

Position Statement on Primary Science

The importance of biology in the primary curriculum: engaging learners in the life sciences

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Introduction

The Society of Biology is a single unified voice for biology: advising Government and influencing policy; advancing education and professional development; supporting our members, and engaging and encouraging public interest in the life sciences. The Society represents a diverse membership of individuals, learned societies and other organisations. We are committed to promoting biology as a subject of choice to pupils in schools, colleges and universities. We support and recognise excellence in biology teaching; champion a biology curriculum that challenges all pupils and encourages their passion for biology; support young scientists through higher education; and provide career guidance at all levels.

Primary science should inspire pupils and enable them to experience, enjoy and investigate more closely the variety of phenomena and wonders of the natural and man-made world around them. By encouraging them to ask questions about what they observe and test their ideas, science offers opportunities for pupils to engage in different types of scientific enquiry, draw simple conclusions and use some scientific language to talk about what they have found out.

This statement:

- Sets out our position on the distinctive contribution biology makes in encouraging engagement with, and enthusiasm for, science at an early age
- Signposts readers to existing high quality resources and support for primary science
- Recommends actions that will contribute to the delivery of high quality and inspiring learning and teaching of biology at primary level.

Importance of science in the primary school curriculum

Primary science ignites pupils' curiosity and offers opportunities to develop their observation, questioning and reasoning skills whilst increasing their appreciation, knowledge and understanding of the world around them and stimulating a lifelong interest in science.

The Society of Biology believes that is important to support and promote primary science because it:

- Offers pupils access to a fascinating body of knowledge, a way of working and a way of thinking that encourages lifelong learning and supports the wider life decisions young people will be required to make;
- Builds on pupils' curiosity, and develops their questioning, reasoning and problem-solving skills;
- Expands pupils' knowledge, understanding and appreciation of the world around them and the natural phenomena they encounter;
- Provides alternative and exciting approaches for engagement – including opportunities for outdoor learning;

- Supports essential cross-curricula activities and skills such as numeracy, literacy, communication, collaboration, manual dexterity and interpersonal skills.

Distinctive contribution of biology to primary science

Biology offers pupils the opportunity to engage with the diversity of living organisms, and their local and wider environment. It enables pupils to understand their own bodies and the changes they experience, and to apply a range of enquiry approaches to investigating and exploring the living world.

The Society of Biology believes that it is important to highlight the distinctive contribution that biology makes to primary science. This contribution:

- Demonstrates to pupils that they are part of the diversity of living things.
- Develops pupils' personal values and sense of responsibility with regard to living organisms and their environment.
- Offers an opportunity for informal learning in and about their environment.
- Is intrinsic to pupils' understanding and awareness of decisions related to health and wellbeing – such as healthy eating, personal hygiene, sex education, substance use and abuse.
- Enables pupils to develop an understanding of how their bodies function and changes they will experience (including puberty).
- Provides accessible contexts in which concepts from other areas of science might be experienced and applied.
- Allows for the collection and manipulation of a broad range of data, in a wider variety of contexts than is normally encountered in other areas of science at primary level.
- Offers exposure to concepts not encountered in the other sciences – such as growth and development, diversity and change, interdependence and classification, natural selection and evolution.
- Provides opportunities to develop skills and techniques not as frequently encountered in the other sciences – including sampling, surveying, sorting and classifying, observing living things, making a series of observations over time and using simple statistics.
- Encourages alternative ways of thinking about 'fair tests' and forms of science investigations. Due to the complexity and unpredictability of living things, it is not possible to control all the variables, or to manipulate single variables, when dealing with living organisms. Therefore pupils must devise alternative approaches for the systematic collection of robust data and evidence.

Development of scientific processes and investigative skills

Primary science education should encourage teaching and learning about “how we know” and “how we find out” as well as “what we know”. The nature and methods of science are the way in which scientists investigate scientific problems and create knowledge. In particular, at

primary school it is important to foster pupils' natural curiosity, by encouraging them to ask productive and meaningful questions and think about how they might answer them.

The Society of Biology believes it is important to highlight the development of scientific processes and investigative skills because this:

- Develops pupils as enquirers, encouraging them to formulate productive questions about the world around them – based on their own observations and experiences – and seek plausible answers and solutions to problems.
- Shows children that some answers remain unknown, and there is always more to explore and discover.
- Encourages the use of a broad range of methods and techniques to support meaningful enquiry that is relevant to the pupil.
- Offers opportunities for a variety of data to be collected and analysed, including through the use of IT, and for comparisons to be formed over a long period of time.

Teaching, learning and assessment

Enquiry-based approaches to learning should be at the heart of science at the primary level. Learning should happen through first-hand experiences – both inside and outside the classroom – and via secondary sources of data and evidence. High quality, on-going and formative assessment should be an integral part of high quality teaching and learning.

The Society of Biology believes that:

- Enquiry-based approaches should enable pupils to enhance their scientific knowledge, understanding, skills and attitudes and further develop their curiosity about the world around them.
- Pupils should have regular access to appropriate hands-on practical activities that:
 - support the development of motor, manipulative and age-appropriate technical skills;
 - underpin their understanding of key scientific concepts;
 - encourage them to ask productive questions, explore and investigate possible answers and communicate their findings to others; and
 - provide opportunities for developing both independent learning and team working skills.
- Learning should include first-hand experiences, the use of a broad range of secondary sources of data and evidence, dialogue and the discussion of ideas.
- There should be regular opportunities for teaching and learning outside the classroom, in a range of outdoor environments.
- Assessment is an essential part of teaching and learning and should:
 - be on-going and formative;
 - encompass a range of contexts;
 - include peer- and self-assessment;

- make use of a variety of approaches including verbal, written, pictorial, IT-based, and practical;
- encompass a variety of learning outcomes, including knowledge and understanding, application of knowledge, enquiry skills and technical/manipulative skills.
- IT and a range of other media should be used to support the collection, analysis, interpretation and presentation of data and evidence.
- Relevant extra-curricular activities make a valuable contribution to primary science learning. These experiences should be used to show the application of what is in the science curriculum, and allow for the development of breadth across science and links to other areas of learning.

Professional support for primary staff

At primary level there are very few specialist science teachers¹. However, within all primary schools there must be a whole school culture and responsibility to embrace the importance of science as a core subject within the primary curriculum that must be adequately and appropriately resourced², and which needs to be assessed. This must be supported at all levels, by headteachers, governing bodies, subject leaders, teachers and teaching assistants.

The Society of Biology believes that all those involved in the teaching of biology at the primary level must have access to, and make proactive use of, adequate and appropriate support, resources and continuing professional development. This needs to include:

- A coherent, flexible and dynamic programme of on-going, high quality subject- and role-specific continuing professional development (CPD), to:
 - support and recognise individual development and ensure a sense of ownership to undertake personalised CPD,
 - increase teacher confidence,
 - develop subject knowledge (especially among non-science specialists),
 - identify and address any misconceptions, and
 - raise the engagement and achievement of learners.
- Access to adequate and appropriate equipment and consumables for delivering practical science³, including a range of suitable outdoor learning environments.
- Robust networks to support science within primary schools – including science subject leaders/coordinators in every school who are empowered to support themselves, their teachers and their teaching assistants through access to appropriate CPD opportunities.

Role of Society of Biology

¹ [State of the Nation: Science and Maths Education 5-19](#), Royal Society, 2010

² [Resourcing Practical Science in Primary Schools](#), SCORE, 2013

³ [SCORE practical resourcing benchmarks for primary schools](#), SCORE, 2013

The Society of Biology believes that the key to maximising the impact of our efforts to support and enhance biological education from school to university lies in a greater degree of collaboration with pupils, teachers, and other science education stakeholders. We recognise that the teaching community is central to creating a society which values and understands the importance of living things and their environments and to developing the next generation of biologists. We will therefore focus on support for teachers in 5-19 education and develop new initiatives to provide teachers with excellent support and membership benefits.

The Society will develop a leading role in primary science education through the coordination of our Member Organisation activities, policy responses and support for non-specialist teachers in primary schools. In particular we will:

- Continue to promote the importance of high quality and practical enquiry-based biology education at all levels, with a specific focus on primary science.
- Continue to promote the importance of adequate resourcing of practical work within primary schools, including access to appropriate outdoor learning spaces.
- Work with relevant organisations to support an increase in the number of good quality biology specialists entering and remaining within primary science education.
- Ensure all other stakeholders (including, but not limited to, Government and its agencies, teaching staff and senior management) are well informed and understand the requirements and resources required to provide a high quality biological component as part of the primary science curriculum.
- Develop a clear link between current and future schemes that support and recognise individual development and ensure a sense of ownership within the teaching workforce to undertake a personalised programme of CPD.
- Develop a coherent position on how leadership in primary schools can foster engaging biology teaching and learning.
- Ensure both biology specialists and non-specialists have reliable and adequate access to biology-specific CPD through developing links with providers such as the National Science Learning Centre and the Science Learning Centre Teaching Consortia.
- Develop the Society of Biology into a leading source of information and support for biology at the primary level, through collaboration with our Member Organisations and encourage wider support from other bodies.

Primary resources for biology

Further information and support for primary science can be found on the Society of Biology website at: www.societyofbiology.org/education/teaching-resources/schools/other-resources.

Monitoring and review of impact of the statement and its content

This document, and the impact of the recommendations within it, will be reviewed on an annual basis and reported to the Council of the Society of Biology.

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The Society of Biology is pleased for this statement to be publicly available and will shortly place a version on www.societyofbiology.org. For any queries, please contact Gemma Garrett, Society of Biology, Charles Darwin House, 12 Roger Street, London, WC1N 2JU. Email: education@societyofbiology.org