

Ofqual: New GCSE regulatory requirements

Response by the Campaign for Science and Engineering (CaSE)

Summary of key points

Ofqual should not take forward these proposals at this time; there is currently not enough evidence to support the proposed approach. Ofqual should seek more robust evidence and further engage with the science, engineering, and education communities to further develop a solution that resolves current concerns surrounding the assessment of practical science at GCSE.

Practical experimental work is at the fundamental core of science and is an essential component of science education. However, there is widespread agreement within the science community that the current system of practical examination at GCSE is in need of reform. It is crucial that this is not rushed and an effective solution is found.

There is a strong risk that the proposal to remove practical work from examinations will send the wrong message to schools: that practical science is not as important as other areas of the curriculum. This could lead to a downgrading of practical science in schools and fewer practical classes, especially in schools with constrained finances.

There is currently very limited evidence to support the proposal or alternatives presented in the consultation document. There is also little detail on how the proposal will be implemented. Such details will have a significant impact on the success of any reforms. The uncertainties resulting from this lack of evidence and detail make it difficult to accurately assess the merits of the different options presented in the consultation.

Ofqual should wait until the impact of recent reforms to AS- and A-levels can be accurately assessed before moving ahead with reforms at GCSE, especially as science GCSEs are experienced by the majority of students, and changes at this level would therefore have far greater reach. If these proposals are enacted by Ofqual, robust monitoring and evaluation of the effects must be undertaken to ensure that science education and the pupil experience are not adversely affected.

Alongside the development of practical science assessment policy, Ofqual should work with government and other relevant bodies to help ensure that schools are properly incentivised, supported, and resourced to deliver a high-quality science education with practical work at its core.

Response

The Campaign for Science & Engineering (CaSE)¹ is a membership organisation aiming to improve the scientific and engineering health of the UK. A key aspect of that is to ensure that the UK has world-leading science, technology, engineering and mathematics (STEM) education. This will be essential if the UK is to have the skilled and responsible scientists and engineers, and successful innovative business, it needs for a high-skill, high tech future. CaSE is funded by around 750 individual members

¹ www.sciencecampaign.org.uk

and 100 organisations including industry, universities, learned and professional organisations, and research charities that recognise the importance of science and engineering for the UK.

Science and engineering are central to the UK's current and future prosperity. A good STEM education equips young people with the knowledge and skills they need in an increasingly technological age. It provides the UK with a workforce able to understand and address the challenges of the 21st Century, from food and energy security to antibiotic resistance and population growth. The Royal Academy of Engineering estimates that the UK needs 1.28m science, engineering and technology professionals and technicians by 2020.² However, there is already a STEM skills shortage, with around one in four employers reporting problems recruiting appropriate STEM-skilled employees.³ There is therefore a strong need to improve the quality of STEM education and increase the number of students taking and achieving in STEM.

The CBI described Ofqual's proposals to remove practical examination from A-Level science as 'not acceptable to business'⁴ and many other business leaders voiced their concerns at the proposals in a letter to the Times.⁵ Despite this representation from the science and engineering community, Ofqual went ahead with its A-level proposals. We hope a more pragmatic and collaborative approach can be achieved with this consultation.

Ofqual should not take forward these proposals without further thought and engagement with the science, engineering and education communities. It is crucial that further evidence to inform a policy decision is developed rather than taking a risk with children's futures, especially at a time when the UK is in such need for more scientists and engineers.

Hands-on practical experiments are at the fundamental core of science and are an essential component of science education. A recent Ofsted report⁶ found that schools that made science interesting for pupils raised achievement in science. The most effective approach to making science interesting was found to be through practical-based investigations. If practicals contribute both to interest and achievement in science it is critical that they are a core element of any science qualification.

However, as noted in the consultation document, there is widespread agreement that the current method of assessing student's practical skills is in need of reform. A new system is required that incentivises the highest standards of practical science education and provides meaningful assessment of student's practical skills and understanding. This is not easy of course but it is crucial that the development of a new system is not rushed and is got right the first time; the teaching profession is rightly tired of constant reform.

There is widespread concern in the science and engineering community that the proposals set out in the consultation will send the wrong message to school leaders: that practical science is less important than other parts of the curriculum because it is not directly assessed. There is evidence to

² The Royal Academy of Engineering, <u>Engineering for Growth</u>, 2014

³ CBI, <u>Changing the pace</u>, 2013

⁴ CBI: practical experiments should count towards A level science results, <u>TES article accessed 17/01/2014</u>

⁵ <u>Scientists attack A levels that will ignore lab work</u>, December 21 2013

⁶ Ofsted, <u>Maintaining curiosity: a survey into science in schools</u>, 2013

support this fear: a Wellcome Trust survey⁷ of primary school teachers found that the amount of time devoted to teaching science and the status of science as a key discipline were both reduced when key Stage 2 science SATs were abolished in 2009. This outcome was contrary to the aim of the reform, which, like the current proposal, was to free up teacher time to allow more science teaching.

Funding for science practical work is already tight in many schools, with nearly half of secondary school teachers reporting that they do not have enough funding for practical science.⁸ On average, funding for practicals was £4 per student in 2011/12, falling as low as 75p in some schools. On average, state-funded secondary schools have just 70% of the equipment and consumables they need to teach science subjects, with four in ten state-funded schools having less than 70% of the equipment and consumables they require.

The proposals state that specifications would set out a minimum of eight practical activities (16 for combined science) that schools "should do during the course". And it does not provide detail of how this will be monitored or whether there would be any penalty for schools not meeting the minimum. We are therefore concerned that schools will not be incentivised to provide the full variety of practical techniques associated with high-quality science education. It is important that effective incentives are in place, especially in schools forced to make difficult decisions on what to prioritise their limited resources on. CaSE believes that all students should have access to an excellent science education. With league table and competing budget pressures, it is very likely that funding for practicals will become less of a priority if assessment of practical work no longer contributes to GCSE achievement. This effect will be most pronounced and have the greatest negative impact in the most deprived schools.

There is currently very limited evidence to support the proposal or alternatives presented in the consultation document. There is also little detail on how the proposal will be implemented. Such details will have a significant impact on the success of any reforms. The uncertainties resulting from this lack of evidence and detail make it difficult to accurately assess the merits of the different options presented in the consultation. Nor does it give confidence that the right solution has been identified in the proposal. We therefore believe that Ofqual should not go ahead with the proposal without further development, consultation, and evidence gathering beyond this consultation. This should include further dialogue with the science, engineering and education communities.

The abolition of practical assessment for A-levels has caused serious concern within British science and business. It has been described as a "highly dangerous experiment" by Sir David Bell.⁹ Before implementing further change at GCSE, it is imperative that the impact of A-level reform is fully understood, especially given that science GCSEs are experienced by the majority of students, and changes at this level would therefore have far greater reach. If these proposals are enacted by Ofqual, which we hope they are not, robust monitoring and evaluation of the effects must be undertaken to ensure that science education and the student experience are not adversely affected.

Effective assessment must be supported by proper resourcing so that schools can prepare students and equip them with the knowledge and skills required for later life. The government must ensure

⁷ Wellcome Trust, <u>Primary Science Survey Report</u>, 2011

⁸ SCORE, <u>Resourcing practical science at secondary level</u>, 2013

⁹ Key note speech at the Association of Science Education annual conference by Sir David Bell, <u>Science</u> <u>education: trusting the front line</u>, 2015

that there are appropriate measures, resources and incentives for schools to sufficiently fund and support teachers to deliver practical science education. As outlined above, there is strong evidence that this is not currently the case. We are concerned that further downgrading of the status of science in schools could lead to greater loss of resources, including the conversion of laboratories to standard classrooms in schools forced to make difficult decisions on how to allocate their resources. Alongside the development of practical science assessment policy, Ofqual should work with government to promote an education environment that prepares students for life in a technology-rich world, allows them to reach their full potential, and provides the UK with the highly-skilled workforce it needs in the 21st Century.