AMGEN® Biotech Experience

Scientific Discovery for the Classroom

June 2025

ABE UK newsletter






Welcome

By Dr Eddie Orija, director, UH Centre for STEM Education

Welcome to our summer newsletter. In this edition we look forward to further bookings onto all our CPD sessions across the country. We provide a summary of the Wednesday 14th May 2025 Network meeting that had a focus on the electrophoresis buffers used in the ABE labs, including addressing some practical considerations and, of course, Health & Safety. Sam Ward from Thomas Alleyne Academy, discusses ABE outreach work at Tech Fest. Cambridge Regional College (CRC) share their outreach work at Cambridge Festival. We celebrate the continued positive impact of ABE programme nationally, based on independently evaluated Jisc survey comments. Alison Ackroyd of MidKent College explains how the Amgen Biotech Experience kit supports T Level science students in developing industry-ready skills.

Earlier this month, I had a very fruitful visit to Boston and attended **#ABEMeeting2025**, where 50 ABE staff from 27 sites and 17 countries, came together at Northeastern University's Innovation Campus in, Boston, MA to reconnect, collaborate, and innovate - Participant Agenda. Among other things, we were introduced to the ongoing developments in ABE Flex, which include a collection of smaller practical activities that can be adapted by each site to suit context and using mostly existing resources; There will more information about ABE Flex in the next newsletter. The new ABE Exploring Precision Medicine curriculum was also launched.

Summer 2025 CPD bookings are live

Our CPD develops participants' knowledge of biotechnology theory, technical and practical skills, including restriction enzyme digestion, ligation reactions and agarose gel electrophoresis, bacterial transformation, DNA profiling and PCR (polymerase chain reaction). It is practical – offering first-hand experience of activities that students will undertake, including producing a functional protein from genetically modified bacteria.

We are pleased to share details for Summer 2025 CPD, which can be booked through Eventbrite by clicking the links in the schedule below, or by accessing our webpage or directly using short URL go.herts.ac.uk/abecpd. **We recommend exploring the possibility of booking at a hub that is not your local hub if you are unable to secure a place for the CPD at your preferred hub.** If you have any queries in this regard, please contact stem@herts.ac.uk.

Course 1 - Introduction to DNA manipulation (day 1 for teachers and technicians, day 2 for technicians)

Location	Date	Time
University of Hertfordshire, College Lane Campus, Hatfield, AL10 9AB	23 & 24 June	9:30 to 15:30
Cambridge Regional College, Cambridge Campus, Kings Hedges, Cambridge, CB24 2QT	25 & 26 June	9:30 to 15:30
Teacher Scientist Network, John Innes Centre, Colney Lane, Norwich, NR4 7UH	2 & 3 July 205	9:30 to 15:30
MidKent College, Medway Campus, Medway Road, Gillingham, ME7 1FN	9 July*	9:30 to 16:30
University of Hull, Hardy Building, Kingston upon Hull, HU6 7RX	1 July*	9:30 to 16:30

*Please note, Course 1 at MidKent College and University of Hull will utilise MiniOne kit and offer a slightly longer Day 1 rather than a separate Day 2 for technicians.

Course 2 - Extending DNA manipulation

Location	Lab day (9:30 to 15:30)	Twilight session (16:00 to 17:00)
University of Hertfordshire, College Lane Campus, Hatfield, AL10 9AB	25 June	26 June 2025
Cambridge Regional College, Cambridge Campus, Kings Hedges, Cambridge, CB24 2QT	27 June	30 June 2025
Teacher Scientist Network, John Innes Centre, Colney Lane, Norwich, NR4 7UH	4 July	7 July 2025
University of Hull, Hardy Building, Kingston upon Hull, HU6 7RX	2 July	N/A

Network meeting

Is SB about to hit the buffers?

(1-hr zoom session held 14 May 2025)

In this short networking session, our focus was on the electrophoresis buffers used in the ABE labs, addressing some practical considerations and, of course, Health & Safety.

Using a TAE buffer will eliminate the presence of the Borate ion (and associated risks) from our labs, which does not make the labs hazard free but does reduce the risk.

It is our intention that future ABE labs involving electrophoresis will use 1 x TAE buffer instead of 1 x SB buffer.

This change will be implemented within our summer 2025 CPD and for kit loans from September 2025.

If you have any questions, please email us: stem@herts.ac.uk

Sharing the ABE programme - Science Hub's Technicians Festival

(Sam Ward, Science Technician – Thomas Alleyne Academy)

The Science Hub supports schools and educators across Herts, Essex, Southend, Thurrock, Beds and Milton Keynes to provide quality science education through the delivery of a local programme of impactful high quality cost-effective CPD, networking opportunities and events for the large number of science technicians working in the schools across the area, including an annual online Tech Fest in December comprising 2-3 sessions each day over a 3-day period.

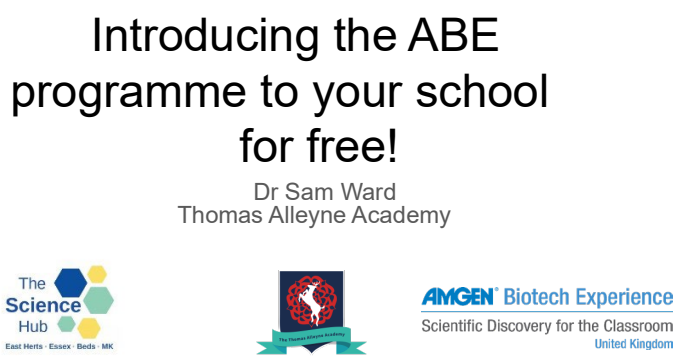
As part of the December 2024 Tech Fest, Sam Ward, Science Technician at Thomas Alleyne Academy, was asked to run a session promoting the ABE programme, an ideal opportunity to spread the word to new schools!

Sam's journey with ABE started back in the summer of 2017, when Sam attended the ABE CPD with a biology teacher colleague and was hooked! Molecular biology has always been her passion (a job she did for 16 years in a previous lifetime), so Sam embraced the opportunity to share this passion with students, for free. In 2021, Sam trained to be an associate facilitator through STEM learning so that she could help with delivering ABE outreach to schools in her area.

Back to Tech Fest - before sharing details of the UK ABE programme and its world-wide impact, Sam started with an overview, explaining the free CPD and kit hire process and outlining the support during the kit loan period before describing the sequence of labs available.

Participants engaged in an enrichment activity to work out the orangutan paternity issue and solve the mystery of otter territories. These are activities that Sam's school often do with their Science Club during their kit loan period.

The session was well attended (around 30 technicians were online) and post-session feedback was good, with a number of these schools now having contacted the UK programme office to express an interest in attending this summer's ABE training sessions in order to join the programme.



Thank you, Sam, for your enthusiasm and continued work to support the programme – we truly appreciate you!

DNA profiling - not just for forensics - Cambridge Festival

(Shiree Gilday Burns, hub leader - Cambridge Regional College, Kings Hedges Road, CB4 2QT)

Every year, the University of Cambridge organises a Science Festival, a two-week period of talks, interactive sessions and on-line events covering the world leading research happening at CRC. This year, Shiree Gilday Burns, hub leader at CRC, conducted a session investigating otter DNA, sadly using otter spraints (excrement) rather than actually getting to play with otters!

Visitors completed the 'restriction digest' using water to save consumables. Shiree then produced the digestions that had been made earlier in order to run the electrophoresis in the MiniOne tanks – many thanks to the two schools that allowed the CRC hub to send out 4 tanks instead of 6 so we could use them at the festival.

It was a very busy evening as Chemistry and Physics were also running two sessions each at the same time, and visitors to the Science Festival also had the chance to attend a talk by a local scientist researching limb regeneration. Did you know it is possible to regrow a fingertip if lost as long as some nail remains?

How the Amgen Biotech Experience kit supports T Level science students in developing industry-ready skills

(Alison Ackroyd, Lecturer - MidKent College)

T Level Science is the new technical pathway equivalent to 3 A levels. There is a focus on developing knowledge, skills and behaviours with a minimum of 9 weeks on an industry placement. So practical laboratory experience is essential for T Level Science students. The Amgen Biotech Experience Kit provides an invaluable opportunity for students to develop core competencies in accuracy, precision and calibration – fundamental aspects of scientific research and industry applications.

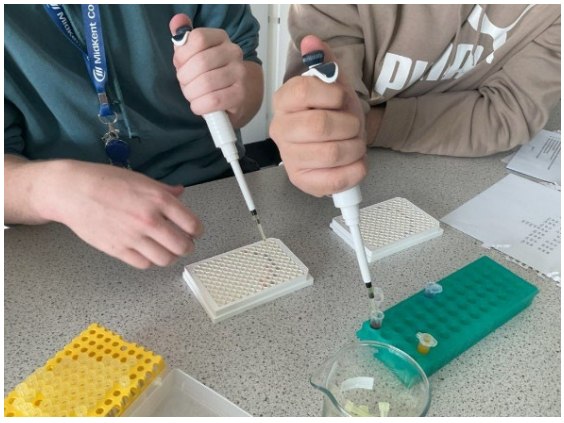
One of the key challenges for students in laboratory settings is ensuring both accuracy and precision. The Amgen Biotech Experience offers structured exercises that guide students in mastering pipetting techniques, sample measurements and data analysis. These skills are critical in genomics and pharmaceutical research, where even minor errors can have significant consequences. Activities such as making "suncatchers" are great for hand-eye coordination, but we also practice consistency in technique using AMGEN resources.

Standard operating procedures (SOPS) are a recurring theme in T Level Science as is the emphasis for reducing errors. We routinely evaluate the calibration of micropipettes using industry protocols. By learning these techniques early, students gain an understanding of best practices in laboratory settings, preparing them for the technical demands of industry roles. On return from placements, we have paired more experienced students with others to peer evaluate technical competence. We are also working towards recording their competences for the Science Council T Level Competence log- a first step in professional registration.

Beyond technical skills, the Amgen Biotech Experience Kit introduces students to genomics, a rapidly advancing field with applications in healthcare and research. Through activities such as DNA extraction, cloning and electrophoresis, students gain firsthand experience with fundamental molecular biology techniques. These experiences mirror real-world laboratory processes, reinforcing the knowledge and practical abilities that will benefit them in their future careers.

For some of our students with Special Educational Needs and Disabilities (SEND), transitioning into industry placements can present additional challenges. Students with SEND can spend up to one third of their placement hours working with our technicians on activities relevant to the qualification. The Amgen Biotech Experience Kit provides a structured and supportive learning environment, allowing students to develop confidence in their laboratory skills before entering professional settings. This preparatory experience helps to reduce anxiety, ensuring that all students, regardless of their learning needs, can fully engage in and benefit from their industry placements.

The Amgen Biotech Experience Kit also plays a key role in increasing science capital by making high-quality laboratory experiences accessible to all students, regardless of background. This early engagement fosters confidence, aspiration and a greater understanding of STEM career pathways, supporting a more inclusive and diverse scientific workforce.



We'd love to hear your ideas about what would make good T-level content, or how we can reach more schools to participate in this amazing programme. Please share your thoughts by emailing stem@herts.ac.uk.

References T Level in Science / Institute for Apprenticeships and Technical Education; New T Level industry placement delivery approaches | NCFE; Pipetting Art | Amgen Biotech Experience; Micropipetting Practice Card | Amgen Biotech Experience; Science Council Igniting Careers T Levels

Feedback from students and teachers

We really value the feedback that we get – it helps us to drive the programme forward and to know what really engages our participants. Here are just a few comments direct from our feedback forms. Thanks to all who provide this vital input.

You'll see the QR code for feedback at our CPD and when you take up your kit loan. Please do scan the code and help us to keep delivering the best programme we can.

Gel electrophoresis practical- helped me learn about the mechanism of gel chores is and why it's used, I had never heard of this process before. I learnt that DNA can be separated, using their negative charge. I also gained practical experience, such as making the gels, preparing the mixtures, and using the gel electrophoresis machine.
(Student feedback)

Learning how to use micropipettes gave me insight into what a career in molecular biology would be like.
(Student feedback)

Thank you to the programme for loaning us the equipment and the reagents for the ABE experience. Our students greatly benefited from the ABE experience. They definitely upskilled in the use of micropipettes and running a gel electrophoresis. They could also see the products of running the gel electrophoresis. The questions at the end of each lab were useful for our students to consolidate their knowledge and understanding of Topic 8: Gene expression, and more specifically the applications of in vivo *and* in vitro *cloning.*
(Teacher feedback)

And finally – a word from Dr Phil

(Dr. Phil Smith, MBE)

"Back to basics - some hub rules" – All hubs in the UK ABE programme strive to make access as easy as possible for schools and teachers so they have a positive experience with the ABE kit from kit pick-up to return. Just occasionally there can be situations when this does not run so smoothly ... Please read the below for a reminder of a few basic 'rules' to facilitate kit collection/return via our amazing hub technicians.

Planning Ahead – The day & time for your kit loan collection and return are agreed when your kit loan is arranged, sometimes months in advance of the actual kit loan taking place. We confirm these arrangements by email as soon as we have booked you into the kit loan calendar. Firming up the arrangements with a quick email/text a day or two before is helpful to avoid miscommunication and to iron out any potential problems/answer last minute questions.

On the day - If something is going to prevent you from collecting (or returning) at the pre-arranged time **please contact the hub** to let them know. Things happen ... we understand ... but in order to have your kit ready and a technician available for the collection (or return) we do need to know. We'll always try and be helpful in such situations, but we can only do this if we're in the loop.

Numbers doing labs - **Please take a moment to carefully consider the number of students who will be completing the labs and provide as accurate a number as possible.** The consumables provided include a small allowance for pipetting errors, so there's no need to over-order. Ordering only what you need helps us minimise waste and keeps costs down - thank you for your support!

The 'a' series - A quick note on the abridged series - we've noticed a little occasional confusion with, where for example some schools list both Lab 6 *and* Lab 6a for the same number of students. In most cases, you will only be running *one* of these (Lab 6 *or* 6a), and will just need a small amount of "R" as a positive control for the technician to run alongside student samples.
To help avoid over-ordering, please simply note this clearly in a sentence on your booking sheet. Thank you for your attention in this regard – it really helps!

2a - single digest of the R-plasmid (to characterise it); 4a - basic PCR lab, also to characterise the R-plasmid; 6a - transformation lab using pre-made R-plasmid (more likely to work when transforming E. coli than the ones the students have tried to engineer)

ABE Flex - The ABE lab series is well known to many of you. It's sequential, builds upon knowledge and skills and allows participants to experience the challenges of hands-on practical work linked to biotechnology, but understanding and conceptualising the different processes linked to DNA can be a challenge for our young people. ABE is an international project, bringing together a rich community of practice from around the world. As part of this, we are looking forward to sharing with you more about an initiative called **ABE Flex** which will include collections of activities and simulations that build upon existing resources to provide some quick and relatively easy to deliver practical activities helping to fill in the gaps of student's knowledge. We will share more details in the Autumn newsletter.