



Nuffield Foundation response to Ofqual Consultation on New A level Regulatory Requirements

The Nuffield Foundation is an endowed charitable trust that aims to improve social well-being in the widest sense. It funds research and innovation in education and social policy and also works to build capacity in education, science and social science research.

Our response is in four parts:

- Information pages
- Responses to questions 3, 4, 5 and 9 relating to proposals for changes to the assessment of biology, chemistry and physics A levels. These appear to change the status of practical work by removing its assessment from contributing to A level grades.
- Comments on the requirement for the assessment of mathematical skills in a range of subjects. These are not in response to specific questions, as none of the questions cover this requirement in itself.
- Follow up/information sharing

Information pages

About you

Are the views expressed in this consultation your personal view or an official response from the organisation you represent? (tick one only)*

Personal views

Official response from an organisation/group (complete the type of responding organisation)

If you ticked 'personal views', are you a ... (tick one only)

Student

Parent/carer

Teacher (but not responding on behalf of a school)

Educational specialist (retired teacher, examiner, assessment expert, subject expert, governor) please state capacity _____

General public (interested in education but no direct link) – please state capacity _____

If you ticked 'official response from an organisation or group', please respond accordingly.

Type of responding organisation (tick one only)*

- Awarding organisation
- Government department/agency or organisation
- Local authority
- University or higher education institute
- Employer
- School/college (please complete the next question)
- Other representative group/interest group (please skip to type of representative group/interest group)

School/college type

- Academy and/or free school
 - Comprehensive
 - State selective
 - Independent/private
 - Special school
 - Further education
 - Sixth-form college
 - None of the above (please state what)
-

Type of representative group/interest group

- Group of awarding organisations
- Union
- Business representative group
- Equality organisation/group
- Subject associations/learned societies
- School or teacher representative group

Other representative/interest group (please state what)

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Nation*

England

Wales

Scotland

Northern Ireland

Other EU country (please state which) _____

Non-EU country (please state which) _____

*Denotes mandatory fields

Consultation questions

Section 3: Assessment

Biology, Chemistry Physics

3. To what extent do you agree that exams in biology, chemistry and physics should include questions to assess conceptual and theoretical understanding of experimental methods?

- Strongly agree
- Agree
- Disagree
- Strongly disagree
- Don't know/no opinion

We **strongly disagree** that exams in biology, chemistry and physics should include questions to assess conceptual and theoretical understanding of experimental methods *if this comes at the cost* of removing assessment of practical work from the final grade.

Clearly attention needs to be given to the validity and reliability of assessment methods for practical work, but the solution proposed by Ofqual is inadequate. Practical skills cannot be assessed solely through written questions. There also needs to be some combination of direct and robust assessment of practical activity under controlled conditions and extended individual projects undertaken by students. There are clearly challenges here for the awarding organisations, but we do not believe that the response to these challenges should be to decouple and downgrade the assessment of practical skills.

4. To what extent do you agree that practical skills in biology, chemistry, and physics should continue to be assessed?

- Strongly agree
- Agree
- Disagree
- Strongly disagree
- Don't know/no opinion

We **strongly agree** that practical skills in biology, chemistry and physics should continue to be assessed.

We believe that hands-on practical work is an integral and vital part of school science which enhances the learning of scientific knowledge. The technical and investigative aspects of scientific inquiry complement students' theoretical understanding, enabling them to make links between what they observe and scientific ideas. It is almost impossible to imagine a coherent approach to the study of science that does not involve the application of such skills as handling of scientific equipment, experimentation, observation, measurement and interpretation. This view is widely shared across the communities of scientists and science educators.

5. To what extent do you agree that the results of practical skills assessments in biology, chemistry and physics should be reported separately on the certificate and not count towards the final grade?

- Strongly agree
- Agree
- Disagree
- Strongly disagree
- Don't know/no opinion

We **strongly disagree** that results of practical skills assessments in biology, chemistry and physics should be reported separately on the certificate and not count towards the final grade.

If practical work is not assessed as a mainstream component of a qualification, and does not directly contribute to its final grading, then it will become lower priority within the curriculum, and effectively be downgraded. In the context of current accountability systems, the removal of the assessment of practical skills is certain to lead to significant reductions in the extent to which schools undertake practical work. In addition to these concerns about the time and attention given to practical work in the classroom, it is likely that the resources that schools will be prepared to devote to equipment and facilities and to technician support will also be reduced. We would also emphasise that practical work is engaging and motivating, both for students who intend to pursue the sciences beyond the compulsory phase and those who do not.

9. Do you have any further comments relating to these subjects?

The Nuffield Foundation has supported research and development in science education for over fifty years. Practical work has always been a strong element of this and we currently offer a popular suite of websites featuring approximately 1,000 practical activities in biology, chemistry and physics. These have been developed in partnership with the learned societies: the Institute of Physics, the Royal Society of Chemistry and the Society of Biology. The sites provide practical protocols and guidance for teachers and technicians and are visited by almost one million people in the UK each year. We are also co-funder and co-developer of Salters-Nuffield Advanced Biology which is a successful and much respected suite of A levels, including internally assessed individual investigations as a core component. In addition, we provide the opportunity for over a thousand A level students a year to undertake authentic research placements in STEM-related organisations.

In addition to submitting our own responses to the questions above, we would like to note that we commend the response of the Wellcome Trust to this consultation. It presents a similar point of view to our own, but does so in more detail, and highlights a number of pieces of evidence to support this.

Comments on the requirement for the assessment of mathematical skills in a range of subjects.

a. We welcome the explicit minimum weightings for mathematical skills, though it would be helpful to know the basis of the weightings and how they apply across the range of content in each subject.

b. Statistical skills are currently implicit in the term 'mathematical skills'. This could be clarified or the statements could use the terms 'quantitative skills' or 'mathematical and statistical skills'.

c. For certain subjects (business, computer science, economics and geography) the regulatory requirements set minimum weightings of mathematical skills for AS and A levels. For biology, chemistry, physics and psychology, no weightings are provided for the mathematical skills for AS qualifications and this should be addressed.

d. Research conducted by SCORE, *Mathematics within A-level science 2010 examinations* www.score-education.org/media/10036/full%20maths.pdf , and by the Nuffield Foundation, *Mathematics in A Level Assessments: A report on the mathematical content of A Level assessments in Business Studies, Computing, Economics, Geography, Psychology and Sociology* www.nuffieldfoundation.org/sites/default/files/files/Maths_in_A_level_Assessments_Nuffield_Foundation_WEB.pdf , indicated that despite being listed in A level subject criteria and qualification specifications, mathematical and statistical elements in the above subjects were inadequately assessed and with significant variation. Therefore, in addition to prescribing weightings, Ofqual's regulatory requirements will need to have subject-specific frameworks to support, monitor and regulate the inclusion and assessment of relevant mathematics and statistics, appropriate ways to spread mathematical content over the assessment cycle, and the regulation of this process. Further, this should be built into the requirement that Awarding Organisations 'apply assessment strategies' (Question 65). The reports referenced above have a number of findings and recommendations that could inform such regulatory work.

e. The DfE content consultation for the new sociology A level

<https://www.education.gov.uk/consultations/downloadableDocs/Sociology%20subject%20content.pdf> touches on quantitative methods in a number of places, including

- the collection of primary and secondary data;
- the analysis of quantitative and qualitative data using appropriate concepts;
- the term *evidence* should be understood to include both primary and secondary sources, as well as both quantitative and qualitative data.

Yet Ofqual's proposed sociology assessment arrangements make no mention of assessing or accounting for quantitative aspects. Even if Ofqual and the sociology community are not recommending a minimal weighting for quantitative skills within sociology (we believe there should be such a weighting), the sociology Assessment Objectives (AOs) should be strengthened by including quantitative aspects where appropriate. In particular, statements for AO1 and AO2 include 'sociological research methods' and these can be modified to 'quantitative and qualitative sociological research methods'; statement AO3 mentions

'evidence' and this can be clarified as has been done by the DfE for the proposed sociology content.

f. On the proposed 'question types', Question 66, we support students having opportunities to synthesise their learning and recommend incorporating 'mathematical aspects where relevant' into point (a), so that it reads:

*a) integrate and apply their knowledge, understanding and skills across different aspects of the subjects, **including mathematical aspects where relevant.***

Follow up/information sharing

We use quotes from responses to highlight views expressed in the consultation document. It is helpful to attribute those quotes to specific organisations. We will not name individuals. If you do not want us to attribute your organisation to the quote, please opt out by ticking the box below

Do not attribute my name/organisation to the quote

Please only respond to the next statement if you have ticked 'no' or 'don't know' above.

We intend to forward your response to Department for Education where your comments are relevant to Department for Education's consultation. If you do not want us to do this, please opt out by ticking the box below

Do not share my response with Department for Education

Personal data

For the purposes of the Data Protection Act, we are the data controller for any personal data you supply in response to this consultation. We will process all personal data (such as your name, address and any other identifying information) in accordance with the Data Protection Act 1998. In most circumstances, this means that your personal data will not be disclosed to third parties.

Please do **not**:

- provide information in comments boxes that might identify you unless you are content for that information to be released into the public domain; or
- provide information in your response that might lead to the identification of other living individuals.

Name	Josh Hillman
Name of organisation or group (if applicable)	Nuffield Foundation
Your role (if applicable)	Director of Education
Address (if organisation only)	28 Bedford Square, London, WC1B 3JS
Email address	kwoodruff@nuffieldfoundation.org

Would you be happy for us to contact you again in relation to this consultation response?

Yes

No