

GCSE Astronomy

Consultation on Conditions and guidance



December 2015

Ofqual/15/5813

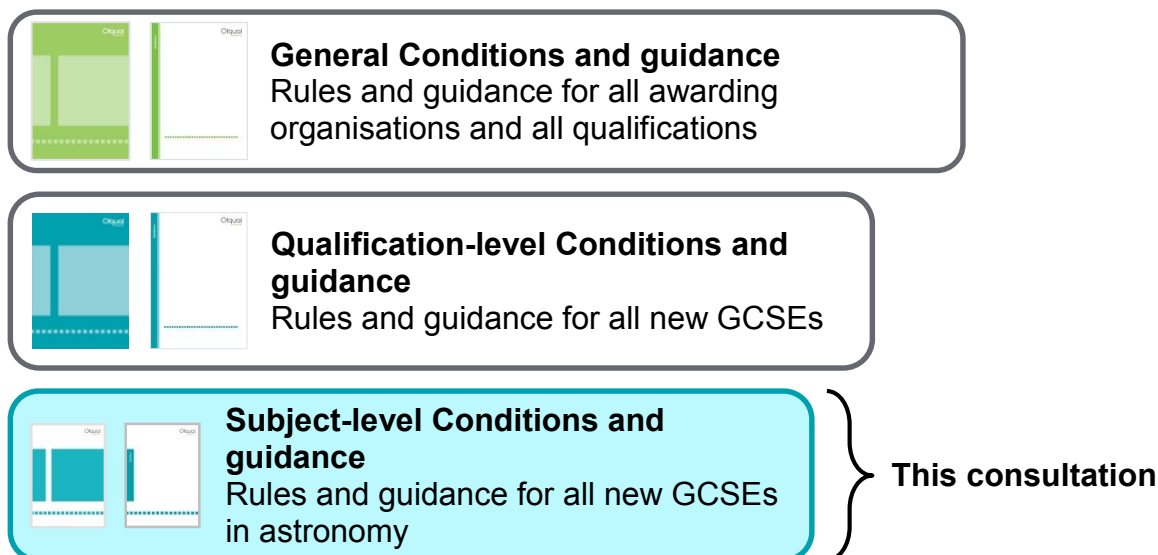
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Introduction

- 1.1 As most readers will know, changes are being made to GCSEs, AS and A levels taken by students in England. New GCSE qualifications in astronomy will be taught in schools from September 2017.
- 1.2 The Department for Education (DfE) published the subject content¹ for GCSE astronomy in December 2015.
- 1.3 Following our own consultation on assessment arrangements for these subjects, we confirmed² in December 2015 that new GCSEs in astronomy will:
 - be assessed entirely through exams; and
 - not be tiered.

Scope of this consultation



- 1.4 This consultation builds on our – and the DfE’s – earlier decisions. It seeks views on the subject-specific rules and guidance we should put in place for GCSE astronomy.
- 1.5 As explained in Appendix A, and highlighted in the figure above, these new rules and guidance will sit alongside our existing rules and guidance for

¹ www.gov.uk/government/publications/gcse-astronomy

² www.gov.uk/government/consultations/development-of-new-gcses-and-a-levels-for-teaching-from-2017

- all qualifications,³ and
- all new GCSE qualifications.⁴

1.6 This document sets out, and seeks views on:

- our proposed approach to regulating new GCSE astronomy; and
- the subject-specific Conditions, requirements and guidance we propose to introduce to implement that approach.

³ www.gov.uk/guidance/awarding-organisations-understanding-our-regulatory-requirements#requirements-for-all-awarding-organisations-and-all-regulated-qualifications

⁴ www.gov.uk/government/collections/gcses-9-to-1-requirements-and-guidance

How to respond to this consultation

The closing date for responses is **20 January 2016**.

Please respond to this consultation in one of three ways:

- Complete the online response at www.surveymzmo.com/s3/2495917/GCSE-reform-regulations-for-astronomy.
- Complete the consultation questions at the end of this document and email your response to consultations@ofqual.gov.uk. Please include the consultation title (GCSE Astronomy Consultation 2015) in the subject line of the email and make clear who you are and in what capacity you are responding.
- Post your response to: GCSE Astronomy Consultation 2015, Ofqual, Spring Place, Coventry Business Park, Herald Avenue, Coventry, CV5 6UB, making clear who you are and in what capacity you are responding.

Evaluating the responses

To evaluate responses properly, we need to know who is responding to the consultation and in what capacity. We will therefore only consider your response if you complete the information page.

Any personal data (such as your name, address and any other identifying information) will be processed in accordance with the Data Protection Act 1998 and our standard terms and conditions.

We will publish our evaluation of responses. Please note that we may publish all or part of your response unless you tell us (in your answer to the confidentiality question) that you want us to treat your response as confidential. If you tell us you wish your response to be treated as confidential, we will not include your details in any published list of respondents, although we may quote from your response anonymously.

Please respond by **20 January 2016**.

Regulating GCSE astronomy

Compliance with subject content and assessment objectives

- 2.1 As we explained in paragraph 1.2, the DfE has published the subject content for new GCSEs in astronomy.⁵
- 2.2 One of the ways we ensure new GCSEs, AS and A levels are comparable across exam boards is by requiring them to be in line with the relevant subject content and our assessment objectives.
- 2.3 The approach we have taken in every other new GCSE, AS and A level qualification is to introduce subject-specific Conditions which:
- require exam boards to comply with the requirements of the subject content (and have regard to any guidance that we publish in relation to the subject content); and
 - require exam boards to comply with our assessment objectives (and have regard to our guidance on those assessment objectives).
- 2.4 In all other subjects this Condition includes a provision which requires exam boards to interpret the subject content in line with any rules we set and to have regard to any guidance we publish. Although we do not always specify how the subject content should be interpreted, we think it is important for us to be able to do so when there is a good reason for that (for example, if a different interpretation could compromise qualification standards or comparability).
- 2.5 We see no reason to take a different approach for astronomy. We are therefore proposing that we should introduce a Condition which requires exam boards to:
- comply with the requirements (and have regard to any guidance) set out in the subject content – this includes requirements and guidance in the proposed new appendices;
 - comply with any requirements (and have regard to any guidance) we publish on interpreting the subject content; and
 - comply with our assessment objectives (and have regard to our guidance on those assessment objectives).

⁵ www.gov.uk/government/publications/gcse-astronomy

Question 1: To what extent do you agree or disagree that we should introduce a Condition which requires exam boards to comply with the relevant subject content and assessment objectives?

Guidance on assessment objectives

- 2.6 For all other new GCSE, AS and A level qualifications, we have published guidance which explains how exam boards should interpret our assessment objectives. This is designed to ensure exam boards have a common understanding of – and take a consistent approach to targeting – the different assessment objectives.
- 2.7 We are proposing we should introduce similar guidance for GCSE astronomy.

Question 2: To what extent do you agree or disagree that we should introduce guidance which clarifies how exam boards should interpret our assessment objectives?

Rules and guidance for exam assessment

- 2.8 In a number of other new GCSE, AS and A level subjects, we have specified rules which cover how specific areas of the subject content should be assessed. We normally do this where we think it is important exam boards take a consistent and comparable approach to assessing an area of content (in terms of the weighting assigned to that content area and/or the types of question used to target it).
- 2.9 For example, the subject content for the new science GCSEs, AS and A levels which have been developed for first teaching from September 2015 and September 2016 include:
- mathematical skills that students should be able to demonstrate;
 - skills requirements in relation to ‘working scientifically’; and
 - practical skills that should be indirectly assessed in exams.
- 2.10 In these subjects, either we or the DfE have set minimum proportions of exam marks which must be allocated to these content areas, and we have specified further rules around how they should be assessed.
- 2.11 The subject content for GCSE astronomy includes specified mathematical skills and observational skills for indirect assessment in exams.

2.12 For GCSE astronomy, we believe we should take a similar approach to regulating exam assessments as we have in other science subjects. So we are proposing to introduce rules to ensure exam boards take a consistent approach to assessing mathematical skills and observational skills in GCSE astronomy.

Question 3: To what extent do you agree or disagree that we should introduce rules for exam assessment to ensure exam boards take a consistent approach to assessing mathematical skills and observational skills in GCSE astronomy?

Assessing mathematical skills in exams

2.13 The subject content requirements for GCSE astronomy include an appendix which specifies the mathematical skills that students taking GCSE astronomy should be able to use and apply.

2.14 When the DfE consulted on the subject content for GCSE astronomy, it included a requirement that exams should allocate at least 20 per cent of marks to assessing mathematical skills. Respondents to the DfE's consultation supported this requirement, which reflects the importance of mathematical skills within astronomy. Since this requirement relates to the assessment of GCSE astronomy, we have agreed with the DfE that it should form part of our rules on assessment, rather than the subject content. It is therefore included within our draft assessment requirements set out below.

2.15 We also want to make sure that mathematical skills are assessed in a way which is appropriate to the subject. In particular, we want to make sure that:

- mathematical skills are assessed at a comparable level of demand across exam boards;
- mathematical skills are assessed in the context of other areas of the subject content (and not in isolation); and
- students across the ability range have opportunities to access marks for mathematical skills (and these marks are not simply targeted at higher or lower ability candidates).

2.16 To do this, we are proposing to set rules which require exam boards to:

- assess mathematical skills in the context of other areas of the subject content, and not in isolation;

- allocate at least 20 per cent of the marks for the qualification to rewarding use of mathematical skills at a level of demand which is at least equivalent to Key Stage 3; and
- assess mathematical skills across a range of levels of demand which supports effective differentiation between candidates.

Question 4: To what extent do you agree or disagree with our proposed approach to assessing mathematical skills in exams (including the 20 per cent minimum weighting) for GCSE astronomy?

Assessing observational skills in exams

2.17 The subject content requirements for astronomy specify the observational skills that students taking a GCSE should develop during their course of study.

2.18 We have previously consulted⁶ on a proposal that exams should include questions/tasks which indirectly assess students' knowledge and understanding of observational skills, and that these should comprise at least 20 per cent of total marks.

2.19 Reflecting on consultation feedback, and on the approach we have taken in other GCSE science subjects (biology, chemistry, physics and combined science), our view is that a 15 per cent weighting would be more appropriate. This would be consistent with the weighting of practical skills in the other GCSE science subjects, and would put GCSE astronomy on an equal footing with the other sciences.

2.20 We also want to make sure exam boards take a consistent and comparable approach to assessing observational skills in the exam. Our expectation is that exams will require students to:

- demonstrate and apply their knowledge and understanding of observational skills;
- apply scientific thinking and practical skills and strategies in the context of written questions and problems;
- analyse and evaluate information in practical contexts; and

⁶ www.gov.uk/government/consultations/development-of-new-gcses-and-a-levels-for-teaching-from-2017

- include questions/tasks which draw on – and, where appropriate, combine – both theoretical and practical aspects of observation.

2.21 We are therefore proposing to set rules which codify these expectations.

Question 5: To what extent do you agree or disagree with our proposed approach to assessing observational skills in exams (including the 15 per cent minimum weighting) for GCSE astronomy?

Assessing working scientifically

2.22 In line with the approach taken for GCSE biology, chemistry, physics and combined science, the subject content requirements for GCSE astronomy sets out requirements for working scientifically that students should be expected to demonstrate.

2.23 In the other science GCSEs, we have required exam boards to assess the generic skills associated with working scientifically across the assessment objectives. This is because working scientifically is a cross-cutting theme within the subject content that applies to all the different content areas and assessment objectives.

2.24 The subject content for GCSE astronomy is written in a similar way, so we think we should take the same approach here. We are therefore proposing to require exam boards to assess working scientifically across all of the assessment objectives.

Question 6: To what extent do you agree or disagree with our proposed approach to assessing working scientifically in exams for GCSE astronomy?

Fieldwork/centre statements

2.25 The subject content⁷ specifies that GCSEs in astronomy must require students to undertake a minimum of two observations.

2.26 These requirements reflect the importance of observational skills within the subject. Observational skills are integral to good astronomy qualifications, and to teaching and learning – and schools should devote sufficient teaching time to those activities.

⁷ www.gov.uk/government/publications/gcse-astronomy

2.27 As set out above, we are requiring exam boards to design their exams in a way which rewards students who demonstrate what they have learned from observation.

2.28 In other subjects with similar requirements for practical work, we have also required exam boards to collect statements from schools which confirm that students have been given reasonable opportunities to complete the required practical work. This is designed to reflect the importance of practical work in those subjects, and to provide an extra safeguard that students are being given appropriate opportunities to carry out practical work.

2.29 We are proposing to take the same approach in GCSE astronomy.

Question 7: To what extent do you agree or disagree that we should require exam boards to collect statements from schools which confirm that students have been given reasonable opportunities to carry out observation?

Our proposed Conditions and guidance

3.1 As set out above, we are proposing to introduce subject-specific Conditions, requirements and guidance to implement the proposals in this consultation. We set out our proposed Conditions, requirements and guidance below.

Proposed Conditions and requirements for GCSE astronomy

3.2 We are proposing to introduce the following Conditions and requirements which will apply to all new GCSE qualifications in astronomy.

- a Condition covering compliance with subject content and assessment objectives;
- a further enabling Condition which allows us to specify more detailed requirements on assessment;
- a Condition covering observational work;
- our assessment objectives; and
- requirements on assessment which relate to assessing mathematical skills, observational work and working scientifically.

Condition GCSE(Astronomy)1	Compliance with content requirements
GCSE(Astronomy)1.1	<p>In respect of each GCSE Qualification in Astronomy which it makes available, or proposes to make available, an awarding organisation must –</p> <ul style="list-style-type: none"> a) comply with the requirements relating to that qualification set out in the document published by the Secretary of State entitled ‘Astronomy GCSE subject content’,⁸ document reference DFE-00202-2015, b) have regard to any recommendations or guidelines relating to that qualification set out in that document, and

⁸ www.gov.uk/government/publications/gcse-astronomy

	<p>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.</p>
GCSE(Astronomy)1.2	<p>In respect of each GCSE Qualification in Astronomy 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.</p>
GCSE(Astronomy)2	Assessment
GCSE(Astronomy)2.1	<p>An awarding organisation must ensure that in respect of each assessment for a GCSE Qualification in Astronomy 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.</p>
GCSE(Astronomy)3	Observational work
GCSE(Astronomy)3.1	<p>In respect of a GCSE Qualification in Astronomy which it makes available, or proposes to make available, an awarding organisation must require each Learner to complete observational work which meets the requirements specified in the document published by the Secretary of State entitled ‘Astronomy GCSE subject content’,⁹ document reference DFE-00202-2015.</p>
GCSE(Astronomy)3.2	<p>In respect of a GCSE Qualification in Astronomy which it makes available, or proposes to make available, an awarding organisation must –</p> <p>(a) set out in the specification for that qualification the range of permitted observational activities from which each Learner must select,</p>

⁹ www.gov.uk/government/publications/gcse-astronomy

GCSE(Astronomy)3.3	<p>(b) promptly amend that specification when the awarding organisation makes any revision to those observational activities, and</p> <p>(c) where such an amendment has been made to the specification, publish that specification as amended.</p>
GCSE(Astronomy)3.4	<p>In respect of each assessment cycle for a GCSE Qualification in Astronomy which it makes available, an awarding organisation must –</p> <p>(a) require each Centre to provide an observational activities statement to the awarding organisation, and</p> <p>(b) treat any failure by a Centre to provide an observational activities statement to the awarding organisation in a timely manner as malpractice and/or maladministration (under General Condition A8 (<i>Malpractice and maladministration</i>)).</p> <p>For the purposes of this condition, an ‘observational activities statement’ is a true and accurate written statement made by a Centre to an awarding organisation which confirms that it has taken reasonable steps to secure that each Learner to which that Centre has delivered the assessments to be taken in a particular assessment cycle for a GCSE Qualification in Astronomy which the awarding organisation makes available –</p> <p>(a) has completed the observational activities required by the awarding organisation, and</p> <p>(b) has made a contemporaneous record of –</p> <p>(i) the work which that Learner has undertaken during those observational activities, and</p> <p>(ii) the knowledge, skills and understanding which that Learner has derived from those observational activities.</p>

Assessment objectives – GCSE Qualifications in Astronomy

Condition GCSE(Astronomy)1.2 allows us to specify requirements relating to the objectives to be met by any assessment for GCSE Qualifications in Astronomy.

The assessment objectives set out below constitute requirements for the purposes of Condition GCSE(Astronomy)1.2. Awarding organisations must comply with these requirements in relation to all GCSE Qualifications in Astronomy they make available.

	Objective	Weighting
AO1	Demonstrate knowledge and understanding of: <ul style="list-style-type: none"> ■ scientific ideas ■ scientific techniques and procedures 	40%
AO2	Apply knowledge and understanding of: <ul style="list-style-type: none"> ■ scientific ideas ■ scientific techniques and procedures 	40%
AO3	Analyse information and ideas to: <ul style="list-style-type: none"> ■ interpret and evaluate astronomical observations, data and methods ■ make judgements and draw conclusions ■ develop and improve observational procedures 	20%

Assessment requirements – GCSE Qualifications in Astronomy

Condition GCSE(Astronomy)2.1 allows us to specify requirements in relation to assessments for GCSE Qualifications in Astronomy.

We set out below our requirements for the purposes of Condition GCSE(Astronomy)2.1. Awarding organisations must comply with these requirements in relation to all GCSE Qualifications in Astronomy they make available.

Mathematical skills

The subject content for GCSE Qualifications in Astronomy is set out in the document published by the Secretary of State entitled ‘Astronomy GCSE subject content’, document reference DFE-00202-2015 (the ‘Content Document’).

Throughout the Content Document, ‘Use of mathematics’ statements specify the mathematical knowledge, skills and understanding which Learners will be required to use and apply in GCSE Qualifications in Astronomy (the ‘Mathematical Skills’).

In designing and setting the assessments for a GCSE Qualification in Astronomy which it makes available, or proposes to make available, an awarding organisation must ensure that –

- a) questions and tasks rewarding the use of ‘Mathematical Skills’ assess those skills within the context of other areas of the subject content, and not in isolation,
- b) in each set of assessments¹⁰, at least 20 per cent of the total marks for the qualification reward the use of Mathematical Skills at a Level of Demand which 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’,¹¹ document reference DFE-00179-2013, and
- c) without prejudice to the above requirements and those outlined in the Content Document, in each set of assessments Mathematical Skills are assessed across a range of Levels of Demand which supports effective differentiation in relation to the qualification.

Assessment of Learners in relation to observational skills

In designing and setting the assessments for each GCSE Qualification in Astronomy which it makes available, or proposes to make available, an awarding organisation must ensure that, taking those assessments together –

- a) Learners’ knowledge, skills and understanding in relation to observational 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 total marks available for the qualification,
- c) the questions and tasks which test Learners’ knowledge, skills and understanding in relation to observational work draw on, and combine as appropriate, the theoretical and technical aspects of observation, and

- d) Learners are required to –
- (i) show and apply knowledge and understanding of observational work, and
 - (ii) apply scientific thinking, use observational skills and strategies, and analyse and evaluate information.

Assessment of ‘working scientifically’

Paragraph 6 of the Content Document states that –

In the first section, the main ways in which working scientifically should be developed and assessed are set out and explained. Specifications must encourage the development of knowledge and understanding in astronomy through opportunities for working scientifically.

Paragraph 9 of the Content Document goes 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 Astronomy 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.

¹⁰ For the purposes of this guidance, a ‘set of assessments’ means the assessments to be taken by a particular Learner for a GCSE Qualification in Astronomy. For clarity, the assessments taken by Learners may vary, depending on any possible routes through the qualification.

¹¹ www.gov.uk/government/publications/national-curriculum-in-england-mathematics-programmes-of-study

Proposed guidance for GCSE astronomy

- 3.3 We are proposing to introduce guidance on assessment objectives which will apply to all new GCSE qualifications in astronomy.

Guidance on assessment objectives for GCSE Qualifications in Astronomy

Condition GCSE (Astronomy) 1.2 allows us to specify requirements and guidance relating to assessment objectives for GCSE Qualifications in Astronomy.

We published our requirements in relation to assessment objectives in *GCSE Subject Level Conditions and Requirements for Astronomy*, and reproduce them in the table below.

	Objective	Weighting
AO1	Demonstrate knowledge and understanding of: <ul style="list-style-type: none"> ■ scientific ideas ■ scientific techniques and procedures 	40%
AO2	Apply knowledge and understanding of: <ul style="list-style-type: none"> ■ scientific ideas ■ scientific techniques and procedures 	40%
AO3	Analyse information and ideas to: <ul style="list-style-type: none"> ■ interpret and evaluate astronomical observations, data and methods ■ make judgements and draw conclusions ■ develop and improve observational procedures 	20%

We set out below our guidance for the purposes of Condition GCSE (Astronomy) 1.2. This guidance explains how we expect awarding organisations to interpret these assessment objectives in terms of:

- the different ‘strands’ within each of the assessment objectives;
- the discrete ‘elements’ within each assessment objective and its strands that questions and tasks could target and/or seek to credit – our expectation is that each and every question/task should target or seek to credit at least one of these elements, and may target or seek to credit multiple elements across one or more assessment objectives;

- the coverage expectations, such as in relation to the different elements within each assessment objective and how those elements should be sampled over time; and
- the key areas of emphasis in each assessment objective and the particular meaning for the subject of any key terms and phrases used; defined terms are shown in bold text, followed by their definitions.

In line with the obligations set out in Condition GCSE (Astronomy) 1.2, we expect awarding organisations to be able to demonstrate how they have had regard to this guidance. For example, an awarding organisation could map how it has regard to the guidance as it:

- develops its sample assessment materials;
- delivers the qualification;
- develops and applies its approach to sampling the elements into which the assessment objectives are divided; and
- monitors the qualification to make sure it addresses all elements appropriately.

AO1: Demonstrate knowledge and understanding of:			40%
<ul style="list-style-type: none"> ▪ scientific ideas ▪ scientific techniques and procedures 			
Strands	Elements	Coverage	Interpretations and definitions
1 – Demonstrate knowledge and understanding of scientific ideas	This strand is a single element.	<ul style="list-style-type: none"> ▪ Full coverage in each set of assessments¹² (but not in every assessment). ▪ A reasonable balance between the strands in each set of assessments (but not every assessment). 	<ul style="list-style-type: none"> ▪ Scientific ideas are aspects of the subject content. They include the subject-specific requirements and the requirements for ‘Working scientifically’ as set out in the document published by the Secretary of State entitled ‘Astronomy GCSE subject content’¹⁴, document reference DFE-00202-2015 (the ‘Content Document’) – for example theories, models, methods and how these develop over time as well as the recall of units and simple mathematical processes. ▪ Scientific techniques and procedures encompass, but are broader than, knowledge and understanding of the identified aided and non-aided observational activities. In the context of this assessment objective, it involves the knowledge and understanding of such techniques and procedures.
2 – Demonstrate knowledge and understanding of scientific techniques and procedures	This strand is a single element.	<ul style="list-style-type: none"> ▪ Awarding organisations should justify the balance between the strands in their assessment strategies 	

¹² For the purposes of this guidance, a ‘set of assessments’ means the assessments to be taken by a particular Learner for a GCSE Qualification in Astronomy. For clarity, the assessments taken by Learners may vary, depending on any possible routes through the qualification.

¹⁴ www.gov.uk/government/publications/gcse-astronomy

AO1: Demonstrate knowledge and understanding of: <ul style="list-style-type: none"> ▪ scientific ideas ▪ scientific techniques and procedures 			40%
Strands	Elements	Coverage	Interpretations and definitions
		<ul style="list-style-type: none"> ▪ No more than 20% of the total marks for the qualification should reward demonstrating knowledge in isolation.¹³ 	<ul style="list-style-type: none"> ▪ The emphasis in this assessment objective is on Learners recalling and communicating relevant familiar knowledge and understanding from the course of study, for example, through the provision of facts, definitions, and explanations of how to do something and why it should be done in a particular way.

¹³ Marks which ‘reward demonstrating knowledge in isolation’ means any mark awarded solely for recalling facts or other knowledge that is part of the specification. It does not include marks awarded for selecting appropriate knowledge (for example, to evidence an argument), or for applying knowledge to a particular context.

AO2: Apply knowledge and understanding of:			40%
<ul style="list-style-type: none"> ▪ scientific ideas ▪ scientific techniques and procedures 			
Strands	Elements	Coverage	Interpretations and definitions
1 – Apply knowledge and understanding of scientific ideas	This strand is a single element.	<ul style="list-style-type: none"> ▪ Full coverage in each set of assessments (but not in every assessment). ▪ A reasonable balance between the strands in each set of assessments (but not every assessment). 	<ul style="list-style-type: none"> ▪ Scientific ideas are aspects of the subject content. They include the subject-specific requirements and the requirements for ‘Working scientifically’ as set out in the Content Document – for example applying theories, models (including mathematical models), methods and the use of relevant mathematics, including to understand and solve problems. ▪ Scientific techniques and procedures encompass, but are broader than, knowledge and understanding of observational activities detailed in the specification for the qualification. In the context of this assessment objective, it involves applying knowledge and understanding of a variety of observational methods, as specified in the Content Document, to appropriate contexts. ▪ The emphasis in this assessment objective is on Learners applying their knowledge and understanding to provide meaning or explanation – for instance, to connect theory with particular contexts, stimuli or materials. This application should relate principally to developing further material that is covered in the specification by: <ul style="list-style-type: none"> □ exploring contexts and situations that are not explicitly indicated in the specification; and
2 – Apply knowledge and understanding of scientific techniques and procedures	This strand is a single element.	<ul style="list-style-type: none"> ▪ Awarding organisations should justify the balance between the strands in their assessment strategies 	

AO2: Apply knowledge and understanding of: <ul style="list-style-type: none"> ▪ scientific ideas ▪ scientific techniques and procedures 			40%
Strands	Elements	Coverage	Interpretations and definitions
			<ul style="list-style-type: none"> □ making links between types of material which are not explicitly indicated in the specification. ■ Application of knowledge should also involve determining how to make sense of connections and linkages within data, information and detail – although not to the extent of drawing conclusions or making judgements.

AO3: Analyse information and ideas to:			20%
<ul style="list-style-type: none"> ▪ interpret and evaluate astronomical observations, data and methods ▪ make judgements and draw conclusions ▪ develop and improve observational procedures 			
Strands	Elements	Coverage	Interpretations and definitions
1 – Analyse information and ideas to interpret and evaluate astronomical observations, data and methods	1a – Analyse information and ideas to interpret and evaluate astronomical observations and data	<ul style="list-style-type: none"> ▪ Full coverage in each set of assessments (but not in every assessment). ▪ A reasonable balance between the strands and between the elements within each strand in each set of assessments (but not every assessment). 	<ul style="list-style-type: none"> ▪ Develop and improve covers a range of approaches to assessment, including questions related to adapting, modifying and enhancing observational procedures. Learners should not be expected to develop their own procedures. ▪ Observational procedures encompass, but are broader than, the observational activities detailed in the specification for the qualification. ▪ In the context of this assessment objective, questions/tasks should take an analytical form such as suggesting the limitations of a particular method. ▪ The emphasis here is on the outcome that Learners produce through the analysis of information – for instance, the interpreting, evaluating, judgement, conclusion or
	1b – Analyse information and ideas to interpret and evaluate astronomical methods		
2 – Analyse information and ideas to make judgements and draw conclusions	This strand is a single element.	<ul style="list-style-type: none"> ▪ Awarding organisations should justify the balance between strands and between elements within each strand in their assessment strategy 	

AO3: Analyse information and ideas to:			20%
<ul style="list-style-type: none"> ▪ interpret and evaluate astronomical observations, data and methods ▪ make judgements and draw conclusions ▪ develop and improve observational procedures 			
Strands	Elements	Coverage	Interpretations and definitions
3 – Analyse information and ideas to develop and improve observational procedures	3a – Analyse information and ideas to develop observational procedures.		modification/improvement of procedures that stems from their reasoning and synthesis of skills. <ul style="list-style-type: none"> ▪ The abilities to interpret and evaluate in this context are both linked and complementary. ▪ Questions/tasks should address a range of sources here – for example, written, numerical, theoretical, practical, social, economic and environmental.
	3b – Analyse information and ideas to improve observational procedures.		

Questions on proposed Conditions, requirements and guidance

Question 8: Do you have any comments on our proposed Conditions and requirements for GCSE astronomy?

Question 9: Do you have any comments on our proposed guidance for GCSE astronomy?

Equality impact analysis

Ofqual's role, objectives and duties

- 4.1 We are subject to the public sector equality duty. We have set out in Appendix B how this duty interacts with our statutory objectives and other duties.

Equality impact analysis relating to proposed changes to GCSE astronomy

- 4.2 We have considered the potential impact on students who share protected characteristics¹⁵ of the application of the principles and features that will apply to all new GCSE qualifications. Our equality impact analysis for our earlier consultations on GCSE reform¹⁶ is therefore of interest and we encourage you to read it.
- 4.3 Issues concerning the proposed subject content have been considered by the DfE, which has published its own Equalities Impact Analysis on its subject content proposals.¹⁷
- 4.4 We have also previously considered the potential impact on students who share protected characteristics of our decisions on assessment arrangements for this subject.¹⁸
- 4.5 We do not repeat here all of the evidence we have considered, as this can be found in our earlier reports. We focus instead on the specific issues that arise from the new proposals in this consultation, and from the way in which we are implementing our previous policy decisions.
- 4.6 We considered potential negative impacts of our requirements around the assessment of observational skills on students with some disabilities, particularly visual impairments, who might find it more difficult to participate in observational activities. Our view is that the negative impact on these students would be mitigated by the way observational skills will be assessed (indirectly

¹⁵ For the purposes of the public sector equality duty, the protected characteristics are disability, racial group, age, religion or belief, pregnancy or maternity, sex, sexual orientation, gender reassignment.

¹⁶ <http://webarchive.nationalarchives.gov.uk/20141031163546/http://comment.ofqual.gov.uk/gcse-reform-june-2013/category/8-equality-impact-analysis/>

¹⁷ www.gov.uk/government/consultations/gcse-and-a-level-reform-content-for-teaching-from-september-2017

¹⁸ www.gov.uk/government/consultations/development-of-new-gcses-and-a-levels-for-teaching-from-2017

through exams), which means affected students can still answer most questions on observation activities. Affected students will also be able to apply for an exemption from observation activities.

- 4.7 We have not identified any additional negative impacts on students who share protected characteristics which would result from the proposals in this consultation (beyond that discussed in the last paragraph and those that we and the DfE have already identified in our earlier reports).
- 4.8 During this consultation, we will continue to seek and consider evidence and feedback on our proposals that might help us identify any potential subject-specific impacts on students who share a protected characteristic.
- 4.9 Exam boards are required to consider the accessibility of their qualifications at the design stage and to remove any unjustifiable barriers.

Question 10: We have not identified any ways in which the proposals for GCSE astronomy would impact (positively or negatively) on persons who share a protected characteristic.¹⁹ Are there any potential impacts we have not identified?

Question 11: Are there any additional steps we could take to mitigate any negative impact resulting from these proposals on persons who share a protected characteristic?

Question 12: Do you have any other comments on the impacts of the proposals on students who share a protected characteristic?

¹⁹ 'Protected characteristic' is defined in the Equality Act 2010. Here, it means disability, racial group, age, religion or belief, pregnancy or maternity, sex, sexual orientation and gender reassignment.

Appendix A: Regulatory tools

Comparability and innovation

Exam boards operate in a market. They can design and deliver their qualifications in different ways, within the parameters we set. This provides some choice to schools or colleges, which is one of the benefits of a qualifications market. Exam boards must, however, make sure that the levels of attainment indicated by their qualifications are comparable to those of other exam boards' versions of the qualifications. The exam boards cooperate in a range of ways to make sure that the standards of their respective qualifications are comparable. To make sure standards are maintained and comparability is secured, we review GCSE qualifications before they can be made available, by applying an accreditation requirement to the qualifications, and we oversee the awarding of GCSE qualifications.

We do not wish to close down opportunities for exam boards to design and deliver their qualifications in different ways. Indeed, we have a statutory duty to have regard to the desirability of facilitating innovation in connection with the provision of regulated qualifications and a statutory objective with regard to the efficiency with which the qualifications market works. If we adopt a regulatory approach in which all aspects of a qualification are very tightly defined, we could effectively remove scope for exam boards to distinguish their qualifications from others and stop choice for schools or colleges. On the other hand, if exam boards have too much scope to vary their approach their qualifications might not be comparable.

In striking a balance, we use a range of tools to regulate qualifications and the exam boards that provide them. The main regulatory tools we use for the qualifications in this consultation are explained below.

Conditions of Recognition

Exam boards must comply at all times with our Conditions of Recognition. These are the main regulatory rules that we use. We can take regulatory action against an exam board that breaches or is likely to breach a Condition.

There are three sets of Conditions that will apply to new GCSEs (graded 9 to 1):

- (i) the published *General Conditions of Recognition*²⁰ that apply to all regulated qualifications;

²⁰ www.gov.uk/government/publications/general-conditions-of-recognition

- (ii) *GCSE (9 to 1) Qualification Level Conditions and Requirements*²¹ that apply to all new GCSE qualifications;
- (iii) GCSE Subject Level Conditions that apply to new GCSEs (graded 9 to 1) in a specific subject. We are consulting now on draft GCSE Subject Level Conditions for astronomy.

Regulatory documents

In some Conditions we refer to published regulatory requirements. We publish these in regulatory documents. The Conditions require exam boards to comply with such documents.

We are consulting on a regulatory document which covers our requirements in relation to assessment of mathematical skills, observational work and working scientifically.

The requirements will have effect as if they were part of a Condition. The requirements will be set out in a stand-alone section of the Conditions document, simply because they are technical and detailed so they sit better as separate from, rather than within, the Condition itself.

Statutory guidance

We publish guidance to help exam boards identify the types of behaviour or practices they could use to meet a Condition. Exam boards must have regard to such guidance, but they do not have to follow this guidance in the same way that they must comply with the Conditions; they are free to meet the outcomes of the Conditions in their own ways. An exam board that decides to take a different approach to that set out in our guidance must still be able to show that it is meeting the Condition or Conditions to which the guidance relates.

We are consulting now on draft guidance for new GCSEs in astronomy.

²¹ www.gov.uk/government/publications/gcse-9-to-1-qualification-level-conditions

Appendix B: Ofqual's role, objectives and duties

Our statutory objectives include the qualifications standards objective, which is to secure that the qualifications we regulate:

- (a) give a reliable indication of knowledge, skills and understanding; and
- (b) indicate:
 - (i) a consistent level of attainment (including over time) between comparable regulated qualifications; and
 - (ii) a consistent level of attainment (but not over time) between qualifications we regulate and comparable qualifications (including those awarded outside the UK) that we do not regulate.

We must therefore regulate so that qualifications properly differentiate between students who have demonstrated that they have the knowledge, skills and understanding required to attain the qualification and those who have not.

We also have a duty under the Apprenticeship, Skills, Children and Learning Act 2009 to have regard to the reasonable requirements of relevant students, including those with special educational needs and disabilities, of employers and of the higher education sector, and to aspects of government policy when so directed by the Secretary of State.

As a public body, we are subject to the public sector equality duty.²² This duty requires us to have due regard to the need to:

- (a) eliminate discrimination, harassment, victimisation and any other conduct that is prohibited under the Equality Act 2010;
- (b) advance equality of opportunity between persons who share a relevant protected characteristic and persons who do not share it;
- (c) foster good relations between persons who share a relevant protected characteristic and persons who do not share it.

The exam boards that design, deliver and award AS and A level qualifications are required by the Equality Act, among other things, to make reasonable adjustments for disabled people taking their qualifications, except where we have specified that such adjustments should not be made.

²² Equality Act 2010, section 149.

When we decide whether such adjustments should not be made, we must have regard to:

- (a) the need to minimise the extent to which disabled persons are disadvantaged in attaining the qualification because of their disabilities;
- (b) the need to secure that the qualification gives a reliable indication of the knowledge, skills and understanding of a person upon whom it is conferred;
- (c) the need to maintain public confidence in the qualification.

Legislation therefore sets out a framework within which we must operate. We are subject to a number of duties and we must aim to achieve a number of objectives. These different duties and objectives can, from time to time, conflict with each other. For example, if we regulate to secure that a qualification gives a reliable indication of a student's knowledge, skills and understanding, a student who has not been able to demonstrate the required knowledge, skills and/or understanding will not be awarded the qualification. A person may find it more difficult, or impossible, to demonstrate the required knowledge, skills and/or understanding because they have a protected characteristic. This could put them at a disadvantage relative to others who have been awarded the qualification. It is not always possible for us to regulate so that we can both secure that qualifications give a reliable indication of knowledge, skills and understanding and advance equality between people who share a protected characteristic and those who do not. We must review all the available evidence and actively consider all the available options before coming to a final, rational decision.

Qualifications cannot be used to mitigate inequalities or unfairness in the education system or in society more widely than might affect, for example, students' preparedness to take the qualification and the assessments within it. While a wide range of factors can have an impact on a student's ability to achieve a particular mark in an assessment, our influence is limited to the way the qualification is designed and assessed.

We require the exam boards to design qualifications to give a reliable indication of the knowledge, skills and understanding of those on whom they are conferred. We also require the exam boards to avoid, where possible, features of a qualification that could, without justification, make a qualification more difficult for a student to achieve because they have a particular protected characteristic. We require exam boards to monitor whether any features of their qualifications have this effect.

In setting the overall framework within which exam boards will design, assess and award the reformed GCSE, A level and AS qualifications, we want to understand the possible impacts of the proposals on persons who share a protected characteristic.

The protected characteristics under the Equality Act 2010 are:

- age;
- disability;
- gender reassignment;
- marriage and civil partnerships;
- pregnancy and maternity;
- race;
- religion or belief;
- sex;
- sexual orientation.

It should be noted that with respect to the public sector equality duty under section 149 of the 2010 Act, we are not required to have due regard to impacts on those who are married or in a civil partnership.

Responding to the consultation

Your details

To evaluate responses properly, we need to know who is responding to the consultation and in what capacity. We will therefore only consider your response if you complete the following information section.

We will publish our evaluation of responses. Please note that we may publish all or part of your response unless you tell us (in your answer to the confidentiality question) that you want us to treat your response as confidential. If you tell us you wish your response to be treated as confidential, we will not include your details in any published list of respondents, although we may quote from your response anonymously.

Please answer all questions marked with a star*

Name*

Position*

Organisation name (if applicable)*

Address

Email

Telephone

Would you like us to treat your response as confidential?*

If you answer yes, we will not include your details in any list of people or organisations that responded to the consultation.

Yes No

Is this a personal response or an official response on behalf of your organisation?*

Personal response (please answer the question ‘If you ticked “Personal response”...’)

Official response (please answer the question ‘If you ticked “Official response”...’)

If you ticked “Personal response”, which of the following are you?

Student

Parent or carer

Teacher (but responding in a personal capacity)

Other, including general public (please state below)

If you ticked “Official response”, please respond accordingly:

Type of responding organisation*

Awarding organisation

Local authority

School or college (please answer the question below)

Academy chain

Private training provider

University or other higher education institution

Employer

Other representative or interest group (please answer the question below)

School or college type

- Comprehensive or non-selective academy
 - State selective or selective academy
 - Independent
 - Special school
 - Further education college
 - Sixth form college
 - Other (please state below)
-

Type of representative group or interest group

- Group of awarding organisations
 - Union
 - Employer or business representative group
 - Subject association or learned society
 - Equality organisation or group
 - School, college or teacher representative group
 - Other (please state below)
-

Nation*

- England
- Wales
- Northern Ireland
- Scotland
- Other EU country: _____
- Non-EU country: _____

How did you find out about this consultation?

Our newsletter or another one of our communications

Our website

Internet search

Other

May we contact you for further information?

Yes No

Questions

Question 1: To what extent do you agree or disagree that we should introduce a Condition which requires exam boards to comply with the relevant subject content and assessment objectives?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 2: To what extent do you agree or disagree that we should introduce guidance which clarifies how exam boards should interpret our assessment objectives?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 3: To what extent do you agree or disagree that we should introduce rules for exam assessment to ensure exam boards take a consistent approach to assessing mathematical skills and observational skills in GCSE astronomy?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 4: To what extent do you agree or disagree with our proposed approach to assessing mathematical skills in exams (including the 20 per cent minimum weighting) for GCSE astronomy?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 5: To what extent do you agree or disagree with our proposed approach to assessing observational skills in exams (including the proposed 15 per cent minimum weighting) for GCSE astronomy?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 6: To what extent do you agree or disagree with our proposed approach to assessing working scientifically in exams for GCSE astronomy?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 7: To what extent do you agree or disagree that we should require exam boards to collect statements from schools which confirm that students have been given reasonable opportunities to carry out observation?

- Strongly agree
- Agree
- Neither agree nor disagree
- Disagree
- Strongly disagree

Please explain your reasons:

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Question 8: Do you have any comments on our proposed Conditions and requirements for GCSE astronomy?

- Yes No

Please provide your comments:

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Question 9: Do you have any comments on our proposed guidance for GCSE astronomy?

Yes No

Please provide your comments:

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Question 10: We have not identified any ways in which the proposals for GCSE astronomy would impact (positively or negatively) on persons who share a protected characteristic.²³ Are there any potential impacts we have not identified?

Yes No

Please provide your comments:

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Question 11: Are there any additional steps we could take to mitigate any negative impact resulting from these proposals on persons who share a protected characteristic?

Yes No

Please provide more information:

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.....
.....

²³ 'Protected characteristic' is defined in the Equality Act 2010. Here, it means disability, racial group, age, religion or belief, pregnancy or maternity, sex, sexual orientation and gender reassignment.

Question 12: Do you have any other comments on the impacts of the proposals on students who share a protected characteristic?

Yes No

Please provide more information:

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