

Changes to the assessment of A-levels in the sciences

What do they mean for higher education admissions?

“Undertaking practical work at A-level gives students important transferable skills that will help with their degree study in any subject, not only the sciences.”

What is this guide for?

This guide aims to shine light on the changes to the assessment of practical work in the sciences at A-level and what they mean for higher education institutions. It is written primarily for admissions officers and tutors by SCORE, a partnership between The Association for Science Education, The Institute of Physics, The Royal Society, The Royal Society of Chemistry, and The Society of Biology.

In this guide the SCORE partners set out how they believe higher education institutions can ensure students receive a rich experience in practical work in the sciences at A-level.

What is happening?

Now

All the assessment of work in practical science contributes to the overall grade, and therefore affects the number of UCAS points awarded. Assessments are supervised by teachers and are marked either by the teacher or by the exam board.

From 2015 (affecting 2017 intake)

From September 2015, the assessment of practical skills in science A-levels (biology, chemistry and physics) is changing in England, meaning the work of students starting undergraduate degrees from 2017 onwards will have been assessed in a different way.

Practical skills will be assessed in two ways. The written exams – for biology, chemistry and physics – will include questions about the theory and application of practical skills. These will contribute at least 15% of the total marks for each of these subjects.

Students' practical skills will also be directly assessed by teachers. From 2017 onwards students will be given a **practical endorsement** which will indicate if they have demonstrated mastery in relation to the practical aspects of the course. This will be reported separately and **will not** contribute to the A-level grade or carry points in the UCAS Tariff, though UCAS will provide information about these results to higher education providers.

These changes have been made because of concerns about the current system of assessing practical work, including the potential for malpractice. Many students achieve similar marks in assessment of their practical work and higher education institutions were concerned about the level of practical skills of students entering their courses.

Why are the SCORE partners concerned about this reform?

Confidence and skills in working practically in the sciences are an integral part of studying the sciences.

- Removing the assessment of practical work from the main qualification grade risks practical work being devalued by schools and higher education institutions.
- Under the new arrangements, the practical skills of A-level students in England will be assessed differently from the way that admissions officers and tutors are used to. Students could be awarded an A-level qualification despite failing the practical endorsement.
- Therefore, the SCORE partners believe it is important that admissions officers and tutors should differentiate between students who pass the written examinations but who fail to achieve the practical endorsement, and students who pass both the examinations and the practical endorsement.

Issues to consider when making decisions about your admissions criteria

You can make a difference in maintaining the quality and quantity of practical science offered by schools in England. The stronger the message sent to schools by admissions officers and tutors about the importance of achieving the new endorsement, the more schools will value practical work.

- The skills developed through practical working have the potential to help students succeed in degrees in both the sciences **and** non-science subjects.
- Higher education institutions can help maintain the status of practical science as a crucial part of science learning by referring to the practical science endorsement both in entry requirements and offers alongside the main grade/UCAS points.

Changes to A-levels in the sciences – how higher education institutions can promote high quality practical work

Higher education institutions have a major role to play in ensuring practical work in the sciences is given due prominence in the A-level curriculum.

From 2017 in England achievement in practical work will be reported separately from the A-level examination grade as an endorsement.

The SCORE partners understand that admissions requirements are under the control of universities, and vary by course and institution. **We would encourage all higher education institutions to specify that the endorsement for practical work is an essential part of A-level study, and that it is a requirement for entry to degree courses in the sciences. This should be clearly indicated in prospectuses and websites.**

Differences in the awarding of A-levels (and equivalent qualifications) in the sciences around the UK in courses from 2015

England

The written exams – for biology, chemistry and physics – will include questions about the theory and application of practical skills. These will contribute at least 15% of the total marks for each of these subjects. Students' practical skills will be directly assessed by teachers and a pass (the endorsement) will be reported on the certificate alongside the qualification grade rather than contributing to it. It is likely that failure to pass will be reported on certificates, though not referred to as "fail". However, this is not yet confirmed.

Wales and Northern Ireland

Attainment in practical work continues to contribute to overall grades awarded in the sciences at A-level. The nature of the assessment, in terms of the skills targeted, is different to that in England.

Scotland

The externally assessed course assessment for all Higher and Advanced Higher science-based qualifications consists of two components, an externally marked assignment carried out by the student in their school or college and an externally marked examination, both of which contribute to the final grade. All Higher and Advanced Higher courses are made up of units. These units are assessed on a pass or fail basis. They do not contribute to the overall grade of the student – but a student cannot be awarded a course grade if they have not completed/passed all component units. These units feature a strong element of practical work.

The reforms – your questions answered

Why has assessment of practical work in A-level biology, chemistry and physics been changed?

Previously, practical work was assessed through tasks set by either the exam board or teachers that were marked by the teacher or the exam board, with this outcome contributing to the overall qualification grade. There were also individual investigative projects, for example Salters Chemistry, Salters Nuffield Advanced Biology and Advancing Physics, which were written up as a coursework component that could be marked by teachers or sent to the exam board for marking.

Some concerns were raised with this system, including the potential for malpractice, the limited ability to validate results across exam boards, and students' grades for practical work often being bunched at the high end of the mark range. This meant these assessments were not discriminating effectively.

Higher education institutions were concerned about the level of practical skills of students entering their courses and this is a significant reason why changes are being made.

Why should the practical science endorsement be part of the offer for science-based degree courses?

Asking for the endorsement alongside the main grade for A-levels in biology, chemistry and physics, ensures that students obtain the vital skills that practical science develops.

Passing the practical endorsement indicates a student has developed the experimental skills which the SCORE partners consider essential to developing a comprehensive understanding of science subjects, and the applicant's ability to succeed in degree-level study.

Should a student be accepted onto a course if they fail the practical endorsement?

Practical skills are an integral part of learning science and provide students with important transferable skills. It is vital that the practical endorsement is explicitly mentioned in published entry criteria and offers.

The SCORE partners would encourage you to distinguish between public statements of admissions policy, which we strongly recommend should refer to the need to pass the endorsement, and any individual student who may have failed to achieve the practical element, for example due to ill health.

The reforms – your questions answered (continued)

Is it valid to ask for the practical science endorsement if a student is applying for a non-science course?

It is appropriate for you to ask for the endorsement because undertaking practical skills is excellent preparation for degree study. Working practically helps students develop skills in analysing, evaluating and interpreting data, problem-solving, communication and team work.

How does the English qualification now compare to those of other UK nations?

The reforms made by Ofqual to the assessment of practical work mean English A-level qualifications in biology, chemistry and physics now differ from those of the other UK nations. This means that it is not appropriate simply to compare the main grade for English A-levels with the single grade for A-levels from Northern Ireland and Wales, since the latter are based on a student's demonstrated ability across the whole specification (including practical work).

What about AS-levels?

The AS-levels in biology, chemistry and physics will not include the practical endorsement, so the grade will not include any direct assessment of the student's ability to use practical skills. AS-levels (like A-levels) will include questions about the theory and application of practical skills. AS-levels will continue to be available as separate qualifications, but in the reformed qualifications first taught from September 2015 they will no longer form part of the A-level. AS-levels will include questions about the theory and application of practical skills.

How will the practical endorsement be assessed?

The practical endorsement will be assessed using common practical assessment criteria (CPAC):

- Follows written procedures
- Applies investigative approaches and methods when using instruments and equipment
- Safely uses a range of practical equipment and materials
- Makes and records observations
- Researches, references and reports

How practical work in the sciences helps develop the skills needed for success in higher education²

Undertaking practical work at A-level gives students important transferable skills that will help with their degree study in any subject, not only the sciences.

These skills include:

- Observation
- Analysing results
- Evaluating their own work and that of others
- Testing out theories and ideas which they have developed
- Developing problem solving strategies
- Developing team work and taking responsibility
- Communicating ideas and results with peers and teachers
- Developing confidence to learn independently and to question the world around them

Achievement of the new practical endorsement shows that students have demonstrated these important skills.

1. See <http://www.northernireland.gov.uk/news-de-080914-science-practicals-will>

2. See <http://score-education.org/media/3662/framework.pdf>

SCORE, a partnership of organisations working together on science education policy:



Association for Science Education
www.ase.org.uk

IOP Institute of Physics

Institute of Physics
www.iop.org

THE
**ROYAL
SOCIETY**

Royal Society
www.royalsociety.org



Royal Society of Chemistry
www.rsc.org



Society of Biology
www.societyofbiology.org

SCORE
SCIENCE COMMUNITY REPRESENTING EDUCATION

SCORE

6 – 9 Carlton House Terrace,
London SW1Y 5AG

T +44 (0) 20 7451 2252

E score@score-education.org

W score-education.org

Published May 2015