Checking Boiling With Two Heater Settings

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

A classroom model heats equal amounts of pure water from the same starting temperature. The chamber fixes the pressure above each sample. A sustained plateau during boiling gives the temperature at which the water vapor pressure matches the chamber pressure. The table gives rounded model temperatures.

Test	Chamber pressure (kPa)	Heater power (W)	Time when boiling starts (min)	Boiling plateau (°C)
P	80	20	8	94
Q	80	40	4	94
R	100	40	5	100

1 Which pair isolates the effect of heater power at the same chamber pressure?

(1) P and Q

(2) P and R

(3) Q and R

(4) No pair uses the same pressure.

2 Use P and Q to evaluate the claim that increasing heater power raises the boiling temperature at fixed pressure. [1]

Answer and work

The class prepares a fourth sample at 100 kPa with a 20 W heater. The water and its starting temperature match the other samples.

3 Predict the fourth sample’s plateau temperature. Explain whether P or R supplies the more relevant comparison for that prediction. [1]

Answer and work

4 Explain how the fourth sample and R can be used to check whether heater power changes the time to reach the same plateau. [1]

Answer and work