

ASSOCIATION OF TEACHERS AND LECTURERS

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Science and Learning Consultation
Response from the Association of Teachers and Lecturers
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ATL, as a leading education union, recognises the link between education policy and our members' conditions of employment. Our evidence-based policy making enables us to campaign and negotiate from a position of strength. We champion good practice and achieve better working lives for our members.

We help our members, as their careers develop, through first-rate research, advice, information and legal support. Our 160,000 members – teachers, lecturers, headteachers and support staff – are empowered to get active locally and nationally. We are affiliated to the TUC, and work with government and employers by lobbying and through social partnership.

ATL policy

ATL believes that teachers as professionals must be recognised for their knowledge, expertise and judgement, at the level of the individual pupil and in articulating the role of education in increasing social justice. Within national parameters, development of the education system should take place at a local level: the curriculum should be developed in partnership with local stakeholders; assessment should be carried out through local professional networks. Schools and colleges are increasingly encouraged to work collaboratively to offer excellent teaching and learning, and to support pupils' well-being, across a local area. Accountability mechanisms should be developed so that there is a proper balance of accountability to national government and the local community, which supports collaboration rather than competition.

ATL response

ATL is pleased to have the opportunity to contribute to the work of the Science and Learning Expert Group. We believe it is important for young people to see their studies at school within a wider context and not simply focus on taking tests. It is welcome that the expert group seeks to advise on providing the best possible science education to the next generation of students so that they may progress and achieve in science study and careers.

This brief response outlines our policy on learning in general and to science education specifically. ATL has a considerable body of evidence-based work that we believe the expert group will find useful. Attached you will find:

- *Subject to Change* – ATL's position statement on the curriculum

- *Assessing to Learn* – ATL’s position statement on assessment
- *New Professionalism* – ATL’s position statement on the teaching profession
- Foreword, and chapters 4 and 5 from *Subject to Change: New Thinking on the Curriculum* – pamphlet published by ATL

Early Years

ATL believes that providing the best science education for young people starts in the earliest years of learning, in the early years foundation stage and throughout the primary curriculum. There is much evidence of the similarity between the ways in which young children make sense of the world and the processes of science. (See for example Andrew Meltzoff et al *The Scientist in the Crib: Minds, Brains, and How Children Learn*.) The early years and primary curriculum should build on these processes, rather than turning children off science with a focus on facts and figures.

There is also plenty of evidence that young children learn best through play. This is not to suggest that play should be structured in such a way as to try to “teach” scientific (or any other) concepts, but certain aspects of play could lay the foundations, often subconsciously, for these concepts. It is about enabling children, through their own self-directed play, to explore the world around them and to form their own hypotheses and questions. The importance of a rich and well-resourced environment, both indoors and outside needs to be emphasised, as well as the need for practitioners to have a good understanding of how to support and develop children’s play so that they can help children to understand scientific concepts and processes at their own pace.

In previous discussion about early years science, an ATL member suggested:

For me, playing with sand is all about the nature of materials. It is of course a solid, and individual grains can often be some of the hardest minerals on the planet. However, let it trickle through your fingers, and it almost feels like a liquid. It will even act like one. Let it turn a waterwheel, it will work just as well as water. What have you got to do to make it more solid; mix it with water! Why does this work? How does water bind the particles together?

*These are the kind of questions we want children to think about. Of course this might lead them to ask one or two awkward questions themselves later on. In year six, or in the secondary school, when they are told that there are three states of matter; solid, liquid and gas, might they not want to know where jelly fits into this pattern, or treacle, or toothpaste; and doesn’t glass, a solid, still flow even when cold, over many years anyway? **I hope they do ask such questions. It will help them to realize that science is not just about facts and figures, but a subject full of variation, imagination, and wonder.***

Because early years and primary teachers must teach across all areas of learning, it is impossible for all to have the same depth of scientific knowledge as those who have initial degrees in science subjects. It is important that all teachers have enough understanding so that they can, with support from subject co-ordinators, explore children’s interests and experience in order to meet their needs. Teachers need a deep knowledge

of scientific concepts and the strategies used to teach them effectively to individual needs. Teachers need not only a knowledge and appreciation of science, but also an understanding of ways in which most children will learn, so that they are equipped with many strategies to help children.

Getting excited

ATL believes that to increase the likelihood of the next generation receiving the best possible science education, both teachers and students need to be excited by what they are learning (and teaching). As science and technology is likely to play an increasingly prominent role in the 21st century, it should not be difficult to make the subject area relevant to the lives of young people and their teachers.

The science world needs an exciting and engaging curriculum that leaves room for teachers to learn and to innovate and allows the freedom to adapt quickly to changes in the landscape. It must develop content that is up-to-date and skills that students want to learn rather than being bogged down in thinking about how to pass their next test. There must be an attempt to fill the knowledge gaps of non-specialist teachers and develop their intrigue in the subject. Ultimately, science, like all subjects, needs inspiring teachers to inspire the young people they teach.

A local focus

Integrating schools' science teaching with the local community can provide an excellent opportunity to drive interest in science in schools and ensure science is valued as important and an attractive route post-16.

The encouragement of strong relationships between schools and employers is essential. This would ultimately lead to employers and individual scientists going into schools and colleges and students and teachers visiting workplaces.

ATL believes that careers education that supports participation in learning and raises aspiration can be of benefit to individual young people and society as a whole, as well as a school and its workforce. By working with partners in the community, schools can fill their own knowledge gaps around science careers and learning, provide impartial information and inspire young people to progress in science.

We strongly advocate careers education that has a local flavour, taking advantage of (and seeking to develop new) opportunities with employers as well as signposting education provision. There should be a coherent approach to providing young people with not just advice on, but opportunities to participate in or visit local employers, universities, FE colleges, work-based training providers and so on. The aspiration for careers education should be that this work is not ad hoc or solely in designated spells of work experience but based upon strong partnership working.

In schools, scientists may join teachers in the classroom to play with materials, to excite pupils with concepts and questions, to lead demonstrations, or they may talk to students about their career, the application of their work and how they got to where they are. They may support teachers' development of scientific understanding. Local university students may do similar. In workplaces, students and teachers could make day visits to see the work going on in their area and students could

undertake periods of work experience or longer, paid internships in the summer holidays could be developed. Each should be directly linked to what is taught in the classroom. We know that children learn best in relevant, everyday contexts. Making science seem close and real to students is essential – whilst these suggestions will be happening already around the country, the challenge is to encourage widespread practice and ensure relationships are lasting. Efforts should be exerted with employers in science-based industries and not solely prescribed to schools. Gender stereotypes around subject choice and science careers must be challenged. For this to have most impact, for it to be feasible in fact, it is necessary that the demands of the curriculum as it is currently exists are eased, freeing up time for teaching young people the skills they actually need to succeed in life within a light curriculum designed locally.

Supporting education professionals

Gordon Brown has described world-class teaching performance as “professionals who seek continuous improvement, who teach better lessons tomorrow than they did yesterday because they are learning all the time”. The science world can help ensure teachers are learning about the discipline and can play a role in suggesting ways in which teachers may integrate scientific values and skills across the curriculum.

In the ATL position statement, *New Professionalism*, we state that:

The teaching profession needs knowledge about the complex and compelling forces that influence daily living in a changing world, including the political, economic, technological, social and environmental, in order to know what pupils need to learn both in the present and for the future.

Contextualised scientific knowledge needs to be provided to teachers if the desired outcomes of the expert group’s work are to be achieved. This must make reference to the world that young people are growing up in and will emerge into following their education. Support from industry in emphasising the importance of thinking and learning skills – which include the scientific skills of investigation, enquiry, analysis and evaluation – will help develop students capable of engaging in science through their education and their life.

Conclusion

In this response we have pointed to the importance of curriculum, pedagogy, and teachers’ continuing understanding, confidence and enjoyment of science as particular issues to be addressed if we are to provide the best science education for children and young people. We believe that these issues must be addressed from the earliest years of education. We would welcome further opportunity to engage with this debate.