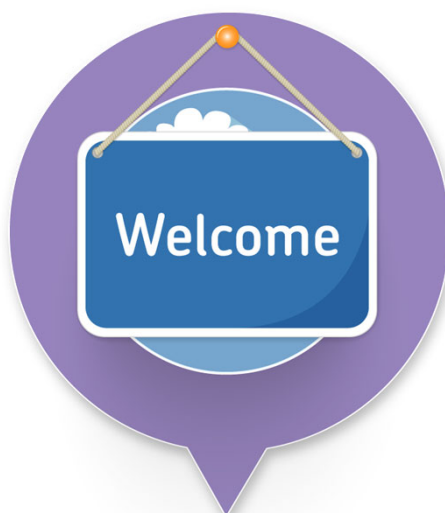


GCSE science: Virtual Communities 2021

Summer 2021



Welcome



Today's agenda

- Supporting students in their transition from:
 - KS3 to GCSE
 - GCSE to A-level.
- Updates on arrangements for autumn 2021.
- What we know about arrangements for 2022.

Supporting student transitions with AQA resources

- Focus on the skills needed at the different key stages, rather than the content.
- We'll look at a particular aspect of maths skills:
 - how the requirements progress from KS3 to KS5 science
 - how the assessments progress from KS3 to KS5 science
 - determining student readiness for the next stage.
- Resources being used:
 - Exampro question banks for KS3 and GCSE science and KS3 Maths
 - MERiT transition tests
 - Focus on Success: Maths skills
 - transition activities ('Teaching resources' page for each A-level).

Key transferable maths skills in science

- Use of standard form
- Use of significant figures
- Rearranging equations
- Drawing and interpreting graphs
- Percentage calculations

Do you incorporate any of these skills specifically in your KS3 science lessons?

General mathematical requirements in science

- From the programme of study for **KS3 science**, pupils should be taught to apply mathematical concepts and calculate results.
- **GCSE Foundation tier** level of maths must 'not be 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*.'
- **GCSE Higher tier** level of maths must 'not be lower than that of questions and tasks in assessments for the foundation tier in a GCSE Qualification in Mathematics.'
- On **GCE** (AS and A-level) papers, mathematical skills must be 'at level 2 or above' (ie equivalent to Higher tier GCSE mathematics or above).

GCSE Subject-level conditions and requirements for Combined Science (2021) and GCE Subject-level conditions and requirements for science. Used under the Open Government Licence v3.0.

Use of standard form: Progression of requirements

- Not specifically mentioned at KS3 science.
- From the programme of study for KS3 Maths:
Pupils should be taught to **interpret and compare** numbers in standard form $A \times 10^n$ $1 \leq A < 10$, where n is a positive or negative integer, or zero.
- From the GCSE Maths criteria:
N9 **calculate with and interpret** standard form $A \times 10^n$ $1 \leq A < 10$, where n is an integer (with and without a calculator).
- From the GCSE science maths criteria:
1b recognise and use expressions in standard form.
- From the A-level science maths criteria:
AO2 recognise and use expressions in standard form.

National curriculum in England: mathematics programme of study – Key Stage 3. Used under the Open Government Licence v3.0.

Use of standard form: Progression of requirements

Poll: Do you incorporate use of standard form in your KS3 science lessons?

- If your answer to the poll was 'yes', what resources do you use?
- If your answer to the poll was 'no', how do you ensure your students are familiar with this skill when it comes to KS4 science?

Use of standard form: Assessment at GCSE

Low demand (Foundation tier only)	Standard demand (Foundation and Higher tier)	High demand (Higher tier only)
Use of standard form will not be assessed at low demand.	An answer will be required in standard form.	An answer will be required in standard form.
	Numbers will be given as positive (eg $\times 10^6$), and simple negative indices.	Numbers will use positive (eg $\times 10^6$) or negative (eg $\times 10^{-6}$) indices.
	Students are expected to convert large or small numbers to standard form.	Students are expected to convert large or small numbers to standard form.
	Students are not expected to carry out calculations using numbers in standard form.	Students are expected to carry out calculations using numbers in standard form.

The transition from KS3 to GCSE

Look at Examples 1–3.

- Example 1 is a simple KS3 maths question where students have to write a very big number in standard form.
- Example 2 is a Standard demand GCSE science question (2019 Biology 2F), where students have to do a calculation, then convert the number into standard form.
- Example 3 is a High demand GCSE science question (2019 Synergy 3H), where students have to multiply a number in standard form with a negative index by 1000, then quote their answer in standard form.
- How might you use these questions to help in the transition from KS3 to KS4 science?

Are your students ready for the KS3 to GCSE transition?

- End of Year 9: KS3/KS4 transition tests (eg on MERiT) help determine general readiness for KS4.
- Beginning of Year 10 – starter activities.
- Simple tests to check basic knowledge of standard form (no science context), for example:
 - write down a list of instructions on how to convert 750 500 into standard form, or write down a list of instructions on how to convert 8.5×10^9 into an ordinary number.
 - use other KS3 maths questions to embed the skill without a context.
- When students demonstrate the skill confidently, add a science context by using Standard demand questions from GCSE, or KS3 maths questions in a science context.
- Students who can do this confidently could be given more demanding questions (eg Example 3).

Use of standard form: Assessment at A-level

Exemplification from the DfE subject criteria for GCE science.

- Carry out calculations using numbers in ordinary and standard form, eg use of magnification, use of Avogadro's number and use of physical constants.
- Understand standard form when applied to areas such as (but not limited to) size of organelles or Kw.
- Convert between numbers in standard and ordinary form.
- Understand that significant figures need retaining when making conversions between standard and ordinary form (eg $0.0050 \text{ mol dm}^{-3}$ is equivalent to $5.0 \times 10^{-3} \text{ mol dm}^{-3}$).

GCE Subject-level conditions and requirements for science. Used under the Open Government Licence v3.0.

The transition from GCSE to A-level

- Look at Examples 3–6.
- Example 3 is a High demand GCSE science question (2019 Synergy 3H), where students have to multiply a number in standard form with a negative index by 1000, then quote their answer in standard form.
- Example 4 is an AS Chemistry question (2018 AS Paper 1). Students multiply a number in standard form (negative indices) by 42, to give an answer in 1g of material, then multiply that answer by 1000 to gain the amount in 1kg of material.
- Example 5 is a High demand GCSE question (2018 Chemistry 2H), where students have to use standard form to come up with their answer – recognising the 2:1 ratio and dividing the number by 2.
- Example 6 is an AS Chemistry question (2018 AS paper 1) where students multiply a number in standard form by 75 and by 1000 to give an answer in milligrams.

Are your students ready for the transition from GCSE to A-level?

- Building confidence throughout the GCSE course:
 - Student maths skills audit – students complete these various stages to map their own progress (teachers could adapt to help planning with maths colleagues eg when each skill is initially delivered in maths lessons).
 - Topic tests (pre-prepared or teacher devised). Specifications list content areas where there are opportunities to develop particular maths skills
 - End of Year 10 tests (Centre Services, formerly e-AQA) to check readiness for Year 11.
- End of Year 11/beginning of Year 12 – transition activities.
- Beginning of Year 12 – starter activities focused on particular skills.

Focus on success: Maths in science

- Published in spring 2020.
- Activities and guidance on:
 - use of diagnostic questions
 - misconceptions
 - applying mark schemes.
- Editable route maps to reflect your school's curriculum planning in Maths and science.
- Audits of maths skills for teachers and students.

GCSE Maths skills audit

Student maths skills audit: What do I know?

Look at each of the maths skills and assessment examples: How confident are you at doing questions like the one in the example?
RAG rate yourself so you can focus your revision on the skills you still need to master.

Maths skill	How it's used in science GCSE	Example question	R	A	G
Recognise and use expressions in standard form	Standard form is a different way of writing numbers. For example, 437 can be written as 4.37×10^2. It's based on using powers of 10 and is very useful for writing very large or very small numbers. In standard form, numbers are given as a number from 1 to 10 (but not 10 itself) which is then multiplied by a power of 10. In maths textbooks this tends to be written as $a \times 10^n$ where $1 \leq a < 10$	Zinc oxide can be produced as nanoparticles and as fine particles. A nanoparticle of zinc oxide is a cube of side 82 nm Figure 15 represents a nanoparticle of zinc oxide. Figure 15  Calculate the surface area of a nanoparticle of zinc oxide. Give your answer in standard form. [3 marks]			

GCSE to A-level transition activities

- A-level Biology, Chemistry, Physics and Environmental Science.



Lesson plans and activities

-  Lesson activity: GCSE to A-level progression (2.0 MB)
-  Lesson activity: GCSE to A-level progression answer booklet (822.9 KB)

- Help with preparing your students for the transition to A-level.
- Guidance and activities for students to test themselves.
- Answers and explanations to help students learn.

Transition resources for maths in science

- Focus on success: Maths in science.
- Materials from previous Hub meetings.
- GCSE Maths skills teaching guides.
- Transition activities for each A-level science.
- Maths skills briefings for A-level sciences.
- KS3 transition tests (Year 9) on Centre Services.
- End of Year 10 tests on Centre Services.
- Exampro
 - transition tests
 - searchable question banks for KS3, GCSE and A-level.
- ASE: *The Language of Mathematics in Science*.
- For the latest resources and assessment support, visit aqa.org.uk/subjects/science/gcse

Resources

Take advantage of our extra resources in the 'Plan', 'Teach' and 'Assess' sections of our website.

Teaching resources

Plan	Teach	Assess
19	35	118
Prepare for your teaching year. Information, support and services to help you deliver the specification.	Teaching resources that you can use to plan your lessons and support your students' learning.	Prepare your students for assessment. Past papers, mark schemes and example answers.
All planning resources >	All teaching resources >	All assessment resources >

Awarding timetable for summer and autumn 2021

- Appeals for summer 2021.
- Ofqual consultation decisions published 4 May.
 - Full exam series for all GCSE and A-level sciences.
 - AS Biology, Chemistry, Physics.
 - All papers, normal format, no adaptations.
 - AS and A-level exams October 2021.
 - GCSE exams November/December 2021.
 - Applied General exams in January 2022, as usual.
- Draft timetable published 7 June.
- Results – A-levels January; GCSEs February 2022.
- Release of materials to Centre Services:
 - question papers just after the exam
 - mark schemes on results day.

What do we know about Summer 2022?

- The Ofqual consultation is ongoing (at the time of this session).
- Expect more detailed information by the end of summer 2021.
- Updates will be published on our website as soon as we know anything.
- The assessment model for the sciences, in terms of balance of Assessment Objectives, types of question and balances of levels of demand, will be the same as in a usual series.
- Autumn 2020 papers will be released on our website in July 2022.

Any questions?

- Your chance to ask questions.
- Any questions that we don't manage to answer today will be sent to you via email approximately one week after this event.

Event materials

These event materials will be available to download shortly. If you can't download them, you can access them at the customer portal of our online booking system.

Once we receive notification that you have attended this course, we'll email you a certificate of attendance. When you receive this email, log in to your account and you'll see these materials on the 'my resources' tab on the welcome screen.

Get in touch

Our friendly team will be happy to support you between 8am and 5pm, Monday to Friday.

Tel: 01483 477 756

Email: gcsescience@aqa.org.uk

Twitter: @AQA

aqa.org.uk



Thank you
