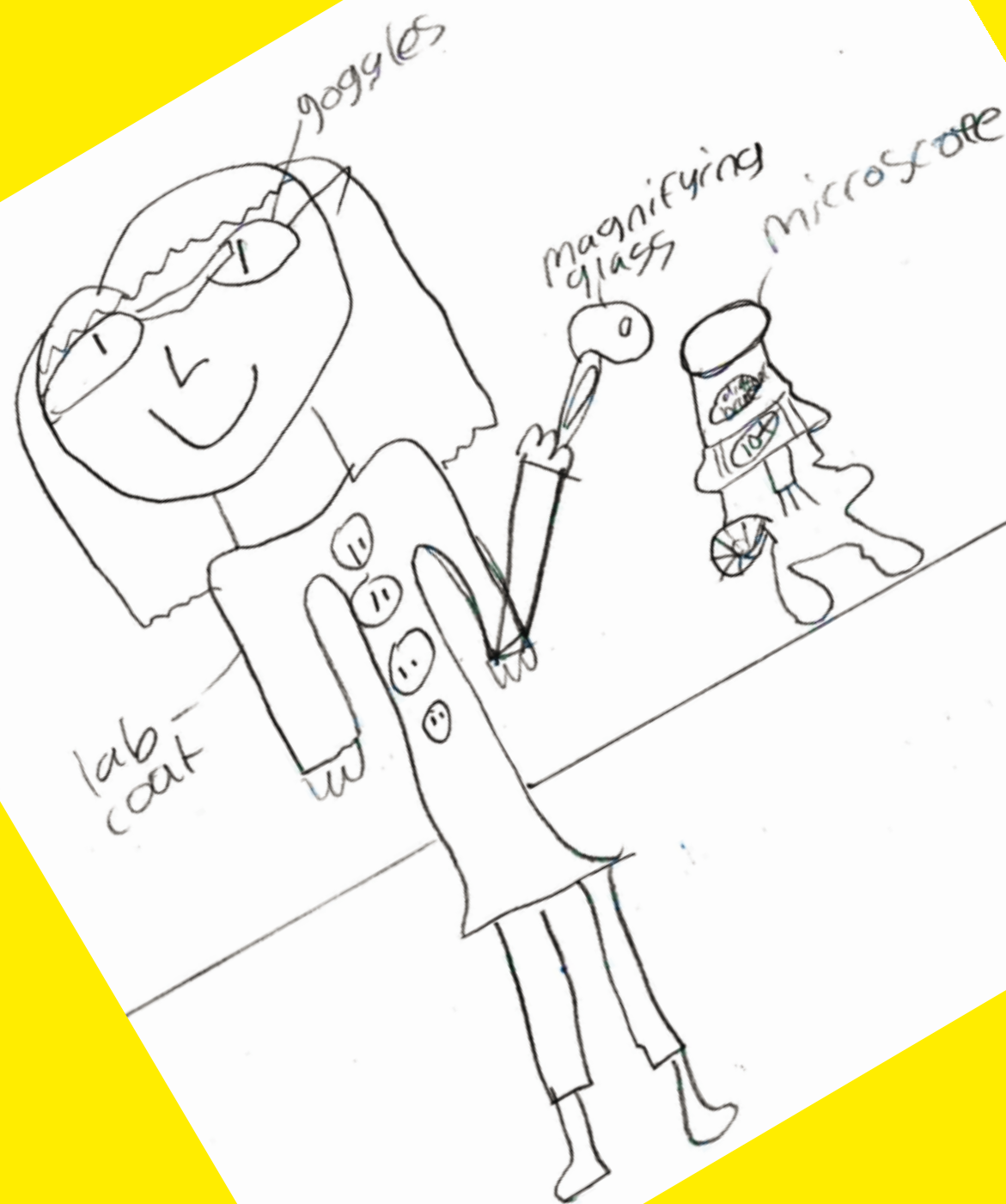


Stepping inside the cell:

using microscopy to promote primary school science

During the spring of 2010, I undertook a microscopy project at my local primary school. The project was a collaboration between myself and a dynamic and enthusiastic teaching assistant at the school, who was keen to promote science within the classroom. The project, entitled “Stepping Inside the Cell”, was supported by a grant from the Royal Society which provided funds for the purchase of 16 QX5 digital microscopes. The aim of the project was primarily to excite and inspire the children by experiencing working with a “real” scientist and carrying out their own investigation. In addition, we wanted to give the children a realistic impression of what it is like to work as a scientist, and to dispel some myths.



I visited the school for one afternoon a week over a five week period working with Year 5 children. The project began with a question and answer session "things I'd like to ask a scientist" which resulted in the expected "do you make things explode?", "do your colleagues have mad hair?" along with other more insightful questions about how you become a scientist. Once we had dispelled some myths and pointed out I was actually quite normal (and mum to a member of the class), we began teaching the children how to use the microscopes. The microscopes were connected directly to a computer to enable easier viewing of the samples by younger children. This also helped the teaching staff see if a child was actually looking at the right thing! First the children observed coins, pen marks and wool, and learnt how to record their findings. They were encouraged to keep lab books up-to-date with methods, results and conclusions, and some very careful drawings of what they had viewed down the microscopes. Having mastered these skills, the children were able to carry out their own investigation into the similarities and differences between plant and animal cells. This entailed making their own slides of onion skin, pond weed and cheek cells, and recording their method, results and conclusions each week in their lab books.

To link the work to my own research, each week I showed the children scientific papers with cell images, posters I had taken to meetings and movies made in my laboratory of migrating cells. Within a couple of weeks, the children were able to make slides, locate cells under the microscope and identify the cell wall, membrane and nucleus. We encouraged the children to save their best images and subsequently these images were used by the children to make their own scientific posters. These posters were presented to the whole school, parents and invited guests at a mini conference one evening after school. The posters looked fantastic and were described by a visitor from the Royal Society as "very professional". The children were really proud of their achievements and keenly demonstrated their new found technical skills to younger pupils, parents and staff. The evening was a great success, and comments left by visitors indicated that the project has inspired the Year 5 children, raised

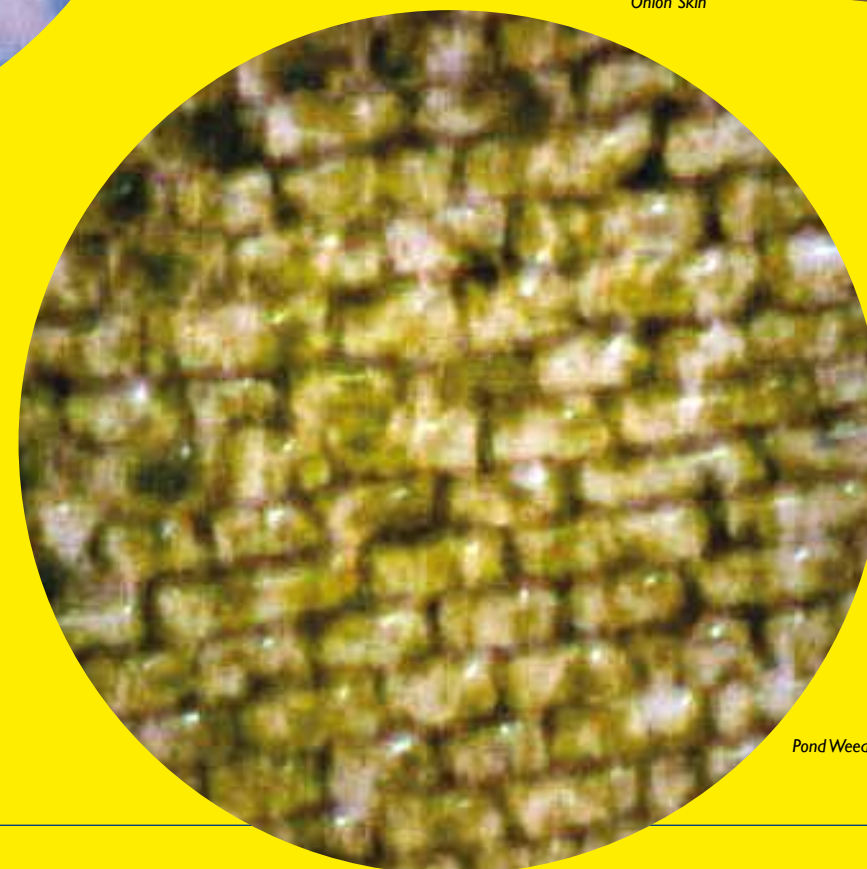


Cheek Cells

"The best part was making the slides because we used different things like onion, pond weed and cheek cells."



Onion Skin



Pond Weed

Comments from the children during the evaluation clearly demonstrated how the microscopes had helped to bring the science alive.

the profile of science in the school and impressed the wider school community.

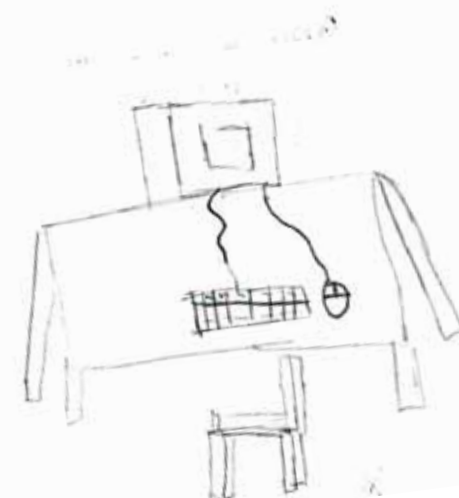
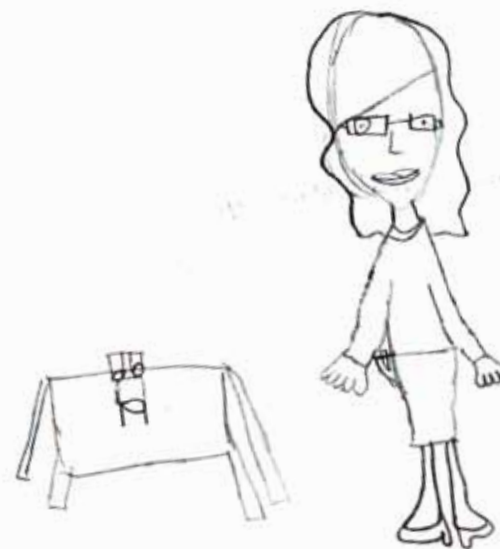
We were also delighted to welcome Melvyn Dodd from Carl Zeiss Ltd into the school to show the children a commercial microscope. The children were treated to a display of historical and state-of-the-art digital microscopy and were able to view their own samples at high magnification. Indeed, one of the pupils was very excited to spot cytoplasmic streaming in the pond weed sample. Towards the end of the project the class travelled to London to visit the Natural History Museum where they took part in an "Investigate" workshop. The children were able to choose and examine specimens (using microscopes and magnifiers) that interested them from the huge bank available, including such exciting objects as fossils, snake skins and shark jaws. As well as the museum staff, some of my PhD students and postdoc colleagues came along to support the children as they developed and investigated their own ideas. It was a great opportunity for the scientific staff to interact with teachers and children and all those who volunteered felt it had been an enriching experience.

After completion of the project the children were asked once again to contemplate what it means to be a scientist by drawing a picture of a scientist. It was interesting to note that many of the children had pictured themselves as the scientist and included features that were recognisable as themselves, and even labelling their scientist as Dr. and inserting their own name. The stereotypical image of a "mad scientist" did not appear in the children's drawings. Comments from the children during the evaluation clearly demonstrated how the microscopes had helped to bring the science alive.

I thoroughly enjoyed my time with the Year 5 class and am now planning to continue using the microscopes to promote science in the school. I have already used the time-lapse function to record cress growing and bean roots sprouting with the younger children in Reception. Next year we will run an afterschool club "The Hidden World of Northlands Playground" and repeat the Year 5 project. I was amazed at how easy it



The Children's view of a Scientist



was to use microscopes with primary school children and am convinced that microscopy is a fantastic way to encourage science enthusiasts from an early age. I am delighted that I have been invited to join the RMS Education and Outreach Committee and hope to bring my experience to the RMS AMFES initiative.

I would like to thank Mrs. Tiller without whom there would have been no project; her enthusiasm for science teaching was an essential element in our success. I would also like to thank Mrs. Symons (Head Teacher) for her constant support. Big thanks also to the Year 5 children at Northlands Primary School who made the project so enjoyable and to the staff and students of King's College

London and to Mr. Melvyn Dodd who generously gave their time. We are extremely grateful to the Royal Society for the partnership grant that provided funds for the microscopes, equipment and school trip to the Natural History Museum. Finally I would like to thank Virgin Trains staff for assistance at both Rugby and Euston Station.

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"I think the best part was when we got to use the microscopes to see the cells."

"The best part was using the QX5 microscopes."

"What really impressed us about this project is the huge enthusiasm shown by the children taking part – An interesting and enlightening exhibition." Visitor

"I loved working with microscopes and cells!" Y5 pupil

"It was nice for my son to have an opportunity to showcase his work and demonstrate the project process and findings. The project has been getting great reviews at home!" Parent

