## 3. Acids and bases

To begin with the topic of acids and bases, ask the students about their experiences. Start with a "flashlight": Which sour foods or acidic beverages are you familiar with?

#### Continue with the question "How do we recognize acidic drinks?"

Describe the sensory perception of the tongue: Chemical sensors on the tongue perceive acid impulses and pass them on to the brain via the nervous system.

There are fewer basic foods and drinks (e.g. pretzels). Some of these products taste "soapy". Similar to temperature, the **pH scale** has been developed for safe and accurate determination of acidity. The pH scale goes from pH 0 (strong acid) to pH 7 (neutral solution) to pH 14 (strong base). To measure the pH values, use either colour indicators or an electronic pH-meter.

# The terms base and alkali mean the same thing: they absorb the hydrogen of the acid and thus neutralize the acid.

The proposed experiments are designed to teach students that our well-being as humans depends greatly on pH and that pH helps us in the safe handling of acidic and alkaline substances.

When you have finished the chapter on acids and bases, have the students apply their knowledge to the following items (Method: "think-pair-share"):

### Digestion

(Answer: Food is digested at pH 6.5 in the mouth, at pH 1-3 in the stomach and at pH 8 in the intestine, because the enzymes work best at these values.

Skin (

Answer: Our skin is protected by an acid mantle of pH 5.5 to kill bacteria and this acid mantle is washed away by soaps (pH 10).

Blood

(Answer: Our blood has an exact pH of 7.38 to 7.42 and changes are harmful to health. Our body can neutralize excessive acids or bases to keep the blood pH constant.

Advantage of acids and bases

(Answer: Acids are good preservatives for food - germs are killed by acids. Diluted acid works as an excellent cleansing agent.

### Agriculture

(Answer: Plants prefer either acidic or alkaline soils. Changes in pH affect the growth of plants – see acid rain)