

# Colour Chemistry

## Colour Chemistry Workshop – Take it Further

Following the Colour Chemistry workshop, take it further by investigating more colours in chemistry. Below is a collection of ideas and links to do just that.

### pH Colour changes (all ages)

Many substances change colour with pH. Some substances only have one colour change, eg turmeric changes from bright yellow to brown/red when the pH is alkaline (pH greater than 8). However, some other substances are very sensitive to changes in pH and go through many colour changes.

Red cabbage water changes colour many times between a strong acid (pH 0) and a strong alkali (pH 14). Prepare your own red cabbage water and investigate the colour changes by testing a variety of household liquids. There is an excellent guide here: [www.compoundchem.com/2017/05/18/red-cabbage/](http://www.compoundchem.com/2017/05/18/red-cabbage/)

Challenge your pupils to investigate the pH sensitivity of other plants in this investigation for secondary pupils from the RSC: [edu.rsc.org/in-search-of-solutions/indicator-puzzle/1153.article](http://edu.rsc.org/in-search-of-solutions/indicator-puzzle/1153.article)

### Mixing light vs mixing paint (all ages)

Mixing coloured lights gives different results to mixing different coloured paints. For instance, yellow and blue paint give green but yellow and blue light give white.

Show the effects of mixing lights in the classroom using torches and coloured filters – cellophane or coloured plastic wallets work well. You only need red, green and blue filters (the primary colours for light) but you may need to experiment to get the right shades.

Mix paints starting with the primary colours of red, yellow and blue.

Mixing all colours of light together gives white. Mixing all colours of paint together gives black. For younger pupils, an awareness of the difference between mixing lights and paints is sufficient. For older pupils, an explanation can be found here: [spark.iop.org/mixing-light-mixing-paint](http://spark.iop.org/mixing-light-mixing-paint)

### Colour Perception – how we see colours (all ages)

When light hits an object some of it is reflected and some is absorbed. The colour we see is the that of the reflected light. For instance, a red object reflects red light but absorbs all other colours of the spectrum. A blue object reflects only blue light. A purple object reflects red and blue light. An object that reflects all colours appears white and an object that absorbs all coloured light (therefore does not reflect any) appears black. You can show the effects of different coloured lights on objects in the classroom using torches with coloured filters shining on objects placed in a dark box.

For younger pupils, an awareness of the effect is sufficient. For older pupils, an explanation can be found here: [www.bbc.co.uk/bitesize/articles/z6mpywx#ztxnvj6](http://www.bbc.co.uk/bitesize/articles/z6mpywx#ztxnvj6)



## Colours under water (all ages)

When light is restricted, such as under water, this has an effect on how we see colours. This can lead to discussions on the colour markings of various marine animals.

There is a video here showing what happens to a multi-coloured object as it is taken to a depth of 155 feet. Scroll down the page to find an explanation.

[www.pbslearningmedia.org/resource/buac20-68-sci-ps-colorsunderwater/colors-underwater/](http://www.pbslearningmedia.org/resource/buac20-68-sci-ps-colorsunderwater/colors-underwater/)

## Chromatography – colours in food (all ages)

Chromatography is a process to separate the components in a mixture. Dyes used in felt tip pens and food colouring are mixtures of different colours and a simple chromatography experiment can reveal these colours.

Here is an RSC resource showing how to set up a chromatography experiment with felt tip pens: [w](#)

Here is a step by step guide to setting up a chromatography experiment with sweets:

[www.instructables.com/Candy-Chromatography/](http://www.instructables.com/Candy-Chromatography/)

For older pupils, this RSC resource details an investigation into the colours in different sweets:

[edu.rsc.org/experiments/chromatography-of-sweets-11-14-years/455.article](http://edu.rsc.org/experiments/chromatography-of-sweets-11-14-years/455.article)

## Environmentally friendly paints (for Secondary pupils)

A recent trend is for manufacturers to label paints as eco-friendly. Set your pupils the task of investigating what this means. This is a useful resource:

[coatings.org.uk/page/DemystifyingEcoPaints](http://coatings.org.uk/page/DemystifyingEcoPaints)

## CREST

CREST is a scheme that inspires young people to think and behave like scientists and engineers.

KS2 pupils can gain a CREST SuperStar Award for completing 8 different activities, each designed to be done in about an hour. 3 of the available activities are associated with colour: Investigating Inks, Surprising Stains and The Mystery of the Colorado Brown Stain. Find the whole collection here:

[primarylibrary.crestawards.org/all-superstar-challenges/61747644](http://primarylibrary.crestawards.org/all-superstar-challenges/61747644)

KS3 pupils can gain a CREST Bronze Award for projects that should take around 10 hours to complete. 2 of the downloadable resources are associated with colour: Bath Bomb Challenge and Revealing Fingerprints. Find them here: [secondarylibrary.crestawards.org/#Bronze](http://secondarylibrary.crestawards.org/#Bronze)

## STEM Learning Resource – Mixing Colours Booklet for KS3/4

The booklet contains an illustrated overview of the topic with suggestions for teachers on how to introduce the ideas in the classroom, plus student activity sheets and notes for teachers and technicians.

This booklet is part of the 'Innovations in Practical Work' series published by the Gatsby Science Enhancement Programme (SEP).

- [www.stem.org.uk/resources/elibrary/resource/29570/mixing-colours](http://www.stem.org.uk/resources/elibrary/resource/29570/mixing-colours)

## Careers information

Here are two links to websites with STEM career resources for teachers and pupils:

- [edu.rsc.org/future-in-chemistry/career-options/job-profiles](http://edu.rsc.org/future-in-chemistry/career-options/job-profiles)
- [neonfutures.org.uk/](http://neonfutures.org.uk/)

## RSC Education

For inspiration, information and resources for primary and secondary teachers:

- [edu.rsc.org/](http://edu.rsc.org/)