<table>
<thead>
<tr>
<th>Required Training</th>
<th>Required PPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>UC Lab Safety Fundamentals</td>
<td>Lab coat, safety glasses/goggles, nitrile gloves</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber stopper</td>
<td>500 mL Erlenmeyer flask</td>
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<tr>
<td></td>
<td>250 mL DI water</td>
</tr>
<tr>
<td></td>
<td>1 drop of 1N NaOH</td>
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<tr>
<td></td>
<td>10 drops of phenol red indicator</td>
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</tbody>
</table>

**Procedure:**

1. Add all the chemicals together in the flask and stopper immediately to protect the solution from atmospheric CO$_2$. The solution should be red at this point.
2. Announce to the classroom that this reaction can be activated by voice, if the person has just the right voice.
3. Pass the flask around and have each student unstopper it, politely ask the solution to change color, stopper the flask and swirl before passing it to the next student.
4. Another option is to blow into the flask. This will speed up the reaction.

**Discussion:**

CO$_2$ from the students’ breath will produce enough acid in the solution to lower the pH and change the color to yellow.

\[
\text{CO}_2 (g) + \text{H}_2\text{O} (l) \rightarrow \text{H}_2\text{CO}_3 (aq) \leftrightarrow \text{H}^+ (aq) + \text{HCO}_3^- (aq)
\]

CO$_2$ also reacts with NaOH to produce Na$_2$CO$_3$

\[
2\text{NaOH} (aq) + \text{CO}_2 (g) \rightarrow \text{Na}_2\text{CO}_3 (aq) + \text{H}_2\text{O} (l)
\]

**Hazards:**

If skin comes in contact with sodium hydroxide, wash affected water with copious water.

**SOP:**
Carcinogen – Phenolphthalein

Corrosive – Sodium Hydroxide

Reproductive Hazard – Phenolphthalein

Disposal (by Storeroom)

N/A