

# Teaching acids and bases companion sheet

This sheet accompanies the online acid and bases video PD course for teachers. It contains links to key resources and some questions we will be considering on the course as well as providing a place to note down your personal reflections as you work through the course.

You can either work through the video in order or use the content page to find the bits you are most interested.

Towards the end of the sheet you will find an action planning template, so that you can plan the steps you propose to take next to both implement new learning from this course and to continue your professional development.

## Learning objectives

### Participants will learn about

- different contexts for teaching acids and bases
- the sequence of key ideas that students need in order to understand acids and bases
- the common misconceptions and challenges that students experience with acids and bases
- engaging practical activities, some suitable for home learning
- ways to support literacy

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<p><i>Acids &amp; bases are all around us (2.03)</i></p> <p><i>Acid rain (17.14)</i></p> <p><i>Ocean acidification(18.25)</i></p>	<p><i>True/false(2.57)</i></p> <p><i>Summary of key difficulties &amp; challenges (5.50)</i></p>	<p><i>Teaching sequences &amp; thread of ideas (6.54)</i></p> <p><i>pH Scale(7.35)</i></p> <p><i>neutralisation &amp; salts (19.00)</i></p>
<p><b>Introduction &amp; Contexts</b></p>	<p><b>Common misconceptions &amp; challenges</b></p>	<p><b>Learning and Teaching</b></p>
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<p><b>Practical activities</b></p>	<p><b>Literacy: confusing language</b></p>	<p><b>Links to other online courses</b></p>

## Introduction

Acids and bases classroom resources used on our in-person acids and bases course are found [here](#). As we will only be looking at a few of these resources on this course, you may find it a useful page to [visit](#).

*You may wish to note down different teaching contexts here*

## Common misconceptions & challenges

Suggested further reading:

[Beyond Appearances: Students' misconceptions about basic chemical ideas](#) Chapter 8 Students' thinking about acids, bases and neutralisation by Vanessa Kind, University of Durham (pages 46-50), 2004

<https://www.stem.org.uk/resources/community/collection/16137/strong-and-weak-acids-and-bases>

[Misconceptions in Acids and Bases A comparative study of student teachers with different chemistry backgrounds.](#)

*Reflection time: What misconceptions and challenges do your students face with acids and bases?*

## Learning and teaching (1)

ARACIDS2 Acids and bases: Thread of ideas

*Reflection time: How does your teaching sequences for acids and bases compare with the progression sequence in the thread of ideas?*

[The PhET pH scale basics simulation](#) including 'How to guide' and pH values on food.  
*This version has the pH already written on the label of the substance.*

[The pH scale basics simulation with no pH values of food](#)  
*This version allows student to pick a substance and 'test' the pH for themselves.*

*Reflection time: How could you use these simulations with your students?*

## Practical activities (1)

Follow the links provided to access the resources for the practical activities discussed on the course

Chemistry in your cupboard: [Red cabbage rainbows](#). This link includes video instructions and an information sheet with background chemistry and a red cabbage colour chart.

[Neutralisation circles](#) practical activity and teacher's notes.

Declan Fleming's: [Rainbow fizz](#) video with accompanying classroom PowerPoint presentation

*Reflection time: How does practical work enhance the teaching and learning of acids and bases?  
How could you use the ideas presented on this course with your students?*

## Literacy: Confusing language (1)

*Reflection time: Is it a base or alkali? What can you do to minimise the chances of your students getting confused?*

## Contexts

[Acid rain](#) Assessment for learning lesson plan and resources

[Ocean acidification](#) resources from EncounterEd are available here

[Video introduction to ocean acidification](#) by EncounterEd

*Reflection time: Consider the pros and cons of teaching acids and bases through real life contexts such as acid rain and ocean acidification. How could you use these resources with your students?*

## Learning and teaching (2)

### Neutralisation

Link to [Neutralisation in a drop](#) video

Johnstone's triangle worksheet [template](#). For further details read the whole article '[Develop deeper understanding with models](#)' by Rachael Hofgartner

*Reflection time: How does using Johnstone's triangle support student understanding of neutralisation? Can you think of another practical activity where you could use this approach with your students?*

## Practical activities (2)

Follow the links provided to access the resources for the practical activities discussed on the course

[A thermometric titration](#)

*Reflection time:*

## Learning and teaching (3)

### Salts

A short video clip showing [Copper sulfate preparation](#) by an alternative approach

A short video clip showing a microscale preparation of [Copper sulfate = microscale](#)

*Reflection time: Reflect up the pros and cons of using these alternative methods for making copper sulfate crystals with your students.*

## Literacy: Confusing language (2)

Link to Keith Taber's [Acid Strength](#) diagnostic probe

[Advanced pH simulation](#)

*Reflection time: Strong or weak? Dilute or Concentrated? What strategies could you use with your students to challenge / avoid these common misconceptions?*

## Links to other online courses & useful articles

To access these pages on the online course, you will first need to register for each one.

Topic	Course	Section
pH Scale	Maths skills	Standard form – exploring understanding <a href="https://www.rsc.org/cpd/resource/RES00001505/standard-form/RES00001503#!cmpid=CMP00004864">https://www.rsc.org/cpd/resource/RES00001505/standard-form/RES00001503#!cmpid=CMP00004864</a>
Size & scale	Maths skills	Standard form – exploring understanding
Titration	Quantitative chemistry	Titration – whole topic <a href="https://www.rsc.org/cpd/resource/RES00001365/titrations/RES00001328">https://www.rsc.org/cpd/resource/RES00001365/titrations/RES00001328</a>

Redox titration	Analytical chemistry	Quantitative analysis Developing understanding <a href="https://www.rsc.org/cpd/resource/RES00001535/quantitative-analysis/RES00001529#!cmpid=CMP00004071">https://www.rsc.org/cpd/resource/RES00001535/quantitative-analysis/RES00001529#!cmpid=CMP00004071</a>
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[Acids and bases: creating solutions](#) by Morag Easson

[How to teach acids. Bases and salts](#) by Naomi Hennah

Mathematics and the pH scale by Dorothy Warren School Science Review Issue 360, Page 37 March 2016

## Acid and Bases Action Planning

*As a result of attending this course, what will you do next?*

*How will you know if you have achieved it?*

Short Term Plan		Evidence of impact
Note down, any actions you will take straight away.eg try out a practical activity with Y7		
Medium Term Plan		Evidence of impact
Note down, any actions you intend to take over the next half term e.g feedback to the rest of the department at a meeting		
Long Term Plan		Evidence of impact
Note down, any actions you intend to take		

<p>over the next half term e.g embed new activities and strategies into our schemes of work</p>		
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