

CHEMISTRY

Acids and bases

Before

In fourth grade, acids were discussed: what they are, what a strong acid is and how you can determine its pH value. In fifth grade, we teach pupils what bases are, and acid-base reactions in a series of lessons and with explanation and assignments from the textbook. In final assignments and practicals, applications are also discussed. This is a cookbook practical in which pupils try to find out step by step which substances would be suitable to use in heartburn tablets by using a detailed instruction.

After reversal and omission

Whole task first

The teacher explains what heartburn is, and that tablets exist to remedy this. The teacher asks the pupils to indicate whether certain substances (calcium sulphate, calcium hydroxide, calcium carbonate and calcium chloride) would be suitable for heartburn tablets. Then Pupils are asked to design an experiment to investigate which substance would be suitable, and to do the test, after having it checked by the teacher or technical teacher assistant. On the basis of their findings and by using the theory from the textbook and additional information from reference works on solubility and toxicity, they have to think up which reactions will occur and which substances will be created. On the basis of what they have learned, they now have to make a founded choice – based on the experiment and information about the properties of the substances such as solubility, toxicity etc. which of the suggested substances is preferred for producing heartburn tablets.

Adaptive support

The original detailed practical instruction is divided into parts for this purpose. In case pupils cannot conceive the next step of their experiment, they are given a part of the practical instruction so they can take the next step. As an illustration, two consecutive parts of the instruction are given below.

A. You are going to add little scoops of the substance mentioned above to this acid solution. To check whether there is a reaction, you look for a change in the pH value of the acid solution.

B. Look up in the reference book which indicator is suitable, and which colour change you can expect when there is a reaction. Fill in the table below for two potential indicators.

Name indicator	Colour in acid solution	Colour after reaction
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