

Editorial

- Amanda McCrory

'Most primary classes [in England and Wales] get less than two hours of science classes per week!' (TES, September 2017).

This headline, underpinned by *The State of the Nation report of UK primary science education* (CFE, 2017), commissioned by the Wellcome Trust, is *alarming* but yet not surprising to those of us who work in primary science education. Indeed, the outcomes of this report state that, on average, across all primary age groups, 58% of classes do not receive at least two hours of science teaching per week and this is after taking into consideration schools that take a cross-curricular approach to teaching science, as well as science trips and science weeks. In addition, 12% of the schools surveyed (1,010 teachers and 902 science leaders) were not delivering weekly science lessons to any year group.

The findings of this report reinforce the view of the Confederation of British Industry (CBI) Director General John Cridland (2015, p.3), who noted that *'Science education in primary schools is being squeezed out, with too many schools struggling to teach the recommended two hours per week'*. In addition, over half the primary teachers surveyed in the *Tomorrow's World* report (2015) stated that they believed that the teaching of science in primary schools has become less of a priority. Furthermore, the outcomes of the NFER Teacher Voice Survey (Wellcome Trust, 2016) reported that, of the 740 respondents to the survey, 48% taught between 1 and 2 hours of science per week, 19% 30 minutes to one hour, and a small percentage, 4%, teaching less than 30 minutes per week. In addition to those surveyed, 24% noted that they did not teach science every week. In comparison with England's international cousins (for example, Spain, Japan and the United States), on average science is taught 8.6% of the week compared with just 6.1% in England (TIMSS, 2015; CaSE, 2017).

One then must ask the question of how schools who don't teach science weekly or for the recommended amount of time expect the children who they teach to make progress in their conceptual understanding of science alongside their process skills? It is important to highlight that process skills cannot simply be honed, in an *ad hoc* fashion; they need to be planned for and developed over time, so that a child progresses in his/her process skills whilst developing a deeper understanding of scientific concepts (Allen, 2016).

When the Department for Education (DfE) abolished science statutory testing (SATs) in 2009 in favour of teacher assessment, it was recognised that this move, in part, was a response to alleviate the pressures on curriculum time and to allow children to develop an enthusiasm for science. Note that SATs testing for English and maths remained and continued to be published in league tables, along with the introduction of Level 6 testing in 2012 – although these have since been abandoned – to cater for children who were categorised as more able in English and maths (the top 2% in the country, whose work in class reflected the standard expected of a 14 year-old). Would it therefore be provocative to suggest that enthusiasm for English and maths

was not an issue – as well as pressure on the curriculum, teachers or pupils – in the eyes of the Government?

The decision to abolish science SATs backfired hugely and in itself devalued the status of science; some schools – pressured by the expectations of attainment for English and maths and the knowledge that English and maths would be the focus of inspections, rather than science – took more and more of the curriculum to focus on these areas: not good news for science, or for all the other subjects in the primary curriculum.

In 2013, Ofsted reported that assessment for scientific enquiry was not well developed in some primary schools (around one third) and that there was less planning for different needs in scientific enquiry than in knowledge and understanding. They argued that programmes of study of science education for all year groups should be balanced, providing opportunities for children to develop their knowledge and understanding of scientific concepts while developing their process skills; hence the changes to the National Curriculum in 2013, hopefully teaching via scientific enquiry (a statutory requirement) are now becoming embedded in primary science (when taught), but only time will tell.

However, issues for schools in providing effective science education includes additional barriers. A lack of resources, the fear amongst teachers of delivering a curriculum in which they might not know the answer, to almost non-existent CPD opportunities for primary teachers as well as a lack of support and opportunities for networking with others, only compound the issue of delivering effective science education even further (Wellcome, 2017).

How can this be possible, given that science has the status of a core subject, being '*a compulsory subject in schools from 5-16*' (DfE, 2013) alongside English, maths and IT in schools in England and Wales, especially when there are bodies such as Ofsted in place to monitor the provision of education in those countries (Ofsted, 2015)?

In September 2015, a Wellcome Trust review of science in schools examined the extent to which Ofsted reports about English schools mention science. They were interested in examining this, given, as we can see, the continual concerns that science has been losing its status in many primary schools in recent years (Ofsted, 2013) and the authority and influence that Ofsted has on the behaviour of schools, with its role in verifying teaching and learning of a broad and balanced curriculum. Therefore, the Wellcome Trust asked, is the provision of science in primary schools a priority for Ofsted?

A preliminary review of Ofsted's full inspection reports from 770 primary schools found that 93% of reports did not mention science at all. This prompted a more thorough examination of recent reports using a sample of 100 schools in 2014; 73% of primary school inspection reports did not mention science, while 100% mentioned maths and English. In comparison, in Northern Ireland, 90% of primary school reports did not mention science, neither did 80% in Scotland – with only Wales bucking this trend: 100% of primary school reports undertaken in Wales mentioned science. In recent years (2016/2017), there has been an improvement in the mention

rate of science in the Ofsted reports of primary schools, with 47.8% of reports referring to science, but still far behind the 99% of reports that mention maths and English (Wellcome, 2017). Disappointingly however, many of these reports mention science only in relation to how science lessons are being used to reinforce writing skills; in reality, only 15% of the reports that mentioned science focused on enquiry, therefore failing to highlight critical issues with curriculum time spent teaching science and the quantity and quality of practical work!

Therefore, how do Ofsted explain their lack of focus on the quality and quantity of provision for science when inspecting primary schools, and the conflicting message that this sends to those responsible for science provision in primary schools? It is imperative for those schools narrowing science provision to understand that a broad and balanced curriculum benefits all children in their knowledge and understanding, and skills across the curriculum, and that they would be wise to rethink and address their provision for science education to ensure that all children receive a quality and inspiring science education.

With all of this in mind, journals such as *JES* play an important role in science education for those who provide and facilitate opportunities for primary-aged children to engage in science education through providing up-to date and relevant information about developments within the field, reporting on and including the outcomes of cutting edge research, as well as providing a narrative around and about school research-based initiatives, often presented via the research articles included in the journal as well as school-based research reports provided by the PSTT.

The *State of the Nation report of UK primary science education* (CFE, 2017) was published to mark the launch of 'Explorify' a new, free digital resource available for school science (www.explorify.wellcome.ac.uk), which is updated regularly and available online for everyone to access. We highly recommend that teacher and science educators sign on and take a look – they will not be disappointed.

In this issue, I present the second part of my paper, ***Scientific enquiry in primary schools***, in which I examine and discuss the good practice taking place in primary schools in England and Wales.

My colleague and Co-Editor, **Suzanne Gatt**, presents the outcomes of a small-scale research project undertaken in Malta, investigating whether or not inquiry can be effectively included in homework activities for science.

Pedreira and Marquez present an interesting paper examining a specific analysis of activities, ***Can I touch?***, designed to promote scientific inquiry for 2-6 year olds and carried out in the Natural Science Museum of Barcelona, thus promoting science education outside of the classroom.

Continuing the theme of informal learning opportunities and environments for scientific inquiry, **Wenzel and Scheersoi** critically reflect on the use of a Discovery Cart to promote interest in children when exploring a wildlife park in Germany.

From the Primary Science Teaching Trust (PSTT), **Ian Milne** presents a reflective narrative about his experiences in his long career as a science educator.

We hope that you enjoy this edition and that, if you are a classroom practitioner, it inspires you to be creative with the opportunities that you provide for science education, both in and out of your school. Furthermore, if you are a school leader, we recognise that by reading *JES* you are unlikely to be one of the 58% mentioned in the Wellcome report; however, if you are, we would urge you to find a way to provide the children for whom you are responsible with, at least, the recommended time to engage in science learning. This can only benefit all!

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