

Picturing Science in Schools: A Science Ambassador Programme with the Crick's Electron Microscopy Team

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We are the Electron Microscopy Scientific Technology Platform team from the Francis Crick Institute in London, and we share our experience of developing and delivering our Science Ambassador programme 'Picturing Science in Schools' to two local primary schools in the London borough of Camden. We work directly with Camden teachers to align our microscopy activities to the schools' Science Technology Engineering Arts and Mathematics (STEAM) curriculum. The desired outcome of our outreach is to diversify pupils' perceptions of scientists, showcase different scientific backgrounds and inspire STEAM career paths. In this article we highlight some example workshop activities and discuss the rewards and challenges we have encountered with each. We also share our approach to delivering a workshop with a multi-disciplinary team of scientists.

Building an outreach programme through a strong school partnership

In the autumn of 2025, we completed the fourth iteration of our Science Ambassador outreach programme, 'Picturing Science in Schools'. The programme originated from a pre-existing connection between the Francis Crick Institute and the primary school, which grew organically thereafter. Through this one connection, the primary school pupils have had the opportunity to connect with a network of people from multiple scientific disciplines and scientific backgrounds. The partnership has grown from a single event to a regular annual engagement with two schools; a sign that it is being positively received by the schools involved. Each year, approximately 300 - 400 pupils engage in our microscopy workshop through this project. Since our 'Picturing Science in Schools' programme began, we have built workshops related to our work in microscopy and to scientific images more generally. We have introduced the use of light, electron and X-ray microscopes to image samples too small to see with our eyes, incorporating themes of cell biology, pathogens, and marine life, as

well as satellite imagery of polar ice caps acquired by NASA. For pupils, the world beyond what we can see with our eyes is new and exciting, and therefore a joy to teach. As a group of scientists who work with microscopes day to day as part of our jobs, we can often become immune to the novelty and excitement that such detail and wonder can bring. It can be pure magic to new eyes.

Delivery in the classroom and adaptation to feedback

The workshops are delivered to all primary school classes, from Year 1 (aged 5-6) to Year 6 (aged 10-11). They are kept short and sharp to retain interest and focus, only 45 minutes long. They include an introduction presentation to teach key learning concepts and incorporate fundamental underlying scientific skills including identifying, categorising, measuring and comparing samples. The pupils then rotate between two different 15-minute activities tailored to the schools' current STEAM theme such as 'Dear Earth'. To finish each workshop, we encourage the pupils to identify which scientific skills they have used and to communicate what they have learnt. We encourage communication in different

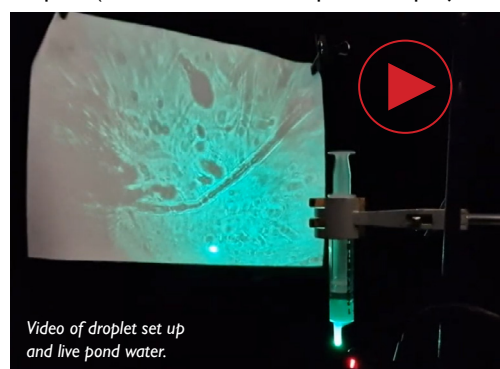


forms just as a real scientist would disseminate their findings, by talking to their family and friends and writing down their findings in class. Support from Camden teachers helped improve our knowledge and skills for adapting and confidently delivering the workshops for different ages.

In the fourth iteration of the Science Ambassador outreach programme, we delivered a workshop on preparing samples for the scanning electron microscope (SEM). To mimic mounting samples onto a sample holder for imaging in a SEM, pupils learnt how to use tweezers to pick up and place tiny beads on top of a cork topped with a sticky pad. We are mindful to introduce the use of scientific skills and tools we would use in the lab. Using tweezers to handle small and fragile samples as an electron microscopist is a difficult skill, and this dexterity challenge is reflected in the workshop feedback where some pupils find this task easier than others. We have adapted the tweezers and the sample beads for different ages to allow for a variety of abilities, making sure that the pupils feel supported. We also introduced very small beads and increased the difficulty level for the older classes by introducing more criteria in their sample preparation; including selecting samples of certain sizes, colours and patterns.

The use of physical educational resources often features very positively in our formal evaluation

forms, including the use of 3D glasses, light diffraction glasses and plankton projectors. A lot of the imaging we do at the Electron Microscopy Scientific Technology Platform is 3-dimensional (3D). When explaining the scientific concept of our workshop task to the class, watching a video of a 3D image dataset with 3D glasses on engages the pupils and has a wow factor; and who doesn't like an opportunity to showcase some 3D data! We have also used light diffraction glasses to demonstrate that a white light is made up of a combination of different colours. Another tool that has received positive feedback is the plankton projector. A droplet of pond water is dangled in mid-air from the tip of a lab syringe, and a laser pen is directed through it to project the droplet onto a surface behind. This magnifies the pond droplet, and the pupils could see the plankton swimming live in the droplet (Instructions for the plankton projector



Video of droplet set up and live pond water.

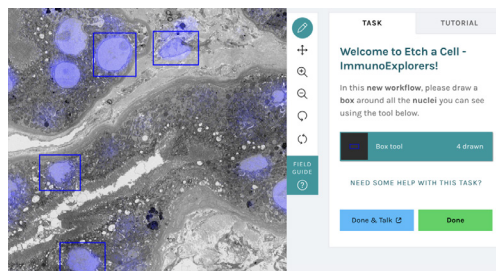
<https://www.exploratorium.edu/snacks/plankton-projector>). We hope that through exciting props, these aspects of the workshops give the pupils an educational take home that they will remember.

Etch A Cell - Involving the pupils in the analysis of real data produced by our team

Pupils contributed to 'Etch A Cell – ImmunoExplorers' (<https://www.zooniverse.org/projects/h-spier/etch-a-cell-immunoexplorers>). This is an online citizen science project that asks volunteers to help with the analysis of real scientific data, led by the Electron Microscopy Team in collaboration with an international team of researchers. This project launched on the Zooniverse platform (zooniverse.org) in 2025 and is live and openly accessible to anyone with an internet connection. Project volunteers help study images that have been taken of kidney biopsies, with the overarching aim of advancing our understanding of chronic kidney failure, which is a significant problem impacting about 11% of the world's population.

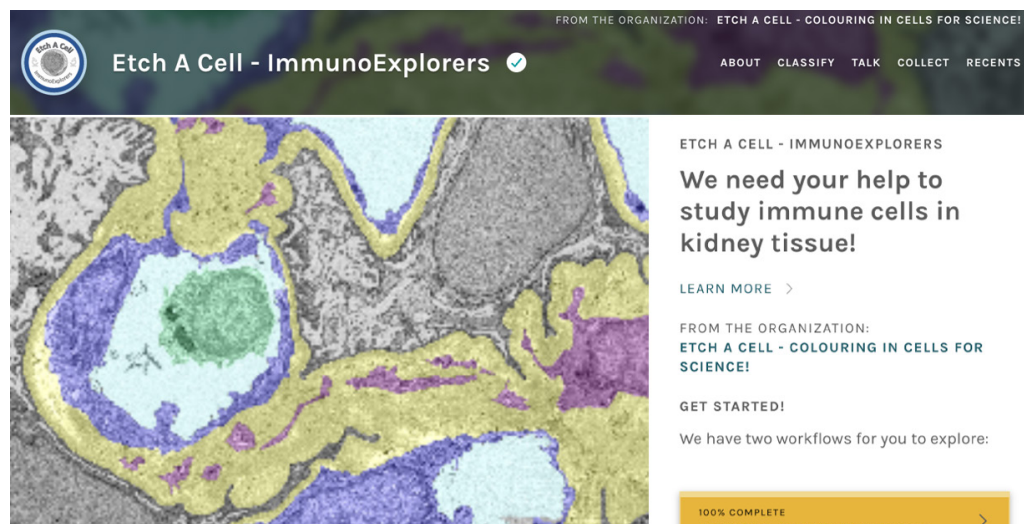
We were able to engage pupils in the Etch A Cell - ImmunoExplorers project through the 'Picturing Science in Schools' programme. We designed educational materials based around one of the Etch A Cell – ImmunoExplorers project workflows; 'Nuclei Hunters'. This workflow was selected as the focus of this component of our outreach

programme as the project task was relatively quick and simple to communicate – the pupils were asked to contribute to the analysis of project data through drawing boxes around fluorescently-labelled nuclei; which could be easily identified in the project data as blue splodges (to put it simply). Each pupil was able to spend about fifteen minutes trying this 'Nuclei Hunters' workflow on a tablet.



The 'Classification Interface' of Etch A Cell – ImmunoExplorers: Nuclei Hunters workflow. Pupils used a 'Box Tool' to mark any blue-highlighted nuclei they could see.

Before the pupils contributed to the Nuclei Hunters workflow, we spent about five minutes teaching the Pupils basic cell biology. The educational level of what we described had been discussed and agreed with Camden teachers, to ensure we connected with the pupils' curriculum where possible. We described what a cell is, what an organelle is and some of the main ones (nuclei, mitochondria, endoplasmic reticulum) before showing the pupils how these structures can be identified in an electron



Etch A Cell – ImmunoExplorers is an online citizen science project hosted on the Zooniverse platform ([zooniverse.org](https://www.zooniverse.org)).

microscopy image. This required us to think carefully about how we could simply communicate the work we do as professional electron microscopists; we focused on breaking the task down into simple digestible instructions, e.g. to find a cell nucleus, look for a round shape with a dark grey outline.

The pupils then had a chance to apply this knowledge in practice through their participation in the Nuclei Hunters workflow. We were really impressed with how well the pupils contributed to the task; they were able to effectively use the technology involved and understood the complex topics we covered. Some of the pupils did struggle to concentrate for the entire activity, hence, designing an activity that can be easily adapted to suit different attention spans is something we would recommend for any in-school engagement projects.

Beyond microscopy to satellite imagery - Incorporating NASA data in our programme

We have also showcased other forms of scientific imagery in our 'Picturing Science' Programme. In 2024, the third iteration of our Science Ambassador programme, we used satellite images to explore some of the fundamental properties of images, such



A collection of samples prepared by pupils.

as pixels and colour. To develop these educational sessions, we took inspiration from the school's STEAM theme of 'Dear Earth' and worked in collaboration with scientists from the Met Office to generate an activity using NASA satellite image data of retreating ice sheets in the Arctic. We facilitated some discussions around climate change with the pupils where we embodied a neutral approach to encourage pupils to make conclusions from the data they were observing rather than introduce bias from any news they had heard.

Formal evaluation from our first and second workshop highlighted that the pupils enjoyed computer-based activities, which encouraged us to build this new workshop using web-based tools developed by Crick members. Web-based tools were chosen to remove the need to install anything on the school's devices. Paper versions of the activities were also created in case of technological issues. Being computer based, we also had the ability to package the entire workshop and its resources online onto GitHub, so it can easily be shared with the image analysis community for wider outreach (<https://github.com/FrancisCrickInstitute/image-analysis-outreach>). In the first activity, the pupils learned how to estimate the ice coverage in the series of satellite images of the Arctic by counting squares in a grid. The pupils were encouraged to use their scientific skills to make conclusions. In the second activity, the pupils learnt how to combine different colours to make a specific colour on a screen. The pupils used a customised version of a publicly available colour slider tool to make a colour of their choice, including the colour of their favourite cartoon character on screen. This workshop on NASA satellite imagery also introduced how computer programming can help us with image analysis and can do it much faster than we can. It and the Etch A Cell projects also highlight how AI and machine learning are used to assist in data evaluation; something that will only become a more regular part of pupils future day-to-day lives both at home and work.

Diverse Crick team and positive impact

The Crick team included a range of science



disciplines, including electron microscopists, image analysis specialist', light microscopists and computer programmers. This meant we delivered the fourth year of the outreach programme alongside the most diverse team to date with respect to scientific discipline. This team from the Crick gave the pupils a broad range of scientists to engage with, from a variety of disciplines, backgrounds and career stages from placement students to facility leads. This demonstrates that anyone can be a scientist, dispelling the traditional stereotypes.

A key feature of modern science, and indeed society, is the rapid adoption of a range of computational and artificial intelligence tools, meaning the landscape of scientific jobs will undoubtedly look very different when the primary age pupils come into the workforce. By introducing these tools in the context of our activities, we aim to provide the pupils with a well-grounded introduction to these concepts. This opportunity to deliver the Picturing Science in Schools programme is a highlight of our year. We look forward to continuing this Science Ambassador programme in 2026, bringing scientists together from a broad range of disciplines to deliver the programme.

If you are thinking how to start your journey into educational outreach for whichever age group, take a look at the STEM Ambassadors programme, funded by UK Research and Innovation and powered by STEM Learning: <https://www.stem.org.uk/stem-ambassadors>.

Some of our tips for taking your science into your local schools:

1. **Connect to a school before you get started** – learn what they need and how you could support. Ask what topics the school is covering and what the learning objectives are. Check the likely prior knowledge and needs of the pupils you will work with.
2. **Variety and interactivity are powerful** – include a selection of teaching, pre-recorded videos, online activities and physical items in your session to appeal to a broad variety of interests and learning styles. Interaction helps hold attention. Consider how your session can be designed to encourage participation from all the pupils, not just the most confident. Keep timings tight, and plan for your set-up, pack-down and transitions between activities.
3. **Logistics and technology** – research ahead of time the school's parking provision, sign-in process, AV compatibility, internet access and in-room provisions. And remember, technology can fail – make paper back-up of activities, if possible.
4. **Ask for the support you will need** – Agree a management plan with the teacher – clarify what expectations are placed on the pupils' behaviour and agree who will handle disruption.
5. **Think about impact and evaluation** – what positive changes are you hoping to achieve through your efforts? What feedback can you get from the teachers or pupils to improve your future work. Remember to think about this before planning any activities so that you can evidence the ways your project has been successful and how it may be improved.