Checking a Cooled Solution With a Seed

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

A cooled solution has eight grams of dissolved solute in a fixed amount of water. At this temperature the equilibrium limit is five grams. The model can temporarily hold more than that without a crystal starting to grow. It compares a trial with a tiny crystal seed and one without a seed.

Trial	Dissolved solute before test (g)	Dissolved solute after 1 minute (g)	Dissolved solute after 10 minutes (g)
P, no seed	8	8	5
Q, seed	8	5	5

1 Which reading shows solute remaining above the equilibrium limit after one minute?

(1) P only

(2) Q only

(3) Both

(4) Neither

2 Calculate how much of the originally dissolved solute has become solid in each trial by one minute. Ignore the mass of the seed. [1]

Answer and work

3 A student says the seed lowers the amount the water can hold at equilibrium. Evaluate the claim using the later readings. [1]

Answer and work

A third solution starts with only four grams dissolved in the same amount of water at the same temperature. It receives a seed much smaller than one gram.

4 Predict what happens to that seed if the model reaches equilibrium. Use the capacity and total solute amount. [1]

Answer and work

The class wants to check whether a rough surface alone can start crystal growth in a fresh eight-gram solution. It has a solute crystal and an insoluble bead with a matched rough surface.

5 Describe a comparison that could test whether the bead also starts growth. Identify what to measure. [1]

Answer and work