

Assessment of Practical Work in New Science GCSEs – Summary



In September 2016 students will begin studying new GCSEs in biology, chemistry, physics and combined science. These GCSEs will be based on new subject content including requirements that emphasise students' understanding of experiments and their ability to conduct them.

In December 2014 we launched a consultation¹ on how practical work in these GCSEs should be assessed. We proposed that students should be assessed on their knowledge of practical work and experimentation, rather than on the actual undertaking of practicals.

We have reviewed the responses to that consultation,² engaged in further discussions with many representatives from science and education, and have used what we have been told to help shape our decisions.

There is unanimous agreement among scientists that practical work is central to good science qualifications. We want science GCSEs that encourage a wide range of practical science teaching, so that students' experience of practical science work is positive and beneficial. We also want to ensure the best educational outcomes, through valid and reliable assessments that are manageable for schools.

How will practical skills be assessed in new science GCSEs?

Science GCSEs taught from September 2016 will be assessed by exam only. There will be no controlled assessment components. The exams will contain questions that specifically draw on the experience students have gained from doing practical work.

¹ www.gov.uk/government/consultations/assessing-practical-work-in-gcse-science

² Findings available to download from: www.gov.uk/government/consultations/assessing-practical-work-in-gcse-science

Weighting of practical questions in written exams

In their exams, students will be required to demonstrate their understanding of scientific experimentation. At least 15 per cent of the total marks available in each science GCSE will be dedicated to this.

This proportion is large enough to have a significant effect on a student's grade, but not so large as to distort assessment or hinder coverage of other requirements in these subjects.

Requirements for practical activities

Each single science GCSE will include a minimum of 8 practical activities. Combined science GCSE will include a minimum of 16 practical activities. These numbers are an increase on the current requirements. Individual exam board specifications may require more than the minimum, and schools will also be free to do more practical work than is in the specification.

Within these requirements, exam boards will set out the apparatus that students should use and the techniques they should develop. We will be working with the Department for Education and subject associations to confirm the lists of apparatus and techniques.

Confirmation of work and keeping record

Schools will be required to confirm that they have enabled their students to do the full range of practical work.

The details of how this will be done are still to be agreed, but we recognise that any arrangements will need to be manageable and realistic so as not to add any unnecessary burden.

Students will be required to keep contemporary records of their practical work. Schools will be free to use any form of record-keeping they see as suitable, and which fits in with their teaching approaches and learning styles.

The records should be used as a way to help students learn. They do not need to be formal documents, but should give accounts of practical work carried out and what the student learnt from doing that work.

The records will not be marked by schools or exam boards, but schools must be able to confirm to exam boards that their students have kept a record of their work. Exam boards can request schools make these records available to them.

What do the decisions mean for schools and colleges?

How will students' practical abilities be assessed?

The content requirements for each science GCSE will specify a minimum number of practical activities (8 in single science subjects and 16 in combined science) that students must carry out.

Students will not be assessed carrying out these activities, but they will need to keep records, and schools must confirm to exam boards that they have enabled their students to do the full range of practical work.

At the end of their course, students will be required to demonstrate their understanding of scientific experimentation through written exam questions that relate to the required list of activities; 15 per cent of the marks will be dedicated to this.

Will students get a separate certificate for their practical work?

No. The understanding developed through carrying out practical work will be assessed by exam. There will be no separate result for practical work.

Students will be required to keep contemporary records of the practical work they carry out, but these will not be marked, so they cannot count towards a grade or separate certificate.

What happens if students don't do the practical work?

If students don't complete the required activities, they will not have had the opportunity to develop skills and knowledge in specific areas of science practical work. They will still be able to achieve their science GCSEs, but they are likely to find it challenging to achieve the highest grades without having the relevant practical experience.

Our approach will give students greater opportunity to develop relevant skills and knowledge. The focus is on developing good practical skills and learning about experimentation. The exam questions will reflect this focus. To get good marks on these questions, students will need to show knowledge and understanding, which will best be gained by carrying out the practical activities.

We know that some schools have expressed concern that they may need additional resources to meet the requirements of the lists of apparatus and techniques in the consultation. This is an issue that the Department for Education is aware of, and we will be reviewing the list with the Department and subject associations.

When do these changes take effect?

Having confirmed our approach, we now plan to consult on the rules and guidance for GCSEs in biology, chemistry, physics and combined science.

The new exam board specifications for these GCSEs will then be designed against these rules. The aim is to have these specifications available to schools from autumn 2015.

Schools will start to teach them from September 2016. This means the first exams for these subjects will be in summer 2018.

Appendix A - Background

What's the situation at the moment?

Current science GCSEs require students to complete a controlled assessment component (also known as non-exam assessment). Students have to carry out set practical work and complete written work about it. The written work is then marked, and this is worth 25 per cent of the student's final grade.

It is generally accepted that current practical assessment arrangements are not working. They lead to a focus on a narrow range of practicals, and encourage assessment of a student's planning and analytical abilities rather than their technical skills. GCSE students are frequently overfamiliar with just a few experiments and their marks for the written work tend to skew towards the top end of the mark range.

What we proposed in our consultation

In our December 2014 consultation³ we proposed:

- Written exams should include questions that draw on students' practical science experience and at least 15 per cent of marks would be allocated to these questions.
- Science GCSE specifications should set out the apparatus that students should use and the techniques they should develop, together with a minimum of 8 practical activities (or 16 for combined science).
- Students should keep a record of their practical work and it should be made available to their exam board on request.
- Schools should confirm to their exam boards that each student has completed the required practical activities and so has used the required apparatus and developed the required techniques.

What our consultation respondents told us

There was support for our proposals, with more than 60 per cent of respondents agreeing that the proposals presented the best balance between delivering curriculum aims, encouraging a wide range of practical science teaching, and providing valid, reliable and manageable assessments.

Overall, there was support for assessing practical work just by exam and that 15 per cent of the exam marks should be allocated to that. There was also support for the proposed minimum numbers of practical activities and lists of apparatus and

³ www.gov.uk/government/consultations/assessing-practical-work-in-gcse-science

techniques. There was some feedback on the content of the lists, with some concerns raised around availability of resources to meet the lists' requirements.

While there were also some concerns around record-keeping and arrangements for confirming practical activities had been carried out, on the whole there was more support for having such requirements than not having them.