ASSOCIATION FOR SCIENCE EDUCATION

ASE POLICY PERSPECTIVES

An Equitable Route through the Sciences at GCSE

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About the ASE

The Association for Science Education (ASE) is the UK's largest community of science educators. We support science teaching and learning through professional development, a community of support, resources and advocacy. Our policy positions are informed by evidence, member expertise and our commitment to excellent science education for all learners.

Summary

The dual route through GCSE sciences (either GCSE Combined Science – two GCSEs, or Triple Science – three GCSEs) exacerbates social inequalities and hinders progression to further study of science post-16 for many young people. The ASE believes that a single route for the sciences at GCSE would offer more equitable access to all, open up options for more young people to study a broad 14-16 curriculum whilst ensuring pathways to science A-levels or technical routes post-16 remain open for all.

Background

Students studying science at GCSE in England can currently take one of two routes:

·Combined science: Students study biology, chemistry and physics in a combined course, resulting in two GCSE grades; or,

·Triple (extended) science: Students study the three sciences (biology, chemistry and physics) separately which results in three GCSE grades.

Both courses should be timetabled for the equivalent of two or three GCSE 'slots' respectively, but often triple science is taught in less than the equivalent time for three separate GCSEs (Lauchlan, 2018).

The introduction of the double award in the late 1980's was intended to reduce inequalities by helping to make a broad and balanced curriculum covering all three sciences available to all students, even those that did not intend to study science beyond GCSE. However, the offer of an alternative route has exacerbated inequality of provision and opportunity, particularly for socially disadvantaged students.

Key messages

- **Inequality of high quality provision**

Although nominally a free choice available to all students, many schools limit the numbers who take triple science for logistical and accountability purposes (Lauchlan, 2018).

Often, there is not sufficient space in the timetable, or sufficient numbers of specialist (in-field) science teachers, particularly physics teachers, to offer triple science to all students. In practice this often means that triple science is only made available to high attaining students or in schools with more resources.

In addition, those schools that do offer triple science often prioritise specialist science teachers for those classes, which can lead to combined sciences being taught by non-specialists (Lauchlan, 2018). This further exacerbates the gap in provision between students taking triple science and those taking combined science.

- **Inequality of Opportunity**

There is evidence that offering a dual route through science at GCSE exacerbates social inequity. Evidence shows that studying triple science is strongly associated with future participation and study in science post-16 (Plaister and Thomson, 2013). Whilst those students who do not take triple science have a diminished likelihood of future participation in science (Archer et al., 2017; Francis et al., 2023; ASPIRES 2, 2018). Evidence also shows that pupil premium students who attained highly at KS2 are less likely to take triple science at GCSE (Sutton Trust, 2015), as are pupils from a lower socio-economic background, or those with lower cultural capital (Archer et al., 2017).

- **Benefits of offering a single route to science**

The ASE advocate for a single science route for all students as part of a broad and balanced 14-16 curriculum. A unified route would promote equality of provision and opportunity allowing all students to access the depth and breadth of science education.

This approach will:

- enhance the social justice of disadvantaged pupils, ensuring equity of access;
- prevent students being selected (or not) for triple (extended) science as an elite route, based on prior attainment;
- ensure equity of allocation of specialist science teachers ensuring high quality science teaching across the board; whilst,
- preserving the successful route to A'Levels provided by the triple science route.

Recommendations

The ASE recommends:

- a single route for science be offered to all students as part of a broad and balanced 14-16 curriculum;
- this offer should be adapted from the current triple science and occupy the same curriculum time as three full GCSE subjects (two hours per week for each of the three sciences – 130 guided learning hours over two years);
- this route should be designed to prepare students to study any, or all, A-level sciences or science-linked technical pathways post-16; and,
- within this route, each of the sciences (biology, chemistry, physics) should be specified and timetabled separately and taught by a teacher who is ideally a specialist in that science.

ASE policy positions are developed through consultation with our members and advisory committees. For more information or to contribute to our policy work, visit: ase.org.uk/our-policy-work.

This policy perspective is applicable to: England only

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Supporting Evidence

Allen, R., 2015. Missing Talent. Research Brief. Edition 5. Sutton Trust.

Archer, L., Moote, J., Francis, B., DeWitt, J. and Yeomans, L., 2017. Stratifying science: a Bourdieusian analysis of student views and experiences of school selective practices in relation to 'Triple Science' at KS4 in England. Research Papers in Education, 32(3), pp.296-315.

ASPIRES 2, 2018, ASPIRES 2 Research and policy briefing, UCL: London. Available from: https://discovery.ucl.ac.uk/id/eprint/10080169/1/aspires_2_triple_science_policy_briefing.pdf

Francis, B., Henderson, M., Godec, S., Watson, E., Archer, L. and Moote, J., 2023. An exploration of the impact of science stratification in the English school curriculum: the relationship between 'Double' and 'Triple' Science pathways and pupils' further study of science. Research Papers in Education, pp.1-23.

Lauchlan, E., 2018. Science timetable models research. [Report] Shift Learning: London. Available from: https://www.iop.org/sites/default/files/2019-06/shift-learning-science-timetable-models-research.pdf

Plaister, N., Thomson, D., 2023. The long-term outcomes associated with Key Stage 4 science options. [Report] FFT Education Datalab: London