

GCSE
Astronomy
2017



Launch event



Agenda

- The GCSE reforms – a reminder
- Introducing our new GCSE (9-1) qualification
 - Overview
 - Content
 - Observational activities
- Assessment
- Support
- Contact details and next steps



GCSE Astronomy 2017 -

“Opening up the Universe to students”

- Builds on students’ innate fascination for space
- Develops ideas that help enrich your science curriculum
- Clear specifications and assessments for all students
- Integrates accessible and engaging observational activities
- Trusted expert support when you need it

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GCSE Reforms



Overview of the changes

- GCSE Astronomy is one of the subjects in the final phase of GCSE reform
- Updated subject content from the DfE and assessment requirements from Ofqual
- Fully linear structure
- New 9 to 1 grading scale, with 9 the top level
- External assessments only – **no controlled assessment for Astronomy**
- All new GCSEs should be 120 – 140 guided learning hours



The new 9-1 grading scale

- Broadly the same proportion of students will achieve a grade 4 and above as currently achieve a grade C and above
- Broadly the same proportion of students will achieve a grade 7 and above as currently achieve a grade A and above
- The bottom of grade 1 will be aligned with the bottom of grade G

| New grading structure | Current grading structure |
|-----------------------|---------------------------|
| 9 | |
| 8 | A* |
| 7 | A |
| 6 | B |
| 5 | |
| 4 | C |
| 3 | D |
| 2 | E |
| 1 | F |
| | G |
| U | U |

GOOD PASS (DfE)
5 and above = top of C and above

AWARDING
4 and above = bottom of C and above

Source:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/465873/your_qualification_our_regulation.pdf



GCSE timeline

| | June 2016 | June 2017 | June 2018 | June 2019 |
|-----------------------|-------------------------|-------------------------------|------------------|------------------|
| Current specification | Summer series as normal | Summer series as normal | Final assessment | |
| New specification | | First teaching of 2-year GCSE | | First assessment |

- The last available assessment for the current GCSEs in Astronomy will be June 2018
- The reformed GCSEs in Astronomy will be reported in the 2019 performance tables

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Changes to
GCSE Astronomy





New DfE / Ofqual criteria

- New subject content for GCSE Astronomy
- Removal of controlled assessment – GCSE Astronomy now assessed by written exam only
- Assessment of observational skills within written exam papers (minimum of 15% of the marks)
- Assessment of mathematical skills within written exam papers (minimum of 20% of the marks)
- Revised assessment objectives



Impact of these changes

- The new content increases depth and breadth, covering a range of new areas of the subject
- The removal of controlled assessment means:
 - some curriculum time will be released to cover the new content requirements
 - however, there is still a requirement for students to undertake at least two observational activities
 - increase in examination time in order to test these skills
- Written exam papers will have a wider variety of question types, including some longer-answer questions

GCSE **Astronomy** 2017

Our new
qualification





Our approach



- We've worked with teachers, higher education and subject associations to develop our new GCSE
- You've told us that you want GCSE Astronomy to:
 - contain topics you know your students will enjoy
 - be able to be split into small topics to suit a range of delivery models
 - retain observational skills, but do away with the less enjoyable aspects of coursework
 - be suitable for students of a variety of ages



Our design principles

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- Familiar course content and approach
 - We've kept most of our current specification as the basis of the new GCSE, to give you continuity
- Clear and simple structure
 - Based on your feedback, we've designed a GCSE that allows students to focus on different topics for each exam paper
 - We've also made our specification and exam papers clear
- Integrating observational and mathematical skills
 - You can continue to use engaging observations to develop student interest and maths to deepen their understanding
- Clear and accessible assessments for all
 - Our new papers will build confidence through ramped questions which slowly increase in demand through the paper



The development process

- Specification developed in conjunction with:
 - teachers
 - Higher Education
 - stakeholders, such as RAS
- Teacher feedback has informed areas of the content to develop and the assessment model
- Specification split into 16 short topics – 8 of these are assessed on each question paper
- Content includes opportunities to develop both mathematical and observational skills



Specification overview



| | Content overview |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “Naked-Eye Astronomy” | <ul style="list-style-type: none">● Topic 1 – Planet Earth● Topic 2 – The lunar disc● Topic 3 – The Earth-Moon- Sun system● Topic 4 – Time and the Earth-Moon- Sun cycles● Topic 5 – Solar System observation● Topic 6 – Celestial observation● Topic 7 – Early models of the Solar System● Topic 8 – Planetary motion and gravity |
| “Telescopic Astronomy” | <ul style="list-style-type: none">● Topic 9 – Exploring the Moon● Topic 10 – Solar astronomy● Topic 11 – Exploring the Solar System● Topic 12 – Formation of planetary systems● Topic 13 – Exploring starlight● Topic 14 – Stellar evolution● Topic 15 – Our place in the Galaxy● Topic 16 – Cosmology |

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Content



Overview of changes



- The specification content has been updated to include all content areas within the DfE subject content
- We've also made changes in response to centre feedback to ensure the new specification is up-to-date
- Some content areas have been strengthened and others have been removed to meet the new requirements



A new 'look and feel'



| Existing specification | New specification |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 4 main topics, each split into sub-topics | 2 areas of study, each split into 8 topics |
| Topics contain a wide range of ideas on an astronomical object / phenomenon | Ideas are split so that e.g. features and exploration of the Moon in different topics |
| Emphasis on recall of factual information | More emphasis on underlying principles |
| Observations largely limited to coursework | Observations throughout the specification content |



New content

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A more detailed mapping document will be available, but some changes include:

- the effects of tides
- precession
- time zones
- early models of the Solar System
- features of radio and IR telescopes
- exploration of the Solar System (probes, orbiters)
- formation of planets
- stellar evolution (Chandrasekhar limit)



New content



Some new topics which incorporate observational skills e.g.

- Topic 5 – Solar System observation
- Topic 6 – Celestial observation
- Topic 13 – Exploring starlight

These topics include knowledge of some basic astronomical techniques.

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Assessment



Assessment objectives



AO1
40%

Demonstrate knowledge and understanding of:

- scientific ideas
- scientific techniques and procedures.

AO2
40%

Apply knowledge and understanding of:

- scientific ideas
- scientific enquiry, techniques and procedures.

AO3
20%

Analyse information and ideas to:

- interpret and evaluate
- make judgements and draw conclusions
- develop and improve experimental procedures.



Mathematical skills



- Students will apply a range of mathematical skills relevant to astronomy
- These comprise calculations and interpretation of data
- They may be within a theoretical or an observational context
- Mathematical skills will:
 - be assessed at a minimum of Key Stage 3 level
 - comprise a minimum of 20% of the total subject marks



Assessment overview



| Paper 1 - 1AS0/01 | Paper 2 - 1AS0/02 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>"Naked-Eye Astronomy"</p> <p>Externally assessed</p> <p>50% of the total GCSE</p> <p>1 hour 45 minutes Multiple choice, short and extended answer (100 marks)</p> | <p>"Telescopic Astronomy"</p> <p>Externally assessed</p> <p>50% of the total GCSE</p> <p>1 hour 45 minutes Multiple choice, short and extended answer (100 marks)</p> |



Paper overview



- Paper 1 will assess Topics 1 – 8; and Paper 2 will assess Topics 9 – 16
- Exam papers will include some multiple choice questions, short and longer answer questions
- Each paper will contain 10 whole questions, each broken into parts
- These will include two 6-mark question parts, which need a more extended response
- Ramped questions gradually increase the demand within each question and across the whole paper



Command words



- A taxonomy of command words has been carefully defined and will be used in the assessments
- This taxonomy is at the back of the specification
- Questions and mark schemes are written so that they match the command word used
- To help your students, this command word taxonomy is the same as the one used for Edexcel GCSE Science and AS / A level Science



Mathematical skills



- An appendix in the specification outlines the skills that students should learn and which will be assessed
- Key equations and data will be provided for students
- Questions may use mathematics across a range of demands from KS3 to GCSE
- Calculators may be used in exams



Observational skills



- A number of observational skills are embedded into the specification
- In addition to the specification content, students must undertake at least two observational activities – one aided and one unaided
- Teachers will certify that these have been completed
- The specification contains a number of suggested observational activities
- Exam questions may ask students to apply the embedded observational skills in different contexts



Observational skills



Unaided observations

- Changing appearance of lunar features
- Find the radiant point of a meteor shower
- Accuracy of stellar magnitude estimates
- Estimate a celestial property using drawings
- Estimate levels of light pollution
- Estimate solar rotation period using drawings of sunspots
- Estimate period of a variable star
- Compare estimates of stellar density

- Find longitude using a shadow stick
- Assess the accuracy of a sundial

Aided observations

- Changing appearance of lunar features
- Find the radiant point of a meteor shower
- Accuracy of stellar magnitude measurements
- Measure a celestial property using telescopic drawings or photographs
- Measure levels of light pollution
- Measure solar rotation period using photographs of sunspots
- Measure period of a variable star
- Compare measurements of stellar density

- Demonstrate range of Messier objects
- Calculate length of the sidereal day



Mark schemes



- Most questions have a points-based mark scheme
- These clearly show:
 - The number of marks for the question
 - The assessment objectives within each question
 - Example responses that would typically be expected
 - Any additional guidance
- The correct response is shown for multiple choice questions and calculations



Mark schemes



- Questions with 6 marks have a levels-based mark scheme
- These clearly show:
 - The number of marks for the question
 - Indicative content
 - Levels-based mark grid which describes the qualities expected within responses
- The 6-mark questions are designed to assess across different assessment objectives so that, in a paper, one question may be content-based and the other more observational



Using levels-based mark schemes

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- Examiners will use a 'best-fit' approach to decide which level most closely describes the quality of the answer
- If the response meets the descriptors fully it will be placed at the top of the level
- If it just meets the descriptors it will be placed near the bottom of the level
- Where an answer falls in a band may be influenced by the answer having a logical structure, showing how the points made are related or follow on from each other where appropriate.

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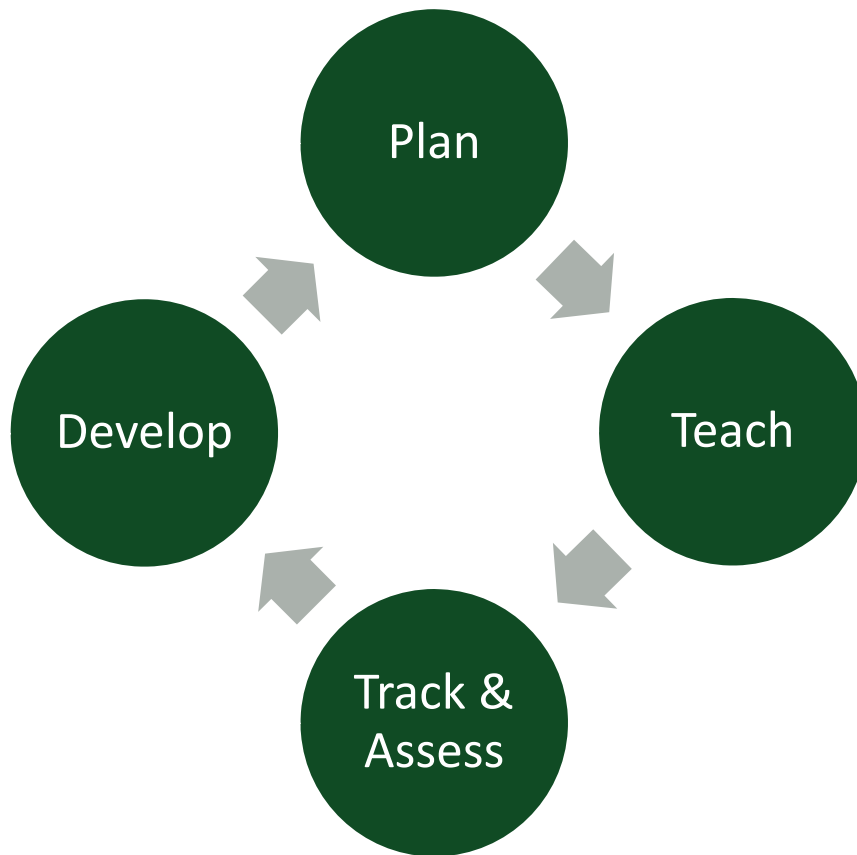


Support



Supporting great Astronomy teaching

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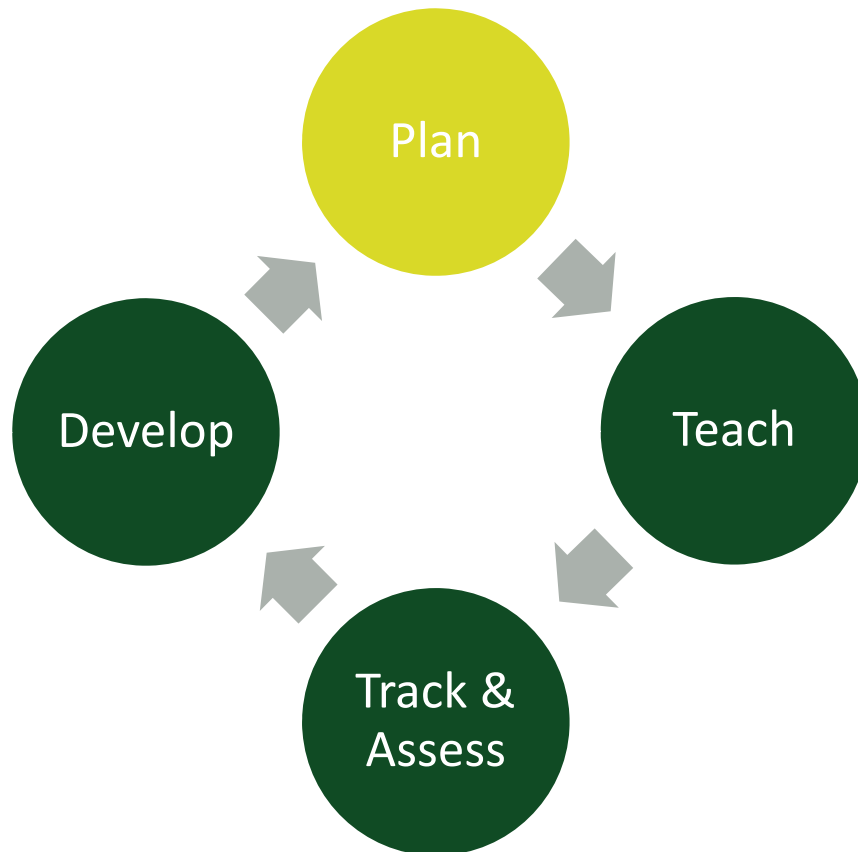


- We will provide a range of support to help you plan, teach, track and assess, and develop the new course.
- This includes free qualification support to download from our website



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To help you plan the new course we are providing:

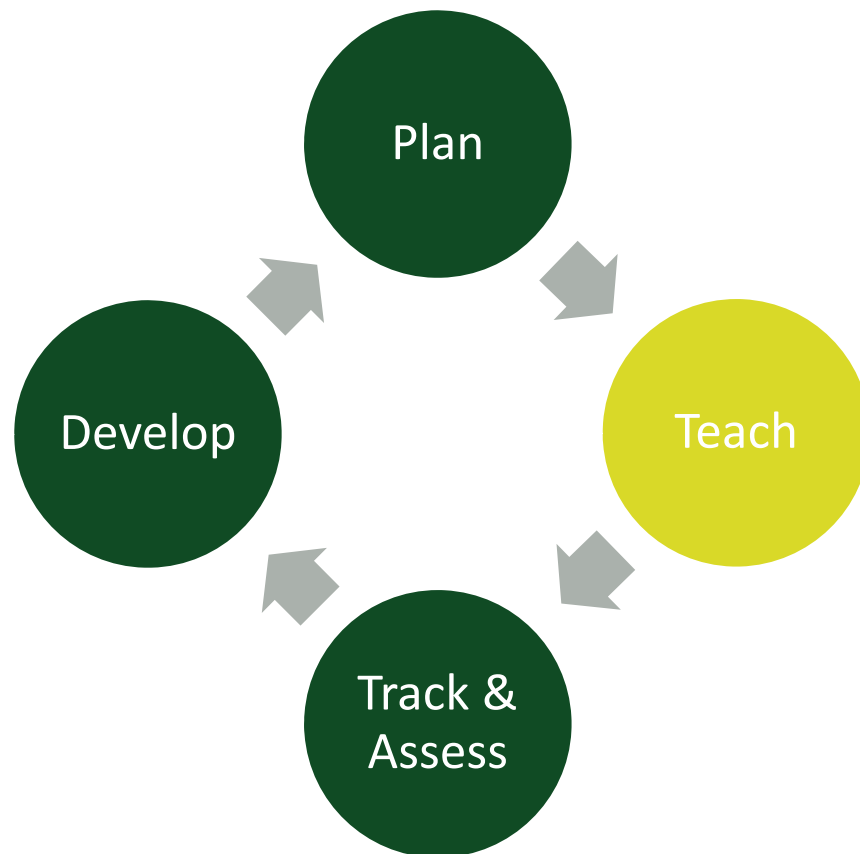
Free support for the qualification:

- Getting Started Guide
- Course planners (for those planning to teach over 2 or 3 years)
- Scheme of work
- Mapping documents



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There will be teaching and learning support to help you deliver the new qualification:

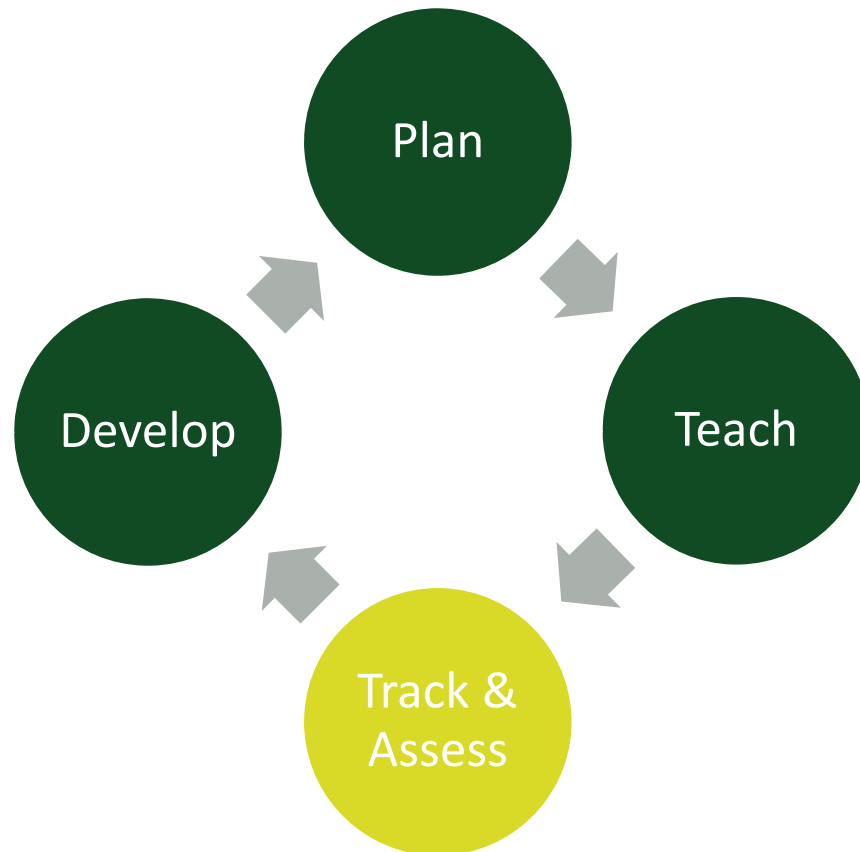
Free support for the qualification:

- Course planners
- A guide to observational activities



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To help you prepare your students for the assessments:

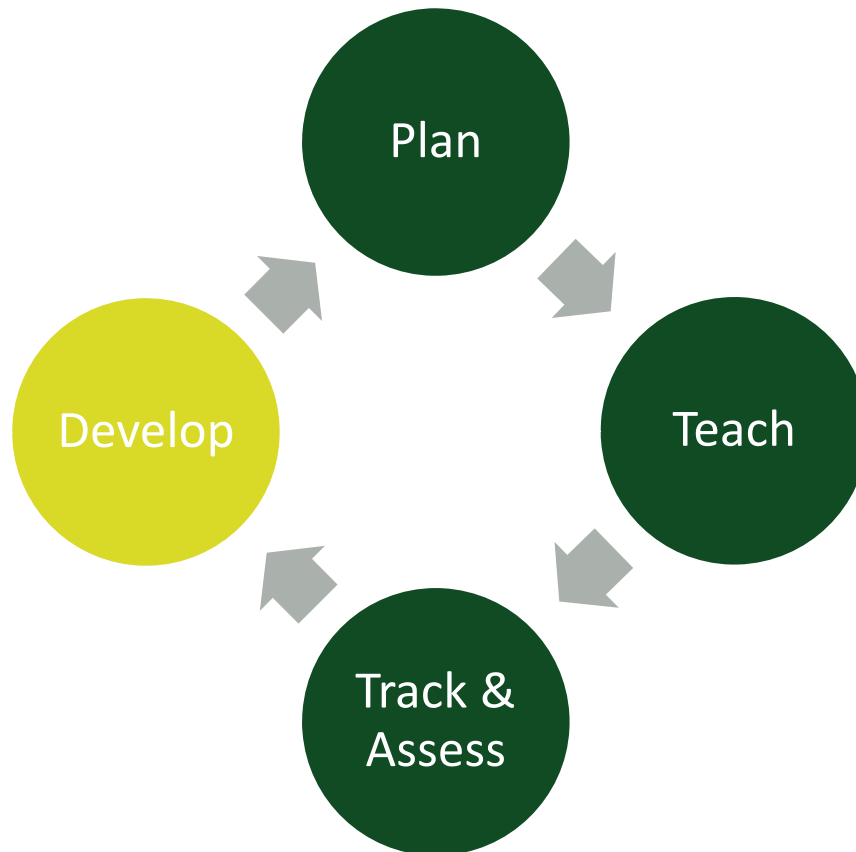
Free support for the qualification:

- Specimen papers to support formative assessment and mock exams
- Marked exemplars of student work with examiner commentaries
- ResultsPlus



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Our training programme includes:

- Launch events
- Getting Ready to Teach events

Our subject advisor team, led by Stephen Nugus and Julius Edwards, will guide you through all the changes and are on hand to answer any questions you might have



Published resources

- We are committed to helping teachers deliver our Edexcel qualifications and students to achieve their full potential
- To do this, we aim for our qualifications to be supported by a wide range of high-quality resources, produced by a range of publishers
- However, it is not necessary to purchase published or endorsed resources to deliver our qualifications
- Pearson does not publish a textbook – the only textbook is *GCSE Astronomy* (Nigel Marshall) published by Mickeldore

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Contact details
and next steps





Contact details

Our Subject Advisors are:

Stephen
Nugus



and Julius
Edwards



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What next

| Date | Activity |
|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| June 2016 | Submission of draft specifications and sample assessments to Ofqual. Draft specifications and sample assessments available on the Pearson website. |
| June onwards | Ofqual review submission and provide feedback. Re-submission made to Ofqual if required. |
| June to October | Free face-to-face and online launch events to walk you through all the proposed changes. |
| After accreditation | Accredited materials and support materials available on the Pearson website. |
| Spring 2017 | Free face-to-face and online Getting Ready to Teach events to help you prepare for first teaching. |



Next steps

- Complete your Evaluation form
- Visit the website for support materials:
<https://qualifications.pearson.com/en/qualifications/edexcel-gcse/astronomy-2017.html>
- Sign up for updates:
<https://qualifications.pearson.com/en/forms/gcse-and-a-level-2017.html>



Finally

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- Any questions?