

Practical Biology Position Statement

The Importance of Practical Biology: from School to Higher Education.

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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 over 80,000 - including, students, practising scientists and interested non-professionals - as individuals, or through learned societies and other organisations. We are committed to promoting biology as a subject of choice to students in schools, colleges and universities. We support and recognise excellence in biology teaching; champion a biology curriculum that challenges students and encourages their passion for biology; support young scientists through higher education, and provide career guidance at all levels.

Biology is a practical science. High quality, appropriate biology experiments and investigations are the key to enhanced learning, and clarification and consolidation of theory. Practical activities are not just motivational and fun: they also enable students to apply and extend their knowledge and understanding of biology in novel investigative situations, which can stimulate interest and aid learning and retention. Crucially, practical work gives students an understanding of how biological knowledge is generated by experiment and observation.

This paper:

- Sets out our position on the importance of high quality practical work to facilitate deep learning and understanding of biology;
- Sign posts readers to existing high quality resources; and
- Recommends work that will ensure delivery of high quality practical work across the sector from Primary School to Higher Education.

Importance of practical work in science

Practical work is a key factor in engaging, enthusing and inspiring students, thus stimulating lifelong interest in science. High quality, appropriate practical work is central to effective learning in science.

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

- Stimulates creativity, curiosity and critical thinking
- Underpins and illustrates concepts, knowledge and principles
- Promotes student engagement with the scientific method
- Encourages active learning and problem-solving
- Allows collaborative working
- Provides opportunities to collect and analyse data and apply mathematical skills

Importance of practical work in biology

From the smallest of organisms to the largest, at a molecular level through to the study of populations and their interactions with a changing world, the inherent variability associated with the practical study of life processes and biological material requires specific teaching of appropriate mathematical, statistical and modelling skills.

The Society of Biology believes that it is important to support and promote high quality practical work in biology because it:

- Illustrates the beauty and complexity of the living world
- Promotes understanding of how to extract information from complex living systems
- Provides experience of analysing and evaluating variable data
- Highlights and promotes discussion of ethical issues
- Gives students the skills to tackle global challenges

Professional support for biology educators

Biology educators and technical support staff are vital contributors to the progress of science. As such, they require training to be competent and confident to respond positively to the unpredictability of working with biological material and embrace the opportunities afforded by the breadth of the biosciences

To support educators in delivering high quality practical biology teaching, the Society of Biology recommends that:

- Partnerships are promoted between biology and mathematics educators to support appropriate mathematics teaching for practical biology
- Educators are provided with professional development, including contemporary issues in biology and the opportunities that they provide for practical investigations
- Educators, technicians and students have access to experimental protocols and guides to practical techniques, underpinned by clear Health and Safety guidance and including resources linking teaching to research

Enhancing delivery of practical biology teaching

Effective delivery requires recognition by management of practical biology teaching as a high priority requiring commitment to professional development of staff and appropriate resourcing

The Society of Biology recommends that the following are needed:

- Dedicated time commitment to practical work
- Well-maintained, well-equipped, well-designed, dedicated laboratory spaces and access to local functioning ecosystems.
- Equipment, software, training and technical support including the appropriate use of ICT
- Staffing and equipment appropriate for class size

Role of the Society of Biology

To support the delivery of high quality practical biology at all levels, the Society of Biology will:

- Take the lead in promoting networking and collaboration between schools, colleges, universities and other stakeholders to facilitate sharing of practice aimed at enquiry-based practical learning
- Collaborate with HE Academy UK Centre for Bioscience to promote the development of practical and other skills as a continuum from school to higher education

- Use the Practical Biology Website (www.practicalbiology.org) to deliver high quality practical resources with an integrated approach to the development of mathematical skills
- Develop a model for Accrediting University Degrees that meet defined outcomes with respect to practical and mathematical skills

The way forward

To support the delivery of high quality practical biology at all educational levels, the Society of Biology recommends that:

- Awarding bodies, Ofqual and Universities ensure that practical work supports:
 - understanding at all levels of biological organisation
 - observation, measurement and analysis at all levels of scale
 - problem-solving and collaborative working
- Awarding bodies and the Ofqual ensure that consideration is given during future curriculum development to the time needed to deliver practical biology that meets the above outcomes
- The Department for Business, Innovation and Skills and the Department for Education make a commitment to ensure stable and robust funding to support investment in infrastructure, provision and renewal of resources and equipment, and recruitment and retention of personnel
- The requirements for educators to undergo subject-specific CPD in their specialist subject, including contemporary science and developments in research techniques, are reviewed as part of the Government's commitment to the Education White Paper.

Practical Biology Resources

To support the delivery of high quality practical work at all levels, the Society of Biology recommends the following resources and websites:

- Practical Biology Website: www.practicalbiology.org
- Getting Practical - Improving Practical Work in Science: www.gettingpractical.org.uk
- The Higher Education Academy UK Centre for Bioscience Resources to support practical biology in HE: <http://www.bioscience.heacademy.ac.uk/resources/themes/practicals.aspx>
- SCORE Practical Work in Science: http://www.score-education.org/2projects/practical_work.htm
- *The Language of Measurement*, ASE and Nuffield Foundation 2010 (ISBN: 978 0 86357 424 5)
- *Analysing Practical Science Activities to Assess and Improve Their Effectiveness*, ASE 2010 (9 78 0 86357 425 2)
- *Biological Nomenclature 4th Edition*, Institute of Biology, 2009 (978 0 900490 39 2)

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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 Rachel Forsyth, Society of Biology, 9 Red Lion Court, London, EC4A 3EF. Email: education@societyofbiology.org

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