

# Topic: Acids and Bases

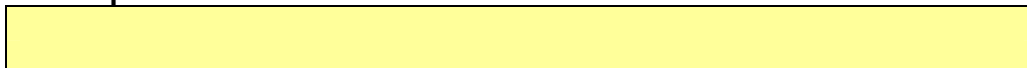
Prepared by: Stella Knowles and Richard Hudson

## Issues tackled:

1. Key ideas, use of language and terminology - Concentration, strength and word equations for acid reactions.
2. Practical work - Planning a safe practical involving acids.
3. Applications, relevance and cross-curricular issues - Experience of acids and alkalis around the school and beyond.

## Issue 1: Key ideas, use of language and terminology – Concentration, strength and word equations for acid reactions

### Prior knowledge and experience:



### Possible tasks:

#### Preparation for tutorial:

1. Consider the terms CONCENTRATION and STRENGTH in relation to acids and alkalis. Make sure you can define them accurately and plan a strategy to explain them to a class.
2. Look up the general word equations for reactions of acids with alkalis, metals and carbonates and be able to name the salts produced when specific acids, alkalis, metals or carbonates are used. Plan a revision game to use with your class to practise these word equations.

#### Possible activities during tutorial:

1. 'Teach' those present the difference between concentration and strength of acids/alkalis.
2. Try out the word equation game with those present. Discuss its strengths and any improvements which could be made.

### AST Input:

- Check that the understanding of strength and concentration are clear and not confused and that the trainees know the salts.
- Discuss how they could deliver these ideas to high and low ability pupils.

### Reading: Subject knowledge and understanding

Ryan, L. (2005) **Chemistry for You**, Nelson Thornes, Cheltenham, pages 142 – 147.

### Subject pedagogy

Prichard, G. Section 1.5 in McDuell, R. (2003) *Teaching Secondary Chemistry*, John Murray, London

### Useful websites and applications

[www.chem4kids.com](http://www.chem4kids.com) - follow links to reactions then acids and bases. Loads of useful information and it's in kiddy speak too!

### Resources: Task 2

[www.chem4kids.com](http://www.chem4kids.com) - follow links to reactions then acids and bases. Loads of useful information.

## Issue 2: Practical work – Planning a safe practical involving acids.

### Prior knowledge and experience:

### Possible tasks:

#### Preparation for tutorial:

1. Research risk assessments for mineral acids.
2. Plan a class practical task involving acids and alkalis, take into account all health and safety issues.

#### Possible activities during tutorial:

1. Discuss issues arising from the risk assessments presented.
2. Share and evaluate the practical lesson plan(s).
3. Demonstrate how you would explain the experiment to the class

### AST Input:

- Direct attention towards health and safety issues as required, emphasising the importance of directing it towards the pupils' own experiences.
- Show other experiments or alternative techniques which the trainees may wish to use.

### Reading: Subject knowledge and understanding

Prichard, G. (2000), *Introducing Chemistry* in McDuell, R. (2000) **Teaching Secondary Chemistry**, John Murray, London.  
(In particular section 1.5.)

Key stage 3 texts and supporting resource packs as available in school.

#### Subject pedagogy

McDuell, R. (2000), **Teaching Secondary Chemistry**, John Murray, London.  
(Pages 300 – 301 are a blank, photocopiable risk assessment form and a sample form filled in.)

#### Useful websites and applications

[www.chem4kids.com](http://www.chem4kids.com)

[www.ase.org.uk/sen](http://www.ase.org.uk/sen) - follow links to projects, microscale chemistry, acids and bases.

### Resources: **Task 1 and 2**

CLEAPSS risk assessments for several different acids, Hazcards, ASE safety file (probably available from technicians)

#### **Task 2**

Practical equipment for acids and alkalis experiments as required.

### Issue 3: Applications, relevance and cross-curricular issues – Experience of acids and alkalis around the school and beyond

Prior knowledge and experience:

Possible tasks:

**Preparation for tutorial:**

1. Research learning which involves acids and alkalis in other subjects including other areas of science.
2. Produce a list of applications of acids and alkalis and prepare an argument to explain the relevance of acids and alkalis in the science curriculum.

**Possible activities during tutorial:**

1. Discuss how other science topics and other subjects make use of knowledge about acids and alkalis. Consider whether they are complementary to the work done in this science topic or not. How could we improve pupils' appreciation of the transfer between topics and subjects?
2. Present the list of uses and argument. Extend and discuss.

AST Input:

- Add ideas about cross-curricular links.
- Add to the list of applications of acids and alkalis that the trainee has produced.

Reading: Subject knowledge and understanding

Ryan, L (2001), **Chemistry for You**, Nelson Thornes, Cheltenham, pages 154 – 156.

Subject pedagogy

Useful websites and applications

See [www.nc.uk.net](http://www.nc.uk.net) for the national curriculum for various subjects.

Resources: Task 1

See [www.nc.uk.net](http://www.nc.uk.net) for the national curriculum for various subjects.