

# Position Statement

## Secondary school teachers' deployment according to their subject expertise in the sciences

Last reviewed: 2020

### Summary

All students should have an unbroken chain of experts<sup>1</sup> teaching them the sciences throughout their school education.

Current low rates of recruitment and retention of chemistry and physics teachers in most parts of the UK make it unlikely that this aim will be met through increased recruitment alone. Consequently, supporting the existing teaching workforce is key.

Initial Teacher Education is just the start of a teacher's journey to become an expert practitioner. To ensure there are enough experts teaching the sciences, teachers must be supported to develop and where appropriate, expand their subject and pedagogical content knowledge throughout their careers.

### Introduction

Teaching requires a complex set of skills and an individual teacher's effectiveness is dependent on a wide range of factors. However, evidence suggests that the most effective teachers have good subject and pedagogical content knowledge.<sup>2</sup>

This is a particular issue for secondary biology, chemistry and physics trained teachers who are usually expected to teach at least some curriculum content from two or three of the science disciplines. Teachers' own education and experiences before they start their initial training can vary considerably and there is not enough time during Initial Teacher Education (ITE) programmes to address fully specific gaps in individual trainees' subject knowledge and pedagogical content knowledge.<sup>3</sup> This means that secondary school teachers of the sciences enter the profession with differing levels of expertise across the three disciplines.<sup>4</sup>

<sup>1</sup> Throughout this document the term 'expert' is used to describe a teacher with appropriate subject knowledge and pedagogical content knowledge (PCK) for the curriculum and classes they are required to teach. Similarly, 'expertise' should be read as a combination subject knowledge and PCK.

<sup>2</sup> What makes great teaching? Review of the underpinning research. Coe, R., Aloisi, Sutton Trust report (2014) <https://www.suttontrust.com/wp-content/uploads/2014/10/What-Makes-Great-Teaching-REPORT.pdf>

<sup>3</sup> This is true for both secondary and primary school teachers, although this policy position focusses on secondary teachers where shortages of specialist teachers is more of an issue.

<sup>4</sup> For example, a biology-trained teacher (with a biological sciences degree) might have stopped studying physics or chemistry at the age of 16 or a physics trained teacher might have ended their biology and chemistry education as soon as they were allowed to.

## Our recommendations

To realise our goal for every child to have an unbroken chain of experts teaching them the sciences throughout their school education:

1. **High-quality<sup>5</sup> subject-specific training and development should be an ongoing entitlement<sup>6</sup> for all teachers, whatever stage they are in their teaching career.** It should:
  - Meet the needs of a broad range<sup>7</sup> of teachers to account for differing prior knowledge, and
  - Include professional development opportunities to help teachers with a background in one science discipline, gradually gain the expertise needed to teach curriculum content in one or both of the other school science disciplines.<sup>8</sup>
2. **Schools should be able to demonstrate that their teachers have sufficient expertise for the curriculum and classes they are required to teach.** This could be through records of qualifications or other forms of diagnostic assessment, or reflective CPD/professional learning records.<sup>9</sup> We would also welcome the implementation of a “credentials/badging” system<sup>10</sup> as a transparent way for teachers’ subject expertise to be recognised and recorded.
3. **Governments (or their agencies) should collect and record information about teachers’ subject-specific expertise within the sciences.** They should use this to inform their workforce planning decisions (e.g. in regard to recruitment and retention incentives or funding for subject-specific teacher support).

For any queries relating to this position statement, please contact the Education Policy team:  
[EducationPolicy@rsc.org](mailto:EducationPolicy@rsc.org)

---

<sup>5</sup> To help school leaders and teachers assess the quality of pre- and post-ITE subject-specific professional development courses, we are supportive of nationally recognised quality assurance systems.

<sup>6</sup> This entitlement for teachers should be a statutory requirement.

<sup>7</sup> Including teachers who want/need to develop expertise in a science discipline outside of the one in which they initially trained, or even non-science trained teachers who have been asked to teach science to younger secondary school pupils.

<sup>8</sup> This could be achieved through provision of short courses each focussing on a different curriculum area and/or age range.

<sup>9</sup> Across the UK the extent to which qualifications needed to teach (either generally or for specific subjects) are prescribed at a national level, varies considerably. For example, in Scotland secondary school teachers need a teaching qualification and a degree in the subject they teach to students from the age of 14 or 15 years old. Whilst in England specific subject qualifications and in many cases teaching qualifications, are not mandated at the national level. Consequently, the way teachers’ expertise can be demonstrated is likely to vary across the UK nations.

<sup>10</sup> In recent years, digital badges have been introduced in areas such as medicine and catering that allow the recording of course content and linkage to traceable standards. We envisage that for education in the sciences the badges might be awarded in 6-8 broad topic areas in each science, and for a specific age range e.g. 5-7, 16-19, etc.