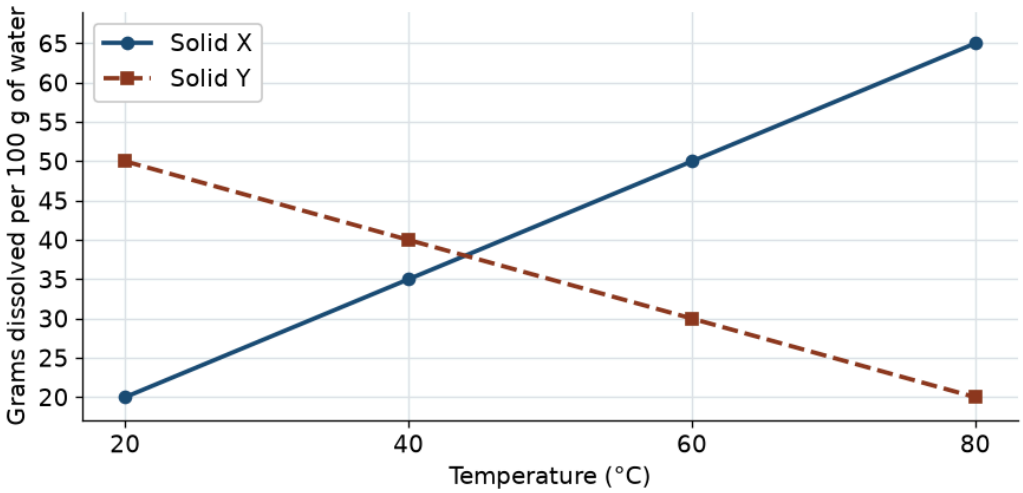
Choosing an Order to Separate Two Solids

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

A classroom model contains 40 g each of solids X and Y and 100 g of water. The graph gives the largest mass of each solid that dissolves in that amount of water at each temperature. For this model, each solid follows its own curve even when the other is present. No water is lost.



Model solubilities of solids X and Y.

1 At 80 °C, which solid remains partly undissolved after the mixture reaches equilibrium?

(1) X only

(2) Y only

(3) Both X and Y

(4) Neither X nor Y

2 Calculate how much of the undissolved solid can be removed by filtering at 80 °C. Show how the starting mass enters the calculation. [1]

Answer and work

After filtering at 80 °C, the class keeps all the filtered liquid and cools it to 20 °C. The liquid still contains 100 g of water.

3 Identify the solid that forms during cooling and calculate how much forms. Use the amount of each solid in the filtered liquid. [1]

Answer and work

4 A student expects both solids to form during cooling. Use the graph and the amounts in the filtered liquid to evaluate the prediction for each solid. [1]

Answer and work