liters B) 1.0 liters C) 15 liters D) 150 liters

$$Q_{\text{evaporative}} = L_v m = 2.2 \times 10^6 \text{ J}$$

$$Q_c = C_v M \Delta t = 4.2 \times 35 \times M$$

$$M = 2.2 \times 10^6 / 147 = 15,000 \text{ g or 15 liters!}$$