Comparing Two Bicarbonate Powders by Mass

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

A classroom model compares pure sodium bicarbonate, $NaHCO_3$, and pure potassium bicarbonate, $KHCO_3$. Each bicarbonate formula unit can produce one CO_2 molecule when it reacts completely. The model supplies enough acid for both samples and collects all the CO_2.

Powder	Sample mass (g)	Molar mass used (g/mol)
$NaHCO_3$	8.40	84.0
$KHCO_3$	8.40	100.0

1 Which sample is predicted to produce more moles of CO_2?

(1) $NaHCO_3$ only

(2) $KHCO_3$ only

(3) They produce equal amounts.

(4) The sample masses prevent a comparison.

2 Calculate the predicted moles of CO_2 from each sample. [1]

Answer and work

The display wants the same CO_2 output as the original sodium bicarbonate sample but uses only potassium bicarbonate in a repeat.

3 Calculate the potassium bicarbonate mass needed to give that output. [1]

Answer and work

The class also tests an 8.40 g blend. It contains equal masses of the two powders. The class uses excess acid and captures all the gas.

4 A student predicts that the blend will give the same amount of CO_2 as the pure sodium bicarbonate sample. Calculate the expected output from the blend and use it to evaluate the claim. [1]

Answer and work