Factors That Affect Dissolving

New Regents original practice • Name: _____ Date: _____
Show your work for written answers.

Dissolving time describes how quickly a given amount dissolves. Equilibrium solubility describes the maximum amount that can dissolve at a stated temperature.

1 Which change can shorten the time needed for a small sugar cube to dissolve in water at fixed temperature?

(1) Stir the water.

(2) Reduce the contact between sugar and water.

(3) Keep the sugar out of the water.

(4) Replace the water with an empty container.

2 Explain why crushed sugar often dissolves faster than an equal mass in one cube. [1]

Answer and work

3 Which observation directly measures dissolving rate for a fixed solute mass?

(1) Time until no solid remains

(2) Maximum mass dissolved at equilibrium

(3) Mass of an empty cup

(4) Boiling point of pure water

4 Explain why faster stirring does not necessarily increase the equilibrium solubility at the same temperature. [1]

Answer and work

Comparing Sugar Samples

Use the information below to answer the questions.

Each model trial uses 5.0 g of sugar and 100 g of water at 25 °C. All samples can dissolve completely. The table shows the time until no visible solid remains.

Trial	Sugar form	Stirring	Time (s)
P	Cube	None	80
Q	Crushed	None	40
R	Crushed	Steady	25

5 Which pair isolates the effect of changing particle size?

(1) P and Q

(2) P and R

(3) Q and R

(4) All pairs isolate size.

6 Calculate how many seconds steady stirring reduced the dissolving time for crushed sugar. [1]

Answer and work

7 Which quantity is the same at the end of each completed trial?

(1) Elapsed time

(2) Initial particle size

(3) Mass of sugar dissolved

(4) Stirring condition

8 Propose one new trial that would test stirring for the cube alone. Identify the trial to use for comparison. [1]

Answer and work