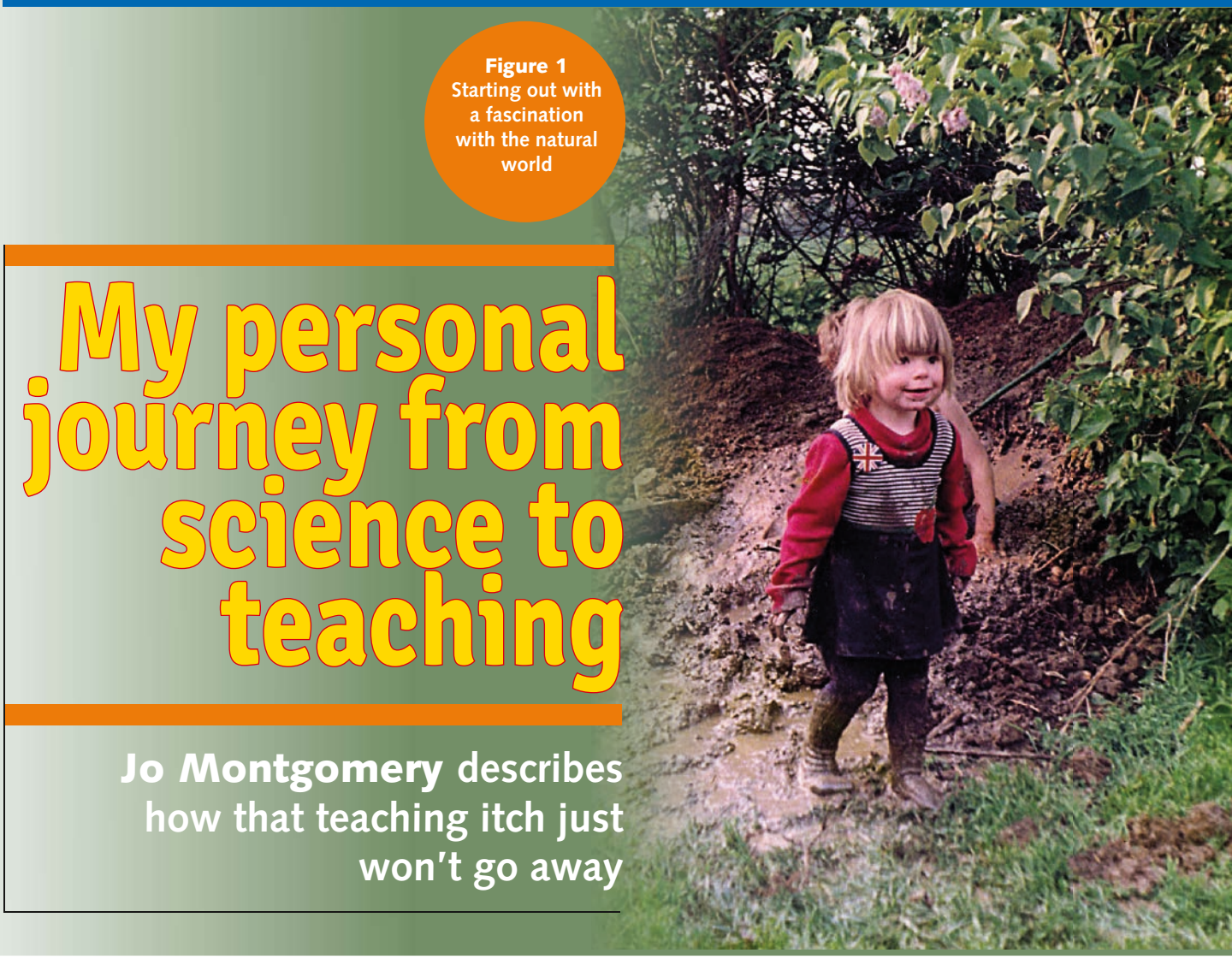

Figure 1
Starting out with a fascination with the natural world

My personal journey from science to teaching

Jo Montgomery describes how that teaching itch just won't go away

I think I was always a scientist. From my earliest days as a toddler pottering about in the mud in my 1970s garden, watching ants and collecting worms, woodlice and snails, I have always been fascinated with the natural world (Figure 1). Although this directed me through school and university into a scientific career, I have also always been a bit of a polymath (essential for a primary teacher!) and I love art, languages, history and people as well.

My love for science comes from being curious, wanting to find things out and learn about new things. In fact, if anything were possible, I think I would probably like to be a student forever – thankfully, life is about continuous learning.

School days

My primary school days were well before the advent of the National Curriculum in England and before science was seen as a subject in primary schools. Fortunately for me, I went to a progressive, creative, wonderful primary school with lots of hands-on learning and investigation as well as nurturing and supportive teachers. I remember little formal science learning, aside from a project on Copernicus and a trip to the planetarium in London, a session making butter (conducted in silence with each child shaking a jar of cream for 60 seconds before passing it on) and a self-directed secondary research natural history project on animals in fourth-year juniors. I do remember plentiful opportunities for discovery in our learning, however, with what seemed to me to be open-ended investigation and play-based learning with Cuisenaire rods, time in the school grounds and at the water table.

My overwhelming memory of my time throughout infant school is of play in the home corner – with wooden shops and sturdy plastic cubes which could be made into chairs, tables, beds and more – and singing in assembly. I can recall the odd bit of writing (and being praised for using the word 'browse' in a recount of my weekend in first-year infants), desperately trying (and usually failing) to remember what I had done at the weekend to put into our Monday morning 'news' writing books, often resorting to a fabricated tale of a picnic or visit to the zoo. I remember red-and-white maths booklets, which were a joy to fill in as you turned each fresh page, and learning about immersive topics such as the Tudors (with a trip back in time to Kentwell Hall in Suffolk – where I have since taken my own children on a school trip), mountains, maps and rivers and Dick Turpin.

Key words: Careers

I did not reliably know my times tables and I couldn't tell the time by the end of year 4 (age 9). I had no idea about fronted adverbials. My reading isn't a product of synthetic phonics, although I do recall watching a floating pen tracing out letters and illustrating the 'magic e' on the giant television wheeled into the school hall. I could tell you about alliteration and onomatopoeia, but appear to have had no formal grammar teaching until secondary French lessons. The advent of the National Curriculum has undoubtedly levelled the playing field, ensuring a standard of education across the country, but there have always been teachers doing a phenomenal job of teaching and inspiring children.

Further study and research

My undergraduate degree in biology and biochemistry (with French!) fuelled my love for experiments and I was mentored and deeply influenced by an amazing mature doctoral student who inspired me to take my research further. She was juggling life as a mother of young children with working as a technician and demonstrator in our university practicals, as well as carrying out part-time research and studying for a PhD. She had originally been a nurse and then worked in clinical trials before deciding to retrain. I feel extremely fortunate that she saw some potential in me, including me in her research and scaffolding me to get involved in her project on reproductive behaviour in mice. There is always a teacher figure at the heart of what makes us tick, isn't there? Even at this point, I didn't have a master plan of what I wanted to do and where I wanted my career to go. I knew that I was enjoying scientific discovery and academic research and just wanted to carry on.

My first proper foray into scientific research came as an undergraduate student, when I was successful in gaining a summer scholarship, prompted by my mentor, from the Universities' Federation for Animal Welfare (UFAW) to study the rescue, rehabilitation and release of abandoned seal pups in North Norfolk (Figure 2). While I was there, I also wrote a paper on the effects of environmental enrichment on behaviour in captive seals. I have always been motivated by doing things that make a difference, and working in animal welfare was something I was incredibly passionate about. It is quite unusual to have a paper published as an undergraduate and this spurred me on to pursue research further.

Figure 2 Studying the rescue, rehabilitation and release of abandoned seal pups in North Norfolk

I studied for a PhD in neuroscience at the University of Cambridge. Continuing my interest in animal welfare and supported by what was then the Ministry of Agriculture, Fisheries and Food (MAFF), I investigated the effects of stress in pigs (happy pigs equals better bacon!). I loved the variety of research – questions, theories, experiments, lab work, reports, presentations, lecturing undergraduates – and I was equally frustrated when things didn't go to plan, funding was cut, or 48 hour experiments became a little monotonous. Studying for a PhD, and subsequently continuing my research as a postdoctoral scientist, helped to shape my transferable skills such as project management, problem solving, organising, writing, public speaking, research, writing reports, teaching and training. I lectured undergraduates and mentored graduate students, developing key teaching skills.

I am the product of two teachers, liberal and supportive parents who, although they loved their chosen careers, urged me not to go into teaching as the pay was terrible, the hours long and the recognition lacking. I found myself in academic research where the pay was terrible, the hours long and the recognition lacking. And it didn't even come with school holidays!

Moving on

I started my family as a young postdoctoral researcher and the relentless hours of research were not compatible with parenthood. I am sure many of you who are teacher-parents will identify with these issues too. My children are the product of two research scientists (so far it doesn't look likely that they will be following in our footsteps!). Thankfully, times have changed in recent years and there is now much more support and job flexibility for academic researcher parents (and teachers too in the right school). Sixteen years ago there wasn't the option to work part time and my experiments did not fit neatly around nursery hours. I also wanted to spend time with my children. When they were very small I juggled being with them with part-time roles in the pharmaceutical industry, working in preclinical development and clinical trials, and I also worked as a baby and toddler swimming teacher and was chair of governors for my local primary school (I did mention polymath!).

Figure 3 Delivering hands-on science in schools as Dr Jo Science Solutions

My personal values have always been imperative in the decisions I have made about my life choices. It is incredibly important to me to be making a difference, benefitting others, giving something back and doing some good in this world.

I continued the voluntary outreach work I had begun to get involved in as an academic research scientist, running laboratory projects for GCSE and A-level students and later delivering sessions in primary schools as a STEM Ambassador. Little by little, I was eroding the barriers I had erected around my not 'teaching'.

When my youngest daughter started school, I combined my previous experiences into one fabulous job: running the educational outreach for a pharmaceutical company delivering hands-on science workshops in primary and secondary schools, running STEM clubs, hosting industry visits for FE and HE students, mentoring students, organising work experience, attending careers events and delivering teacher CPD. I absolutely loved it and was thrilled to have the opportunity to engage and inspire so many children and young people.

Into the classroom

After seven years in the role, that teaching itch just wouldn't go away. A local primary head teacher from one of the schools I worked with had spent several years trying to convince me that I belonged in the classroom. Eventually, I gave in and trained with School Direct in his nurturing, wonderful school. The pay was terrible, the hours long and the recognition not always evident, but the rewards were great. It is a privilege to spend your days with children, helping them to be the best they can be. I have taught year 2 (ages 6–7), year 4 (ages 8–9) and year 5 (ages 9–10). I don't know which is my favourite year group to teach – they each have their own special qualities. Interestingly, perhaps due to time and curriculum constraints, science has not always been my favourite subject to teach formally. I often find that there isn't enough time for proper practical investigation – letting children be curious and find things out – and the requirement for written content can stifle some children's love of science.

Many primary teachers are doing a fantastic job bringing the science curriculum alive. Striking a balance between hands-on, engaging, child-led investigation and explicit content teaching can be tricky and there is a place for both, interwoven with working scientifically and critical-thinking skills. Research suggests, however, that a third of primary teachers are not confident teaching science. 62% want more professional development to build their confidence and 39% think there is a need for a science specialist within their school. More than a third (36%) of schools are not providing the minimum recommended two hours of science every week in key stage 2 (ages 7–11) (CBI, 2015).

There are many cross-curricular opportunities for teaching science, including within literacy and maths. Rather than squeezing these aspects into just two hours a week for a core subject (compared to more than five for each of maths and English), I believe that science content should spill over into other lessons: use the engaging science content as a hook for writing and use real data in mathematics.

Final thoughts

People outside of teaching have no concept of how all consuming and relentless the job is, including those who have been involved on the periphery of education for many years, but we do it because we care. I have (and perhaps always have had) what is probably best described as a 'portfolio career' and more recently have been combining part-time primary school teaching with adult training back in the science world, as well as delivering enrichment and curriculum-supporting activities as a science specialist with Dr Jo Science Solutions (Figure 3). For me, while the implicit rewards of teaching are great, in any other industry the job would not fall on just one person to deliver the entire curriculum as well as all the required assessment and pastoral roles.

At another crossroads in parenthood, when I find that my own children need more academic support as they embark on GCSE exams and beyond, I have decided to take a break from being a class teacher and focus on my passion for delivering practical science in schools. As a lifelong learner, I am interested to know where my teaching journey will take me next!

Reference

CBI (2015) *Tomorrow's World: inspiring primary scientists.* London: Confederation of British Industry.

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