SSR in Depth

The ASE's academically reviewed journal for science education 11–19

March 2023, **104**(387)

Contents

Contributing to *SSR in Depth*

We welcome contributions for all sections of *SSR in Depth*. 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, including references.

These can be emailed to The Co-editor, ssreditor@ase.org.uk, or posted to The Co-editor, *SSR in Depth*, 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.

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Health & Safety

For all practical procedures described in *SSR in Depth*, 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 in Depth*.

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;
- eye protection is worn whenever there is any recognised risk to the eyes;
- good laboratory practice is observed when chemicals or living organisms are handled;
- 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.

Editorial

There have been few practical science notes in recent editions, so it is pleasing to see five included here. All but one come from stalwart members who have been frequent contributors throughout my time as editor and before.

During the early days of the COVID-19 pandemic, I was pleased to be able to include an explanation of it in the March 2020 issue of *SSR*. Three years on, the problem has lessened, but it has not gone away. Peter Borrows explains the lateral flow test that we all had to use for self-diagnosis during those times.

Iain MacInnes explains why objects rolling down a slope do not move at the same speed as those sliding without friction. In a second article, he describes a way to obtain a spectrum from sunlight, using water and a mirror. He asked for my help in producing diagrams and photographs. As you will see, it proved difficult to obtain sharp images, although they looked clear when viewed through the camera. The background is white, but the contrast is such that it appears almost black in close-up. It seems that our eyes and brain make judgements about what we see, while the automatic-exposure camera does not have the same flexibility.

Rik Clay illustrates a method for finding the temperature of the flame from a Bunsen burner. I remember doing this in my own schooldays as a class experiment. Rather than raiding another piece of equipment, we were given large hexagonal nuts to hold in the flame. Randal Henly shows some methods to demonstrate resonance and interference with sound. As you will see, this has to be managed on a larger scale than is needed for light.

The longer articles start with Jon Hale exploring how using immobilised yeast can help students to develop a more synoptic understanding of the practical skills as well as the concepts. Michael Reiss and Mark Winterbottom explain that education in biology is not best served by only learning what is in the textbook. Practical work done by students is an important part of this and all science subjects. I have known teachers from other subjects complaining about how much equipment and space was allocated to science and other practical subjects.

Michael Reiss and Tamjid Mujtaba explain the BRaSSS approach, an abbreviation for Broadening Secondary School Science. While many of us teach biology, chemistry or physics in isolation, links to other subjects, particularly mathematics, art, and design and technology – and not forgetting English and other languages – are all important.

Martin Pickett and Berry Billingsley examine the relationships between science and modern foreign languages using the development of autonomous cars as an example. Many of us drive cars made in other countries, and sometimes we in the UK choose to drive hire cars when abroad, so it is important that technology is culturally sensitive.. The docklands light railway in London already runs without drivers, but the trains are confined to the rails, and electronic systems prevent collision as well as stopping at stations and opening doors.

Having announced my intention to step down as editor of *SSR* after 17 years, I have continued to manage the progress of articles that were submitted while I was in post, which includes those in the issue of *SSR in Depth*. There are still a few to come through the pipeline, which I will continue to manage. Though time-consuming on occasions, I have enjoyed the process of editing articles submitted, and I have tried to ensure that every article could be understood by those who did not have personal knowledge of the topic concerned.

Last month, ASE was delighted to appoint Fiona Williams as content editor of both parts of *SSR*. Fiona will therefore be editing the next issue of *SSR in Depth*.

Geoff Auty
Co-editor, *SSR in Depth*

Read more in *SSR in Practice*

Readers of Jon Hale's *SSR in Depth* article 'Using immobilised yeast synoptically at A-level' may find Jon's *SSR in Practice* companion article 'Post-16 microscale biology – immobilised yeast' (pp. 16–17) of interest. In this shorter article, Jon describes how immobilised yeast in alginate balls can be used to support students in understanding biotechnology within the time constraints of a single lesson.

This issue of *SSR in Practice* also features a researcher interview with Professor Michael Reiss who is an author of the articles 'Teaching secondary biology' and 'Teaching science interdisciplinarily – the BRaSSS approach' in this issue of *SSR in Depth*.

SSR in Practice is available at:
www.ase.org.uk/ssr-in-practice/issue-387