

### 3.1 Indicators to test acids and bases (alkalis)

<b>Basic information and collecting ideas</b> 	<p>A good way to introduce the subject of acids and bases to students is in relation to our body: the tongue as a taste sensor, the acid mantle of the skin, soap in the eyes, acid burps, etc.</p> <p>We can refer to natural and artificial dyes as “sensors” for acids and bases.</p> <p>By the way, base is the general term whereas alkalis (they contain alkali metals) are a subset of basic substances.</p>
<b>Setting up and conducting experiments</b> 	<p>Use red cabbage to make an inexpensive acid-base indicator: Chop the leaves, put them in a plastic cup with a 1:1 mixture of spirit and water, place the lid on the cup and shake. You can remove the leaves the next day and store the indicator solution for at least one year.</p> <p>The students should first produce comparative colours for red cabbage juice in acidic, neutral and basic/alkaline solutions.</p> <p>Then they compare the different samples with the reference series.</p>
<b>Observing and documenting</b> 	
<b>Analysing and reflecting</b> 	<p>Can I distinguish weak and strong acids with red cabbage juice as an indicator?</p> <p>&gt; <i>Red cabbage juice does not react sensitively enough with stronger or weaker acids to produce distinguishable colour changes.</i></p>
<b>Doing further research</b> 	<ul style="list-style-type: none"> <li>▪ What acidic foods are you aware of? &gt; <i>Pickles, sauerkraut, ...</i></li> <li>▪ Why are acids used in food? &gt; <i>Acids kill germs and act as preservatives for food.</i></li> </ul>
<b>Technical and vocational application</b> 	<p>Applications of acids and bases in many technical professions. Effects on humans and materials should be well known.</p> <p>More detailed information is provided in further experiments (pH value, neutralisation, chemical reactions, etc.).</p> <p><b>Examples:</b>  <b>Medical professions, Cosmetology, Catering, household products</b></p>

**Research question:**

Search on the Siemens Stiftung Media Portal: indicator or red cabbage as interactive media.

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**What is the pH value of red cabbage juice? What was added?**

← acidic	neutral	basic →

Vinegar

Tap water

Soft drink

Bar soap

Washing soda

Detection of acids and bases using red cabbage juice