Develop the tools to teach physics

Upskill biology, chemistry and non-specialist teachers of physics at KS3/4

AUTUMN TERM  SPRING TERM  SUMMER TERM
WAVES  ELECTRICITY  MATTER & SPACE  ENERGY  ATOMIC PHYSICS  FORCES

FULLY FUNDED CPD: building physics subject knowledge, pedagogy & confidence in the classroom

Sign up now for the modules you need: www.stem.org.uk/skpt
Contents

4 Editorial
5 News
9 ASE Chairs 2023/24 – an introduction
10 Lead article: A biologist looks at sex and gender
13 SEND: Practical work and learners with SEND
14 Widening access to science
16 The Prep Room
  • Top tips for technicians and ECTs
  • SQA practical assignments and projects in Scotland
  • Notes on delivering a conference workshop
19 Shared parental leave – a reflection
20 Annual Conference 2024
22 A conversation on the pragmatics of open schooling: Reflections after two European projects
24 The STEM Education MA at King’s College London
27 Bookshelf
28 Scottish education reforms – an update
29 ASE Green Tick

Education in Science (EiS) is the ASE house magazine and is published four times a year. It is sent to all members as one of the many benefits of membership. The contents of this magazine do not necessarily represent the views or policies of ASE except where explicitly identified as such.

Editorial Contact: Jane Hanrott - Janehanrott@ase.org.uk
Typesetting: Karen Dyer
Published by The Association for Science Education (ASE), College Lane, Hatfield, AL10 9AA. Call 01707 283000 info@ase.org.uk www.ase.org.uk
Registered charity no. 313123 Printed by The Manson Group, St Albans
© ASE 2023 ISSN 0013–1377

© ASE 2023 ISSN 0013–1377
Editorial

Welcome to the latest edition of EiS!

By the time this issue of EiS lands on your doorsteps, the school term will be well under way. I hope you’ve all had a lovely summer and feel well rested for the busy term ahead.

We have had an exciting summer here at ASE: our new membership model launched on 1st September (more about that on page 5) and, as you will have seen, we have given ASE a bit of a makeover. It’s been more than 50 years since the black and white ASE logo was introduced and some of our more long-standing members may even remember its introduction! We hope that you like the new look as much as we do!

Meanwhile, in other news, we are still awaiting Government Guidance on policies for transgender pupils. It was promised a few years ago, was due to be published in the summer term, but we understand that it has been further delayed. There is no doubt that some form of guidance to support school leaders as they navigate this sensitive and complex area is much needed. Beyond the policy framework, there is of course a need to understand the science and how the topic might be taught sensitively, accurately and scientifically – to this end, for those looking for an understanding of what the biology tells us, the article by ASE President Professor Michael Reiss on page 10 is an excellent place to start. Professor Reiss offers both a practical and biological perspective on sex and gender that could prove helpful in the classroom.

We know that students thrive in environments in which they feel safe, welcomed and included, but we also know that not all students do feel safe or included and many will need additional support.

A number of ASE’s projects actively support schools and staff to follow inclusive practices and, in his article (page 13), our SEND and Wolfson Schools Project Lead, Rob Butler, sets out his advice to help support learners with SEND with practical science.

Fostering inclusion and gender equality are just as important for staff wellbeing, job satisfaction and retention too and I’m heartened by Paul Hunter’s experience of shared paternity leave (see page 19) and the support that he’s received from both his school and the charity MaternityTeacherPaternityTeacher, which has enabled him to stay in teaching – a ‘job he loves’.

Don’t forget to book your tickets for the 2024 Annual Conference (see page 20) if you’ve not already done so – it promises to be a fantastic event with a packed programme, fabulous exhibition and opportunities to network and socialise with colleagues and friends. I look forward to seeing many of you there.
Our ASE membership structure is changing!

A word on the new membership model from the ASE CEO

I have always felt strongly that the great strength of the Association for Science Education is our dynamic, committed and enthusiastic membership. It is this membership that helps us to shape our priorities, outputs, activities, panel sessions, conferences and journal content; it is from this membership that our committees and special interest groups are drawn, and it is this membership’s collective voice that informs our policy positions and contributes to the work that we do to influence science education policy at both regional and national level. As such, it’s vitally important that our membership truly reflects the community whom we seek to represent and why we wanted to make ASE as accessible as possible for all.

From 1st September 2023, those wishing to renew or take out professional membership with ASE can do so from just £25 for technicians and £45 for all other science educators, and I’m delighted that those studying to be a teacher will be able to access membership for free for their first two years of training.

We are a charity as well as a professional association and, as such, some of our materials and resources will continue to be freely available to all. However, members can expect to get exclusive access to a termly copy of EiS, regular e-mails with the latest news and events, regional mailings, public liability insurance and large discounts on ASE events, publications and activities. Our fabulous journals – Primary Science and SSR are available for an additional annual subscription fee and we will be launching an online hub for Science Teacher Education in the New Year.

We recognise that these changes are not without financial risk – but we understand that our community is having to make difficult financial decisions too and we know that, in recent years, high membership subscriptions have actively put off many of our colleagues from renewing or taking out membership with us. We hope that, with a lower fee and a clearer offer, many more teachers, technicians, lecturers, academics, teacher trainers and trainees will join us and benefit from the community of support that we offer. Your support in making this new membership model work is also vital. Please do help us by broadcasting the new membership fees as far and wide as you can. Please share on social media, school noticeboards, with colleagues, school leaders, trainees, technicians and new starters. If each of our existing members can persuade two or three colleagues to join, and subscribe to a journal of their choice, we will not only grow as a member association, be stronger in our influence, but we’ll also be able to do even more in the way of content, resources, activities, events and knowhow too.

For more information on the new membership fees, please visit www.ase.org.uk/ase-membership

Call for nominations for Chair-Elect of the Association 2024/2025

We’re now seeking nominations for Chair-Elect of the Association. The Chair plays a vital role, helping to steer and shape the Association’s activities as well as providing an authoritative voice for thousands of ASE members and the wider science education community. We are seeking nominations for the next Chair-Elect, who will take up the role on 1st August 2024. The Chair-Elect will work in the Chair Trio partnership alongside the Chair and the Immediate Past-Chair over three consecutive years. The Chair Trio provides continuity of practice and transfer of knowledge. The Trio are all members of the Education Group, which is led by the Chair. The person or persons elected as Chair-Elect for 2024/25 will become Chair in 2025/2026. They will also eventually become a member of the Trustee Body. Nominees must have had a minimum of three years’ continuous membership of the Association at the date of the election.

A full description of the role and qualities required can be found on the ASE website at www.ase.org.uk/chair-of-association along with an online application form.

Deadline: Chair-Elect nominations should be submitted by 31st March 2024. Elections will be carried out by the membership, via the ASE website, in April 2024, with the intention to confirm the election result at a meeting of Trustees in late April/early May.

Should there be only one nomination for Chair-Elect of the Association, given that this is a very significant role, an announcement on the ASE website will take place in which members are invited to express their support or otherwise in writing. Any comments received will be taken into account when the Trustee Body meets to confirm the appointment of the Chair-Elect.
Members are ASE’s body, heart and soul

Constitutionally, the Quality and Assurance (Q&A) Committee exists to ensure (with apologies to Abraham Lincoln) ‘Government of the Members, by the Members, for the Members’. The Association’s governance is outlined on the ASE website at www.ase.org.uk/governance

ASE is dignified by a Royal Charter. Q&A’s role is determined by the ASE Bylaws and has the power to require the production of such information from the Trustee Body and Education Group, its Officers and employees, as the Committee shall consider necessary.

Our Bylaws establish a Q&A Committee. This is required to monitor the Trustee Body’s management of the Association’s resources and to report accordingly to the members in a General Meeting. Q&A includes a maximum of five members, who tend to be experienced and long-serving ASE members. Four are appointed by the membership and one is a representative of Council. Q&A can co-opt as many as two members where particular expertise is required.

While its role is advisory, Q&A considers a range of matters on which an opinion is required, either by its own choice or upon request by members, the Chief Executive or Trustee Body and Education Group. Acting as a ‘critical friend’, Q&A attends, as an observer, Trustees’ meetings and other events on the organisation’s calendar.

In summary, Q&A exists to ensure that your interests are the foremost consideration.

The John Barker Award for AC24

John Barker, a strong supporter of ASE and a regular attendee at Annual Conferences over many years, generously left a large donation in his will to ASE a few years ago. In response, ASE decided to offer support for three trainee teachers to attend an Annual Conference. This will apply again for ASEConf2024.

Trainees must be ASE members, the subscription for which, under the newly launched membership structure, is now free. The financial support being offered in response to John Barker’s legacy will provide up to £150 towards any travel or accommodation costs for three science trainees who are attending Conference on any day from 4th to 6th January 2024.

In the first instance, application for funding needs to be made via conferences@ase.org.uk and received by Sunday 12th November 2023. Please provide your details, including where you are doing your ITE course, and up to 200 words outlining how you believe attending ASEConf2024 will benefit your teaching and professional learning. If you are successful, you will be notified by the end of November 2023 and, after Conference, you will be asked to write a small article for EiS in the spring of 2024 telling everyone how you found your ASE Annual Conference experience beneficial to your teaching.

For more information about ASEConf2024, please see pages 20 and 21.
Integrating global aspects of science education into our mainstream activities

Earlier this summer, the Trustee Body and Education Group agreed that the International Group (IG) should be dissolved. The proposal was at the recommendation of the Group themselves, as members of the Group felt that the IG had achieved what it was established to achieve – namely to ensure that international links and global aspects of science education were mainstreamed within ASE activities. Our Annual Conference now features international sessions throughout the three days at conference, we have excellent links with sister organisations in Europe, America and Asia, and we are proud to be working with schools and organisations in Thailand and China to support science educators in these countries too.

Whilst the International Group may no longer meet, we remain highly committed to the value of learning from global perspectives and fostering cross-cultural understanding. Access to and understanding of international science education research, practice and pedagogy can help our members both here in the UK and across the world to improve their teaching methods, pedagogical approach, engagement and interest. We will continue to grow our international community and work with global partners to share, learn and support excellence in international science education. ASE membership is open to all, including educators working outside the UK, and we are keen to nurture and support this international community as well. We are currently looking at developing a dedicated online international event with international speakers and, if we can find willing volunteers, a series of podcasts featuring speakers from across the world.

Similarly, from January 2024, we will no longer publish ASE International. We are pleased to say that, from January 2024, international content will feature more widely in our core journal offer – EiS, SSR and Primary Science – helping to ensure that we are learning from and sharing global science education news and content with our mainstream audience.

This means that issue 19 of ASE International, published in September, was the final issue of the journal. We would like to thank our previous Editors, up until recently the Chairs of the ASE International Group, for their hard work in pulling the journal issues together, and also the Group themselves, who acted as an Editorial Board. Special thanks go to the current Editor, Ade Magaji, for his continuing efforts not only to co-ordinate the selection of suitable pre-published articles, but also with the sourcing and collation of a growing amount of original content.

Keep reading future issues of EiS to find out how our international provision is developing!

Wellbeing and retention: taking control using ASE RISE

Science teacher wellbeing and retention continue to be issues faced by many Heads of Science. ASE offers support to science departments in being proactive in meeting the needs of individuals and departments as a whole.

We continue to offer science departments with ASE membership access to ASE RISE (Retention Initiative for Science Educators). Based on principles of wellbeing, job satisfaction and career intentions, science teachers are asked to complete a short online survey anonymously. The results are given to the Head of Department and collated into a ‘national picture’. Along with the resources on the RISE Hub, a Head of Science can prioritise and select interventions to support science teacher wellbeing and job satisfaction.

This will be the fourth year of RISE and we would encourage science departments to take part. The online survey will be open between 9th and 16th October 2023, with the results being with Heads of Science by early November. Interventions then start during the term leading to Christmas and into the New Year.

Find out more and express your interest here: www.ase.org.uk/ase-rise

Dr. Andy Chandler-Grevatt, ASE RISE Lead Researcher.
Changes to the staff team at ASE

You may have noticed a few changes to the staff team at ASE HQ in recent weeks.

In September, we welcomed new Director of Communications, Olivia Hill. Olivia joins us from the Royal College of Paediatric and Child Health where she was Head of Brand, Web and Digital. Olivia will be taking over from Alistair Strayton, who is taking a well-earned career break after three years at ASE, in which he supported us through COVID-19, our move to online conferences and our recent rebrand! Emilija Guzauskaite, our Content Editor, is also leaving us for a new challenge as she takes on a role as Marketing Officer at the Royal College of General Practitioners. We wish both Emilija and Ali all the very best as they move to pastures new.

We also say a very fond farewell to Suzanne Dickinson, Karen Shoebottom, Frances Evans and Rebecca Dixon-Watmough, who have all worked at ASE for over 20 (and in some cases nearly 30) years! We are enormously grateful for their long service and their significant contribution to the growth and development of ASE and wish them luck in the next phase of their professional journey – whether that’s retirement, consultancy or in exciting new roles.

In other changes, we would like to thank Steve Savill, Fergus Hegarty and Gaynor Sharp, Regional Field Officers, whose responsibilities will be taken on by a national position following a review of our structure. Support for events and activities in the English regions will be provided by our new Membership and Regional Events Officer, Melanie Bennett, as well as our Director ofProfessional Learning (currently being recruited). Finally, we wish Natasha Kirkwood, Book Sales Co-ordinator, the best of luck as she embarks on a new career move.

We look forward to welcoming a new Director of Professional Learning, Officer Manager and Policy Adviser in coming weeks. In the meantime, we would like to wish all those leaving us all the very best for their future.

Applications for Alexander Award now open

Applications for the Alexander Award are now open. The Alexander Prize (of £500) is awarded annually to a woman or group of women who have made a significant contribution to the scientific, technological, engineering or mathematical (STEM) education of girls or women, in situations of scarce resources.

The Award was named in honour of the late Sir Norman Alexander, who created numerous universities in newly independent commonwealth countries such as Nigeria, Malaysia and Singapore, and in memory of Dr. Elizabeth Alexander and the late Lady Evelyn Alexander. Previous winners of the Award include Cynthia Rahinatu Harunah, principal of a school in Ghana, who teaches girls science, technology and numeracy to develop local marketable skills in order to improve their lives and future careers.

More information and how to apply can be found at: www.ase.org.uk/alexander-award

Deadline date for applications is 10th November 2023.

Appointment of new auditors for ASE

The ASE conducted a competitive tender process for our audit services in May 2023, having been with HW Fisher for many years and following a recent sharp price increase. We invited proposals from several firms with charity expertise and invited three to interview. Interviews were conducted in May, with a panel including our CEO and two Trustees. Following the interviews, we appointed a new auditor – Goldwins – who impressed the panel with their charity expertise, staff continuity and cost-effective fee. More information can be found at: www.goldwins.co.uk/our-clients/charities
Chairs of ASE 2023/24: Alex Sinclair and Leigh Hoath

If anyone reading this has attended any of the sessions that we have delivered at ASE conferences, or had the dubious pleasure of working with us in some other form, you will know that we have a way of presenting that might make you question if we even like each other. In between the quick digs (usually Alex berating Leigh for something that she has done!) and humour, our choreographed sessions earned us the title of the ‘Fred Astaire and Ginger Rogers’ of the science education community.

We have worked together on a number of projects and, in addition to the ‘day’ jobs, have similar roles – for example, we are both Primary Science Quality Mark hub leaders and authors of science books. We are experienced across both secondary and primary age phases and, as a result, have a strong interest in where the primary-secondary dichotomy that often prevails can be mitigated or minimised.

We are the first Co-Chairs of the ASE – time for a little change in how things have been done before. And this is a theme for ASE at the moment. There has been a great deal of change over the last few years and we are really keen to support the development of key agendas, such as equality and diversity, inclusion, membership, and working with a wider audience of technicians and trainee teachers. We have been fortunate to work closely with the outgoing Chair, Helen Harden, who has led the way with embracing change, and we are delighted to have technician expertise as part of the Chair Trio (yes! We are still ‘trio’ even though there are actually four of us!) with Jane Oldham as Chair-Elect.

One of the reasons for applying together was to be able to offer a little more at a time of change. We both have senior academic positions in universities, so there was a pragmatic approach in that, alone, we could not dedicate everything needed to do the role. However, by sharing the position, we felt that ASE could benefit from extra resource through us. We are looking forward to working with the ASE CEO, Lynn Ladbrook, in the forthcoming year, representing ASE nationally and internationally, and supporting the move to the new membership structure.

We debated about the photos for this article – our first offerings were the ones that you might find on our work profiles. However, we felt that they did not best represent us and how we really are. We have used holiday snaps from this year instead, which we hope will show our human side and how, above all else, we want to be accessible and approachable, as people, to the membership. We promise that when we are the face of ASE at events, we will be sensible!

On a more serious note, we are proud and privileged to take up this position. We are following in many great footsteps and we are aware of the significance of this role. Times have been hard for the Association at points, no one likes change, but we are confident that we have the skills and expertise to bring to this role that can, and will, make a positive difference.

Being involved with ASE (between us, we have had a number of roles and been on many committees!) has been a positive career influence for both of us. Above everything else, we want ASE to be able to continue to be such a positive influence for others.

We are longstanding members of ASE and want to know and speak with other members in order to best represent them. When you are at the Annual Conference, or other ASE events, please grab us in passing and say hello. Alternatively, e-mail us, or message us on X (formerly known as Twitter).

**Alex Sinclair**, Senior Lecturer, St Mary’s University, Twickenham.
E-mail: alex.sinclair@stmarys.ac.uk
Twitter: @SIMMSPriScience

**Leigh Hoath**, Professor of Science Education and Deputy Dean of Education, Leeds Trinity University.
E-mail: l.hoath@leedstrinity.ac.uk
Twitter: @leighhoath
Sex determination – in humans and other species

There is an extraordinary range of ways in which sex is determined in different species. For a start, many species, including most flowering plants and about 5% of all animals, are hermaphrodites, so that an individual can produce both female and male gametes. The clownfish that star in Finding Nemo, and which I used to keep in a marine tank in the last school in which I taught, are (in nature, not in the film) sequential hermaphrodites. Individuals start off as males and then the largest in the group becomes a female. If this female dies, its male mate changes sex so that it becomes the dominant female, and the next largest male becomes its mate. Nemo’s dad, Marlin, should have changed into a female soon after the start of the film when his ‘wife’ Coral (along with all other offspring except Nemo) got eaten by barracuda.

Back to humans. The Y chromosome is unusual in that it has far fewer genes than our other chromosomes, probably only about 50-60, compared to an average of about 1000 for each of the others. Unsurprisingly, as only males have Y chromosomes, the genes that are on the Y chromosome tend to play roles in male sex determination and development. One of the most important of these genes is the SRY (Sex-determining Region Y) gene. The DNA of this gene, early in development, produces a protein called TDF (testis-determining factor). Classic research by Robin Lovell-Badge and his colleagues showed that when mice SRY gene sequences were injected into XX (female) mice early in development, the resulting mice looked male.

Until the developing human embryo is about seven weeks old (post-conception), there is no visible sexual differentiation. Individuals with XX chromosomes look the same as individuals with XY chromosomes. Then, at about the same time that the embryo starts to be called a fetus, sexual differentiation begins. The TDF protein does several crucial things. For one thing, it begins to act on certain tissues, turning them into what will become the testes. At the same time, it stops the same tissues from developing into ovaries, fallopian tubes and the upper vagina. And, again at the same time, it turns on genes on other, non-sex chromosomes. The net result is that, in an XY fetus from about seven weeks of age, levels of the hormone testosterone (which promotes development of the testes) and anti-Müllerian hormone (which stops the ovaries, fallopian tubes and the upper vagina from developing) are substantially higher than in an XX fetus. In the large majority of cases, such development results in the birth of individuals that are unambiguously females or males. But sometimes it doesn’t. For example, occasionally, during meiosis (the type of cell division that occurs in the production of sperm and eggs), the SRY gene ends up on the X chromosome. If this chromosome is in the sperm that gives rise to a fertilised egg and then a baby, the resulting individual ends up with what is called ‘XX male syndrome’. As the term suggests, the individual has two X chromosomes in each of their cells, but looks male. Of course, while these X chromosomes look under a light microscope like X chromosomes, the point is that one of them in each cell has the SRY gene on it, so these chromosomes differ from the usual X chromosomes.
XX male syndrome is only one of a large number of conditions where individuals don’t fit unambiguously into the binary classification of ‘male’ and ‘female’ on grounds of appearance. For such a classification of sex to work, one needs a clear-cut alignment of sex chromosomes, sex hormones (such as testosterone and oestrogen) and development. An example where these do not align is congenital adrenal hyperplasia. This condition results from a number of different causes but, in all cases, entails either excessive or deficient production of the hormone androgen by the adrenal glands. Importantly, the gene responsible for the production of this hormone is located on an ‘ordinary’ (autosomal) chromosome, i.e. not the X or Y chromosomes. This means that congenital adrenal hyperplasia can affect individuals who are XX and it can affect individuals who are XY.

Congenital adrenal hyperplasia results in alteration to either the primary (genitalia) or secondary sexual characteristics. Our secondary sexual characteristics develop at puberty, so include growth of pubic hair and, in females, widening of the hips and growth of breasts and, in males, broadening of the shoulders and enlargement of the larynx. With congenital adrenal hyperplasia, there can be ambiguous genitalia resulting from in utero exposure to unusual levels of sex hormones.

Intersex issues

The term ‘intersex’ is widely used to identify individuals who can’t unambiguously be assigned as male or female. While some intersex individuals find the term helpful, others don’t. It can be read as reifying the notion of two ‘correct’ sexes with ‘intersex’ stuck in between in a sort of no-man’s (!) land.

XX male syndrome and congenital adrenal hyperplasia are each a cause of someone being intersex. As mentioned above, XX male syndrome results from a tiny, but crucial, piece of DNA that would normally be on the Y chromosome ending up on the X chromosome. The result is that, while the person looks male, their chromosomes look XX. The reason why this matters is that, for a person with XX male syndrome, their X chromosomes lack a number of the genes that are normally found on a Y chromosome. Although individuals with XX male syndrome have normal male genitalia and can ejaculate, they are infertile.

Other causes of being intersex include being XX but one’s mother having unusually high levels of testosterone (for example, because of an ovarian tumour), and being XY but the receptors to the male hormones not working properly (over 150 different problems with these receptors not working are known, each sometimes called ‘testicular feminisation’). Some individuals have both ovarian and testicular tissue; this used to be called ‘true hermaphroditism’ and the cause is usually unknown, though in some non-human animal research it has been linked to exposure to high levels of certain agricultural pesticides.

There are many types of intersexuality and it is difficult to determine its overall extent. If one includes conditions like Klinefelter syndrome, Turner syndrome (women with 45 chromosomes as they have only one X chromosome) and late-onset adrenal hyperplasia, a figure of 1.7% has been calculated. Adopting much narrower criteria, a figure of 0.02% has been calculated. A recent review noted that, if we use a definition of intersexuality that focuses on genitalia that make classification at birth as a boy or girl difficult, a figure of about 0.6% is reasonable.

But how precisely does a midwife or doctor tell if a newborn is a boy or a girl? A quick inspection of the genital region usually suffices, but things are not always so straightforward. The Phall-O-Meter (Figure 1) is a semi-satirical device devised by Kiira Triea, one of the founders of the intersex movement, based on a book by Suzanne Kessler in which she summarised existing views on what were considered medically acceptable infant penis and clitoris sizes.

![Figure 1. How to tell if a newborn is a boy or a girl. Source: Taken from https://en.wikipedia.org/wiki/Phall-O-Meter#/media/File:Phall-O-meter__Intersex_Society_of_North_Wellcome_L0031936.jpg](https://en.wikipedia.org/wiki/Phall-O-Meter#/media/File:Phall-O-meter__Intersex_Society_of_North_Wellcome_L0031936.jpg)
What happens to newborns who cannot straightforwardly be classified as female or male? As the labelling on the Phall-O-Meter indicates, a common response has been surgery. Indeed, the incidence of ‘corrective’ genital surgery in the USA has been estimated to be about one to two per thousand births (0.1%-0.2%). There are two intertwined issues here – an ethical issue to do with consent (obviously, newborns cannot consent to such surgery) and a conceptual issue to do with what is deemed to be desirable.

There is a growing demand from the intersex movement that surgery should not be undertaken on newborns simply because they don’t conform to general presumptions about what a baby should look like. The surgery required for intersex individuals is not straightforward. In the case of what are called ‘feminising surgeries’, what usually happens is clitoral reduction and vaginoplasty (construction or enlargement of a vagina). Vaginoplasty is not an easy surgical procedure, but ‘masculinising surgeries’ make it look relatively straightforward. The problem is building a conventional penis when you don’t have that much to start with. It is difficult to draw firm conclusions about how successful these operations are. In many cases, data on satisfaction come predominantly either from follow-ups by doctors with former patients or from members of intersex support groups. Follow-ups by doctors with former patients often suggest that the surgery was welcomed; support group data point in the opposite direction. This may tell us as much about who goes to support groups and how easy it is for people to tell their doctors that the surgery was a failure as anything else.

Transgender issues

Someone is transgender if they identify with a gender other than that associated with the sex that they were assigned at birth. Iconically, this means someone who was presumed to be male at birth but, sometimes from an early age, feels (realises) that they are a girl, or being presumed to be female at birth but, from an early age, feels (realises) that they are a boy. Trans people often, to use medical language, manifest gender dysphoria – strong persistent feelings of discontent with one’s assigned gender and identification with another (or no) gender, which result in significant distress and impairment.

Some trans people reject the term ‘gender dysphoria’, and the term ‘gender diversity’ is sometimes used more generally to reject a binary classification of people into female versus male, and instead describe the wide range of gender identifications outside conventional gender categories. At the present time, arguments about transgender and other gender diversity issues can be passionate to the point of violence. The arguments become especially heated when it is children who want to transition.

Trans issues are much in the news nowadays, but it is worth noting that many cultures have long rejected a binary classification of people in which everyone is either female or male. Examples of the many millions of people who do not fit into ‘the standard gender model’ include the Hijra of the Indian subcontinent (where they are officially recognised as third gender), ‘two-spirit’ people in some native American tribes (who sometimes reject the label), the māhū (meaning ‘noble’ or ‘in-the-middle’) on a number of Pacific Islands, including Hawaii and Tahiti, and the mukhannathun in pre-Islamic and early Islamic times.

Gender diversity illustrates a number of points. First, it does not fit with a narrow, essentialist reading of sex and gender in which there is a one-to-one correspondence between a person’s sex (understood as a binary) and their gender (also understood as a binary). Secondly, it illustrates how, as humans, we are neither independent of our biological heritage nor reduced to it. Thirdly, it highlights how part of being human is to be able to exercise autonomy and live authentically.

Michael J. Reiss is Professor of Science Education, University College London and President of ASE. He has a PhD in evolutionary biology and population genetics.

This piece is an abbreviated version of the argument in the chapter on ‘Sex and Gender’ in Reiss, M.J. & Ruse, M. (2023), The New Biology: A Battle between Mechanism and Organicism, Harvard University Press, Cambridge, Massachusetts, USA.

New awards for RSciTech

We are proud to announce the following awards, granted since July 2023.

Ricardo Alarcon-Grinan
Neil Duddy
Julia Burgess
Simon Blackford

Valerie Kerr
Olivia Wansbury
Saffron Grandage

12

Education in Science – October 2023
Practical work and learners with SEND

Compiled by Rob Butler

As we start a new term, it’s a good opportunity to make new academic-year resolutions with the aim of improving your teaching. Although this article has a SEND focus, it’s worth pointing out that these strategies will support all the learners in your group.

The Gatsby Good Practical Science Report identified 5 purposes for practical science. With our results-driven focus, we can sometimes forget that the learning from practical lessons often goes beyond the science; for example, I’ve had learners who started the year unable to mix with other students and finish the year being comfortable working within a (structured) group:

The five purposes are:
A. To teach the principles of scientific inquiry.
B. To improve understanding of theory through practical experience.
C. To teach specific practical skills, such as measurement and observation, that may be useful in future study or employment.
D. To motivate and engage students.
E. To develop higher level skills and attributes such as communication, teamwork and perseverance.

(See www.gatsby.org.uk/education/programmes/support-for-practical-science-in-schools)

Why do practical work?
The first step in doing practical work with your learners is being clear about the purpose of practical work. ASE has produced a very useful resource that will guide your thinking as a department, helping you to reflect on why you do each practical and what you expect your students to learn. For example, if you want your learners to apply and embed theory that you have been learning in class, you might not want the learners to plan their investigations and you might be happy giving them complete sets of model data to analyse. Considering your intention for the learners when you plan practical work in this way allows you to narrow the focus of a practical lesson and reduce unwanted cognitive load. See www.ase.org.uk/good-practical-science

Routines for practical work
The new term is also the perfect opportunity to build routines that will help your SEND learners to access practical work without support. You can speed up the acquisition of routines by labelling boxes or trays of equipment and storing them in the same place. My learners soon became familiar with the start and end of practical lessons, meaning that we could set up and clear away quickly and independently.

Routines will help to remove some of the anxiety when approaching new practical activities, and help learners to manage cognitive load as they need only think about the practical skills/activities that are new. You can also reduce cognitive load by adding tick boxes to your instructions (which should include diagrams or visuals), or by using integrated instructions as first introduced by David Paterson from our 11-19 Committee (primary and secondary teachers have found these very useful): see https://edu.rsc.org/feature/improving-practical-work-with-integrated-instructions/3009798.article

Adaptations in practical work
You may be able to make adaptations to the way in which you do practical work and analyse results. One of the strategies that I found works well is to use a spreadsheet for learners to enter their data into (projected onto the screen). This spreadsheet would be set up with graphs/labelled axes, the
The current number of decimal points to suit your learners and be locked down (so that the learner can’t accidentally delete graphs or formulae). Students can quickly see trends in their results on the screen.

At our May meeting of the Inclusive Science Group, we were joined by Dr. Zoe Schneppe from the University of Birmingham, who talked us through some of the adaptations she had made to practical lessons for visually impaired learners. The simpler adaptations included labelling a scale with bump-ons (tactile self-adhesive dots), using notched syringes, and using measuring spoons instead of a traditional balance. Zoe also introduced us to a scent-based titration (where learners can smell the end point) and a variety of tactile models.

You can find out more about these on the ChemBAM site. These adaptations were used with the whole class, and the adaptations made the practical work more accessible for all learners. Dr Schneppe’s work shows us how it is possible to adapt practical work to suit the needs of your learners.

Resources on ChemBAM for teaching learners with visual impairment: https://chembam.com/vi/


The Inclusive Science Group is made up of interested educators from all phases and sectors who have an interest in teaching students who have additional support needs or special educational needs. It is organised by Rob Butler from ASE and Dr. Jane Essex (ASE and RSC member), who both have an interest in this area of science education. Membership of this group is open to anyone, and attendance at the meetings is optional. Notes taken during the discussion will be shared with the whole group. You can join by filling in the form at www.ase.org.uk/ise

Widening access to science
Christina Astin

Why is it that, despite decades of effort and scores of initiatives, some young people still don’t see that science is for them? Your gender, disability, socio-economic status, ethnic background, even your postcode can still make it hard to imagine studying or working in science.

As science educators, we know what works to encourage everyone in science, especially those from under-represented groups: inclusive classrooms that create safe, nurturing spaces for all to learn; opportunities to tinker in the lab, explore beyond the curriculum or meet inspiring role models; dispelling myths about science being hard or requiring a university degree. But we’re still battling every day with the stereotypes, the images of ‘stale, male, pale’ scientist-boffins and ‘girls don’t like hard maths’ comments.

I get very excited when a new project comes along that promises to help teachers win this battle. I’d like to tell you about two of these that I’ve been involved with. Teachers have ever-decreasing time on their hands to seek out such projects and get their students involved – but these two are super-accessible and don’t need to cost a penny!

People Like Us
www.peoplelikeus.io is a free resource featuring STEM careers role models. These are real people who come from very
ordinary (and often quite challenging) backgrounds who have found STEM jobs that they absolutely love. The website is aimed at ages 9-14 and includes many videos and a game that helps stretch engagement time.

Meet India who designs roads, Cate with her pink hair who busts viruses, or Rem, excluded from school but now making TV programmes: they – and many more – are passionate about what they are doing.

There’s a ‘staffroom’ page where you can access teacher resources, including slides to drag-and-drop into lessons so that you can easily illustrate science topics with one of the role models to give careers context – and tick off some Gatsby benchmarks. The curriculum mapping document helps you to see which topic is relevant to each person featured.

See how one school has been using People Like Us in practice at www.youtube.com/watch?v=2PGkN2sXD-o

Planet Possibility

Planet Possibility is a consortium of five organisations working together to increase diversity in one particular science subject: physics.

Physics is perhaps the hardest sell for young people. ‘You can’t be what you can’t see.’ If you’re a young person from a BAME or disadvantaged background, or a girl, or have a disability, it can be quite hard to see yourself working in physics.

Planet Possibility (www.planetpossibility.co.uk) aims to disrupt that – and help teachers – by connecting people with physics careers, creating physics experiences and opportunities and helping young people feel that they belong in physics.

Funded by the IOP’s Challenge Fund4, we aim to encourage more young people to study and work in physics. There’s a wealth of advice and information about this on the website, and lots of activities for schools:

- The Blair Project5 can bring you a free online Physics Club, or their STEM truck can park up at your school and guide your students through exciting hands-on physics experiments, if you’re too busy to run enrichment sessions yourself. See the STEM truck in action at the Big Bang Fair7. They also post awesome TikTok videos8!
- Future First9 lead physics careers workshops at your school, bringing relatable role models for students to meet. Plus there’s a fun online game10 to discover your future physics job! (Spoiler – mine is rollercoaster designer!)

Projects such as Planet Possibility and People Like Us are keen to connect with more schools. But I know from years of teaching science that it can be hard to sort the useful projects that land in your inbox from the time-wasters.

I am confident that these two are great examples of resources that can help you grow future scientists who have not been put off working in science for the wrong reasons – people who will form teams that are more diverse so that better solutions to our global challenges are found.

For more support in EDI, check out the ASE’s fabulous Inclusion in Science programme11.

References

1  www.ucl.ac.uk/ioe/departments-and-centres/departments/education-practice-and-society/aspires-research
2  https://spark.iop.org/inclusive-teaching-10-tips-teachers
3  www.bbc.co.uk/news/uk-politics-61247374
4  www.iop.org/strategy/challenge-fund#gref
5  https://physicspartners.com/events/planet-possibility/
6  www.theblairproject.org/planet-possibility/
7  www.youtube.com/watch?v=XjG7xxAvtEQ
8  www.tiktok.com/@getmemotoring
9  www.planetpossibility.co.uk/partners/future-first
10 infinitygame.futurefirst.org.uk
11 www.ase.org.uk/inclusion-in-schools-recruitment

Christina Astin, Education Consultant and Chair of Planet Possibility.
E-mail: christina@astinconsulting.com
@ChristinaAstin
The Prep Room

Compiled by Fiona Roberts

Welcome to another academic year, whether you are a technician with years of experience or completely new to the role. Check out the top tips section below for ways to make the new school year go smoothly.

Back in July, technicians had a great day at their conference in Bristol. A huge thanks to Clifton College and their team for hosting us. Looking forward to 2024, we have the Technicians Day at the ASE Annual Conference on 5th January at Northampton University. Bookings are now open and there is a wide range of sessions available specifically for technicians.

Some fantastic news for technicians is the new reduced rate for ASE membership. This makes membership much more affordable. And more good news: the ASE Chair-Elect for 2023/24 is Jane Oldham. Jane is currently the Chair of our Technicians Committee. Congratulations, Jane!

Fiona Roberts RSciTech, email: fifirob@aol.com

Top tips for technicians and ECTs
(source: Facebook Technicians Group suggestions)

It’s the beginning of a new academic year and many school science departments will have been joined by Early Career Teachers (ECTs) or trainees. Here are some top tips to help that working relationship between teacher and technician get off to a positive start.

New teaching staff

• Book in time with the technicians to ask advice, practise practicals and learn how to manage them safely in a class.
• Never be afraid to ask questions, or ask if you can run through a new practical.
• Add technician time to your timetables – a simple way of ensuring that you have a dedicated period in which to get support. Mentors can make sure that this time is being used wisely.
• Booking time means that technicians aren’t caught at a busy moment, can get equipment prepared and give you their undivided attention.
• Ask the technicians how they want requests done and what submission deadlines are.

• There may be occasions where technicians will accommodate late requests, though this should be the exception to the rule – always ask before submitting a late request.
• Risk assess the students and the room, not just the practical. Ask for help if needed – other staff may have taught students before and can pass on knowledge.
• Don’t be afraid to change plans. For instance, if a Teaching Assistant is off sick, it may be necessary to postpone a practical, or see if the technician can support it.
• Have a back-up plan in case you need to stop mid-practical for safety reasons, or if students aren’t focused.
• Observe other teachers organising practicals, particularly with challenging classes.
• Feed back to technicians if your practical went well, or if there was a problem.
• Feel free to cry or let it all out in the prep room – technicians are great at lending a listening ear and sometimes a 5-second ‘aaarrrh’ in there is all that you need to refocus!
• Remember that technicians are here to help, not hinder.
**Technicians**

- Be approachable and friendly.
- Pop your head into labs occasionally and ask if everything is going OK.
- Don’t overwhelm new staff – there’s so much that goes into great teaching beyond how practicals are managed.
- Be aware that this may well be their first proper experience of doing everything for themselves. Their workload will be high whilst learning how to balance everything. Respect this and try to remember what it’s like to start a new job.
- Make it clear that staff are always welcome to come and practise things in the prep room and that you welcome them asking you questions.
- Talk to the ECT mentors and liaise with them regarding how best you can support new staff.
- If prepping a new practical, check with the teacher that it went OK and ask if there is anything they’d like changing.
- Have a handy supply of biscuits, tea and a listening ear.
- Remember that technicians are here to help, not hinder.

---

**The return of SQA practical assignments and projects in Scotland**

*Caroline Butler RSciTech, Lead Science Technician, Scottish Borders Council writes:*

Practical assignments and projects, which were removed from National 5s, Highers and Advanced Highers during the COVID-19 pandemic, are set to return for the 2023-24 academic session.

Given that the introduction of mandatory practical assignments only came into effect for a brief period before the pandemic, many of us may not have much, or possibly any, experience in this area. So, you may ask what support and resources are available to technicians to successfully support teachers and young people in this area?

Below are some suggestions. It’s not an exhaustive list, but illustrates some of the support network that we have and can build upon.

**Networking**

It is said that ‘there is no such thing as a stupid question’, but often it doesn’t feel like that, right? However, the easiest, most accessible and helpful resource is our colleagues. Networking with other technicians is a great way to share information and experiences. Are you aware of the Scottish Technicians Advisory Council (STAC), and do you know who your regional representative is? Check out the Scottish Schools Education and Research Centre (SSERC) Techné site: [www.sserc.org.uk/technicians/techne/](http://www.sserc.org.uk/technicians/techne/)

Here you will find links to online versions of The Stem Technician publication, with the May 2023 edition having an up-to-date list of STAC members. Your STAC representative helps to support the Scottish school technician profession and is an extremely useful contact to have.

There are also some national resources, some of which are referenced below.

**SSERC**

The SSERC website is an essential and extremely useful resource. SSERC will also be running a number of sessions over the next few months covering this area. Some sessions will be available online via Microsoft Teams and others available as on-site hands-on practical sessions. These are primarily aimed at teachers; however, some of the online session content may be useful for technicians looking to support assignments and projects. These are available for sign-up and offer a great professional learning opportunity!

The SSERC website has more information: [www.sserc.org.uk/professional-learning/](http://www.sserc.org.uk/professional-learning/)

In addition, SSERC provides guidance on the supervision and management of project work, and one potentially useful support document is available via this link: [www.sserc.org.uk/technicians/technicians-resources/](http://www.sserc.org.uk/technicians/technicians-resources/)

The Techné site has the potential to become a future resource in this area. There is an option to contribute via a share site where you can upload information, hints and tips.

**Scottish Qualifications Authority (SQA)**

The SQA website offers support regarding coursework elements required for their qualifications, with lists of possible assignments and investigation areas available for some subjects and levels.
Other sources

Another resource comes from Strathclyde University, which hosted an Education Scotland Chemistry Teachers and Science Technician Networking event in May. Part of this event looked at possible Advanced Higher Chemistry projects and these ideas (and more) are available within a freely accessible database, for local use, via the following link: www.strath.ac.uk/science/chemistry/teachers/advhigherpracticals/

Other universities offer outreach events and meetings, sometimes in conjunction with other professional bodies such as SSERC, ASE, and the Royal Society of Chemistry (RSC), which periodically cover ideas for SQA assignments.

Education Scotland (ES) Secondary Sciences Network and their social media feeds @EdScotSciences are another useful resource. They regularly post content pointing out relevant resources and events and have a Microsoft Teams group.

However, remember that any advice and comments posted on these types of platforms should be fully researched and risk assessed before implementation.

In summary

Finally, remember that we technicians are Subject Matter Experts (SMEs) – please try to get involved and partake in discussions within your department. Practical assignments, investigations and projects add a huge amount to an already stretched technician’s workload. We should express our opinions and offer help and guidance where we can.

It is both exciting and challenging to see this key part of our young people’s education coming back; we will be an integral part of its success!

---

Notes on delivering a conference workshop

Catherine Davidson and Christine Sodera, technicians from Wiltshire, write:

We are both technicians in Wiltshire schools who became RSciTechs a few years ago and then joined the West of England ASE region committee. As a result of this, we were invited to run a workshop at the South and West Technicians Conference at Clifton College in Bristol.

We had previously run two online sessions at our region’s autumn event 18 months before, but had not done any live presentations so this was quite a development.

Planning involved lots of coffee and cakes to help us concentrate. We put together a list of ideas to include in our circus, then whittled down the list to a manageable number.

Practising proved crucial – a colleague suggested that we do a run-through beforehand and this was invaluable, giving us time to iron out problem issues we identified.

Conference day was a sunny day in July and we set out along the M4 to Bristol feeling ever so slightly nervous. On arrival, we had tremendous help from ASE people and the College technicians, who helped us carry our trolley and bags up the stairs to the lovely chemistry lab. We had also sent a list of chemicals and resources to the College and everything was ready and waiting for us. Luckily, we had an hour to set up and make sure that everything was ready to go.

The purpose of the workshop was to showcase a circus of activities aimed at saving time, money, resources and, most importantly, washing up for technicians! Some of the ideas had been developed and tested by technicians in our own prep rooms and some had come from other forums, including the CLEAPSS and RSC websites.

At the start of the session, the lab filled up with many happy eager faces and we quickly ran through the list of everything available. We had made a PowerPoint with a page for each activity; these were printed out and we noticed that folk were photographing the ones useful to them, negating the need to download links at a later time.

The delegates then had the chance to have a go at all the activities. There was a lively buzz in the room and we particularly enjoyed hearing the ‘oohs’ and ‘ahhs’!
With our first child, I felt terribly guilty leaving my wife and child to go back to work, just two weeks after the birth. It felt as if I was abandoning them and missing out on so much. This was part of the reason that I decided to change career into teaching from academic research in 2017, when she started school. I felt that having the school holidays together would be a great opportunity for bonding and help to ease our childcare issues, at least for the holidays, because without some form of wrap-around care, the ‘9am-3.30pm’ doesn't come close to allowing school drop-offs or pick-ups.

When our second daughter came along in 2021, we jumped at the chance of using SPL. It made sense to our family, both financially but, more importantly, personally. My wife was keen to go back to work as a partner in a law firm and I was eager to experience what she had done eight years earlier. After the blind panic of the first few days, I have to admit that I loved having the time to bond with our daughter and experience caregiving responsibilities. I felt that we became more balanced as a family. It might sound odd, but it made me appreciate teaching more by being removed from it for a defined period of time. Looking back, it has made me review my work-life balance and really think about what is important to me, in terms of work and family life. I feel much more likely to stay in teaching now that I fully appreciate the reasons to tear myself away from planning or the marking pile! I like that I am able to show students that gender equality is something that I am very passionate about and, even if I am still one of the only Dads at baby classes, it doesn’t matter to me any more.

Towards the end of my SPL, my mind turned to CPD. I’ve always been a planner, so I wanted to be as prepared as possible for returning to teaching. After some online research, I discovered the MaternityTeacherPaternityTeacher (MTPT)* project – an amazing charity dedicated to teacher CPD during parental leave. I cannot stress enough how great this is for parent teachers. Attending online workshops with other parents to share worries and ideas about returning to teaching was invaluable and definitely helped ease the nerves. I struggled to find opportunities for science-specific CPD, which was a shame, and I wonder if schools and CPD providers should collaborate more to engage with parents on leave. Thankfully, I regularly met with a fellow biology teacher on leave to discuss coping strategies. I also managed to listen to lots of science podcasts to keep up-to-date with the subject that I love. I highly recommend The Curious Cases of Rutherford and Fry and The Infinite Monkey Cage to while away the nap-time walks! Additionally, the late-night feeds are great for exploring some of the fantastic ideas and resources on X (formerly known as Twitter).

I was lucky that my school allowed me to return part-time, which for me is great, not only to keep the bond with my daughter, but also to get back to enjoying science again. The nursery drop-offs and school pick-ups mean than I can’t hang around chatting/marking after school as I used to. This is positive, as it forces me to be productive in a timely manner. I’m aware that the work-life balance is still a work in progress, but the little one keeping me on my toes, and having the job I love too, make me feel very lucky.

*For more information about the MaternityTeacherPaternityTeacher (MTPT) project, please visit www.mtpt.org.uk

Paul Hunter teaches at Burnham Grammar School, Buckinghamshire.
The themes underpinning the sessions for 2024 include Climate Change, Diversity and Inclusion, Post-Covid Learning, Practical Work, Professional Journeys, Research, and Sustainability. The ever-popular Frontier Science sessions, showcasing the host University’s research lecturers’ expertise in topics at the forefront of development, are also threaded throughout all three days of the event.

Based on feedback gathered from the 2023 Conference, we have reduced the number of parallel sessions on offer by scheduling 7 time slots across each day instead of 8, along with starting the first session a little later in the day, providing ample time for participants to meet up and engage in networking opportunities. Each session is also timetabled to be 50 minutes long, thus including a 10-minute transfer window to enable transit to the next presentation. The Conference Team extends its thanks to the ASE committees, which drew together their timetables from the many proposals submitted earlier in the year to form a stimulating and thought-provoking programme for the 2024 Conference.

What’s on when

Thursday offers a dedicated post-16 programme, along with a selection of sessions for other science education sectors.

On Friday, the timetables offer dedicated programmes for technicians, kindly sponsored byPhilip Harris, and Early Career Teachers.

The ever-popular Schools Exhibition takes place on Saturday, when delegates will also be able to explore the latest research in science education at sessions on our dedicated Research Day.

Throughout all three days there will be inspirational presentations for the primary and secondary sectors too, along with ASE’s sessions of global science interest – there is sure to be something for everyone involved in science teaching and learning.

Plan ahead

The live-digital timetable can be viewed on Sched on the link: https://bit.ly/ac24sched, where participants are able to use filters according to the days they wish to attend, particular themes underpinning sessions, or their favourite presenters, and form their own personal agendas.

The ASE Annual Conference webpage, (www.ase.org.uk/events/AC24) has more information and a link to ticket sales, so please do visit to explore what is on offer for January 2024. Ticket prices start from as low as £123 for a member-teacher, and even lower for technicians and trainees. We sincerely hope that you are able to join us.

For queries, please e-mail conferences@ase.org.uk
Are you a science technician?

Read on to whet your appetite for what’s in store at the 2024 ASE Annual Conference.

**Technicians Day at the University of Northampton’s Waterside Campus is on Friday 5th January 2024! It’s going to be good!**

The ASE Technicians Committee has drawn together a great programme of CPD sessions, presented by technicians for technicians, and we look forward to your participation! Presentations are underpinned by the theme of practical work, and take place in lab-type spaces with demonstrations and inspirational talks, sharing best practice to send you back to your prep rooms feeling energised and ready for the future.

Due to generous sponsorship by Philip Harris UK Ltd, we are very excited about the 2024 Annual Conference Technicians programme, which can be viewed on the link: [https://bit.ly/ac24sched-techs](https://bit.ly/ac24sched-techs)

The day starts off with a Technicians Breakfast Meet from 08:30, where technician delegates registered on Eventbrite for the day will be welcomed with tea/coffee, Danish pastries and fresh fruit. Technicians can come along at any time from 08:30 until 09:35 – the first of the CPD sessions start at 09:45 and there is a choice of 4 sessions in each time slot. Do browse the link above to choose what you would like to do throughout the day.

Lunch is also provided, courtesy of Philip Harris UK Ltd and, if at the end of your Conference Day you have a little time to spare, the ASE Technician Committee is hosting a meet and greet where you will be able to ask questions about what goes on behind the scenes at ASE and see how you could get involved. Ever thought of writing an article to share your experiences with other technicians? It could start next January...

There will also be some social activities on offer in the evening, with limits on numbers, so keep an eye on the webpage for developments over forthcoming weeks.

Ticket prices start at £49 for those with technician membership – if you aren’t a member already, do sign up on the ASE membership page ([www.ase.org.uk/ase-membership](http://www.ase.org.uk/ase-membership)) to take advantage of the low price of entry – it’s such good value for money and the ASE technician community is waiting to welcome you. Please browse the ASE Annual Conference webpage ([www.ase.org.uk/events/AC24](http://www.ase.org.uk/events/AC24)) for further information and links to tickets.

---

**Early Career Teachers Day – Friday 5th January 2024**

Be inspired by what’s on offer at Annual Conference 2024 for anyone within the first few years of their science-teaching career pathway!

Whilst there are a number of sessions throughout all three days suitable for Early Career Teachers at the 2024 ASE Annual Conference, ASE has drawn together a dedicated ECT/trainee programme on Friday 5th January.

The live digital timetable can be viewed on the Sched link: [https://bit.ly/ac24sched](https://bit.ly/ac24sched), which will showcase what a great variety of thought-provoking and inspirational presentations are on offer throughout the event. However, for those ECTs only able to attend on one day, Friday’s ECT offer can be viewed on the filtered link: [https://bit.ly/ac24shed-ECT](https://bit.ly/ac24shed-ECT)

The ECT programme has been designed for trainee teachers, NQTs and RQTs and anyone at the beginning of their science teaching career pathway. If you’d like to join in the fun and be inspired, book a Member-Trainee-ticket on Eventbrite, and be sure to have your membership number to hand, as your booking process will request it!

And remember, from September 2023, ASE trainee membership is now **FREE** – just go to [www.ase.org.uk/sign-up](http://www.ase.org.uk/sign-up) and sign up before processing your ticket booking.

---

**Online courses for technicians**

We also have a great variety of online technician courses presented by Simon Quinnell, taking place throughout autumn 2023. See below for what’s on offer:

12th October: **Technicians Supporting Biology** ([www.ase.org.uk/tech-supporting-bio](http://www.ase.org.uk/tech-supporting-bio))

26th October: **Technicians Leadership Working and Training Others** ([www.ase.org.uk/tech-leaders-working-training](http://www.ase.org.uk/tech-leaders-working-training))


21st November: **Technicians Supporting Chemistry** ([www.ase.org.uk/tech-supporting-chem](http://www.ase.org.uk/tech-supporting-chem))

5th December: **Technicians Supporting Physics** ([www.ase.org.uk/tech-supporting-phys](http://www.ase.org.uk/tech-supporting-phys))
A conversation on the pragmatics of open schooling: Reflections after two European projects

Giulia Tasquier and Alfredo Jornet

Question 1: Both of you have been involved and collaborated in two research projects, SEAS and FEDORA, where the idea of open schooling has been central. What does open schooling mean and where does it come from?

Alfredo (AJ): The term ‘open schooling’ has been used in different ways in different contexts. I guess one of the first things that you think of when you consider open schooling is a school that is accessible, easier to reach, for example, by otherwise excluded or minoritised students. In other contexts, I’ve seen the notion of open schooling as referring to those days when doors are open to families and others to get to know the school.

Our research is based on a definition given by the European Commission when they were seeking projects to innovate science education: namely, those pedagogical innovations in which schools collaborate with community actors outside the school for the wellbeing of the community. According to this, the object of schooling is of course the students’ learning, but is expanded to include having an impact outside the school, generating something that is also beneficial for the community.

In a way, this was not new, and similar ideas have been given different names. For example, we are now co-operating with the Reggio Emilia municipality on an idea called ‘widespread schooling’, which is very similar to open schooling. In every case, it is the notion of the school addressing the community in a way that goes beyond what traditionally has been the school’s boundaries that defines open schooling. The meaning of open here has to do with the openness that comes with breaking barriers that previously separated the school from the society. In the context of climate change and sustainability – the focus of our work – open schooling is about providing students with opportunities for feeling and knowing that, at school, their learning actually matters.

Giulia (GT): A critical moment was the publication in 2015 of the report Science Education for Responsible Citizenship. The way in which the open schooling idea entered into the European context was through science, education, and innovation. This report emphasised the need to create and explore these ways of expanding science education beyond traditional school models. I think that some needs came from the schools, and some from science education, as encountered throughout this report. This was very innovative but also quite open and vague as a definition, because it was more like a promotion of a new concept in which the needs of science and of the school find a territory where they can meet and seek new ways to address the challenges of the 21st century.

SEAS was one of those projects that centred around open schooling, while FEDORA took inspiration from SEAS’ notion of open schooling, which contributed much in building together the three main pillars of the project – interdisciplinarity, future-oriented science education, and new languages. Open schooling was the way in which these three pillars developed.

The notion of open schooling is thus a work in progress. And that’s the beauty of it.

Question 2: What did this notion mean for the articulation of the SEAS project?

AJ: The way we approached it was very pragmatic, very focused on thinking from the perspective of teachers, educators, school leaders and students: what are the barriers, the challenges that they will confront when they actually take up this concept and try to translate it into actual practices? For much of the pedagogical ideas in the research literature do not translate into real practices. So, when we look at how schools function today, it’s taking much longer for institutions to catch up with these innovative ideas that come from research. The challenge for SEAS was to both stimulate the
schools to take up this challenge and document how new barriers and opportunities emerged at different levels. The first level focused on how schools managed the collaboration with actors outside its boundaries as an institution. In SEAS, schools worked with activist organisations, municipalities, enterprises and science centres, and we have documented how schools and partners transform to be able to collaborate with each other in ways that can be sustained over time and be meaningful for everyone.

At a second level, open schooling also challenges how we think about learning itself. What are the pedagogical challenges and opportunities? What are the pedagogical identities, such as when, suddenly, an activist organisation is taking up a pedagogical role because they are engaging with students directly in their process of learning, and how this educational responsibility is distributed and on what terms? Here, the disciplinary boundaries are also challenged. Because when you are addressing a particular ecological or sustainable challenge, such as the water quality in a river in your community, the social and the scientific merge. The third level we were focusing on was within the school institution: how you manage an institution that is open, and how you manage the relationships between leadership and teachers, teachers and other teachers.

**GT:** It is also important to refer to a model used within SEAS, and which we also adopted in FEDORA: the heuristic model of the three spheres of transformation, created in 2013 by O’Brien and Sygna. This is a model for understanding the changing relationships between individual, collective and political agency as we work in open schooling innovations. According to this model, transformation concerns three different but interconnected spheres. The practical sphere includes technical and behavioural change; the political sphere highlights the systems and structures that facilitate, or sometimes impede, the transformation; and the personal sphere, which is the most cultural one, highlights the importance of the individual and collective worldviews, values and beliefs and those of paradigms that drive people’s motivations and trigger practical and political actions. It is the dynamic interrelation among the three that nurtures the change.

**Question 3: How does open schooling challenge the teachers’ traditional role, in your opinion?**

**AI:** Open schooling is a new practice and, like any other social practice, is established through particular cultural tools connected to the profession. Teaching in general is connected to some habits of mind, concepts that are key to the teaching profession, vocabulary, all the things that articulate what being a teacher means in a particular sociocultural context. Open schooling is transforming what the classroom looks like and, therefore, to actually change your practice, you need to modify those tools, habits, vocabulary, concepts that articulate what being a teacher means. Through SEAS, we tested and developed tools and methods to support teachers and school leaders in this transition, including tools to outline teaching plans connected to local challenges, insights on how to carry out enquiry-based activities and also how issues of sustainability should be addressed so as to not lose sight of the social, political, technical and scientific dimensions.

**GT:** In both SEAS and FEDORA, we use a term borrowed from Peter Galison, the trading space, to refer to a space where teachers and researchers are invited to inhabit an interdisciplinary context by exchanging, at first, aims and values, but also acknowledging the practices, methods of their disciplines and their experience. In open schooling, teachers have the opportunity to both shed light on the disciplinary foundations and on the identities of the disciplines, as disciplinary teachers, and also to regenerate the subject matter to make subjects like climate change, artificial intelligence, quantum technology and sustainability more relevant from a personal point of view. So, this way of collaborating between teachers to create new forms of participation in the classroom, and also of offering a new way of perceiving teachers in a new role, is essential. The trading zone is one of deep relational character, where encounters take place between the disciplines and the teaching languages, practices and methods, redefining the relations among teachers themselves, between teachers and students, between teachers and school leaders, and the relationships with the rest of the community.

**References**

1. This is a revised version of a podcast interview originally published in *Lenses for tomorrow*, the official podcast of the European project FEDORA, led by Prof. Olivia Levrini. See: www.fedora-project.eu/podcast/lenses-for-tomorrow-fifth-episode/?fbclid=IwAR0KSrNBoYJRXUJohtNNKHq1XsUdUMp7x9OuATAYbMUlVzmccwhosW5Sbplk
2. See more about SEAS (Science Education for Action and Engagement towards Sustainability) at: www.seas.uio.no, and FEDORA (Future-oriented Science Education to enhance Responsibility and Engagement in the society of acceleration and uncertainty) at: www.fedora-project.eu
3. The tools and methods are archived in the SEAS pages (www.seas.uio.no) and in the Acedu repository, here: https://aceduintdev.azurewebsites.net

**Giulia Tasquier** is Senior Assistant Professor at the Department of Physics and Astronomy “Augusto Righi,” University of Bologna (Italy). **Alfredo Jornet** is Ramón y Cajal Researcher at the University of Girona (Spain).
Supporting autonomy, passion and creativity: the STEM Education MA at King’s College London

Melissa Glackin and Richard Brock

Science, Technology, Engineering & Mathematics (STEM) education offers young people an opportunity to be guided through a doorway to a creative, inspiring and exciting world in which science and mathematics support the application of technology for a sustainable future. However, there is no single prescribed model or framework for STEM education. For example, one school might teach STEM as separate subject disciplines (e.g. science, maths, and computing), whilst another might foreground teaching STEM within themes of complex global issues (e.g. climate change, AI, and biodiversity loss). Curriculum planning concerning how STEM education ought to be approached and what might be included are important questions for school leaders and staff. However, underpinning these answers is essentially the question as to why we educate young people...answering the 'why' question can set the foundation for 'how' and 'what' we teach.

Since 2019, the STEM Education MA at King’s College London has supported teachers to explore these questions in light of their own educational contexts. The programme offers opportunities to investigate the policy governing our decisions as educators and to understand the theories and debates supporting them. Optional modules, such as Environment, Sustainability and the Role of Education, Making and Creating in STEM Education and Quantitative Research Methods in STEM Education, enable students to carve out their own pathway, so that they have the appropriate tools to support their community and create their vision, and curriculum, for STEM learning.

The programme is unique in that most of the teaching takes place in person on Saturdays or online on weekday evenings. This enables STEM educators from across the country to gain from a diversity of experiences, as well as to learn from researchers in the field. This variety of educational interest was evident at the recent programme mini-conference (June 2023), where students presented their dissertation findings. Topics ranged from equity in STEM education through to environment and sustainability. For example, Rachel, a primary school teacher, explored children’s affective attitudes towards plants in London, and Tom, a secondary mathematics teacher, investigated teachers’ and pupils’ values related to academic and vocational subjects. Table 1 offers a fuller flavour of the students’ interests.

One student reflecting on their experiences commented: ‘I have developed a wide range of skills relating to STEM, including leadership of STEM, which I am now utilising within my current role where I have been made a STEM Director within my school. I have also been able to think about STEM more holistically and have a broader understanding of STEM education and many different inequities present within STEM’.

Our course has benefited from the philanthropy of WIPRO, an Indian technology consultancy. Their generous funding pays for 70% of fees for practising teachers in English state schools. In September, we welcome our 5th cohort of scholarship awardees, and we are excited to learn from them and see how they expand our understandings of STEM learning.

More information on the programme can be found here: [www.kcl.ac.uk/study/postgraduate-taught/courses/stem-education-ma](http://www.kcl.ac.uk/study/postgraduate-taught/courses/stem-education-ma)

Find out about the research group: [www.kcl.ac.uk/research/centre-for-research-in-education-in-science-technology-engineering-mathematics](http://www.kcl.ac.uk/research/centre-for-research-in-education-in-science-technology-engineering-mathematics)
### Table 1. King’s College London STEM Education MA dissertation presentation titles (June 2023).

<table>
<thead>
<tr>
<th>Theme</th>
<th>Dissertation presentation title</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equity</strong></td>
<td>Improving equity in secondary mathematics education by using microworlds to teach graph sketching to Year 9 students.</td>
</tr>
<tr>
<td></td>
<td>Exploring the link between students’ and teachers’ values and the prioritisation of academia within our education system.</td>
</tr>
<tr>
<td></td>
<td>Does offering triple science to GCSE pupils help or hinder access to STEM careers? An analysis of the views and practices of leaders in secondary science education in England.</td>
</tr>
<tr>
<td></td>
<td>Exploring students’ and teachers’ perceptions of racial barriers to STEM subjects.</td>
</tr>
<tr>
<td></td>
<td>What are the perspectives of highly-successful STEM neurodiverse students on their STEM learning experience?</td>
</tr>
<tr>
<td><strong>Engineering/Technology</strong></td>
<td>Exploring the ongoing influence of an informal STEM event: a case study.</td>
</tr>
<tr>
<td></td>
<td>An investigation into the understanding and use of design thinking for STEM education in UK secondary schools.</td>
</tr>
<tr>
<td></td>
<td>The impact that a girls-only making and creating programming club has on their identities and their relationship to computer science and programming.</td>
</tr>
<tr>
<td></td>
<td>The affordance of the Virtual Classroom from a teacher’s view.</td>
</tr>
<tr>
<td><strong>Environmental &amp; Sustainability Education: Teachers’ perspectives</strong></td>
<td>To what extent are teachers prepared to deliver a whole-school, action-oriented approach to climate change education with a focus on climate justice? An analysis within a secondary school in England.</td>
</tr>
<tr>
<td></td>
<td>Climate change education in Indian schooling – perspectives from environmental educators – an exploratory study.</td>
</tr>
<tr>
<td></td>
<td>What role do teachers believe carbon literacy plays in climate change education?</td>
</tr>
<tr>
<td></td>
<td>Geography teachers in urban areas: What shapes their values and pedagogical approaches to learning outside the classroom?</td>
</tr>
<tr>
<td><strong>Environmental &amp; Sustainability Education: children, media &amp; curriculum</strong></td>
<td>An exploration of qualification pathways into environmental-related degrees during a climate crisis: A case study of the IBO’s ESS course in Switzerland.</td>
</tr>
<tr>
<td></td>
<td>Exploring the gendered communication of natural history in children’s magazines since the late nineteenth century: do they encourage connections with nature?</td>
</tr>
<tr>
<td></td>
<td>Exploring children’s affective attitudes towards plants in an urban UK primary school.</td>
</tr>
<tr>
<td></td>
<td>A case study to look at how students’ attitudes to nature change with different teaching strategies.</td>
</tr>
</tbody>
</table>

---

**Dr. Melissa Glackin**, Reader in Science and Environmental Education.  
E-mail: melissa.glackin@kcl.ac.uk  
STEM Education MA, Co-director, School of Education, Communication & Society, King’s College London.

**Dr. Richard Brock**, Senior Lecturer in Science Education.  
E-mail: richard.brock@kcl.ac.uk  
STEM Education MA, Co-director, School of Education, Communication & Society, King’s College London.
Graham Kingsley 1939 – 2023

We were deeply saddened to hear of the death of Graham Kingsley on 13th August 2023. Graham was a stalwart ASE supporter, having been a member for many decades. He was a very active member of not only the Home Counties Region, but also the Hertfordshire Section (Hertfordshire Science Teaching Association). He was Chair of the Region, and this led to his involvement nationally.

He was a member, and then later the Chair, of the ASE Publications Committee, a member of the then ASE Council for many years, Association Chair from 2007/8, member and then Chair of the Quality and Audit (Q&A) Committee, and latterly a member of the 11-19 Committee. He was awarded Honorary Membership of the Association in 2009.

Those who worked alongside Graham remember him as a quiet, modest, thoughtful and meticulous colleague, with a close attention to detail, a dry sense of humour and often a twinkle in his eye! He was passionate about science education and, as well as his enormous contribution to ASE efforts over many years, was very active in his local community, taking great pride in bringing historical teaching to life in his role as a ‘Victorian teacher’ in the Hitchin British Schools Museum where he was also a Trustee.

Graham was a pleasure to know and work with, and will be greatly missed.

LabAid news

After the disruption caused by COVID, the LabAid Foundation has had a successful year, continuing the work started by the late Alan Welch, MBE. LabAid accepts donations of used scientific equipment, mainly from schools in the UK, and sorts, checks and packs it for sending to schools and similar establishments in developing countries. Mostly these gifts arise when a UK school is closing, moving site or refurbishing its laboratories, although we have accepted items from universities doing the same, or from suppliers closing warehouses and so on.

As with many charities, we rely on volunteers and need more, especially people who could easily reach our store in Amersham, Bucks., to help to sort and pack equipment. You don’t have to have a scientific background, just an ability to turn up for a couple of hours one or two afternoons per week. Scientists, and especially former science teachers or technicians, would be particularly welcome and we might be able to find more specialist jobs that you could do: checking, testing or repairing equipment. Last year, we sent out about 12 boxes per month to developing countries but, with more hands-on local volunteers, we could send out more.

The campus of Alliance Model School in Kilembe, Uganda was swept away in floods in 2020. It set up again in abandoned mine buildings and LabAid supplied apparatus, here being used in the holidays as students try to catch up after COVID lockdowns.

We are grateful to teachers and technicians throughout the country who responded to information about LabAid in EiS and the CLEAPSS Bulletin to supply us with a record amount of equipment for which they no longer had a use. The shelves in our rather cramped store are overflowing. We had been worried that the supply was drying up, but this year’s bumper harvest means that we can offer a much better selection to those schools in developing countries with a ‘laboratory’ – but nothing to put in it.

Despite a limited number of volunteers, we managed to supply science teaching equipment to 14 educational establishments between July 2022 and June 2023 – everything from microscopes to magnets, beakers to balances and clamp stands to cathode ray oscilloscopes. In all, we supported establishments in six countries: Ghana, Libya, Malawi, Sierra Leone, Somalia and Uganda.

Dr. Peter Borrows, Chair of the Trustees of the LabAid Foundation.
Website: www.labaid.org
E-mail: labaidfoundation@labaid.org
Coming soon!

Grappling with Graphs

We are excited to announce that a new publication titled Grappling with Graphs will be coming soon to the bookshop. This book is inspired by the now out-of-print Getting to Grips with Graphs and builds on the mathematical approaches of The Language of Mathematics in Science. It aims to give 11-16 educators comprehensive graphing tools that include: plotting, interpreting and drawing.

Each section also includes student-focused activities enabling teachers to identify gaps and misconceptions, provide intervention and sequence graphing throughout the science curriculum.

If you would like to hear more about the publication and when it will be available for sale, please complete the expression interest form here: www.ase.org.uk/gwg/eoi

New book

Stories for Science: The Zoo

The Zoo is the next edition in the delightful Stories for Science series aimed at children aged 5-7. It centres around a man who loves animals and decides to open a zoo, but not all goes to plan...

As with the other books in the series, this story does not have a satisfactory ending and the character is left with problems to solve. After doing appropriate investigations during science lessons, children will be able to use their knowledge to complete the story.

You can purchase the book here: www.millgatehouse.co.uk/the-zoo

Wow! But why?

We are delighted to share that Wow! But why? has been shortlisted in the Teach Primary Awards 2023 STEM category.

This is a fantastic resource that supports primary science knowledge and is full of fun activities to explore the science behind the phenomena.

Find out more: www.millgatehouse.co.uk/wow-but-why
National discussion

ASE Scotland responded through the Learned Societies Group and also as an individual organisation.

The key theme of the discussion was to make sure that no one was left behind and that educational experiences equip learners for the future. Areas of the Curriculum for Excellence that were seen as positive included the four capacities: confident individuals, successful learners, responsible citizens and effective contributors.

The discussion focused on a number of themes:

- **Inclusion and diversity**: A separate theme, but also part of several others. Inclusion and diversity relates to everything: how buildings are designed, how to ensure that teachers have the skills to support learners with different neurological and physical needs, etc. There should be no barriers to learning.

- **Health and wellbeing**: Linking to all aspects of developing whole school approaches to both physical and mental wellbeing. Also covers the issues of recruitment and retention. It was noted that staff need professional development and time to take part in this, with implications for class contact.

- **Curriculum**: There were mixed views, but there was an agreement on the need to keep a broad-based curriculum under constant review. This is also linked to Professor Hayward’s review of assessment. Overall, there was a call for a more joined-up approach and a smoother transition between different educational phases.

- **Digital future and skills for life and work**: It was felt that the education system is not keeping pace with change and that staff will need professional development to support learners to develop the necessary digital skills now and in the future.

The report finally makes the case for a **human-centred educational improvement process**, which includes meaningful listening and consultation with everyone. It also considers the education profession, valuing their expertise by allowing them to lead change rather than having changes imposed top-down.

Qualifications and assessment

The review group was led by Professor Louise Hayward and included the views of teachers, universities, parents/carers, employers and young people.

Their report states that, although the Scottish assessment system is highly regarded, there are increasing concerns over the impact of assessment, especially in the senior phase of secondary education (S4-6, ages 15-18).

The overarching recommendation is that any future qualifications system must be agile and flexible. Learners need to be at the centre of things; they need a sense of achievement and a positive future pathway. The system needs to be able to respond quickly to change. The report notes that the current system is not as equitable as it could be and needs to serve all students, and that employers have signalled that there are gaps in the skill base of senior learners after graduation that need to be addressed. It is recognised that qualifications and assessment are powerful and can have a negative impact on innovation.

The report is full of enthusiasm for change, with the need to demonstrate achievement. Learners need to be prepared for future life, able to achieve high standards and leave school well-prepared to fit into the modern world. Hopefully, the wider breadth will be suitable for all learners and reflect the wider purposes of education.

What is suggested is a Scottish Diploma of Achievement (SDA), consisting of:

- **Programme of Learning**: The opportunity to study subjects in depth; this will be graded.

- **Project learning**: Knowledge and skills to support progression beyond school, the ability to work together, to tackle problems and to think creatively.

- **Personal pathway**: Opportunities to show what they, as an individual, can do – interests, wider achievements, contribution to the community. Pupils must show progress in all elements to be awarded the SDA.
This aims to provide:

- a balance between exams and coursework (with a need to make sure that there is progression – see last paragraph);
- a range of teacher assessments with fewer exams;
- a more modular approach;
- external exams for Higher and Advanced Higher only;
- more time for teaching and learning; and
- support for the professional learning of teachers.

In addition, all types of qualification at a particular SCQF level will be treated equally and, importantly, the challenges and opportunities provided by AI for qualifications and assessments will be considered.

As well as the reports above, the Government has also agreed to reform the current assessment (SQA) and curriculum (Education Scotland, ES) bodies, although a recent Government announcement states that no changes will take place this parliamentary year.

The new qualifications body will be key in designing the flexible modular approach and the new assessment methods, as well as revising existing courses, and in ensuring that the newly-developed systems are rigorous and well-regarded.

The new curriculum body will improve progression between the Broad General Education (BGE) and the Senior Phase, and within national qualifications offered in the Senior Phase. The new body will also build the new moderation system and develop resources for the Project Learning component to be used and adapted across the sector.

References
1. National discussion final report

Susan Burr is Honorary Treasurer of ASE, past Chair of ASE Scotland, and a member of the ASE Trustee Body.

Collins KS3 Science Now – Learn & Practice Book with Teacher Pack

The new Collins KS3 Science Now is neither a textbook, nor a scheme of work, but endeavours to ‘enrich and update’ existing schemes of learning. A Teacher Pack is available, with free download access to customisable, and printable, materials.

Learn and Practice Student Book: fully covering the KS3 (ages 11-14) curriculum, 18 units are shared equally between biology, chemistry and physics. Each begins with a unit ‘road map’, followed by starter activities based on big questions addressed by the unit, career profiles, a Knowledge Organiser and unit-based practice questions including a worked example. The final spread consists of a ‘Maths and practical skills’ set of questions, relating to the unit. The structure is flexible, so that it can be integrated with an existing scheme of learning.

The Teacher Pack includes mapping and progression rationale for curriculum content, maths skills and working scientifically skills. There are ideas for using the starter activities, commentaries on some questions to contextualise them, identification of interleaving opportunities and a bank of retrieval questions, as well as download instructions for the customisable materials.

The front page for each unit introduces a framework to ‘zoom in’ on why we seek to understand the concept, and how we can use it in a real-life context. The insights into so many related careers are interesting and help answer the question ‘But when would I ever use science?’

KS3 Science Now is a well-developed resource, offering many high-quality questions of differing level of challenge. The collections of maths and practical skills questions are in context. The Knowledge Organisers summarise the whole of KS3 Science and introduce connections to concepts met more fully at KS4. It is a fresh take on a book that is not a textbook.
Collins Secure Science for GCSE: Intervention to get back on track

Teacher resource: ISBN 979-0-00849210-6
Student workbook: ISBN 979-0-00849209-0

This teacher resource book and student workbook are aimed at supporting those students who struggle with science, giving them the best opportunity to succeed in their examinations. The books provide teachers and students with an intervention programme and resources to help re-teach troublesome topics. The teacher resource book complements the student workbook through guided instruction, although the workbook can be used as a standalone resource for independent study.

Each of the 30 sessions follows a structure of Think → Connect → Solve → Practise. The teacher resource leads the teacher through this sequence, with clear signposting to relevant sections of the student book.

The ‘Think’ phase is intended for students to retrieve prior learning and consider its relevance to a stimulating question. The ‘Connect’ phase of the session draws heavily upon the videos found with the online Adapt® package, but may be substituted with traditional teaching. The section includes several teaching tips that focus on how the content is examined within the GCSEs. The ‘Solve’ section revisits the prompt question initially presented to the students at the beginning of the session.

The ‘Practise’ element is organised slightly differently, with command words taking precedence. Each session has at least one question assigned within the ‘Additional Practice’ section of the student book.

This is a fantastic resource for teachers who are picking up a group midway through the GCSE, teaching out of their specialism or those beginning their careers. It provides structure for teacher-led revision lessons that can focus on developing foundation tier students’ confidence in preparation for final examinations, but still holds value for some higher tier students. Furthermore, the student workbook provides ample opportunities for students to develop their independent revision skills through carefully sequenced tasks.

Eisco LabGlass® lab glassware

www.eiscolabs.com/collections/laboratory-glassware

Eisco is a multinational corporation, producing Eisco LabGlass® glassware available for schools to purchase from several local school suppliers. This evaluation considers the suitability of LabGlass® laboratory glassware for use in UK school laboratories based on a small sample tested.

A series of tests were conducted on the glassware supplied, including visual tests, glass thickness measurements, titration, heating, distillation, drop tests and compatibility of ground glass fittings.

Eisco LabGlass® glassware performed at least as well as other glassware in most of the tests. For the full evaluation, please visit: www.ase.org.uk/news/green-tick-eisco-labglass

This evaluation is, by necessity, based on a small sample of glassware tested over a short period of time. No conclusions can therefore be reached about how satisfactory it would be over the longer term.

Eisco LabGlass® offers good value for money for glassware, with prices being considerably lower than brands such as Pyrex and Simax. All glassware performed well in all tests, with the exception of the still head in the organic chemistry set. Since the original tests, the company has redesigned a new still head that is expected to perform well.

ASE is grateful to CLEAPSS for their support with testing the glassware through their lab facilities.

Fashion fixers Ultimate STEM Challenge 2023 for KS2 & KS3

https://energisingfutures.co.uk/ultimate-stem-challenge/

This resource is designed to help young people aged 9-14 to bring their STEM knowledge to the fore, developing their creativity, problem-solving and other employability skills, by tackling real-world challenges around sustainability. There are two separate challenges – one for KS2 and one for KS3 pupils. The challenges are appropriately adapted for different age groups.

The challenges are topical, relevant and easily accessible to young people and their teachers. They are focused around discovering where our clothes come from, learning about the impact that clothes have on the world and environment, finding out how new ideas in science and technology are helping to fix fashion and then providing the opportunity to create a vision for how to fix fashion for the future.

The resource offers a passionate member of school staff the chance to promote sustainability in an exciting and engaging way. This is an increasingly important topic to raise within all schools and the resource provides the structure and information for young people and adults to engage in meaningful conversations in a creative and innovative way.

Creativity, innovation and the promotion of science and STEM skills in the real world are all highlighted beautifully, and the competitive element and examples used provide excellent content to motivate the students to start thinking about sustainability. The links to innovation, future careers and how young people can positively contribute to the world are what makes this an excellent resource.
We are welcoming Assessment Specialists who wish to become examiners for Physics and Biology.

You will gain an insight into the teaching and assessment of Cambridge qualifications, and we offer training and support with freelance opportunities which fit around your existing commitments.

For more details, just visit https://asrecruit.cambridge.org
The ULTIMATE tool to teach the foundations of Physics

Complex Physics theories made easy for non Physics specialists.

Ready to inspire a life long love of Physics?

STEP 1:
Start your journey with the Universal Stand

STEP 2:
Then explore the wonder and awe of Physics with our suite of add ons
- Motions and forces
- Energy conservation, transfer and collisions
- Light reflection, refraction and optics
- Waves, observed waves and wave motion

Each add on includes:
- Comprehensive instruction manuals, teacher and student notes
- Mapped to the current KS3-KS5 curriculum

Scan the code to investigate more now

Take a look at the full range at www.philipharris.co.uk/foundation-physics

Universal Stand
PP00054183
Only £66.95