Acids and Alkalis

This activity is designed to enable students to understand the nature of the continuum from strong acid through neutral substance to strong alkali. In addition to understand the relationship between substance description, pH number and universal indicator colour.

This is a matching, sequencing activity which uses clue cards to help students arrive at the correct sequence of substance descriptions, pH numbers, universal indicator colours and substance examples. Clue cards take the form of "logic problem" sentences and need careful reading and thinking through. The activity can be useful as a prequel to practical work using universal indicator to find out the identity of mystery liquids, or as a sequel to practical work to consolidate learning.

Developed by Ian Leaver and Steve Cooke at Soar Valley College in Leicester.

The webaddress for this activity is:
http://www.collaborativelearning.org/acidsandalkalis.pdf

COLLABORATIVE LEARNING PROJECT
Project Director: Stuart Scott
We support a network of teaching professionals throughout the European Union to promote inclusive education. We develop and disseminate accessible talk-for-learning activities in all subject areas and for all ages.
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BRIEF SUMMARY OF BASIC PRINCIPLES BEHIND OUR TEACHING ACTIVITIES:

The project is a teacher network, and a non-profit making educational trust. Our main aim is to develop and disseminate classroom tested examples of effective group strategies that promote talk across all phases and subjects. We hope they will inspire you to develop and use similar strategies in other topics and curriculum areas. We want to encourage you to change them and adapt them to your classroom and students. We run teacher workshops, swapshops and conferences throughout the European Union. The project posts online many activities in all subject areas. An online newsletter is also updated regularly.

*These activities are influenced by current thinking about the role of language in learning. They are designed to help children learn through talk and active learning in small groups. They work best in non selective classes where children in need of language or learning support are integrated. They are well suited for the development of speaking and listening . They provide teachers opportunities for assessment of speaking and listening.

*They support differentiation by placing a high value on what children can offer to each other on a particular topic, and also give children the chance to respect each other's views and formulate shared opinions which they can disseminate to peers. By helping them to take ideas and abstract concepts, discuss, paraphrase and move them about physically, they help to develop thinking skills.

*They give children the opportunity to participate in their own words and language in their own time without pressure. Many activities can be tried out in pupils' first languages and afterwards in English. A growing number of activities are available in more than one language, not translated, but mixed, so that you may need more than one language to complete the activity.

*They encourage study skills in context, and should therefore be used with a range of appropriate information books which are preferably within reach in the classroom.

*They are generally adaptable over a wide age range because children can bring their own knowledge to an activity and refer to books at an appropriate level. The activities work like catalysts.

*All project activities were planned and developed by teachers working together, and the main reason they are disseminated is to encourage teachers to work more effectively with each other inside and outside the classroom. They have made it possible for mainstream and language and learning support teachers to share an equal role in curriculum delivery. They should be adapted to local conditions. In order to help us keep pace with curriculum changes, please send any new or revised activities back to the project, so that we can add them to our lists of materials.

Acids and Alkalis

Teacher notes

The activity consists of a sheet of four clue cards, a matrix grid and a sheet of twenty-eight matrix cards. Photo-copy each sheet on different coloured card. Cut out the clue cards and matrix cards. Students work in groups of four. Each group is given a matrix grid and a set of matrix cards. Each group member is given a different clue card so each group has the set of four. The task is to arrange the cards on the matrix using prior knowledge and/or the clues provided. A set of student instructions is provided below.The information on the clue cards is linguistically relatively simple, but the information load is dense and needs a great deal of thinking about.

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Acids and Alkalis - Student instructions

Which substances are acids and which are alkalis? What are the characteristics of these substances? You will be working in a group of four. Each member of the group should take a clue card. You also have a matrix grid and a sheet of twenty-eight matrix cards. Your task is to work together to arrange the cards on the matrix using your prior knowledge and the clues provided.

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Acids and Alkalis Clue Cards

1

A substance which has a pH number of 3-4 turns universal indicator orange

Salt solution is neither an acid nor an alkali

A neutral substance has a pH number of 7

Nitric acid is a strong acid

2

A weak alkali has a pH number of 8-10

Ammonium hydroxide has a pH number of 10-12

A substance which turns universal indicator orange is a medium strong acid

A substance which is a strong acid turns universal indicator red

3

A substance which is a weak acid does not turn universal indicator blue-green

A substance which has a pH number of 7 turns universal indicator green

A substance which turns universal indicator red has a pH number of 1-2

A substance which has a pH number of 10-12 turns universal indicator blue

4

Sodium hydroxide is a strong alkali

Citric acid has a pH number of 3-4

A substance which is a weak acid has a pH number of less than 7

A weak alkali turns universal indicator blue-green

MATRIX GRID

substance	universal indicator colour	pH number	description

nitric acid	red	1-2	strong acid
citric acid	orange	3-4	medium strong acid
ethnoic acid	yellow	5-6	weak acid
salt solution	green	7	neutral substance
sodium bicarbonate	blue green	8-10	weak alkali
ammonium hydroxide	blue	11-12	medium strong alkali
sodium hydroxide	violet	13-14	strong alkali

MATRIX CARDS