Checking a Heat Reading When Water Escapes

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A classroom model gives the same 10.0 kJ of energy to two identical blocks. P is dry. Q holds some water. The block takes 0.20 kJ for each degree Celsius it warms. In this model the supplied energy either warms the block or evaporates water. Ignore other transfers.

Block	Water evaporated (g)	Temperature increase (°C)
P	0.0	50
Q	2.0	27

1 How much of the supplied energy warms the dry block?

(1) 0 kJ
(2) 2.0 kJ
(3) 5.0 kJ
(4) 10.0 kJ

2 Calculate the energy used to warm block Q and the energy left for evaporation. [1]

Answer and work

The simulation gives an evaporation energy of 2.3 kJ per gram of water under these conditions.

3 Use the measured evaporated mass to check whether it accounts for the energy left over in Q. [1]

Answer and work

The class lets Q dry completely and return to its original temperature. It supplies another 10.0 kJ to Q.

4 A student says Q requires more energy per degree than P because Q warmed less in the first trial. Predict the temperature rise for dry Q in the repeat. Explain how that prediction addresses the claim. [1]

Answer and work