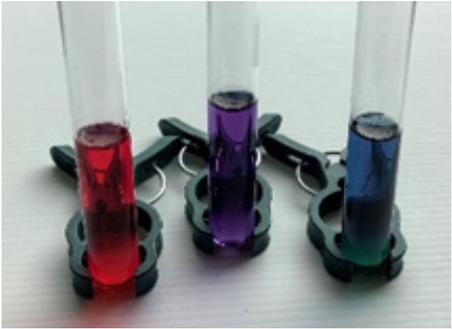


3.3 Neutralisation of acids and bases/alkalis

<p>Basic information and collecting ideas</p> 	<p>Try to introduce the topic of “neutralisation” from the students’ perspective. Show examples of sour foods and drinks, and have the students think about what would happen in our body if we ingested too much acid: malaise, burping. Also remind the students that athletes suffer from muscle soreness caused by too much lactic acid due to a lack of training.</p> <p>Problem solving: How can the body neutralise acidic or basic substances so that the organs function properly? The pH scale (like a temperature scale) helps us evaluate whether substances are acids or bases.</p> <p>Nature also has similar systems to control pH in certain areas.</p>
<p>Setting up and conducting experiments</p> 	<p>We use red cabbage indicator for the experiments because it is long-lasting and very inexpensive. Chop red cabbage leaves into small pieces and place them in a sealable container with a 50/50 mixture of water and spirit. Let the container sit overnight.</p> <p>You can remove the leaves after one day and store the concentrated indicator solution for one year. The solution can be further diluted with water (indicator:water = 1:5). The students receive 50 ml of this diluted solution for their experiments.</p> <p>When it comes into contact with an acid or base the indicator shows its bright colours:</p> <p>acidic (pH 1-6 red), neutral (pH 7 violet), basic (pH 8-9 blue), (pH 10-14 green)</p> 
<p>Observing and documenting</p> 	<ol style="list-style-type: none"> 1. Washing soda (similar to soap) is an alkali and turns the indicator to a blue colour. The carbon dioxide of a person’s breath reacts with water to form the weak carbonic acid (red colour). 2. Vinegar turns the purple colour of the indicator to red 3. Carbon dioxide from our breath forms carbonic acid, which neutralises the washing soda and produces a neutral solution (purple). The students should recognise that excess alkalinity can be neutralised by an acid and, conversely, excess acidity can be neutralised by a base.
<p>Analysing and reflecting</p> 	<p>In stressful situations, some people tend to hyperventilate. They breathe out too much carbon dioxide and can become unconscious. How can you explain this? How can you help people?</p> <p>> <i>The release of too much carbon dioxide reduces the carbonic acid in the body; the pH of blood rises from 7.4 to above 7.5 and causes unconsciousness. The person should breathe into a paper bag and inhale most of their own breath again.</i></p>

