



# Seeing Is Believing!



**Topic:** Carbon dioxide formation – chemical reactions

**Courses:** General Chemistry

**Text References:**

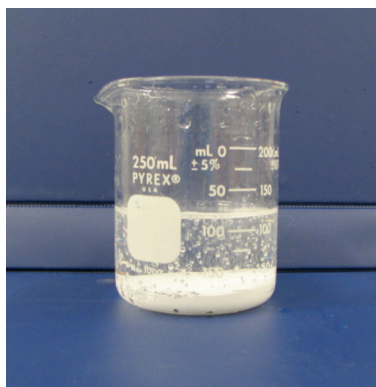
**Setup:** Preparation time is < 5 minutes.

- Baking soda
- Beaker
- Vinegar (or dilute acetic acid)

**Procedure:** Demonstration time is < 5 minutes.

1. Add baking soda to the beaker.
2. Add vinegar. Observe.

**Observation:** Bubbles form.



**Explanation:** Vinegar is dilute acetic acid ( $\text{CH}_3\text{COOH}$ ), and baking soda is sodium bicarbonate (sometimes called sodium hydrogen carbonate,  $\text{NaHCO}_3$ ). These two species react to form sodium acetate ( $\text{CH}_3\text{COONa}$ ), carbon dioxide ( $\text{CO}_2$ ), and water ( $\text{H}_2\text{O}$ ) according to the reaction below. Baking soda is used in baking cakes and breads where there is always an acid present (in the form of buttermilk, lemon juice, or cream of tartar). The baking soda and the acid react to produce carbon dioxide gas ( $\text{CO}_2$ ), which causes the cake or bread to rise.

