ofqual

Guidance

GCSE subject-level conditions and requirements for single science (2022)

Published 11 November 2021

Contents

Introduction

Introduction

Subject Level Conditions
Assessment objectives
Assessment requirements

Print this page

About this document

This document is part of a suite of documents which sets out the regulatory requirements for awarding organisations offering GCSE qualifications (graded from 9 to 1) in 2022.

We have developed these requirements with the intention that GCSE qualifications (graded from 9 to 1) should provide:

- evidence of students' achievements against demanding and fulfilling content
- a strong foundation for further academic and vocational study and for employment
- a basis for schools and colleges to be held accountable for the performance of all of their students, if required

Requirements set out in this document

This document sets out the GCSE Subject Level Conditions for Single Science subjects (biology, chemistry and physics) in 2022. These conditions will come into effect at 09:30 on 12 November 2021 for all GCSE qualifications (graded from 9 to 1) in Single Science for Learners completing the qualification in 2022, except where the General Qualifications Alternative Awarding Framework applies.

It also sets out our requirements in relation to:

- interpretation of subject content - awarding organisations must comply with these requirements under Condition GCSE(Single Science)1.1(c)
- assessment objectives - awarding organisations must comply with these requirements under Condition GCSE(Single Science)1.2
- tiering of assessment - awarding organisations must comply with these requirements under Condition GCSE(Single Science)2.1
- assessment - awarding organisations must comply with these requirements under Condition GCSE(Single Science)3.1

With respect to all GCSE qualifications (graded from 9 to 1) in Biology, Chemistry or Physics in 2022, awarding organisations must also comply with:

- our General Conditions of Recognition, which apply to all awarding organisations and qualifications
- our GCSE Qualification Level Conditions
- all relevant Regulatory Documents

With respect to GCSE qualifications in Biology, Chemistry or Physics taken by Learners completing the qualification in 2023 and after, an awarding organisation must continue to comply with the GCSE Subject Level Conditions and Requirements for Single Science (Biology, Chemistry, Physics).

Subject Level Conditions

GCSE Subject Level Conditions for Single Science (Biology, Chemistry and Physics)

Condition GCSE(Single Science) 1: Compliance with content requirements
GCSE(Single Science)1.1

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must -

(a) comply with the requirements relating to that qualification set out in the document published by the Secretary of State entitled 'Biology, Chemistry and Physics GCSE subject content', document reference DFE-00352-2014,

(b) have regard to any recommendations or guidelines relating to that qualification set out in that document, and

(c) interpret that document in accordance with any requirements, and having regard to any guidance, which may be published by Ofqual and revised from time to time.

GCSE(Single Science)1.2

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must comply with any requirements, and have regard to any guidance, relating to the objectives to be met by any assessment for that qualification which may be published by Ofqual and revised from time to time.

Condition GCSE(Single Science) 2: Assessing the full range of abilities

GCSE(Single Science)2.1

In respect of each GCSE Qualification in Biology, Chemistry or Physics that an awarding organisation makes available, or proposes to make available -

(a) Condition GCSE1.1 does not apply, and

(b) the awarding organisation must ensure that the qualification, and each assessment for it, complies with any requirements which may be published by Ofqual and revised from time to time.

Condition GCSE(Single Science) 3: Assessment
GCSE(Single Science)3.1

An awarding organisation must ensure that in respect of each assessment for a

GCSE Qualification in Biology, Chemistry or Physics which it makes available it complies with any requirements, and has regard to any guidance, which may be published by Ofqual and revised from time to time.

Condition GCSE(Single Science) 4: Practical work
GCSE(Single Science)4.1

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must -

(a) require each Learner to complete or observe at least eight practical activities set by the awarding organisation, and

(b) ensure that, taken together, those practical activities provide opportunities for each Learner to use, or observe the use of, all of the apparatus and techniques set out in the document published by the Secretary of State entitled 'Biology, Chemistry and Physics GCSE subject content', document reference DFE-00352-2014.

GCSE(Single Science)4.2

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must -

(a) review the practical activities which it has set following any revision by the Secretary of State of the apparatus or techniques specified in respect of that qualification, and

(b) revise those practical activities if appropriate.

GCSE(Single Science)4.3

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must -

(a) set out in the specification for that qualification the practical activities which each Learner must complete or observe,

(b) promptly amend that specification when the awarding organisation makes any revision to those practical activities, and

(c) where such an amendment has been made to the specification, publish that specification as amended.

Interpretation of subject content

Requirements in relation to subject content for GCSE Qualifications in Biology, Chemistry and Physics

The subject content for GCSE Qualifications (graded 9 to 1) in Biology, Chemistry and Physics is set out in the Department for Education's Biology, Chemistry and Physics GCSE subject content, document reference DFE-00352-2014 (the 'Content Document').

Condition GCSE(Single Science)1.1(c) requires awarding organisations to interpret the Content Document in line with any requirements published by Ofqual.

We set out our requirements for the purposes of Condition GCSE(Single Science)1.1(c) below.

Sampling of subject content

The Content Document uses a range of terms to indicate the depth to which knowledge, skills and understanding in relation to particular aspects of subject content should be covered and assessed. Such terms include (but are not limited to) 'recall', 'describe', 'explain' and 'evaluate'. In relation to each of Biology, Chemistry and Physics the Content Document states -

> Awarding organisations may, however, use flexibility to increase depth, breadth or context within the specified topics or to consolidate teaching of the subject content.

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must -

(a) set the specification for that qualification on the basis that the terms in the Content Document described above provide an indication of the minimum depth of the knowledge, skills and understanding which Learners must be expected to demonstrate with respect to specific aspects of content, and

(b) design and set the assessments for that qualification such that, over the shortest period of time that is reasonably practicable, those assessments require Learners to demonstrate knowledge, skills and understanding of each specific aspect of content up to and including the full depth indicated in the specification (and therefore at least at the depth indicated by the Content Document).

Equations in physics

Paragraph (a) of Appendix 1 to the Content Document specifies a list of equations in physics that -

> students should be able correctly to recall, and apply…

In respect of each GCSE Qualification in Physics which it makes available, or proposes to make available, an awarding organisation must -

(a) interpret the above requirement in the Content Document as permitting awarding organisations to set individual questions and/or tasks which require Learners to -

(i) recall one or more of those specified equations, and/or

(ii) recall, and then apply, one or more of those specified equations, and/or

(iii). apply one or more of those specified equations which is given in the question and/or task, and

(b) design and set the assessments for that qualification such that, over the shortest period of time that is reasonably practicable, those assessments require Learners to demonstrate their ability to recall, and then apply, each of the equations listed in paragraph (a) of Appendix 1 to the Content Document.

Practical work

An awarding organisation must interpret the Content Document as if a Learner may observe the undertaking of practical work (including that outlined in the section on Working Scientifically and Appendix 4), or practical work by virtual or simulated means, where public health requirements mean that it is not possible for the Learner to undertake that work him or herself in the usual way.

Assessment objectives

Assessment objectives - GCSE Qualifications in Biology, Chemistry and Physics

Condition GCSE(Single Science)1.2 allows us to specify requirements relating to the objectives to be met by any assessment for a GCSE Qualification in Biology, Chemistry or Physics.

The assessment objectives and additional requirements set out below constitute requirements for the purposes of Condition GCSE(Single Science)1.2. Awarding organisations must comply with these requirements in relation to each GCSE Qualification in Biology, Chemistry or Physics they make available.

Assessment objective	Description	Weighting
AO1	Demonstrate knowledge and understanding of: • scientific ideas • scientific techniques and procedures	40%
AO2	Apply knowledge and understanding of: • scientific ideas • scientific enquiry, techniques and procedures	40%
AO3	Analyse information and ideas to: • interpret and evaluate • make judgements and draw conclusions • develop and improve experimental procedures.	20%

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must design and set the assessments on the basis that -

(a) in each set of assessments the weightings in respect of the assessment objectives outlined above may vary by plus or minus 3 per cent,

(b) taking together those assessments over the first 4 years of awarding (i.e. the first 4 assessment series) the weightings specified above are achieved for each of the foundation and higher tiers, and

(c) taking together those assessments over each subsequent and discrete 4-year period the weightings specified above are achieved for each of the foundation and higher tiers.

For the purposes of paragraph (c) above, the reference to each subsequent and discrete four-year period means years 5 to 8 of awarding, years 9 to 12 of awarding, and so on. As each 4-year period will be discrete there will not be any overlap between periods. Thus, an awarding organisation is not required to achieve the weightings specified above, in years 2 to 5 or years 7 to 10 of awarding, for example.

Tiering requirements

Tiering requirements - GCSE Qualifications in Biology, Chemistry and Physics

Condition GCSE(Single Science)2.1(b) allows us to specify requirements relating to assessing the full range of abilities for each GCSE Qualification in Biology, Chemistry or Physics.

We set out below our requirements for the purposes of Condition GCSE(Single Science)2.1(b). An awarding organisation must design, deliver and award each GCSE Qualification in Biology, Chemistry or Physics that it makes available, or proposes to make available, in accordance with these requirements.

Use of the overlapping tiers model

Each GCSE Qualification in Biology, Chemistry or Physics must be tiered. An awarding organisation must design and set the assessments for each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, using an overlapping tiers model.

Such a model must use two tiers - a foundation tier and a higher tier - and each assessment must be designed and set in such a way as to fall within one of those two tiers only.

Preclusion of mixed tier entry

An awarding organisation must ensure that each Learner is permitted to take assessments in either the foundation tier or the higher tier only.

Targeting of grades in each tier

The questions or tasks in foundation tier assessments must be targeted at the Level of Demand required for the award of grades 1 to 5.

The questions or tasks in higher tier assessments must be targeted at the Level of Demand required for the award of grades 4 to 9.

Awarding of grades in each tier

A Learner who takes foundation tier assessments must be awarded a grade within the range of 1 to 5, or be unclassified.

A Learner who takes higher tier assessments must be awarded a grade within the range of 4 to 9, or be unclassified. However, if the mark achieved by such a Learner is a small number of marks below the 4/3 grade boundary, that Learner may be awarded a grade 3.

Assessing the full range of abilities

An awarding organisation must ensure that the assessments within each tier allow each specified level of attainment available for that tier to be reached by a Learner who has attained the required level of knowledge, skills and understanding.

An awarding organisation must ensure that the assessments both within each tier, and taken together across both tiers -

(a) ensure sufficient differentiation between Learners,

(b) ensure sufficient discrimination between Learners, and

(c) ensure the accurate and consistent setting of grades across the full range of attainments demonstrated by Learners.

In designing assessments, an awarding organisation must take all reasonable steps to ensure, at each tier, that Learners achieving the lowest targeted grade have demonstrated attainment with regard to a sufficient range of the subject requirements, in terms of the subject content and the assessment objectives. Equally, an awarding organisation must take all reasonable steps to ensure, at each tier, that Learners achieving the higher targeted grades must have demonstrated attainment with regard to suitably stretching and challenging requirements, in terms of the subject content and the assessment objectives.

The overlap at grades 4 and 5

An awarding organisation must take all reasonable steps in the design and delivery of the assessments and awarding processes to secure that the level of attainment (in terms of the subject content and the assessment objectives) indicated by grades 4 and 5 is comparable regardless of the tier for which a

Learner is entered. Each awarding organisation must demonstrate in its assessment strategy the steps it has taken to secure such comparability between tiers, including on an ongoing basis.

In particular, an awarding organisation must ensure that -

(a) at least 20 per cent of the marks available in the assessments for each tier are made available through questions that are -

(i) common to both tiers, and

(ii) targeted at a Level of Demand consistent with grades 4 and 5, and

(b) an appropriate proportion of marks for each tier is targeted at a Level of Demand consistent with grades 4 and 5.

Assessment requirements

Assessment requirements - GCSE Qualifications in Biology, Chemistry and Physics

Condition GCSE(Single Science)3.1 allows us to specify requirements in relation to assessments for a GCSE Qualification in Biology, Chemistry or Physics.

We set out below our requirements for the purposes of Condition GCSE(Single Science)3.1. Awarding organisations must comply with these requirements in relation to each GCSE Qualification in Biology, Chemistry or Physics they make available.

Minimum assessment times

In respect of each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must design and set the assessments for that qualification on the basis that the total amount of time spent by each Learner in taking those assessments will be no less than 3.5 hours.

Assessment of mathematical skills

The Content Document sets out the mathematical skills which must form part of each GCSE Qualification in Biology, Chemistry and Physics (the 'Mathematical Skills') in the 'Use of Mathematics' sections and individual content statements for each subject, the mathematical forms of Working Scientifically and the appendices addressing different aspects of the mathematical requirements.

On page 5 of the Content Document it is stated -

> The mathematics [outlined in the Content Document in respect of each subject] should be at levels up to, but not beyond, the requirements specified in GCSE mathematics for the appropriate tier.

In designing and setting the assessments for each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must ensure that, taking the assessments for that qualification together -

(a) the total mark used to credit the relevant Mathematical Skills is no less than -

(i) for a GCSE Qualification in Biology, 10 per cent of the sum of all of the marks allocated to assessment objectives AO1 to AO3,

(ii) for a GCSE Qualification in Chemistry, 20 per cent of the sum of all of the marks allocated to assessment objectives AO1 to AO3, and

(iii) for a GCSE Qualification in Physics, 30 per cent of the sum of all of the marks allocated to assessment objectives AO1 to AO3,

(b) the questions and tasks used to target Mathematical Skills are at a Level of Demand which -

(i) is appropriate to the subject,

(ii) will allow effective differentiation between a range of attainments by Learners in relation to the subject content being assessed,

(iii) in respect of assessments for the foundation tier, is not lower than that which is expected of Learners at Key Stage 3 as outlined in the Department for Education's document 'Mathematics programmes of study: key stage 3', document reference DFE-00179-2013, and

(iv) in respect of assessments for the higher tier, is not lower than that of questions and tasks in assessments for the foundation tier in a GCSE Qualification in Mathematics, and

(c) without prejudice to the above requirements and those outlined in the Content Document, mathematical skills are assessed at an appropriate range of Levels of Demand in each set of assessments and over the lifetime of the qualification.

Assessment of Learners in relation to practical work

In designing and setting the assessments for each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, an awarding organisation must ensure that, taking the assessments for that qualification together -

(a) Learners' knowledge, skills and understanding in relation to practical work is assessed across assessment objectives AO1 to AO3,

(b) the number of marks used to credit such knowledge, skills and understanding is no less than 15 per cent of the sum of all of the marks allocated to assessment objectives AO1 to AO3,

(c) the questions and tasks which test Learners' knowledge, skills and understanding in relation to practical work draw on, and combine as appropriate, the theoretical and practical aspects of experimentation, and

(d) Learners are required to -

(i) show and apply knowledge and understanding of practical activities, and

(ii) apply scientific thinking, use experimental skills and strategies, and analyse and evaluate information.

Assessment of 'working scientifically'

The Content Document states that -

> Specifications should encourage the development of knowledge and understanding in science through opportunities for working scientifically. Awarding organisations should identify in their assessment strategy how, over a cycle of assessments, they will ensure that working scientifically is developed and assessed through the subject content.

Pages 7 to 8 of the Content Document go on to set out 'the main ways in which working scientifically may be developed and assessed'.

In relation to working scientifically, an awarding organisation must design and set the assessments for each GCSE Qualification in Biology, Chemistry or Physics which it makes available, or proposes to make available, to ensure that, taking the assessments for that qualification together, Learners' knowledge, skills and understanding is assessed across assessment objectives AO1 to AO3.

Benefits

Births, deaths, marriages and care

Business and self-employed

Childcare and parenting

Citizenship and living in the UK

Crime, justice and the law

Disabled people

Driving and transport

Education and learning

Employing people

Environment and countryside

Housing and local services

Money and tax

Passports, travel and living abroad

Visas and immigration

Working, jobs and pensions

How government works

Departments

Worldwide

Services

Guidance and regulation

News and communications

Research and statistics

Policy papers and consultations

Transparency and freedom of information releases

Help Privacy Cookies Accessibility statement Contact Terms and conditions
Rhestr o Wasanaethau Cymraeg Government Digital Service