



Science education in the
context of the climate crisis

Need a bit of a challenge or some fuel for an enquiring mind?

Over recent years, many educational websites and portals have come and gone, as enthusiasm and funding has dried up or moved on...

...but not this one!

A long-exposure photograph of a roller coaster at night, with vibrant, multi-colored light trails (red, orange, yellow, blue, green) forming a large, swirling tunnel shape. The background is dark, making the bright lights stand out.

*school*science.co.uk

Where things NEVER stand still!

School Science Review

The ASE's journal for science education 11–19

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Health & Safety

For all practical procedures described in SSR, we have attempted to ensure that:

- the requirements of UK health & safety law are observed;
- all recognised hazards have been identified;
- appropriate precautions are suggested;
- where possible procedures are in accordance with commonly adopted model risk assessments;
- if a special risk assessment is likely to be necessary, this is highlighted.

However, errors and omissions can be made, and employers may have adopted different standards. Therefore, before any practical activity, teachers and technicians should always check their employer's risk assessment. Any local rules issued by their employer must be obeyed, whatever is recommended in SSR.

Unless the context dictates otherwise it is assumed that:

- practical work is conducted in a properly equipped laboratory;
- any mains-operated and other equipment is properly maintained;
- any fume cupboard operates at least to the standard of CLEAPSS Guide G9;
- care is taken with normal laboratory operations such as heating substances or handling heavy objects;
- good laboratory practice is observed when chemicals or living organisms are handled;
- eye protection is worn whenever there is any recognised risk to the eyes;
- fieldwork takes account of any guidelines issued by the employer;
- pupils are taught safe techniques for such activities as heating chemicals or smelling them, and for handling microorganisms.

Readers requiring further guidance are referred to:

Safeguards in the School Laboratory, 12th edn, ASE, 2020.

Be Safe! Health and Safety in School Science and Technology for Teachers of 3- to 12-year-olds, 4th edn, ASE, 2011.

Topics in Safety, ASE, latest version on the ASE website: www.ase.org.uk/resources/topics-in-safety (login required).

Hazcards, CLEAPSS, latest version, and other relevant publications, on the CLEAPSS website: www.cleapss.org.uk (almost all schools, colleges and teacher training establishments in the UK outside Scotland are members, as are many overseas).

Hazardous chemicals database, SSERC, latest version on the SSERC website: www.sserc.org.uk/health-safety/chemistry-health-safety/hazchem_database-2/ (schools, colleges and teacher training establishments in Scotland).

Preparing Risk Assessments for Chemistry Project Work in Schools & Colleges, SSERC, 2020.

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Contributing to SSR

We welcome contributions for all sections of *School Science Review*. For reference, a full page of A4 text in the journal is about 800–850 words; including two small figures on a page would bring that down to about 600 words. Articles should be no longer than 4000 words in total.

These can be emailed to The Editor, ssreditor@ase.org.uk, or posted to The Editor, *School Science Review*, ASE, College Lane, Hatfield, Herts AL10 9AA. Detailed advice on the submission of articles and Science notes is available on the ASE website at: www.ase.org.uk/submission-guidelines.

We have now experienced nearly 2 years under the coronavirus cloud. It seems that its form keeps changing unpredictably, like the British weather. Once it was realised these changes were happening, letters of the Greek alphabet were used to name the variants. Starting with alpha, there was a quick slide through beta and gamma before we were hit by the vigorous delta. Then there were whispers about omicron – easily spread but less severe. There are 10 letters between delta and omicron in the Greek alphabet. Did strains using these names ever exist? The four home nations have taken different approaches to restrictions over the last few weeks. Statistics might eventually tell us who took the best approach, on both medical and social grounds.

With politicians from around the world having a meeting in Glasgow during the autumn term, it seemed fitting that we should run a theme about climate change. Lynda Dunlop at York and Elizabeth Rushton at King's College London have coordinated this. They introduce the topic on page 9.

In this time of uncertainty, teachers and lecturers have been kept very busy trying to cope with frequently changing situations. In 2020, we were receiving a few write-ups showing how some people had been creative in devising home-schooling ideas. But that gradually faded away. However, other suggestions have arrived from various sources.

In a letter, John Potter asks us to study the detail of the construction of light bulbs, and why they eventually fail (usually when switched on). It might be thought in theory that they should not fail unless they are overloaded (producing excessive current).

Peter Borrows, a long-serving member of our Editorial Board representing the Health and Safety Group, shares an experience concerning the reactivity of metals in water, and shows that electricity plays a part in the explanation.

The non-theme articles open with Ruth Jarman and Joy Alexander from Northern Ireland reminding us that science books can be inspiring for new readers. They focus on the 7–14 age range, which covers part of the target audience of *School Science Review*, but it is useful for children to have considered some aspects of science before reaching secondary age.

Science education can become a structure for learning new topics in a logical way, but Ken Rotheram reminds us that new ideas and discoveries come from scientists being creative. I suspect that is often overlooked as teachers have to drive their students through the examinations treadmill.

A trio of authors from Russia ask us to consider the use of the metal zirconium. It is a silver-grey metal that is popularly used for jewellery as it resists corrosion, while its oxide can provide synthetic substitutes for precious stones. There are also some surprising medical uses. We are told it is a small but important component of the human body. That fact left me wondering how we obtain it and whether it disperses between generations.

Hal Sosabowski, who has been the leader of some of our chemistry themes in the past, and colleagues give us a view of the chemistry of several natural products. This is a sequel to a previous article in 2017 and provides ideas for science clubs (probably only suitable for A-level students).

Pamela Dugdale from North West England shows how ideas on maintaining sustainability can be included in physical science and engineering courses at post-16 level.

Tracy Kirsten from South Africa shows an experiment to help students to understand motion by using a fun practical activity outdoors, and emphasises that physics is not just for boys.

In our small island, the human population has learned to protect itself from large wild animals. However, we are still under the threat of something very small that can manage to change its identity and replicate at an alarming rate once it is in contact with living cells. As we enter a new year, we have to hope that our scientists and healthcare staff can build adequate defences.

It is rare for me to mention the *Reviews* and *Science websearch* sections at the end of each edition. After many years, the section editors, Miriam Chaplin and David Moore, have decided to step down from their respective roles. I want to thank them both for their dedication to these roles over many years.

Geoff Auty

Editor, *School Science Review*