

December 2017

Defining primary science expertise



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Introduction

Learning science and closely associated subjects at primary school helps children to explore, investigate and understand the world around them.

The definitions below describe what is needed to lead and to teach science to primary pupils aged 3-11. A teacher new in their role may not meet all the expectations but should have a plan to develop the skills and knowledge required. All teachers must adhere to their national professional standards for the minimum requirement for teachers' practice and conduct.

Primary Science Subject Leaders

A Primary Science Subject Leader is the person in school who has responsibility for ensuring that the science element of a broad and balanced curriculum is delivered effectively so that children make good progress in their understanding of science and develop the scientific skills they need to prepare them for the next phase of their education. Across the UK different titles may be used to describe this role, and science may not be referred to as a discrete subject but as a component of the curriculum. There is no requirement for a primary science subject leader to have qualifications above national statutory requirements for teaching. They should recognise the links and opportunities for learning between science and closely associated subjects such as maths, design and technology, and computer science.

Subject leadership

A Primary Science Subject Leader should value science, understanding the importance and relevance of science in our lives, and recognising that teaching and learning science develops skills and ideas that can be either specific to science or can be applied across the curriculum.

They should:

- keep up to date with broad developments in science and science education, and consider how to share these with colleagues, and pupils when appropriate

- be aware of, and take responsibility for developments that affect school science policy, including health and safety
- be aware of the existence of unconscious biases and the effects they can have on children's developing identities; take responsibility for countering gender stereotyping across the school, in science lessons and enrichment activities - particularly when it relates to gendered expectations.
- implement a whole-school vision for science, and advise and support colleagues on the pedagogy and appropriate resources to achieve it
- ensure that they access continuing professional development (CPD) for leadership of science and that colleagues access CPD to address their requirements too
- monitor provision of science, pupils' progress and contribute to the strategic development of learning in school.

Subject knowledge

A Primary Science Subject Leader should have a deep understanding of the scientific concepts within the primary science curriculum, supported by an understanding of progression into the next phase of education. They should identify any gaps in their knowledge or weaker areas of understanding of the scientific methods, and address these through appropriate sources, including high quality CPD.

They should understand the different methodologies for science enquiry and when to use them, including appropriate methods for recording and presenting different types of data. They should be confident in the use of scientific vocabulary related to the curriculum and able to explain these terms to colleagues.

Pedagogical content knowledge

A Primary Science Subject Leader should have secure knowledge of, and be able to apply and model, an appropriate range of methods suitable for teaching across all phases in their school. Their knowledge should include enquiry-based teaching and learning methods, practical activities, out-of-classroom learning, independent and group work, problem solving, and digital technologies. They should have secure understanding of both formative and summative assessment practices for primary science, and evaluate outcomes to monitor the impact of science teaching and learning on pupils.

A teacher of primary science

Subject knowledge

A teacher of primary science should have secure understanding of the scientific concepts within the primary science curriculum, with a focus on the age range they are teaching. They should understand how the content they are teaching fits into the progression from early years in to secondary education (ages 11-14). They should recognise areas where their knowledge is less secure and use appropriate sources to address these before teaching.

A teacher should use correct age-appropriate scientific vocabulary and expect pupils to do the same. They should understand and model the different methodologies for science enquiry, including appropriate methods for recording and presenting different types of data.

Pedagogical content knowledge

A teacher of primary science should have good knowledge of a range of teaching methods suitable for the science curriculum for all their pupils, including addressing gender stereotyping. Their knowledge should include enquiry-based teaching and learning methods, practical activities, out-of-classroom learning, independent and group work, problem solving, and digital technologies. They should have good understanding of both formative and summative assessment practices, and use outcomes to ensure their pupils make good progress.

Background

These definitions were agreed in March 2017 by representatives from the following organisations involved in science education:

- [Association for Science Education \(ASE\)](#)
- [Campaign for Science and Engineering \(CaSE\)](#)
- [Institution of Engineering and Technology](#)
- [Institute of Physics](#)
- [Primary Science Quality Mark](#)
- [Royal Society](#)
- [Royal Society of Biology](#)
- [Royal Society of Chemistry](#)
- [Wellcome](#)

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