

*Sample Problem for Bleach and Hydrogen Peroxide Lab***Word equation for the reaction between sodium carbonate and hydrochloric acid:**

sodium hydrogen carbonate + hydrochloric acid \rightarrow sodium chloride + water + carbon dioxide

Balanced Equation for the reaction between sodium carbonate and hydrochloric acid:**Table 1.** Data for the reaction between sodium hydrogen carbonate and hydrochloric acid

| Set A | Vol 5.00% NaHCO ₃ (mL) | Vol of 3.00% HCl (mL) | Mass of NaHCO ₃ (g) | Mass of HCl (g) | Moles NaHCO ₃ | Moles HCl | Moles CO ₂ (predicted) | Volume CO ₂ (mL) (predicted) | Volume CO ₂ (mL) (actual) | % Yield |
|-------|-----------------------------------|-----------------------|--------------------------------|-----------------|--------------------------|-----------|-----------------------------------|---|--------------------------------------|---------|
| Run 1 | 10.00 | 3.00 | | | | | | | 58.7 | |
| Run 2 | 10.00 | 4.00 | | | | | | | 79.5 | |
| Run 3 | 10.00 | 5.00 | | | | | | | 98.3 | |
| Run 4 | 10.00 | 6.00 | | | | | | | 118.3 | |
| Run 5 | 10.00 | 7.00 | | | | | | | 137.8 | |
| Run 6 | 10.00 | 8.00 | | | | | | | 150.1 | |
| Run 7 | 10.00 | 9.00 | | | | | | | 149.9 | |

| Set B | Vol 3.00% NaHCO ₃ (mL) | Vol of 5.00% HCl (mL) | Mass of NaHCO ₃ (g) | Mass of HCl (g) | Moles NaHCO ₃ | Moles HCl | Moles CO ₂ (predicted) | Volume CO ₂ (mL) (predicted) | Volume CO ₂ (mL) (actual) | % Yield |
|-------|-----------------------------------|-----------------------|--------------------------------|-----------------|--------------------------|-----------|-----------------------------------|---|--------------------------------------|---------|
| Run 1 | 3.00 | 10.00 | | | | | | | 45.0 | |
| Run 2 | 6.00 | 10.00 | | | | | | | 90.0 | |
| Run 3 | 9.00 | 10.00 | | | | | | | 135.0 | |
| Run 4 | 12.00 | 10.00 | | | | | | | 180.0 | |
| Run 5 | 15.00 | 10.00 | | | | | | | 197.1 | |
| Run 6 | 17.00 | 10.00 | | | | | | | 196.9 | |
| Run 7 | 18.00 | 10.00 | | | | | | | 197.2 | |