20 AUGUST 2013

GCSE REFORM

RESPONSE TO THE OFQUAL CONSULTATION

GATSBY

KEY MESSAGES

1 We welcome the recognition that science, like many other GCSE subjects, involves a set of practical skills that are not best assessed by a written exam. These technical and manipulative skills are important for progression to further study and employment and our research shows that both industry and universities feel they need to be strengthened.

2 We welcome the proposal that 10% of the marks in each GCSE science qualification comes from an alternative to a written exam but the current system of controlled assessment of practical skills via investigations is deeply flawed and should not continue.

3 In the long term, a way needs to be found to restore professional integrity to teachers' assessments but in the short-term we recommend a terminal practical examination for the 10% direct assessment of technical and manipulative skills in science GCSEs.

4 The quality of science GCSEs can only be assured if exam boards are given clear subject criteria to follow, and Ofqual operate a rigorous accreditation and monitoring process, drawing on impartial subject and assessment expertise, and giving exam boards time to respond to their feedback.

INTRODUCTION

1 Gatsby is a foundation set up in 1967 by David Sainsbury (now Lord Sainsbury of Turville) to realise his charitable objectives. We focus our support on the following areas:

- Plant science research
- Neuroscience research
- Science and engineering education
- Economic development in Africa
- Public policy research and advice
- The Arts

2 Practical work is an essential part of school science education. Good quality practical science develops important skills, deepens knowledge, enhances engagement among students, and challenges them to apply both knowledge and skills in purposeful contexts. Yet, over the last 20 years, there has been a steady erosion of laboratory skills taught in school science and this is of significant concern to industry and universities.

3 Evidence shows that practical science needs support in UK schools and colleges and Gatsby is currently engaged in a programme focused on better assessment, improved access to teaching resources, and strengthened roles for technicians and senior leaders[1]. This response is based on work conducted in partnership with the Wellcome Trust.

THE PROBLEM WITH PRESENT ARRANGEMENTS FOR GCSE SCIENCE

5 The current norm at GCSE is 'controlled assessment', whereby, in science, candidates have to carry out one or two investigations from a small number set by the exam board under highly controlled conditions. There is universal agreement among those we have consulted that this assessment method is deeply flawed. It makes teachers focus on a narrow range of externally-set practicals as they hone students to do well in what constitutes 25% of their final grade. Students are internally assessed on their planning and analytical abilities (not on their technical skills) by their teachers who, under our high stakes system, are under enormous pressure to give students maximum marks.

6 In the long term, a way needs to be found to restore professional integrity to teachers' assessments, but this is not easy to do within the current high-stakes system and timescale for implementation. A good start would be for Ofqual and exam boards to show that effective and visible systems are in place to monitor the operation of teachers' assessments and to impose exemplary sanctions where abuse is shown to have taken place.

7 For the short to medium term, and based on discussions with experienced science teachers held in July 2013, we recommend a terminal practical exam for the assessment of technical and manipulative skills across science GCSEs. We outline this model further below and would be pleased to discuss how we might work with Ofqual and the exam boards to further develop this model. Together with the Wellcome Trust we have produced a policy note and a more detailed addendum to give further information on our position on GSCE science assessment[2,3].

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[1] Further information about this programme of work and the evidence collected is on the Gatsby website: http://www.gatsby.org.uk/Education/Projects/Review-of-Practical-Science-in-Schools.aspx.
[2] Policy note: Assessment of school practical science, Gatsby Foundation and Wellcome Trust, April 2013: http://www.gatsby.org.uk/~/media/Files/Education/Practical%20Science%20Policy%20Note.ashx

A SUGGESTED MODEL FOR DIRECT ASSESSMENT OF TECHNICAL AND MANIPULATIVE SKILLS

8 The following model for a terminal practical examination has been developed to minimise the impact on teaching time and to reduce the potential for malpractice. Ideally, it would be piloted before widespread implementation.

9 The examination would comprise a series of short experimental tasks, each focussed on a specific practical skill. It would be set up as a carousel of stations, performed under exam conditions, with individuals moving between stations after a set period of time. Groups of candidates would take the examination sequentially; stations would be refreshed and tasks changed between groups.

10 The examination could take place over several days using a number of different tasks, drawn from a bank provided by the exam boards to prevent candidates from sharing the contents. The examination would be independently invigilated, perhaps by a teacher from a neighbouring cluster school. Tasks could have simple and advanced versions, providing differentiation. Evidence of performance would combine results recorded by the student and witness statements from the teacher. Written or photographic evidence could be taken and samples sent for moderation by the exam board. The examinations would be monitored by the exam board through visits to schools, with serious consequences where malpractice is discovered.

INDIRECT ASSESSMENT

11 Teachers are sceptical about the use of written questions to assess practical knowledge and skills, finding that it is possible to train pupils to answer the questions without having done any practical work themselves. Work needs to be done by exam boards to improve the quality of written questions on practical work, to minimise the potential for candidates to score well without having done any experimental work.

THE ROLE OF OFQUAL

12 Ofqual has a vital role in ensuring that the new GCSEs are of high quality and meet the requirements laid out in the new criteria. These requirements must be made explicit in order for exam boards to develop demanding and fulfilling science qualifications and for Ofqual to assess whether they can be accredited. Practical skills, including technical and investigative, must be made clearer within the GCSE science subject criteria. We develop our recommendations on this further in our response to the DfE consultation on GCSE subject content.

13 For Ofqual to fulfil its role in accrediting science GCSEs it will need to be able to draw on subject and assessment expertise from across physics, chemistry and biology. Sufficient time will also need to be given for exam boards to respond to the feedback from these experts.

14 Questions regarding this response should be directed to:

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The Gatsby Charitable Foundation
The Peak
5 Wilton Road
London SW1V 1AP
email: education@gatsby.org.uk

[3] Policy note addendum: Assessment of school practical science, Gatsby Foundation and Wellcome Trust, August 2013: http://www.gatsby.org.uk/~/media/Files/Education/Practical%20Science%20Policy%20Note%20Addendum.ashx