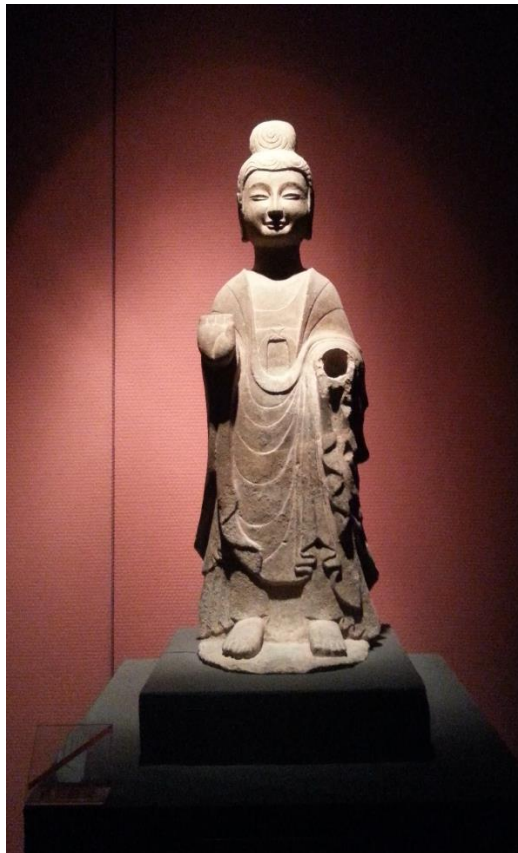


Oxford, Cambridge and Top 20 UK  
University Guidance

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# UCAS ADVICE and Activities



Name: \_\_\_\_\_

Class: \_\_\_\_\_

## For digital version of this book (with active links)

File name of this document: *Oxford, Cambridge and Top 20 University UCAS **Advice and** Activities*

As well as a wide variety of other free AS and A2 Chemistry resources, and some Biology resources, visit the website ([www.SmashingScience.org](http://www.SmashingScience.org)) or scan this code:



### A note on the GENERAL version of this **ADVICE and** Activities workbooklet

This book contains all of the activities and most of the advice that can also be found in the Revision Books for the Cambridge entrance exam (ESAT) for the Natural Science Tripos undergraduate degree at Cambridge.

### A note on the GENERAL version of this workbook

**For students who might take the Biology or Chemistry Cambridge ESAT** the revision books with past exam questions broken down by A level (and for chemistry IB) topic number will contain more detailed and specific information and can be found at [www.SmashingScience.org](http://www.SmashingScience.org)

**For students taking the Physics ESAT** most, if not all of this book will be relevant.

**For students making any Oxbridge application** much of the information and activities will be directly relevant, and most will have some value. For instance, knowing that data may exist relating to Oxbridge college offer statistics, or getting another perspective on the things that are assessed in the application process.

**For any student interested in making a great top 20 university application** than a lot here, especially those activities relating to improving your references and those that help you to live the amazing academic and life experiences that make a great personal statement.

If you have looked at the grade statistics in here and realise that you fit the grade profile, then making an Oxbridge application is most likely worth doing. You should try to understand that success should be measured in the new skills you have learnt, and the things you are now better at. If you approach it as an opportunity for growth than you have nothing to lose in making an ambitious but less likely application to a top university (as well as 3 or 4 applications that are more likely to deliver you offers). Learning to try more often to give hard things a jolly good go will deliver powerful advantages, now and throughout a well lived life. If you don't quite have the grades but have been successful academically but also have overcome other challenges, for instance, you are the first in your family to apply for university, then you definitely should think about applying.

**For teachers** there is also a lot of information and activities in here that may help you advise and guide your students to deliver their best UCAS application.

**For parents and guardians** there are a great many voices in this space. The official websites from the universities, colleges and departments are more reliable sources, but the general internet also has a great deal of information. The traditional approach is through careful selection of the school; for most students who would perform well at Oxbridge, this school selection is not possible. The UCAS process is about making the finish line as fair as possible: student A, at the end of the race is ahead of student B. But where and when the students start, and how much, and importantly, how effective, the help they get along the way varies wildly. A student who goes to a top 20 university may have achieved more than another student who gets an offer from Oxbridge, and they could easily go on to have a more interesting and successful life. Finding the time to find out what your child is doing, when they are doing it, and taking the opportunity to feel pride in the work that they are doing, and communicating those positive feelings to them, can address some of the more challenging feelings that working within any important but difficult process delivers. And it would also encourage and promote stronger achievement.



# To do checklist for making your greatest Oxbridge application

Tick ✓ each box when you've finished the task.

Learning about making a great UCAS application and this book	Silver - read it	Winner—thought about it (why is it included?)	Legend —revisited the idea a month later and talked about it with a teacher/parent/adult
Read this statement.	✓		
Understand that a great Oxbridge application involves a thorough understanding of alternate university degree courses that you can be happy and proud of completing, and with hard work, can deliver the same kind of life opportunities.			
Read about the deadlines and read the calendars at the back.			
Finished your first draft of your personal statement and talked to someone about it, ideally a teacher with experience with UCAS applications.			
Look at <a href="http://www.SmashingScience.org">www.SmashingScience.org</a> for other free resources, especially about Paper 1 MCQ .			
Understand why NSAA Section 1 is like the ESAT.			
Understand which topics are most important.			
Understand why most of your extended learning should be done becoming an expert at a topic before you try an NSAA question.			
Use the calendar to plan out the rest of the year until your last Oxbridge Interview.			
Spend 3 minutes each week thinking about which of your working time slots are productive, and which are not. Think about why they may have been different (e.g. first/last week after/before holiday, feeling unwell, Monday etc), and update your working schedule if these changes in your patterns are likely to be important next week.			
Used the graphs and tables to compare how the AS topics compare with the ESAT, and how the ESAT compares with the NSAA.			
Read each of the sections highlighted in “ <i>Contents mapped to Cambridge’s assessment of applicants list</i> ” and using a calendar planned through how and when you are going to act to improve your chances and application across all of these different assessment points.			
Thought about how you are going to get the best possible reference, and what you can do to help make that happen, including, perhaps, by completing the questionnaire at the back: “ <i>Appendix: How to get the best reference</i> ”.			
Thought about how the test being online now will affect your working on the exam questions. You are likely to have to write on lined paper to do your working and will enter your answers with a keyboard. This is very different compared to A levels and IB Diploma qualifications which all use paper exams, so your preparation should change to deal with this.			
Thought about what makes these questions harder than normal AS questions: more steps for each, more answer choices, tighter time allowance. Generally, these require a stronger approach to eliminating errors in your process, through a more systematic approach to showing yourself your thinking in your working.			
Thought about this whole UCAS process as a magnificent way to build invaluable skills in dreaming about, planning and then working towards the world’s biggest goals that you will be able to use for the rest of your life at the most critical times, regardless of the outcome of your Oxbridge application.			

## Contents mapped to Cambridge's assessment of applicants list

In addition to their various websites, and other formats of communication, Cambridge also delivers information through general feedback on individual applicants<sup>1</sup>, which provides an unusually complete list of what is used to compare applicants with each other. The order of the statements has been preserved and quotes from that have been used for this contents table.

For each of these resources, **after you have read them, write down the page number** next to the section heading. Highlight or underline whichever sections you find most important; the first two have already been done for you.

Method of assessment	Title of section in this book that provides some information
"Recent academic achievement, as evidenced by transcripts, GCSEs (or equivalent), AS-levels (where relevant), A-levels, or other school-leaving qualifications;"	<ul style="list-style-type: none"> <li>• <i>UCAS entry requirements for some degrees that need Chemistry A Level (as of Nov. 2023). Page # ____.</i></li> <li>• <i>UMS(/PUM) performance and the eventual HE destination of Cambridge applicants. Page # ____.</i></li> <li>• <i>How does Cambridge process grades and UMS scores? Page # ____.</i></li> </ul>
"Contents of references and quality of predicted grades, where relevant;"	<ul style="list-style-type: none"> <li>• <i>Top 15 performing UCAS Apply Centres in 2022 for Cambridge. Page # ____.</i></li> </ul>
"Quality of the personal statement, and evidence of interest in the subject to be studied and of engagement with that subject outside the classroom;"	<ul style="list-style-type: none"> <li>• <b><u>Appendix: Personal Statement advice and information.</u></b> Page # ____.</li> </ul>
"Performance in admissions assessments, where relevant;"	<ul style="list-style-type: none"> <li>• <i>Comparing marks allocated to each topic . Page # ____.</i></li> <li>• <i>Section 1 Questions . Page # ____.&amp;</i> <ul style="list-style-type: none"> <li>◦ <i>Section 1 Mark Scheme. Page # ____.</i></li> </ul> </li> <li>• <i>Appendix: ESAT syllabus mapped to CAIE A Level Biology</i></li> <li>• <i>Section 2 Questions . Page # ____.&amp;</i> <ul style="list-style-type: none"> <li>◦ <i>Section 2 Mark Scheme. Page # ____.</i></li> </ul> </li> </ul>
"Quality of submitted work, where relevant;"	<p>[No work is required to be submitted for most science subjects, with the exception of Psychology at Cambridge:]</p> <ul style="list-style-type: none"> <li>• <i>University of Cambridge Science Subjects Entrance Exams. Page # ____.</i></li> </ul>
"Performance at interview;"	<ul style="list-style-type: none"> <li>• <i>Appendix: Degree subjects which require interviews. Page # ____.</i></li> <li>• <i>Appendix: Organising your interview preparation. Page # ____.</i></li> </ul>
"Performance in standardised tests of English language proficiency such as IELTS, where relevant;"	<ul style="list-style-type: none"> <li>• <i>Appendix: Performance in standardised tests of English language proficiency such as IELTS. Page # ____.</i></li> </ul>
"Individual contextual factors, as signalled in the UCAS application, My Cambridge Application, and where applicable the Additional Applicant Information Form and/or Extenuating Circumstances Form;"	<ul style="list-style-type: none"> <li>• <i>Appendix: Individual contextual factors. Page # ____.</i></li> </ul>
"Geo-demographic and school-level indicators such as those supplied by the Index of Multiple Deprivation and other UK databases (see here: <a href="https://www.undergraduate.study.cam.ac.uk/apply/after/contextual-data">https://www.undergraduate.study.cam.ac.uk/apply/after/contextual-data</a> )."	<ul style="list-style-type: none"> <li>• <b><u>Appendix: Contextual data.</u></b> Page # ____.</li> </ul>

<sup>1</sup> Generic statement that follows an individual student's feedback that they can (and always should) request after the application process has finished.



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Week Starting	Wk #	Events	Topic Focus
3-Jun	1	<p><b>Tue 4<sup>th</sup> PM Paper 1 (ADMINISTRATIVE Zone 5)</b></p> <p>When you have finished all of your exams, start planning out the rest of the year to know what you have to do and when:</p> <p><a href="https://www.undergraduate.study.cam.ac.uk/apply">https://www.undergraduate.study.cam.ac.uk/apply</a></p> <p><a href="https://www.ox.ac.uk/admissions/undergraduate/applying-to-oxford/guide">https://www.ox.ac.uk/admissions/undergraduate/applying-to-oxford/guide</a></p>	
10-Jun	2	<p>Finish an early draft of <b>Personal Statement</b> and talk to someone, ideally a teacher or university counselor.</p> <p>Tell someone, probably several people, at your school you intend to apply to Oxford or Cambridge (ideally, they should know much earlier than this).</p> <p>Find out about the <b>interview process</b> and begin preparing (ideally earlier) by talking to others about science, ideally a teacher who knows about UCAS and Oxbridge applications.</p>	
17-Jun	3		
24-Jun	4	<p>Last chance usually to get feedback before the summer on your latest version of your <b>personal statement</b></p>	
1-Jul	5		
8-Jul	6		
15-Jul	7		
22-Jul	8		
29-Jul	9	<p><b>Thursday 1<sup>st</sup> August – Start of ESAT registration period</b></p>	
5-Aug	10	<p><b>Thursday 15<sup>th</sup> August – Start of Oxford's BMSAT registration period</b></p>	
12-Aug	11		
19-Aug	12		
26-Aug	13	<p>Get your most up-to date version of your <b>personal statement</b> seen by someone at your school for feedback if possible; it should be largely finished now (for most students there will not be time to do anything extra to add to it now before the deadline)</p>	
2-Sep	14		
9-Sep	15	<p>Your <b>personal statement</b> should be ready to fit into the 4000-character 47-line limit; you should not be adding to it now, rather cutting out and condensing now</p>	



Week Starting	Wk #	Events	Topic Focus
16-Sep	16	<b>Monday 16<sup>th</sup> September – Deadline to register for the ESAT Cambridge Entrance Exam</b>	
23-Sep	17		
30-Sep	18	<b>Tue 1<sup>st</sup> Morning Chemistry Paper 3.5 (ADMINISTRATIVE Zone 5)</b> Last good opportunity to get feedback on your <b>personal statement</b> and then act on it 4 <sup>th</sup> October	
7-Oct	19		
14-Oct	20	<b><u>TUESDAY 15<sup>TH</sup> OCTOBER UCAS DEADLINE for OXBRIDGE APPLICATIONS</u></b> <b>Tuesday 15<sup>th</sup> ESAT</b> <b>Wednesday 16<sup>th</sup> ESAT</b> <b>Fri 18<sup>th</sup> Morning Chemistry Paper 2.3 &amp; Paper 5.3 (ADMINISTRATIVE Zone 5)</b>	
21-Oct	21		
28-Oct	22	<b>Tue 29<sup>th</sup> Morning Chemistry Paper 3.6 (ADMINISTRATIVE Zone 5)</b>	
4-Nov	23	Interview invitations for Cambridge sent out this month starting about now <b>Mon 4<sup>th</sup> Morning Chemistry Paper 4.3 (ADMINISTRATIVE Zone 5)</b>	
11-Nov	24	<b>Thu 14<sup>th</sup> Morning Chemistry Paper 1.3 (ADMINISTRATIVE Zone 5)</b>	
18-Nov	25		
25-Nov	26		
2-Dec	27	Oxford interviews are carried out this week and next	
9-Dec	28		
16-Dec	29		
23-Dec	30		
30-Dec	31		
6-Jan	32		
13-Jan	33	Normally last Oxbridge interviews for Winter Pool applicants	

For calendars and revision timetables see “Appendix – Calendars and stage-management” at the back of this book





## What is the ESAT?

Throughout this book direct quotes from indicated websites are used, with largely original formatting, **except passages highlighted yellow.**

"You need to take the Engineering and Science Admissions Test (ESAT) if you are applying for:

- Chemical Engineering and Biotechnology
- Engineering
- Natural Sciences
- Veterinary Medicine

You will take the test on 15 or 16 October 2024. You must take the test in this first sitting.

You should make sure to **register for the ESAT by 16 September 2024.**

### Test format

The ESAT is a computer-based assessment. It is made up of individual multiple-choice assessments lasting 40 minutes each. You will sit these back-to-back on the day of the test.

Mathematics 1 is compulsory for all candidates.

The remaining assessments will depend on the Cambridge course you are applying to. If you're applying for Chemical Engineering and Biotechnology, Natural Sciences or Veterinary Medicine, you will complete Mathematics 1 and two additional multiple-choice assessments from the following list, making the test 120 minutes in total:

- Biology
- Chemistry
- Physics
- Mathematics 2

If you're applying for Engineering, alongside Mathematics 1, you'll also complete:

- Physics
- Mathematics 2

There is no pass or fail for ESAT. You should aim to do the best you can.

Your final scores are based on the number of correct answers you give. You do not lose marks for wrong answers, so it's worth attempting all questions.

### How to register for the ESAT

You must be registered in advance to sit the ESAT.

**You can register for the ESAT from 1 August 2024. The registration deadline is 16 September 2024.**<sup>2</sup>

<sup>2</sup> <https://www.undergraduate.study.cam.ac.uk/apply/how/science-engineering-admission-test> (accessed on 27th May 2024); [www.SmashingScience.org](https://www.SmashingScience.org)



## ESAT preparation recommendations

By far the most effective revision will be completing the past exam questions FOR THE FIRST TIME, starting from a position of strength, under timed conditions.

1. **Start early**, but not seriously until AFTER AS Paper 2 and 3 exams; could start this process before Paper 1 (usually end of May). **If you are finding AS or IB level difficult, DO NOT work on any of this until after ALL your May exams!**
2. Identify an ESAT/NSAA topic you are strong in and find the corresponding AS or IB topic at the back of this book. **NSAA questions are extremely rare** and should be done AFTER you are already extremely good at AS or IB questions NOT before!
3. Revise that topic using A level exam questions (and IB past exam questions, especially HL Paper 1 MCQ questions on relevant topics).
4. **Start with questions with explained answers** to them, which is indicated in the question ID that precedes each question.
5. When you are really confident in your understanding of that topic try **2 NSAA questions under timed conditions** (90 seconds per mark, 3 minutes).
6. **Mark** those 2 questions.
7. If you found them easy, and got them correct with time to spare, try another 2 questions of the same topic.
8. **If you found any question hard**, or couldn't finish in the time you had, **stop this process** and **use A Level** and IB exam questions to get stronger in this topic before you come back.
9. Some of the **last questions** you should try are **Section 2 MCQ** on ESAT syllabus topics (180 seconds per mark). These are available towards the back of this book. Start with the questions with explained answers to them.
10. The very last thing you could do, after you have gained full confidence in all aspects of the MCQ process, is the Section 2 short answer questions which are included at the very back, as well as the section 2 MCQ covering material that is not on the ESAT syllabus (essentially A2 or IB HL material). **More practice talking about biology** in preparation for the **interview** will be by far better use of time for nearly all students than solving these questions, however.
11. For students less familiar with AS or IB biology most of the work will be done using AS and IB exam questions to get to a suitable standard.
12. **If you arrive at this book later in the application process** (September for exams on the 15<sup>th</sup> October):  
ignore AS or IB questions and just get as much of the MCQs in this book done as time allows.
13. **If you arrive at this book early** (September or October, the **YEAR BEFORE** you will sit the exam):  
you can **try a small number** of these questions as you are studying AS biology after you have revised completely a given topic for a test or an exam but stop using this book if you are unable to get them correct within the time limit. For many students it would be better to do them after your AS exams, when their biology is stronger, rather than work unsuccessfully on them throughout the year. **You want to have had as much experience in delivering this skill of solving them for the first time, correctly, and as quickly as possible.** Being able to solve these kinds of question within the time limit, but only after several attempts is a skill that will not help much in the real exam.

Things to avoid:

- **Do NOT start after the summer holidays.**
- Do NOT only work over the summer holidays. Some time should be spent taking a real break that is able to recharge you so you can hit your September, October and November months with your full force. A break is doing something that you thoroughly enjoy doing, so if an activity could be put in a UCAS personal statement, it's highly unlikely to be properly regarded as a break.
- Spoiling the impact of a brand new and fresh NSAA past question, by for instance, looking over an NSAA question just to see what it looks like.
- Attempting any question in a given topic you are not sure you are really strong in (because of extensive work you have already done with AS or IB questions).

# How the NSAA (1<sup>st</sup> exam 2016) became the ESAT (1<sup>st</sup> exam 2024)

No past exam papers exist for the ESAT, but the ESAT Preparation Materials<sup>3</sup> suggested are all of the NSAA Section 1 exam papers.

The sample tests given on the official ESAT website<sup>4</sup> all seem to be in line with Section 1:

- Same format: both MCQ with 5 to 8 possible answers
- Similar time: 90sec/mark for Section 1 and 89 sec/mark for the ESAT
- Identical syllabus, but Advanced Mathematics from Section 2 has been renamed and added to create Mathematics 2

## NSAA changes: description

From 2016 to 2023 the Natural Science Admission Assessment, (NSAA)<sup>5</sup> was a test<sup>6</sup> all students sat when applying for any science subject at University of Cambridge. In its final form it was all Multiple-Choice Questions (MCQ), and had 2 exam papers, called Section 1 and Section 2.

Section 1 (always MCQ) has these parts:

- Part A Mathematics (compulsory)
- Part B Physics
- Part C Chemistry
- Part D Biology
- Part E Advanced Mathematics and Advanced Physics (until 2019, Part E was removed in 2020 and later)

Section 2 as a short answer exam (from 2016 to 2019) with these parts which are all optional, choose any 2:

- Physics P1 and P2 (contains Advanced Mathematics syllabi)
- Chemistry C1 and C2
- Biology B1 and B2

Section 2 as a MCQ short answer exam (from 2020 to 2023):

- Part X Physics
- Part Y Chemistry
- Part Z Biology

The **ESAT** has these parts:

- ESAT Mathematics 1 (syllabi almost identical to NSAA Mathematics in 2023) - Compulsory
- ESAT Biology (syllabi identical to NSAA Biology in 2023)
- ESAT Chemistry (syllabi identical to NSAA Chemistry in 2023)
- ESAT Physics (syllabi identical to NSAA Physics in 2023)
- ESAT Mathematics 2 (syllabi identical to NSAA Advanced Mathematics in 2023)

## NSAA changes: analysis

The ESAT is essentially the NSAA Section 1 exam which also has Mathematics 1 (based on AS material) compulsory but these changes:

- 7 more MCQ questions (27 total) per Part
- 2 of the 4 optional Parts must be completed
- Mathematics 2 assesses material previously in NSAA Part X Physics from Section 2

<sup>3</sup> <https://esat-tmua.ac.uk/esat-preparation-materials/>

<sup>4</sup> <https://home.pearsonvue.com/uatuk>

<sup>5</sup> <https://web.archive.org/web/20231207155418/https://www.undergraduate.study.cam.ac.uk/apply/how/natural-sciences-admission-test>

<sup>6</sup> For past exam questions 20106 to 2022 including marking schemes, example answers and both Section 1 and Section 2 from Cambridge university: <https://www.undergraduate.study.cam.ac.uk/publications/natural-sciences-admissions-assessment-papers>



## How the structure of the NSAA (Section 1 and 2) has changed through time:

Paper ID	Date	Day	Section	MCQ?	Total parts	Parts to do	Marks/ part	Total time	Total marks	Part A (Maths)	sec/ mark	Notes	Dictionaries or calculator allowed?
2016sp	Specimen	N/A	1	Yes	5	3	18	80	54	Essential	88.9		No
2016	2 <sup>nd</sup> Nov '16	Wed	1	Yes	5	3	18	80	54	Essential	88.9		No
2017	2 <sup>nd</sup> Nov '17	Thu	1	Yes	5	3	18	80	54	Essential	88.9		No
2018	31 <sup>st</sup> Oct '18	Wed	1	Yes	5	3	18	80	54	Essential	88.9		No
2019	30 <sup>th</sup> Oct '19	Wed	1	Yes	5	3	18	80	54	Essential	88.9		No
2020sp	Specimen	N/A			4	2	20	60	40	Essential	90	New format, advanced maths is gone	No
2020	November	N/A	1	Yes	4	2	20	60	40	Essential	90	No day	No
2021	November	N/A	1	Yes	4	2	20	60	40	Essential	90	No day	No
2022sp	Specimen											Section 1 not part of this, only Section 2	
2022	"2022"	N/A	1	Yes	4	2	20	60	40	Essential	90		No
2023	"2023"	N/A	1	Yes	4	2	20	60	40	Essential	90		No
2024	15/16 Oct '24	Tu/We	1	Yes	5	3	27	120	81	Essential	88.9	Section 1 (?) is now ESAT	No
2016sp	Specimen	N/A	2	No	6	2	25	40	50	N/A	48	6 multipart questions (range: 1 to 12 marks)	Name calculator model
2016	2 <sup>nd</sup> Nov '16	Wed	2	No	6	2	25	40	50	N/A	48	6 multipart questions (range: 1 to 12 marks)	Name calculator model
2017	2 <sup>nd</sup> Nov '17	Thu	2	No	6	2	20	40	40	N/A	60	6 multipart questions (range: 1 to 10 marks)	Name calculator model
2018	31 <sup>st</sup> Oct '18	Wed	2	No	6	2	20	40	40	N/A	60	6 multipart questions (range: 1 to 10 marks)	Name calculator model
2019	30 <sup>th</sup> Oct '19	Wed	2	No	6	2	20	40	40	N/A	60	6 multipart questions (range: 1 to 10 marks)	Name calculator model
2020sp	Specimen	N/A		Yes	3	1	10	30	10	N/A	180	"New format", half as many Qs as normal. All MCQ exam.	No calculator
2020	November	N/A	2	Yes	3	1	20	60	20	N/A	180		No calculator
2021	November	N/A	2	Yes	3	1	20	60	20	N/A	180		No calculator
2022sp	Specimen	N/A	2	Yes	3	1	10	30	10	N/A	180	"Updated for 2022", half as many Qs as normal. Cannot see what was updated, but explained answers were given	No calculator
2022	"2022"	N/A	2	Yes	3	1	20	60	20	N/A	180	Last one easily available	No calculator
2023	"2023"	N/A	2	?	?	?	?	?	?	N/A	180	Not published, but likely same format at 2022 and before	No calculator
2024												NSAA section 2 does not exist in 2024	

NSAT and ESAT syllabi comparisons

By looking with the aid of a plagiarism detector<sup>7</sup>, everything on the ESAT (on the left) is also on the NSAA 2023 syllabi (red highlight indicates exact match; **non-highlighted text is essentially what is not in the ESAT but was in the NSAA**). The difference is NSAA Section 2 material, which has been removed from the ESAT. Mathematics 2 in the ESAT is a renamed version of the NSAA Advanced Mathematics.

Back

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May 29, 2024, 00:37:05

Mike Housden

Plagiarism Detection

98.1%

Content

Questions will draw upon the topics listed for each part in Appendix 1. All parts will assume knowledge of the content of Mathematics 1. The knowledge assumed for each part is summarised:

Part	Knowledge assumed
Mathematics 1	topics labelled 'M' in Appendix 1
Biology	topics labelled 'B', and topics labelled 'M', in Appendix 1
Chemistry	topics labelled 'C', and topics labelled 'M', in Appendix 1
Physics	topics labelled 'P', and topics labelled 'M', in Appendix 1
Mathematics 2	topics labelled 'M', and topics labelled 'MM', in Appendix 1

Candidates are expected to apply conceptual knowledge to solve problems. Some questions involve the straightforward application of this knowledge, but others require more creative thinking and the application of principles in less familiar contexts.

Scoring

In all parts, each correct answer will score 1 mark. No marks are deducted for incorrect answers. Results for each part will be reported separately.

Content

Section 1

Questions in Section 1 will draw upon the topics listed for each part in Appendix 1. All parts will assume knowledge of the mathematical content of Part A (Mathematics). The knowledge assumed for each part in Section 1 is summarised:

Part A (Mathematics)	Mathematics	(topics labelled 'M', Appendix 1)
Part B (Physics)	Physics Mathematics	(topics labelled 'P', Appendix 1) (topics labelled 'M', Appendix 1)
Part C (Chemistry)	Chemistry Mathematics	(topics labelled 'C', Appendix 1) (topics labelled 'M', Appendix 1)
Part D (Biology)	Biology Mathematics	(topics labelled 'B', Appendix 1) (topics labelled 'M', Appendix 1)

Section 2

Questions in Section 2 will draw upon the relevant subject-specific topics as in the following table:

Part X (Physics)	Advanced Physics Advanced Mathematics Physics Mathematics	(topics labelled 'AP', Appendix 2) (topics labelled 'AM', Appendix 2) (topics labelled 'P', Appendix 1) (topics labelled 'M', Appendix 1)
Part Y (Chemistry)	Advanced Chemistry Chemistry Mathematics	(topics labelled 'AC', Appendix 2) (topics labelled 'C', Appendix 1) (topics labelled 'M', Appendix 1)
Part Z (Biology)	Advanced Biology Biology Mathematics	(topics labelled 'AB', Appendix 2) (topics labelled 'B', Appendix 1) (topics labelled 'M', Appendix 1)

All parts in this section assume knowledge of the mathematical content of Section 1 Part A (Mathematics). Parts X (Physics), Part Y (Chemistry) and Part Z (Biology) assume knowledge of the specified additional 'Advanced' content listed in Appendix 2.

Candidates are expected to apply conceptual knowledge to deconstruct and solve problems. Some questions involve the straightforward application of this knowledge, but others require more creative thinking, problem solving, and the application of principles in less familiar contexts.

Scoring

In both Section 1 and Section 2, each correct answer will score 1 mark. No marks are deducted for incorrect answers. Results for each part will be reported separately.

APPENDIX 2: ADDITIONAL ASSUMED KNOWLEDGE IN SECTION 2

The material that follows outlines the additional scientific and mathematical knowledge assessed in Section 2 of the Natural Sciences Admissions Assessment.

Section 2 consists of three parts. Candidates will be required to answer one part only. The three parts are:

- Part X: Physics
- Part Y: Chemistry
- Part Z: Biology

There are 20 multiple-choice questions in each part.

The time allowed to complete Section 2 is 60 minutes.

Calculators may NOT be used in Section 2.

Questions in Section 2 will draw upon the relevant subject-specific topics as in the following table:

Part X (Physics)	Advanced Physics Advanced Mathematics Physics Mathematics	(topics labelled 'AP', Appendix 2) (topics labelled 'AM', Appendix 2) (topics labelled 'P', Appendix 1) (topics labelled 'M', Appendix 1)
Part Y (Chemistry)	Advanced Chemistry Chemistry Mathematics	(topics labelled 'AC', Appendix 2) (topics labelled 'C', Appendix 1) (topics labelled 'M', Appendix 1)
Part Z (Biology)	Advanced Biology Biology Mathematics	(topics labelled 'AB', Appendix 2) (topics labelled 'B', Appendix 1) (topics labelled 'M', Appendix 1)

All parts assume knowledge of the mathematical content of Section 1 Part A (Mathematics).

Parts X (Physics), Part Y (Chemistry) and Part Z (Biology) assume knowledge of the specified additional 'Advanced' content listed in Appendix 2.

ADVANCED CHEMISTRY

AC1. Atomic structure

- AC1.1 Deduce the electron configuration of atoms (up to Z = 36) and corresponding ions (given ions change in terms of main energy levels and s, p and d orbitals).
- AC1.2 Define first ionisation energy, and write equations for first and successive ionisation energies.
- AC1.3 Understand how first and successive ionisation energies in Period 3 and Group 2 relate to electron shells and subshells.
- AC1.4 Understand how a simple time-of-flight (ToF) mass spectrometer works, including expressions for kinetic energy ( $\frac{1}{2}mv^2$ ) and speed ( $\frac{d}{t}$ ).

AC2. Bonding and structure

- AC2.1 Describe permanent and induced dipole-dipole interactions between molecules, including hydrogen bonding.
- AC2.2 Describe the term electronegativity, and use it to explain the existence of polar bonds.
- AC2.3 Know why some molecules with polar bonds do not have a permanent dipole.
- AC2.4 Understand and be able to predict the shapes of simple molecules and ions with up to six outer shell pairs of electrons (any combination of bonding pairs and lone pairs, excluding those involving a total of 5 pairs with at least one lone pair) in terms of electron pair repulsion theory (VSEPR) (VSEPR model, VSEPR).

ADVANCED BIOLOGY

AB1. Cell structure

- AB1.1 Know and understand the principles and limitations of light microscopes, transmission electron microscopes and scanning electron microscopes, including reference to magnification and resolution.
- AB1.2 Recall and apply the equation:  $\text{magnification} = \frac{\text{image size}}{\text{actual object size}}$
- AB1.3 Know and understand the structure and function of the main organelles and cellular components found in eukaryotic cells including:
  - a. nucleus
  - b. nuclear (including nuclear envelope)
  - c. rough endoplasmic reticulum (RER)
  - d. smooth endoplasmic reticulum (SER)
  - e. ribosome
  - f. Golgi apparatus
  - g. lysosome
  - h. tonoplast
  - i. vacuole
  - j. centrioles

ADVANCED PHYSICS

AP1. Forces and equilibrium

- AP1.1 Understand the nature of scalars and vectors:
  - a. Examples include velocity, speed, mass, momentum, force, weight, acceleration, displacement and distance.
  - b. Know and be able to interpret vector notation.
- AP1.2 Components and results of vectors:
  - a. Be able to resolve a vector into two components at right angles to each other by drawing and by calculation.
  - b. Be able to calculate the moment of a force about a point (2 dimensions only).
  - c. Find the resultant of two coplanar vectors at right angles to each other by calculation.
- AP1.3 Moments:
  - a. Understand moment defined as force  $\times$  perpendicular distance from the point to the line of action of the force.
  - b. Be able to calculate the moment of a force about a point (2 dimensions only).
  - c. Know and be able to apply the principle of moments.



**MATHEMATICS 1**

[illegible][illegible][illegible]

# BIOLOGY

## BI Cells

**BI 1** **Know and understand the structure and function of the main sub-cellular components of eukaryotic cells (animal and plant including)**

- ☐ **1** **(1) NUCLEUS (ANIMAL AND PLANT)**
- ☐ **2** **(2) CYTOSOL**
- ☐ **3** **(3) CYTOSKELETON**
- ☐ **4** **(4) MITOCHONDRIA**
- ☐ **5** **(5) CHLOROPLAST (PLANT ONLY)**
- ☐ **6** **(6) GOLGI APPARATUS (PLANT AND ANIMAL)**
- ☐ **7** **(7) VACUOLAR SYSTEM (PLANT ONLY)**

**BI 2** **Know and understand the structure and function of the main sub-cellular components of prokaryotic cells (bacteria including)**

- ☐ **1** **(1) NUCLEUS**
- ☐ **2** **(2) CYTOSOL**
- ☐ **3** **(3) CYTOSKELETON**
- ☐ **4** **(4) MITOCHONDRIA**
- ☐ **5** **(5) CHLOROPLAST**
- ☐ **6** **(6) GOLGI APPARATUS**
- ☐ **7** **(7) VACUOLAR SYSTEM**

**BI 3** **Know and understand the levels of organisation within organisms, from cells to tissue up to the organ systems**

**BI 4** **Movement across membranes**

**BI 5** **Know and understand the processes of diffusion, osmosis on basis of water potential and active transport, including examples in living and non-living systems**

**BI 6** **Cell division and sex determination**

**BI 7** **Mitosis and the cell cycle**

[illegible][illegible]

**14**

1. **Know and understand the importance of mitosis in the growth of an organism;**  
Explain its role in increasing the number of cells, repairing tissue, replacing old and diseased/underused cells

2. **Know and understand that cancer is the result of changes in cells, including mutations, that lead to uncontrolled cell division**

**Protein and the cell cycle**

3. **Know and understand that the metabolic cell cycle involves irreversible catabolic and growth and anabolic reactions, involving catabolic catabolic and anabolic reactions, leading to the synthesis of macromolecules, simple mixtures of atoms, molecules**

4. **Know and understand the role of mitosis in producing genetically identical parent gametes so that the zygote (fertilised egg) will be produced at fertilisation (meiosis)**

**Enzymes and cellular metabolism**

5. **Know and understand that cellular metabolism involves both parents and the offspring are genetically identical when the mutation occurs**

6. **Know and understand that cellular metabolism involves both parents and the offspring are genetically identical when the mutation occurs (meiosis) and the genetic leading to cancer is passed on to the offspring**

**Cell division and cancer**

7. **Know that in most cancers, including melanoma, tumours are not and melanoma is not**

8. **Know that genetic cells and changes to the cells and cells of offspring**

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1. (2) Focus and understand the importance of mitosis in the growth of an organism, especially its role in increasing the number of cells, repairing tissue, replacing and renewing (reproduction).

2. (2) Focus and understand the importance of the results of changes in genetic material, leading to uncontrolled cell division.

3. (2) Mitosis and the cell cycle

1. (2) Focus and understand that the mitotic cell cycle includes interphase (most of the cycle), DNA replication, and then creating two daughter cells in two daughter cells, each with a single copy of each chromosome.

2. (2) Focus and understand the role of mitosis in producing genetically identical copies of cells so that the organism (the new cell) can proceed at different rates.

3. (2) Mitosis and sexual reproduction

1. (2) Focus and understand that sexual reproduction involves two parents and offspring are genetically different from the immediate parent.

2. (2) Focus and understand that sexual reproduction involves two parents and offspring are genetically different in relation to each other and the parents, leading to increased variation.

4. (2) Sex determination

1. (2) Focus role in sexual reproduction including humans, females are XX and males are XY.

2. (2) Focus genetic cross and diagrams to establish the sex and ratio of offspring.

## CHEMISTRY

### C6. Atomic structure

C6.01 Describe the structure of an atom as a central nucleus containing protons and neutrons and a cloud of negatively charged electrons

C6.02 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.03 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.04 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.05 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.06 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.07 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.08 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.09 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

C6.10 Explain the relative masses and charges of protons, neutrons and electrons, and recognise that most of the mass is in the nucleus

### C7. The Periodic Table (IUPAC conventions, Groups are labelled as 1-10)

C7.01 Know that Periods are horizontal rows and Groups are vertical columns

C7.02 Know that Periods are horizontal rows and Groups are vertical columns

C7.03 Know that Periods are horizontal rows and Groups are vertical columns

C7.04 Know that Periods are horizontal rows and Groups are vertical columns

C7.05 Know that Periods are horizontal rows and Groups are vertical columns

C7.06 Know that Periods are horizontal rows and Groups are vertical columns

C7.07 Know that Periods are horizontal rows and Groups are vertical columns

C7.08 Know that Periods are horizontal rows and Groups are vertical columns

C7.09 Know that Periods are horizontal rows and Groups are vertical columns

C7.10 Know that Periods are horizontal rows and Groups are vertical columns

### C8. Chemical reactions, formulae and equations

C8.01 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.02 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.03 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.04 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.05 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.06 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.07 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.08 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.09 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

C8.10 Understand that in a chemical reaction, atoms are conserved and the mass is conserved

[illegible]

# MATHEMATICS 2

**MM1. Algebra and functions:**

MM1.1: Levels of indices for all rational exponents.

MM1.2: Use and manipulation of surds.  
*(Remembering manipulating the four main rules, including understanding the distributive law)*

For example: simplifying  $\sqrt[3]{\frac{8}{27}}$  gives  $\frac{\sqrt[3]{8}}{\sqrt[3]{27}} = \frac{2}{3}$ .

MM1.3: Quadratic formulae and their graphs; the discriminant of a quadratic function; completing the square; solution of quadratic equations.

MM1.4: Simultaneous quadratic-analytical solution by substitution;  $a^2$  of the mean and one quadratic equation.

MM1.5: Solution of linear and quadratic inequalities.

MM1.6: Algebraic manipulation of polynomials; long-division.

$x^2 + 3x - 18$  factorises to  $(x+6)(x-3)$ .  
If  $x$  is a negative integer and satisfying the terms  
of the polynomial, then  $x+6$  will always deliver odd if  $x$  is even, therefore impossible.  
Hence of the form  $x = -6$ , and  $-3$  are solutions, including those of the form  $x = 6k - 6$  or  $x = 3k - 3$ .

or divide of the Factor Theorem and the Remainder Theorem.

MM1.7: Outcomes understanding that a function is a many-to-one sometimes just a one-to-one relationship between two sets.  
Familiarity with the properties of continuous functions, including  $f(x) = x^2 + 1$  [even axis] makes the positive square root and  $\sqrt{x^2 + 1}$  [odd]

**MA2. Sequences and series**

MA2.1: Sequences; including those given by a formula for the  $n^{th}$  term and those generated by a linear recurrence relation of the form  $u_n = au_{n-1} + b$ .

MA2.2: Arithmetic series; including the formulae for the sum of the first  $n$  natural numbers.

MA2.3: The sum of a finite geometric series.

The sum to infinity of a convergent geometric series, including the use of  $S_1/S_2$ .

MA2.4: Binomial expansion; including  $(1+x)^n$  for positive integral  $n$ ; also for non-integral values of  $n$  (Pascal's Triangle).

# ADVANCED MATHEMATICS

**AM1: Limits and functions:**

- AM1.1: Levels of indices for all rational exponents
- AM1.2: One and manipulation of surds
- AM1.3: Expanding expressions that contain surds, including rationalising the denominator

For example, simplifying  $\frac{1}{\sqrt{2} + 1} = \frac{1}{\sqrt{2} + 1} \times \frac{\sqrt{2} - 1}{\sqrt{2} - 1} = \frac{\sqrt{2} - 1}{2 - 1} = \sqrt{2} - 1$

**AM1.3.1:** Quadratic Functions and their graphs: the discriminant of a quadratic function; the nature of the solution of quadratic equations

**AM1.3.2:** Simultaneous equations: analytical solution for simultaneous systems of one linear and quadratic equation

**AM1.3.3:** Solution of linear and quadratic inequalities

**AM1.3.4:** Algebraic manipulation of polynomials, including:

- a. Multiplying brackets and collecting like terms
- b. Interpolation and simple algebraic division (as a linear polynomial), including those of the form  $(x - a)$  and  $(x^2 - 1)$  for quadratics, including those of the form  $(x^2 - a^2)$
- c. Factorisation of the Cubic Trinomial and the Trinomial Trinomial

**AM1.3.5:** Factorising cubic polynomials

**AM1.3.6:** Quadratic understanding that a function is a many-to-one can sometimes pick out interesting points with the properties of extremal functions, including  $f(x) = x^2$  which all means the 'positive square root' and  $f(x) = x^2 \pm 1$

**AM2: Sequences and series**

- AM2.1: Expansion, including those given by a formula for the  $n^{\text{th}}$  term and those generated by recursive relations of the form  $u_n = au_{n-1} + b$
- AM2.2: Arithmetic series, including the formulae for the sum of the first  $n$  natural numbers
- AM2.3: The sum of a finite arithmetic series
- AM2.4: The sum of infinity of a convergent geometric series, including the use of  $|x| < 1$
- AM2.5: Binomial expansion, including  $(1 + x)^n$  for positive integers  $n$  and for exponents of  $n$  that are  $(a - x)^n$  for positive integer  $n$

**The binomial coefficient is**  $\binom{n}{r} = \frac{n!}{r!(n-r)!}$

[illegible]

- Q.6.2) **Explain** how other chemical species can be involved and can not be considered as part of the products for the reaction between a weak acid/bases in a closed system.
- Q.6.3) **Explain** the factors that will affect the position of an equilibrium constant ( $K_c$ ) for a reaction. **Explain** the effect of changing these factors on the position of the equilibrium.

**7. Quantitative chemistry**

- Q.7.1) **Explain** how to calculate the relative molar mass ( $M_r$ ).
- Q.7.2) **Explain** how to calculate the number of particles in the mole of a substance.
- Q.7.3) **Explain** how to calculate the mass of a substance in the  $g$ ,  $mol$ ,  $g$ , and perform calculations involving the amount of substance, the number of particles and the mass of a substance.
- Q.7.4) **Explain** the percentage composition by mass of a compound using a chemical formula.
- Q.7.5) **Explain** the empirical formula of a simple ionic salt and explain, in a simplified way, how to find it. A compound has a relative of mass. Assume the percentage composition to find the empirical formula or heating product. Find the molecular formula of the compound.
- Q.7.6) **Explain** the stoichiometric equations to calculate the masses of reactants and products.
- Q.7.7) **Explain** how to calculate the number of moles of a substance in a given volume of a solution.
- Q.7.8) **Explain** how to calculate the number of moles from reacting masses or a given volume of a solution.
- Q.7.9) **Explain** the concentration of a given volume of a gas in  $mol$ ,  $dm^3$  at room temperature and pressure (20 °C and 100 kPa) and explain the effect of temperature and pressure on the volume of a gas.
- Q.7.10) **Explain** the concentration of a solution in  $mol$ ,  $dm^3$  and  $g$ ,  $dm^3$ .

**8. Chemical reactions**

- Q.8.1) **Explain** the effect of concentration on the rate of reaction in  $mol$ ,  $dm^3$  and  $g$ ,  $dm^3$  and explain the concentration effect on the number of moles per unit volume of the volume of solution.
- Q.8.2) **Explain** the effect of temperature on the rate of reaction and explain the effect of temperature on the rate of reaction.
- Q.8.3) **Explain** the effect of surface area on the rate of reaction and explain the effect of surface area on the rate of reaction.
- Q.8.4) **Explain** the effect of catalyst on the rate of reaction and explain the effect of catalyst on the rate of reaction.
- Q.8.5) **Explain** the effect of pressure on the rate of reaction and explain the effect of pressure on the rate of reaction.
- Q.8.6) **Explain** the effect of concentration on the rate of reaction and explain the effect of concentration on the rate of reaction.
- Q.8.7) **Explain** the effect of temperature on the rate of reaction and explain the effect of temperature on the rate of reaction.
- Q.8.8) **Explain** the effect of surface area on the rate of reaction and explain the effect of surface area on the rate of reaction.
- Q.8.9) **Explain** the effect of catalyst on the rate of reaction and explain the effect of catalyst on the rate of reaction.
- Q.8.10) **Explain** the effect of pressure on the rate of reaction and explain the effect of pressure on the rate of reaction.

**M01. Coordinate geometry in the  $(x, y)$ -plane**

**M03.1** Equation of a straight line (including)

- (a)  $y - y_1 = m(x - x_1)$
- (b)  $ax + by + c = 0$

Conditions for two straight lines to be parallel or perpendicular to each other

**Finishing equations of straight lines given information in various forms**

**M03.2** Coordinate geometry of the circle, using the equation of a circle in the form:

- (a)  $x^2 + y^2 + 2gx + 2fy + c = 0$
- (b)  $(x - a)^2 + (y - b)^2 = r^2$

**M03.3** Use of the following circle properties:

- (a) The perpendicular from the centre to a chord bisects the chord.
- (b) The tangent at any point on a circle is perpendicular to the radius at that point.
- (c) The angle subtended by an arc at the centre is twice the angle subtended by the same arc at any point on the circumference.
- (d) The angle in a semicircle is a right angle.
- (e) The angles in the same segment are equal.
- (f) The opposite angles in a cyclic quadrilateral sum to  $180^\circ$ .
- (g) The angle between the tangent and chord at the point of contact is equal to the angle in the alternate segment.

**M04. Trigonometry:**

**M04.1** The sine and cosine rules, and the area of a triangle in the form  $\frac{1}{2}ab \sin C$

The sine rule and the understanding of the ambiguous case (ambiguous angles)

Trigonometric equations to be solved to 2 decimal places

**M04.2** Radian measure, including use for arc length and area of sector and segment

**M04.3** The values of sine, cosine and tangent for the angles:  $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$

**M04.4** The various kinds and tangent functions; their graphs; asymptotes; and periodicity

**AM3: Coordinate geometry in the (x,y) plane**

**AM3.1:** Equation of a straight line, including:

- (a)  $y - y_1 = m(x - x_1)$
- (b)  $ax + by = c$

Conditions for two straight lines to be parallel or perpendicular to each other;

**Finding equations of straight lines using equations in various forms**

**AM3.2:** Coordinate geometry of a circle, using the equation of a circle in the form:

$(x - a)^2 + (y - b)^2 = r^2$

(a)  $x^2 + y^2 + 2gx + 2fy + c = 0$

**AM3.3:** Use of the following three properties:

- The perpendicular from the centre to a chord bisects the chord
- The angle subtended by any point on a circle is perpendicular to the radius at that point
- The angle subtended by an arc at the centre of a circle is twice the angle subtended by the arc at any point on the circumference

(a) The angle at the circumference is a right angle

(b) The angle in the same segment is equal

(c) The opposite angles are supplementary

(d) The angle between the tangent and chord at the point of contact is equal angle in the alternate segment

**4. AM4: Trigonometry:**

**AM4.1:** The sine and cosine rules, and the area of a triangle in the form  $\frac{1}{2}ab \sin C$

The sine rule involves an understanding of the **ambiguous case** (angle-angle-side)

**Problem 1** involves an understanding of the **ambiguous case** (angle-angle-side)

**AM4.2:** Problem 2 involves finding area for any angle and unit of length and height.

**AM4.3:** The values of sine, cosine and tangent for the angles:  $0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ$

**AM4.4:** The sine, cosine and tangent functions; their graphs; amplitudes, and periodicity

**AM4.5:** Knowledge and use of the equations:

(a)  $\tan \theta = \frac{\sin \theta}{\cos \theta}$

negative value of  $a$  as represented by:

- $y = a f(x)$
- $y = f(x) + a$
- $y = f(x + a)$
- $y = f(ax)$

Compositions of these transformations

**MM8.3** Understand how altering the values of  $a$ ,  $b$ ,  $c$  and  $d$  in the function  $y = a f(b(x - c) + d)$  affects the graph of the function.



- c.  $y = f(x + a)$
  - d.  $y = f(ax)$

Compositions of these transformations

AM8.3 Understand how altering the values of  $a$  and  $c$  affects the graph of  $y = a(x - c)^2$

AM8.4 Understand how altering the values of  $a$ ,  $b$  and  $c$  in  $y = a(x - b)^2 + c$  affects the corresponding graph

## Additional information

IB Biology Higher Level Paper 1 multiple choice questions can be helpful here, IB Questionbank is a program that can help you find these questions in a given IB topic.

There is a note about when marking would happen for the 2016 exam for Biology, at 11<sup>th</sup> November, the exam was on the 2<sup>nd</sup> November, which implies that the marking of them happens as one might expect, and before the interviews.

The exam will be online: your practice of these questions should reflect the actual conditions. Instead of annotating the questions, which is normally on a paper exam the best way to process and present your thinking, learn how to write these notes in an effective way on scrap lined paper. This skill can be built with AS MCQ questions, but it is unlikely to added value to AS exam technique, so only invest time and energy after your AS Paper 1, or after you have achieved a level of performance where you almost never drop a mark under timed conditions for that topic.

## A note on how marks were assigned topics

Sometimes topic boundaries are blurred.

Remember, these questions need to be done without a calculator, and if there are about 3 steps to an IB HL question, there are 5 to 7 steps for a calculation question in the NSAA/ESAT. A single mistake at any step will result in the mark, and the time invested, being lost. So being quick and but especially error free for these kind of questions is key.

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## Explained Exam Mark Schemes for MCQs

The Specimen Paper for 2020 has explained answers for section 1 questions.

The Specimen Paper for 2022 has explained answers for section 2 questions.

## Comments on marking and unusual questions

Sometimes in section 2 chemistry questions 2 marks was assigned for a single point, or 4 marks were assigned for a single correct number, but the method marks were not clearly described. This implies a style and a creative flair in the marking process that would be hard to find in CAIE or IB mark schemes for such a small sample space. This is for the older short answer section 2 before it became all multiple choice, so a lot less relevant moving ahead, but it can be helpful to think that these kinds of questions do not follow all of the same principles and processes as, for instance CAIE A Level or IB Diploma Level. Other parts of other assessment points, like the interview, might also be importantly different.

## Alternative universities: Using effective planning to make difficult things less stressful

A good applicant to Oxbridge has already had a magnificent amount of success in school and will continue to be successful with continued hard work, regardless of which university they eventually study at. You should be aiming to deliver your best performance, in a positive and productive way. You can definitely push yourself and find out how to get the most from yourself, not just sometimes, but for weeks and months at a time, all towards a really long term, but important life goal.

You should be aware that you'll be using your brain throughout, in the same way that an athletes will use their body, so you need to work in a way that maximises its performance. Stress, negativity and bad vibes aren't just totally uncool, they also do not make a brain more open to remembering or processing new ideas, or more able to deliver the higher order thinking skills which are exactly what this process done well will deliver. In fact, the brain is designed to protect you if it feels too stressed, and it does that through a variety of emotional feedback loops, like the fight or flight response, which sets the stage for how you perceive new things, lowers your levels of intellectual interest and reduces your ability to deliver thought-based work, like learning, under pressure. In the brain's evolutionary history, individuals that ran away from stressful situations, like a large predator, more often survived and reproduced than others that took the time to explore their fascination with the magnificent predator eating their slower moving friend. So, you should be aiming to reduce or eliminate as much unnecessary stress and anxiety as possible to maximise your brain's processing power, and your ability to push yourself towards splendid success.

Common to how brains work is to reduce a situation to a binary outcome, in this case, pass or fail, Oxbridge or nothing. But that is not at all true. If you plan to for another top university as a backup you can really help your brain function better, and by doing this actually improve your performance, and therefore improve your chances. You can still ask of yourself more work than you see others doing, more often, and to find a way, through deliberate and thoughtful action to be more interested than even the strongest students in your year group. You are at the start of a long journey, so it can seem that these first few steps are exceptionally important, but years of hard work later on will be far more important to your life's biggest successes.



## UCAS entry requirements for some degrees that need Chemistry A Level (as of Nov. 2023)

For your best performance you should think of this process as part of the most important year in education, how ambitious you are, and how hard you work, and how much you grow will set a range of limits and expectations for years to come, but you are aiming to move from excellent to outstanding, and

Uni	Biochemistry Degree			Biology Degree			Pharmacy Degree			Medicine			GCSE requirements		
	BSc or MSci	A Level	IB	A Level	IB	Bio Notes	A Level	IB	Notes	A Level	IB	Notes	Math	English	Other
Aberystwyth	BSc	BBC/BBB	28/30	BCC/BBB	28/30	Biology							N/A	4/C	C in Biology
Aston	BSc	BBB		BBB	31	Biological sciences	BBB/ABB	31/32		A*AA	39	UCAT and Interview needed	4/C	4/C	
Bath	MBiochem	AAB	36	AAB	36	Biology	AAB	36	<sup>8</sup>				4/C	4/C	
Bath	BSc	AAB	36	AAB	36	Biology			<sup>9</sup>				4/C	4/C	
Birmingham	BSc	AAB	32	AAB	32	Biological sciences				A*AA	32		N/A	N/A	5xC
Birmingham	MSci	AAA	32 (HL 665)	AAA	32	Biological sciences	AAB	32							
Birmingham	BSc <sup>10</sup>	AAB	32												
Bristol	MSci	ABB/AAA	32-36	ABB/AAA	32-36	Biology				BBC	29	<sup>11</sup>			
Bristol	BSc	ABB/AAA	32-36	ABB/AAA	32-36	Biology				ABB/AAA	32/36	Standard entry, UCAT			
Cambridge				A*A*A	40/42					A*A*A	40/42	BMAT			
Durham	BSc	AAA	37	N/A		Biological sciences							N/A	N/A	
East Anglia	BSc	ABB	32	ABB	32	Biological sciences							4/C	4/C	
East Anglia	MSci	AAB		AAB	33	Biological sciences	AAB	33		AAA	36	UCAT and Interview needed			
Edinburgh	BSc	ABB/AAA	32/37	ABB/AAA	32/37	Biological sciences				A*AA	40				
Glasgow	BSc	BBB/AAB	32/36												

<sup>8</sup> MPharm & Always interviewed

<sup>9</sup> <https://www.pharmacyschoolscouncil.ac.uk/study/international-applicants/>

<sup>10</sup> Medical Biochem

<sup>11</sup> Gateway to medicine, UCAT. This course is open to applicants from specific schools and colleges in the UK only and/or to those who have spent 3 months or more in care. Further information and lists of the eligible schools and colleges is available at contextual offers: <http://www.bristol.ac.uk/study/undergraduate/entry-requirements-qualifications/contextual-offers/>



Uni	Biochemistry Degree			Biology Degree			Pharmacy Degree			Medicine			GCSE requirements		
	BSc or MSci	A Level	IB	A Level	IB	Bio Notes	A Level	IB	Notes	A Level	IB	Notes	Math	English	Other
Greenwich	BSc			32 points from Bio	HL5	Biology									
Huddersfield	BSc	BCC/BBC	112-104 points <sup>12</sup>	BCC/BBC	112-104 points	Biological sciences	BBB/ABB	136 UCAS points <sup>13</sup>	-	-	-	-			
Imperial	BSc	AAA	38	AAA	38	Biological sciences				AAA	38	BMAT			
Imperial	MSci	AAA	38												
King's, KCL	BSc	AAA	35	N/A			AAB	35		A*AA	35				
Kingston	BSc	BBC/ABB	27	BBC/ABB	27	Biological sciences	BBB/AAB	32							
Liverpool	BSc	ABB	33	ABB	33	Biological sciences				AAA/A*AB		<sup>14</sup>	4/C		
Manchester	BSc	AAB/AAA	35/36	AAB/AAA	35/36	Biology	AAB	35		AAA	36	UCAT and Interview needed	4/C	4/C	
Nottingham	BSc	AAB	34	AAB	34	Biology	AAB	34					6/B	4/C	
Nottingham		AAB	34										6/B	4/C	
Oxford	MBio	A*AA	39	A*AA	39	Biology									
Queen Mary	BSc	ABB	34	ABB	34	Biology				A*AA	38	UCAT and Interview needed	4/C	4/C	
Queen's University Belfast	BSc	BBB/ABB	32/33	BBB/ABB	32/33	Biological sciences	AAB	34		A*AA	Not given	UCAT and Interview needed	C	C	CC in Double science
Royal Holloway, Uni London	BSc	BBC/BBB	32	N/A											5x A* to C
UCL	BSc	AAA	38	AAA	38	Biological sciences	AAB	36					6/B	6/B	
Warwick	BSc	ABB/AAB	32-34	ABB/AAB	32-34	Biological sciences									
York	BSc	AAB	35	AAB	35	Biology									

<sup>12</sup> UCAS tariff points from International Baccalaureate qualifications which should include modules in relevant Science subjects.

<sup>13</sup> including Higher Level Chemistry at grade 6 and Higher Level Mathematics and Biology at grade 6 and 5 (in any order).

<sup>14</sup> A levels taken in one sitting after a 2 year period of study, AAA, to include Chemistry together with either Biology, Physics or Mathematics and a third academic subject. The Advanced Welsh Baccalaureate Skills Challenge Certificate is accepted in lieu of a third academic subject. Alternatively, A\*AB also accepted but the A\* A grades must include Chemistry together with either Biology, Physics or Maths; and a B grade required in the third academic subject. Applicants with a minimum of 12 points at GCSE may be considered if, at the time of application, they have achieved AAA or A\*AB (as defined above). GCSEs in nine subjects attained by the end of Year 11 which must include: English Language, Mathematics, Biology, Chemistry, and Physics. Core & Additional Science is an acceptable alternative to the three individual sciences. Minimum of grade B (score 6) required in core subjects



## Selected Chemistry degrees and entrance requirements

University	Chemistry Degree		Material Science Degree		Chemical Engineering		Deadline
	A Levels	IB points	A Levels	IB points	A Levels	IB points	
Aberystwyth							31-Jan
Aston	BCC/BBC				BCC/BBB	31	31-Jan
Bath	AAB/AAA	36					31-Jan
Bath					A*AA	36	31-Jan
Birmingham	AAB/AAA	32	AAB	32	AAA	32 (HL 666)	31-Jan
Birmingham	AAA/AAA*				A*AA/AAAA <sup>15</sup>	32	31-Jan
Birmingham							31-Jan
Bristol					N/A		31-Jan
Bristol	ABB/AAA	32-36			N/A		31-Jan
Cambridge	A*A*A	40/42			A*A*A	40/42	16-Oct
Durham	A*AA	38					31-Jan
East Anglia	BBB	31					31-Jan
East Anglia	AAB	33					31-Jan
Edinburgh	ABB/AAA	32/37			ABB/AAA	32/37	31-Jan
Glasgow							
Greenwich	32 points from Chemistry	HL5			<sup>16</sup>	HL5 Maths and Phx	31-Jan
Huddersfield	BCC/BBC	112-104 points			BBC/BBB <sup>17</sup>	Not given	31-Jan
Imperial	AAA	38	AAA	38	A*A*A	40	31-Jan
Imperial							31-Jan
King's, KCL	AAA	35					31-Jan
Kingston	BBC/ABB	28					31-Jan
Liverpool	ABB	33					31-Jan
Manchester	AAA <sup>18</sup>	36	AAB	35	AAA <sup>19</sup>	36	31-Jan
Nottingham	ABB/AAB <sup>20</sup>	32-34			AAA	36	31-Jan
Nottingham							31-Jan
Oxford <sup>21</sup>	A*A*A	40	A*AA	40	A*A*A	40	16-Oct
Queen Mary	ABB	34	ABB	32	AAB	34	31-Jan
Queen's University Belfast	BBB <sup>22</sup>	32			BBB	32	31-Jan
Royal Holloway, Uni London	N/A						31-Jan
UCL	AAA	38			AAA	38	31-Jan
Warwick	AAB	34					31-Jan
York	AAB/A*AA	35/37					31-Jan

<sup>15</sup> Only course to ask for 4 Alevels!

<sup>16</sup> 32 points from Chemi32 Points from Mathematics and 32 points from a physical science or a numerate subject.

<sup>17</sup> <https://www.hud.ac.uk/undergraduate/how-to-apply/entry-requirements/>

<sup>18</sup> English is easier 6.5 overall with no less than 6.0 in any component

<sup>19</sup> AAA including Mathematics and either Chemistry or Physics.

<sup>20</sup> Need a C in maths GCSE, easier

<sup>21</sup> MChem only available, no BSc offered

<sup>22</sup> Only need C in GCSE maths



# Factors that affect acceptance rates for Cambridge

## What does success in the ESAT look like?

Key information supplied by the University of Cambridge regarding the ESAT and especially the NSAA over the last few years:

"Please note that your performance in the pre-interview assessment will not be considered in isolation, but will be taken into account alongside the other elements of your application.

### Specimen and past papers

A specimen paper has been produced to allow you to sample the written assessment format and practice under timed conditions. It is not expected that you will answer every question correctly; the written assessment is designed to be challenging. **Even some strong candidates may not complete the paper in the time allowed**; it is designed to distinguish across our field of high-calibre applicants.

Experience with similar assessments and from trials indicates that, on average, typical applicants to the most highly selective undergraduate courses (who are by definition academically very able) **will gain approximately half of the available marks**. The best applicants will score more highly, but only **relatively few are expected to gain more than 80 per cent** of the available marks.

Written assessments help admissions tutors to assess whether candidates have the skills, aptitudes and any required subject knowledge and understanding required to study the relevant course at Cambridge. They are only one of the elements used in the admissions process. Others include:<sup>23</sup>

1. a candidate's academic record and forecast grades in school-leaving examinations;
2. UCAS application form;
3. examples of recent written work submitted to the College to which they are applying;
4. and performance at interview, if invited to attend.(2020)"<sup>24</sup>

### "You don't need to get every question right

We don't expect that you will answer every question correctly. The assessments are designed to challenge you.

**Some strong applicants may not even complete the paper in the time given.** Almost no one gets full marks.(2024)"<sup>25</sup>

For more details on changes to this website see "*Appendix – Changes to the Natural Sciences Entrance Requirements webpage through time*" at the back of this book.

In addition to the websites, Cambridge also delivers information through feedback on individual applicants (this was used in the section at the start of this book: *Contents mapped to Cambridge's assessment of applicants list*).

"Our assessment includes, in **no particular order**:

1. Recent academic achievement, as evidenced by transcripts, GCSEs (or equivalent), AS-levels (where relevant), A-levels, or other school-leaving qualifications;
2. Contents of references and quality of predicted grades, where relevant;
3. Quality of the personal statement, and evidence of interest in the subject to be studied and of engagement with that subject outside the classroom;

#### **4. Performance in admissions assessments, where relevant;**

5. Quality of submitted work, where relevant;
6. Performance at interview;
7. Performance in standardised tests of English language proficiency such as IELTS, where relevant;
8. Individual contextual factors, as signalled in the UCAS application, My Cambridge Application, and where applicable the Additional Applicant Information Form and/or Extenuating Circumstances Form;
9. Geo-demographic and school-level indicators such as those supplied by the Index of Multiple Deprivation and other UK databases (see here: <https://www.undergraduate.study.cam.ac.uk/apply/after/contextual-data>)."<sup>26</sup>

In this list they have also included references. And while they have explicitly stated that these are not in order, it does seem that there is in fact a particular order, or hierarchy, to their assessment process, and that some things are more important than others, which can be seen later where we see some students who have top NSAA scores can also be rejected.

<sup>23</sup> The original paragraph has been reformatted here to convert this sentence into a numbered list

<sup>24</sup> From: <https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences#entry-requirements> (accessed September 2020)

<sup>25</sup> <https://www.undergraduate.study.cam.ac.uk/apply/how/admission-tests>, accessed 27<sup>th</sup> May 2024

<sup>26</sup> Generic statement that follows an individual student's feedback that they can (and always should) request after the application process has finished. [The original bullet points were changed to the numbered list]



### UMS performance and the eventual HE destination of Cambridge applicants

The emphasis placed on attainment at AS-level in the Cambridge admissions process makes it very probable that those applicants who are successful in obtaining an offer of a place at the University have a stronger academic record than those who are unsuccessful. While it is difficult to capture in statistics the full assessment made of an applicant's academic record, a proxy through which to operationalise relative attainment is through the use of UMS.

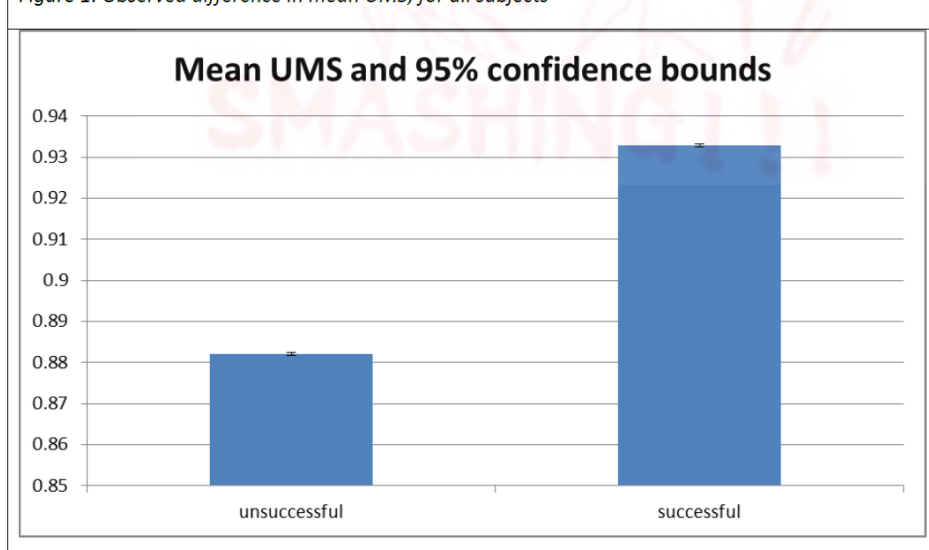
This short paper therefore tests the hypotheses that:

- The UMS attainment of applicants made an offer of a place at Cambridge is significantly higher than those not made the offer of a place, and,
- That this relationship is consistent across all Tripos subjects for which students are admitted, and,
- That differentiation in UMS attainment is consistent across the sector, in that the Cambridge applicants with the highest attainment tend to attend the more selective universities.

This is a report by into students UMS (Uniform Mark Scale, the UK version of PUM, Percentage Uniform Mark score, which is used in international exams like the ones used by CAIE) from their AS levels, which were achieved before they applied to university. The main finding was that the students accepted into the university had on average a UMS score of 93 across all of their subjects, while those rejected had a UMS score of 88. The fact that this study of 40 000 applicants was carried out, and especially because it was published and is still hosted by the university means that this is something they would like the world, and probably also prospective applicants, to know about. They are the only university that asks every student specifically for their UMS/PUM scores.

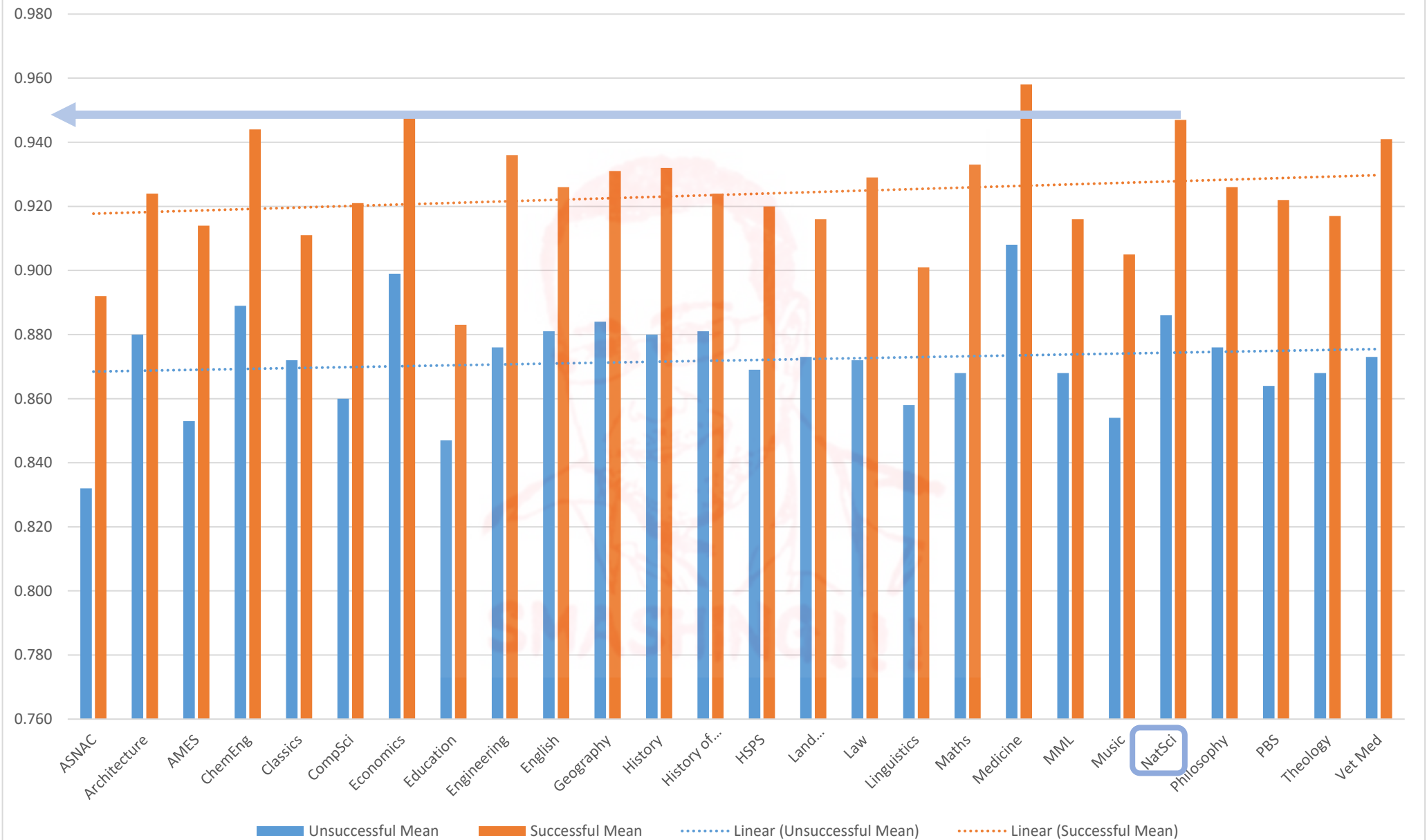
Another way to think about this is that if you have a lower UMS/PUM score, you probably might rethink Cambridge, and maybe lean more towards Oxford instead.

Figure 1. Observed difference in mean UMS, for all subjects

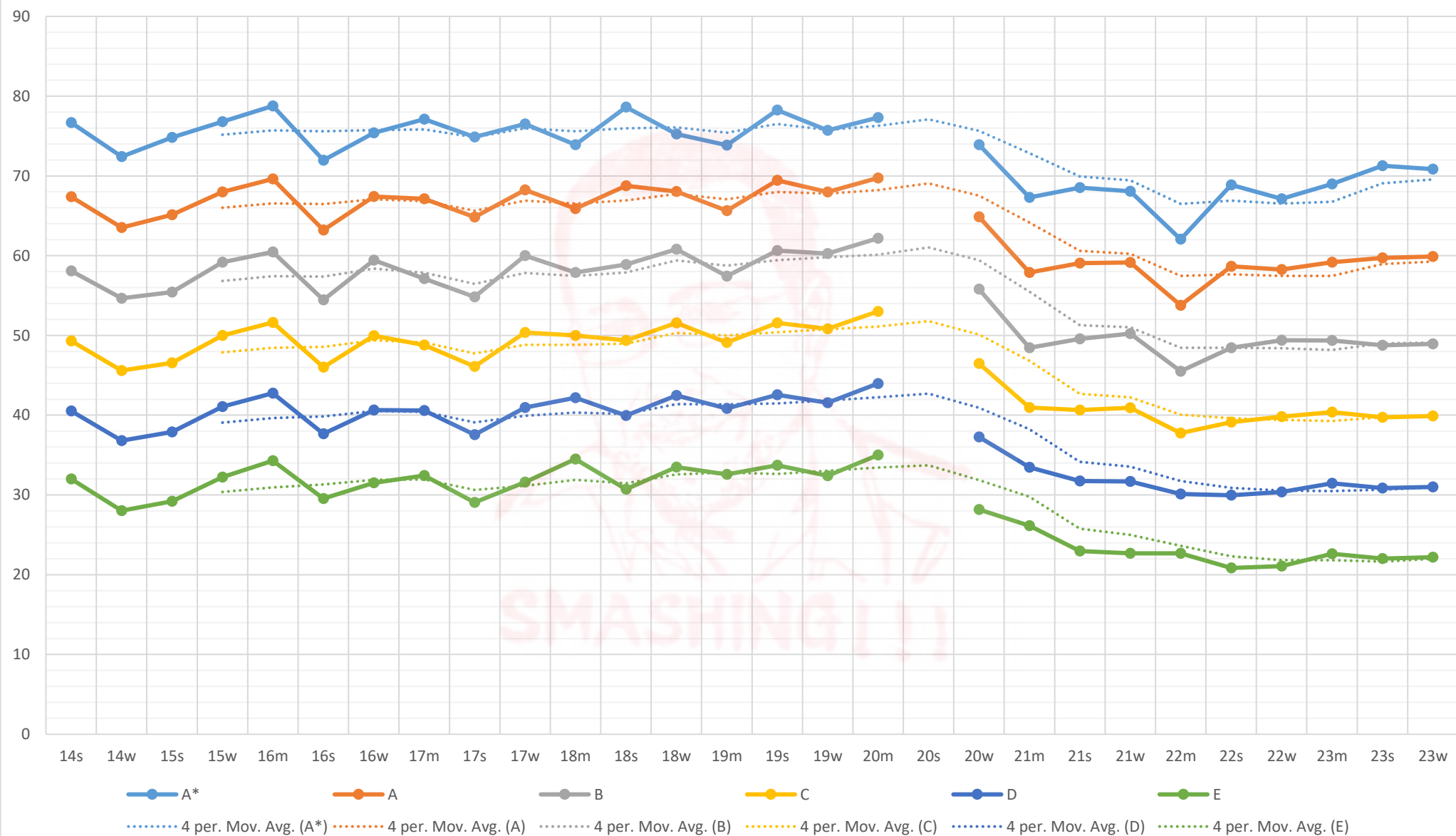


<sup>27</sup> <https://www.cao.cam.ac.uk/ums-performance-and-eventual-he-destination-cambridge-applicants>

UMS Score of Successful vs Unsuccessful Cambridge Applicants by (Tripos) Subject



# CIE AS Chemistry 9701 Grade boundaries from 2014s to 2023w average % of all variants of component combinations awarding the A Level



## How does Cambridge process grades and UMS scores?<sup>28</sup>

This table was created from a Freedom of Information (FOI) request. Cambridge is unusual in that they always ask for UMS scores for all applicants. But it also seems that exceptional AS results are stored in a different way to all other results (results in green, 781 total results for 317 total unique ApplyID candidates almost all not shown here).

A total of 1054 candidates had A Level results in this data set. It is not explained why there is such a mismatch between the number of AS results held and the A Level results. The random anonymising ApplyID for the two tables from the original pdf do not seem to match. A total of 84 unique ApplyID numbers were made offers from this AS results cohort, against a total of 271 of students with A Level Results who were made offers from the same Apply Year with the same FOI document. Most offers were made then to students who did not have AS results.

**At least 2 students who had flawless UMS scores (shown in yellow below) in at least some of the AS levels were not offered a place.**

The CAIE international exam board is contained within the Title of the subject, as shown at 300007 (highlighted blue), indicating that some differentiation is made with regards to the same subject from different exam boards. In this case, and everywhere else, just because information has been stored does not mean it was all reported here, and just because it was does not mean it was used, or even that those making decisions had access to it.

Course	Apply Year	ApplyID	Offer Holder	Qualification	Title	Result	Additional Info
Natural Sciences (Physical)	2020	300172	Yes	GCE Advanced Subsidiary	Chemistry	a 92	92
Natural Sciences (Physical)	2020	300172	Yes	GCE Advanced Subsidiary	Physics	a 95	95
Natural Sciences (Physical)	2020	300082	Yes	GCE Advanced Subsidiary	Chemistry	A- 200/200	200/200
Natural Sciences (Physical)	2020	300082	Yes	GCE Advanced Subsidiary	Physics	A- 200/200	200/200
Natural Sciences (Physical)	2020	300082	Yes	GCE Advanced Subsidiary	Mathematics	A- 240/240	240/240
Natural Sciences (Physical)	2020	300083		GCE Advanced Subsidiary	Physics	A (111/160)	(111/160)
Natural Sciences (Physical)	2020	300083		GCE Advanced Subsidiary	Chemistry	A (127/160)	(127/160)
Natural Sciences (Physical)	2020	300083		GCE Advanced Subsidiary	Further Mathematics	A (130/160)	(130/160)
Natural Sciences (Physical)	2020	300083		GCE Advanced Subsidiary	Mathematics	A (153/160)	(153/160)
Natural Sciences (Physical)	2020	300233		GCE Advanced Subsidiary	Physics	A- 196/200	196/200
Natural Sciences (Physical)	2020	300233		GCE Advanced Subsidiary	Chemistry	A- 200/200	200/200
Natural Sciences (Physical)	2020	300233		GCE Advanced Subsidiary	Mathematics	A- 239/240	239/240
Natural Sciences (Physical)	2020	300212		GCE Advanced Subsidiary	Chemistry	A-200/200	200/200
Natural Sciences (Physical)	2020	300212		GCE Advanced Subsidiary	Physics	A-200/200	200/200
Natural Sciences (Physical)	2020	300212		GCE Advanced Subsidiary	Mathematics A	A-240/240	240/240
Natural Sciences (Physical)	2020	300006	Yes	GCE Advanced Subsidiary	Chemistry	A	
Natural Sciences (Physical)	2020	300006	Yes	GCE Advanced Subsidiary	Physics	A	
Natural Sciences (Physical)	2020	300007		GCE Advanced Subsidiary	Biology 9700	A	
Natural Sciences (Physical)	2020	300007		GCE Advanced Subsidiary	Mathematics 9709	A	
Natural Sciences (Physical)	2020	300007		GCE Advanced Subsidiary	Physics 9702	A	
Natural Sciences (Physical)	2020	300007		GCE Advanced Subsidiary	Chemistry 9701	B	
Natural Sciences (Physical)	2020	300008		GCE Advanced Subsidiary	Chemistry	A	
Natural Sciences (Physical)	2020	300008		GCE Advanced Subsidiary	Mathematics	A	
Natural Sciences (Physical)	2020	300008		GCE Advanced Subsidiary	Physics	A	
Natural Sciences (Physical)	2020	300009		GCE Advanced Subsidiary	Chemistry	A	
Natural Sciences (Physical)	2020	300009		GCE Advanced Subsidiary	Mathematics	A	
Natural Sciences (Physical)	2020	300009		GCE Advanced Subsidiary	Physics	A	

In the same document<sup>29</sup> we can see here some of the overall A Level results after 2 years of study 1054 unique ApplyIDs in total, most of this data is not shown here.

Course	Apply Year	A Level App	ApplyID	Offer Holder	A Level Results
Natural Sciences (Physical)	2020	Yes	401013		Mathematics: A, Further Mathematics: B, Physics: B
Natural Sciences (Physical)	2020	Yes	401014	Yes	Mathematics: A, Further Mathematics: C, Physics B (Advancing Physics): D
Natural Sciences (Physical)	2020	Yes	401015		Mathematics: A, Music: A, Physics (Astrophysics): A
Natural Sciences (Physical)	2020	Yes	400036		Biology: A*, Chemistry B (Salters): A*, Further Mathematics A: A*, Mathematics A: A*, Physics (Turning Points): A*

**They evidently have and store all A Level results of all applicants, including students who are not made an offer, which might help them measure a school's effectiveness at making reliable predictions at A2 level.**

<sup>28</sup> <https://www.whatdotheyknow.com/request/statistics-for-applicants-for-ph>

<sup>29</sup> <https://www.whatdotheyknow.com/request/statistics-for-applicants-for-ph>





## Top 15 performing UCAS Apply Centres in 2022 for Cambridge<sup>30</sup>

#	UCAS Apply Centre	School Name	School Sector	Apps	Offers	Accept.	Offer rate %	2 Years?	Notes	Reference
1	15326	Brampton Manor Academy	Maintained	205	65	72	32	?	No info on syllabus on website or prospectus	<a href="https://www.bramptonmanor.org/Information/Prospectus/">https://www.bramptonmanor.org/Information/Prospectus/</a>
2	48056	Raffles Junior College, Singapore	Other and Overseas	129	49	39	38	?	Uses a H1, H2 and H3 SEAB Singapore Examinations Board	<a href="https://www.ri.edu.sg/">https://www.ri.edu.sg/</a>
3	12060	Westminster School	Independent	86	35	34	41	2 Years	Now study CAIE A Level Chemistry; might do combined instead of individual exams, in 2023 study PreU Chemistry	<a href="https://www.westminster.org.uk/academic-life/exam-results-he/">https://www.westminster.org.uk/academic-life/exam-results-he/</a>
4	45199	Hwa Chong Institution, Singapore	Other and Overseas	92	34	27	37	?	Doesn't study A level. "The Hwa Chong Integrated Programme (IP) is designed by our own teachers who have years of experience teaching high ability students"	<a href="https://www.hci.edu.sg/high-school/academic-prog/">https://www.hci.edu.sg/high-school/academic-prog/</a>
5	13040	Brighton Hove and Sussex Sixth Form College	Maintained	133	31	20	23	2 Years	"all culminate in final exams at the end of two years."	<a href="https://www.bhasvic.ac.uk/courses/sixth-form-study">https://www.bhasvic.ac.uk/courses/sixth-form-study</a>
6	11078	Queen Elizabeth's School, Barnet	Maintained	69	29	28	42	?	AQA AS and A Level syllabi followed, but not easy to see if all exams are at the end of A2 year.	<a href="https://www.qebarnet.co.uk/academic-programme/our-curriculum/">https://www.qebarnet.co.uk/academic-programme/our-curriculum/</a>
7	10172	Hills Road Sixth Form College	Maintained	101	27	26	27	?	OCR Chemistry; cannot see if it has AS exams, or all at the end	<a href="https://www.hillsroad.ac.uk/study-with-us/a-level-subjects/chemistry">https://www.hillsroad.ac.uk/study-with-us/a-level-subjects/chemistry</a>
8	10642	King Edward VI Grammar School, Chelmsford	Maintained	58	24	22	41	2 Years	OCR Chemistry. "Total of 6 hours of exams (2 x 2 hours 15 minutes and 1 x 1 hour 30 minutes) taken at the end of the course."	<a href="https://www.kegs.org.uk/filedownload/5795FCB9-CFF7-2D4D-2F9C8875F60539AF.pdf/kegs-sixth-form-options-booklet-for-september-2024.pdf">https://www.kegs.org.uk/filedownload/5795FCB9-CFF7-2D4D-2F9C8875F60539AF.pdf/kegs-sixth-form-options-booklet-for-september-2024.pdf</a>
9	11055	Peter Symonds College	Maintained	82	23	20	28	2 Years	"Methods & Patterns of Assessment. A Level: End of Year 2. Three exams of approx. 2 hours each."	<a href="https://psc.ac.uk/study/course/chemistry">https://psc.ac.uk/study/course/chemistry</a>
10	45346	Shenzhen College of International Education	Other and Overseas	92	23	18	25	?	CAIE A Levels, but cannot see from website if they have all exams at the end, but likely have AS exams.	<a href="https://www.scie.com.cn/subject-chemistry/">https://www.scie.com.cn/subject-chemistry/</a>
11	11815	St Paul's School, London	Independent	69	22	21	32	?	"Nearly half the year group studies chemistry at A Level, following the OCR A syllabus."	<a href="https://www.stpaulsschool.org.uk/academic/academic-13-16/subjects/chemistry/">https://www.stpaulsschool.org.uk/academic/academic-13-16/subjects/chemistry/</a>
12	12092	King's College School	Independent	65	21	20	32	?	Cannot see curriculum details	<a href="https://www.kcs.org.uk/senior-school">https://www.kcs.org.uk/senior-school</a>
13	12528	Magdalen College School, Oxford	Independent	72	21	20	29	2 Years	"Assessed through public exams in the summer of the Upper Sixth [A2]"	<a href="https://www.mcsoxford.org/senior-school/academic/subjects/chemistry/">https://www.mcsoxford.org/senior-school/academic/subjects/chemistry/</a>
14	11947	Henrietta Barnett School	Maintained	45	21	20	47	2 Years	"There are no External exams in Year 12"	<a href="https://www.hbschool.org.uk/academic-programme/departments/sciences/">https://www.hbschool.org.uk/academic-programme/departments/sciences/</a>
15	12041	Wilson's School	Maintained	55	21	22	38	1 Year	Year 12 students currently sit the AS examination at the end of Year 12.	<a href="https://www.wilsons.school/curriculum/dept/chemistry/">https://www.wilsons.school/curriculum/dept/chemistry/</a>

<sup>30</sup> [https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/undergraduate-admissions\\_by\\_apply\\_centre\\_2022\\_cycle.pdf](https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/undergraduate-admissions_by_apply_centre_2022_cycle.pdf)  
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**Key takeaways:**

Only one school of the top 15 obviously takes the AS exams at the end of the first (AS) 6<sup>th</sup> form year. Of the schools that do provide information about the structure of their exams at A levels on their websites, 6 schools have used a 2 year program with all exams at the end. One explanation for why so few AS results were in the FOI dataset used previously<sup>31</sup> is because most students applying to Cambridge do not take the AS exams.

Schools that have a stronger reputation with Cambridge, for instance because their A level predictions are more reliable (or other reasons), might opt for the 2-year approach which might have advantages with a variety of university applications. For instance, it avoids the substantial levels of difficulties in gaining 95% UMS in the AS year Cambridge have reported on. Students from newer schools, and others, which have a less well-established reputation might benefit instead from the AS UMS exam scores.



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<sup>31</sup> [https://www.whatdotheyknow.com/request/statistics\\_for\\_applicants\\_for\\_ph](https://www.whatdotheyknow.com/request/statistics_for_applicants_for_ph)  
[www.SmashingScience.org](http://www.SmashingScience.org)

## A Level grade profiles for 2022

Table 4.1 Home applications, offers and acceptances to Cambridge by A Level profile and gender 2022<sup>32</sup>

A Level Grades	Applications						Offers						Acceptances					
	Male	%	Female	%	Total	%	Male	%	Female	%	Total	%	Male	%	Female	%	Total	%
<b>Arts, Humanities and Social Sciences</b>																		
A*A*A*	826	12.9	1,043	16.0	1,869	14.5	279	19.7	435	28.2	714	24.1	281	23.1	441	32.5	722	28.1
A*A*A	485	7.6	831	12.7	1,316	10.2	104	7.3	253	16.4	357	12.1	109	9.0	260	19.2	369	14.3
A*A*B	52	0.8	80	1.2	132	1.0	14	1.0	16	1.0	30	1.0	9	0.7	15	1.1	24	0.9
A*A*C	3	0.0	8	0.1	11	0.1	0	0.0	1	0.1	1	0.0	0	0.0	0	0.0	0	0.0
A*AA	357	5.6	573	8.8	930	7.2	74	5.2	126	8.2	200	6.8	66	5.4	124	9.1	190	7.4
A*AB	127	2.0	245	3.8	372	2.9	19	1.3	37	2.4	56	1.9	8	0.7	17	1.3	25	1.0
AAA	126	2.0	231	3.5	357	2.8	14	1.0	25	1.6	39	1.3	7	0.6	11	0.8	18	0.7
<AAA	382	6.0	799	12.2	1,181	9.1	33	2.3	63	4.1	96	3.2	2	0.2	2	0.1	4	0.2
<b>Subtotals</b>	<b>2,358</b>	<b>36.8</b>	<b>3,810</b>	<b>58.3</b>	<b>6,168</b>	<b>47.7</b>	<b>537</b>	<b>38.0</b>	<b>956</b>	<b>61.9</b>	<b>1,493</b>	<b>50.5</b>	<b>482</b>	<b>39.7</b>	<b>870</b>	<b>64.1</b>	<b>1,352</b>	<b>52.6</b>
<b>Sciences</b>																		
A*A*A*	2,066	32.3	1,106	16.9	3,172	24.5	739	52.2	469	30.4	1,208	40.8	659	54.2	423	31.2	1,082	42.1
% of science cohort		30.5		16.4		46.9		50.4		32.0		82.4		54.0		34.7		88.7
A*A*A	663	10.4	417	6.4	1,080	8.4	90	6.4	59	3.8	149	5.0	64	5.3	45	3.3	109	4.2
A*A*B	22	0.3	27	0.4	49	0.4	3	0.2	4	0.3	7	0.2	0	0.0	1	0.1	1	0.0
A*A*C	0	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
A*AA	511	8.0	381	5.8	892	6.9	31	2.2	31	2.0	62	2.1	10	0.8	12	0.9	22	0.9
A*AB	149	2.3	103	1.6	252	1.9	3	0.2	6	0.4	9	0.3	0	0.0	0	0.0	0	0.0
AAA	198	3.1	176	2.7	374	2.9	4	0.3	10	0.6	14	0.5	0	0.0	5	0.4	5	0.2
<AAA	432	6.8	512	7.8	944	7.3	8	0.6	9	0.6	17	0.6	0	0.0	1	0.1	1	0.0
<b>Subtotals</b>	<b>4,041</b>	<b>63.2</b>	<b>2,723</b>	<b>41.7</b>	<b>6,764</b>	<b>52.3</b>	<b>878</b>	<b>62.0</b>	<b>588</b>	<b>38.1</b>	<b>1,466</b>	<b>49.5</b>	<b>733</b>	<b>60.3</b>	<b>487</b>	<b>35.9</b>	<b>1,220</b>	<b>47.4</b>
<b>Totals</b>	<b>6,399</b>	<b>100.0</b>	<b>6,533</b>	<b>100.0</b>	<b>12,932</b>	<b>100.0</b>	<b>1,415</b>	<b>100.0</b>	<b>1,544</b>	<b>100.0</b>	<b>2,959</b>	<b>100.0</b>	<b>1,215</b>	<b>100.0</b>	<b>1,357</b>	<b>100.0</b>	<b>2,572</b>	<b>100.0</b>

Key takeaways:

- Science students academically perform better than other students; almost all of them have 3 A\*. Almost no students are admitted to science with less than A\*A\*A.
- There is a strong gender split in the number of applications, but this is closed slightly at the “Offers” and “Acceptances” stages.
- It may be possible to infer a possible ranking order for non A\*A\*A\* profiles, e.g. A\*A\*C could be higher than A\*AA; A\*AB could be higher than AAA.

<sup>32</sup> [https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/undergraduate\\_admissions\\_by\\_apply\\_centre\\_2022\\_cycle.pdf](https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/undergraduate_admissions_by_apply_centre_2022_cycle.pdf)  
[www.SmashingScience.org](http://www.SmashingScience.org)



## Looking at the entrance exam and the interview score together

The NSAA is just one part of the process, but looking at averages for it and accepted students, doing better in it will likely ensure you get an interview (no students with an unusually high score in it were denied an interview, but students with lower scores get accepted, and higher scores get rejected).

St John's College has published analysis for 2020 application year (these students would have sat the entrance exam in 2019, which involved the older Section 2 paper that had short answer questions, not MCQ).<sup>33</sup>:

		Min	Min %	Mean	Mean %	Max	Max %
<b>Made offers</b>	<b>Section 1</b>	9	25.0(a)	18.05	50.1(b)	27	75.0(c)
Winter Pool	<b>Section 1</b>	6.8	18.9	14.86	41.3(d)	25.6	71.1
Invited for interview (e)	<b>Section 1</b>	6.8	18.9	17.02	47.3	27	75.0
Rejected	<b>Section 1</b>	3.1	8.6	11.51	32.0(f)	25.8	71.7
Not invited for interview	<b>Section 1</b>	3.1	8.6	11.95	33.2	22.3	61.9(g)

<b>Made offers</b>	<b>Section 2</b>	11	27.5	28.27	70.7	40	100.0
Winter Pool	<b>Section 2</b>	6	15.0	22.91	57.3	38	95.0
Invited for interview	<b>Section 2</b>	6	15.0	26.32	65.8	40	100.0
Rejected	<b>Section 2</b>	3	7.5	19.79	49.5	36.5	91.3
Not invited for interview	<b>Section 2</b>	3	7.5	20.49	51.2	37	92.5(h)

<b>Interview score</b>	<b>Accepted</b>	7	70(i)	7.89	78.9	9.3	93
<b>Interview score</b>	<b>Rejected</b>	4.3	43	6.43	64.3	8.5	85

Logically relevant statements possible with this data working left to right, top to down):

- Some students who are made offers perform really poorly in the entrance exam.
- About half of students who were made an offer scored 50% or less on the MCQ part of the exam.
- All students missed at least 1 in 4 marks, including the best accepted students.
- Students who were placed in winter pool, so considered really good applicants by Cambridge standards, but whose applications were for an unusually (for Cambridge) competitive group, were on average lower performing than their average applicant that went for interview. This could indicate that St John's college is unusually competitive in larger proportion of places than the average college. AND/OR winter pool represents students who did unusually well in an interview. Which could be an indication that good interviews have a stronger impact.
- More than half, perhaps as many as 80% of applicants are invited for interview, so only a small amount of selection has happened to get to this point, but likely the poorest performing quintile are likely removed by that process.
- Students rejected do substantially less well than those who were made offers showing a clear correlation: doing better on the NSAA is linked in some way to a higher rate of acceptance.
- Students who were not invited to interview included some who scored higher than about half of those accepted, indicating that success in the NSAA does not overcome whatever other challenges those students had that caused them to be rejected. Possibly these students had lower AS UMS/PUM scores, for instance.
- One student got nearly a perfect score (37) for section 2 but was not invited to interview, they could have had a problem with their GCSE or AS grades, or also possible, a problem with their personal statement (e.g. plagiarised) or their reference
- All students who were made offers received a good interview score. It is not easy to know what information the interviewer has about the applicant before the interview. The social sciences might have made some inroads on delivering effective, reproducible interview style inquiries, but it is unclear what protocols are followed or why for the Cambridge (or Oxford) interview process.

### Key take away:

Higher test scores do track with acceptance, but they are obviously not the only or most important part to the selection process. Interestingly, there is a scoring process for the interview.

To find out about Winter Pool go here:

[https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/guide\\_to\\_the\\_winter\\_pool\\_0.pdf](https://www.undergraduate.study.cam.ac.uk/sites/www.undergraduate.study.cam.ac.uk/files/publications/guide_to_the_winter_pool_0.pdf)

<sup>33</sup> [https://www.whatdotheyknow.com/request/natural\\_sciences\\_applications\\_20\\_21](https://www.whatdotheyknow.com/request/natural_sciences_applications_20_21)  
[www.SmashingScience.org](http://www.SmashingScience.org)



## Impact of GCSEs on acceptance rate

From Natural Sciences A level admissions data for 2020 (excludes IB and other qualifications)<sup>34</sup>

Percentile	Total A* Acpt.	A* Rej.	Not A* Acpt.	Not A* Rej.	Total GCSE Acpt.	Total GCSE Rej.	% A* to all Acpt.	% A* to all Rej.	% (A*+A) to all Acpt.	% (A*+A) to all Rej.
0.01 LEAST	3	0	0	0	4	1	38	0	60	33
0.05	4	2	0	0	6	4	50	20	71	50
0.10	5	3	0	0	7	5	60	36	80	64
0.20	7	5	0	1	9	7	73	50	90	76
0.40	9	6	1	2	10	9	86	64	100	90
0.50	9	7	1	3	10	9	90	73	100	91
0.60	10	8	1	3	10	10	91	80	100	100
0.80	10	9	3	5	11	10	100	90	100	100
0.90	11	10	4	6	11	11	100	100	100	100
0.95	11	11	5	7	12	12	100	100	100	100
1.00 MOST	13	13	8	11	14	13	100	100	100	100

	GCSE A* Count	GCSE A Count	GCSE Other Count	Total	Non A* Total	% A* to all	% (A*+A) to all
Average Accepted	8.6	1.0	0.5	10.1	1.5	85.2	95.0
Averages Rejected	6.9	1.8	1.2	9.9	3.0	68.7	86.8

	A Level Applicants	Offer Holder	No offer
Totals	983	251	732

### Key takeaway:

Most students who get offers have about 9A\*, and almost all of them, about 80% have 7. A large number of student with a majority of A\* get rejected. Almost half of all rejected students (and therefore a larger number of students than the number made offers) only have A\* and A GCSEs.

Most students made offers have only A\* or A grades, but students with one, and sometimes two B grades or lower are also accepted, but only about 1%, or 10 students a year, are admitted with a substantial proportion of grades lower than A.

The number of A\* is less important than the ratio of A\* to non A\* (which is also stated on their website).

<sup>34</sup> [https://www.whatdotheyknow.com/request/statistics\\_for\\_applicants\\_for\\_ph](https://www.whatdotheyknow.com/request/statistics_for_applicants_for_ph)  
[www.SmashingScience.org](http://www.SmashingScience.org)





	Totals	Maths	Physics	Biology	Chemistry	Advanced Maths	Section 2 B1	Section 2 B2	Section 2 C1	Section 2 C2	Section 2 P1	Section 2 P2
<b>Offer Made NSAA Averages %</b>		<b>75.8</b>	<b>66.0</b>	<b>66.3</b>	<b>61.8</b>	<b>55.2</b>	<b>N/A</b>	<b>65.0</b>	<b>69.2</b>	<b>69.0</b>	<b>64.4</b>	<b>55.3</b>
Rejected NSAA Averages %		<b>57.5</b>	<b>43.5</b>	<b>43.8</b>	<b>42.6</b>	<b>30.7</b>	<b>33.7</b>	<b>53.1</b>	<b>47.4</b>	<b>50.7</b>	<b>42.6</b>	<b>40.1</b>
Offer made total candidates	270	269	256	43	154	84	0	3	137	131	104	165
Rejected total candidates	775	775	714	79	447	292	17	26	368	303	364	470
Total applicants attempting NSAA part	1045	1044	970	122	601	376	17	29	505	434	468	635
<b>Success rate %</b>	<b>26</b>	<b>26</b>	<b>26</b>	<b>35</b>	<b>26</b>	<b>22</b>	<b>0</b>	<b>10</b>	<b>27</b>	<b>30</b>	<b>22</b>	<b>26</b>

### NSAA Section 1 Results by percentile group from 2020 entry year<sup>36</sup>

Larger percentile represents a thresholds above which increasingly smaller numbers of more highly performing students were placed. Where higher scores are found at lower percentiles it indicates that higher scores were more common out of all exams taken.

Percentile	Maths S1 Accepted	Maths S1 Rejected	Physics S1 Accepted	Physics S1 Rejected	Biology S1 Accepted	Biology S1 Rejected	Chemistry S1 Accepted	Chemistry S1 Rejected	Advanced Maths Accepted	Advanced Maths Rejected
<b>Average%</b>	<b>75.8</b>	<b>57.5</b>	<b>66.0</b>	<b>43.5</b>	<b>66.3</b>	<b>43.8</b>	<b>61.8</b>	<b>42.6</b>	<b>55.2</b>	<b>30.7</b>
0.01	39	17	20	6	11	10	28	6	5	0
0.05	50	28	33	17	24	17	37	17	28	6
0.10	56	33	39	22	46	21	44	22	33	11
0.20	61	44	50	28	50	33	50	28	39	17
0.40	72	56	61	39	67	39	61	39	44	28
0.50	78	56	67	39	72	44	61	44	56	28
0.60	83	61	72	44	73	50	67	44	61	33
0.80	89	72	83	61	81	58	74	56	74	44
0.90	94	83	89	67	83	61	78	61	83	50
0.95	100	89	94	78	88	67	83	67	94	61
1.00	100	100	100	100	89	83	94	94	100	89

Even at the highest level, for most sciences students who were rejected had lower scores than around 30-40% of those candidates accepted. The mean average tends to be around 40-50% better for all subjects for those made an offer compared to those who completed the same part but were rejected.

The students who were in the highest decile (0.90 to 1.00) tended to get scores that were at often as good as more than half of the students who were accepted. And the highest scores of the best of those rejected often were as good as those who were accepted. So exceptionally achieving students were sometimes rejected. Possibly as a result of their score in other parts of the exam, which was not considered here.

But the lowest scores of students accepted in the lowest decile (0.01 to 0.10) tend to be roughly in line with the mean of those rejected, implying about half the rejected cohort got a score as good or better. So a lower score can still result in an offer.

Biology in section 1 was the lowest scoring at the highest levels of those accepted, which was reflected in having the highest success rate for those who attempted it (35% success for biology against an overall average success rate of 26%)

<sup>35</sup> [https://www.whatdotheyknow.com/request/statistics\\_for\\_applicants\\_for\\_ph](https://www.whatdotheyknow.com/request/statistics_for_applicants_for_ph)

<sup>36</sup> [https://www.whatdotheyknow.com/request/statistics\\_for\\_applicants\\_for\\_ph](https://www.whatdotheyknow.com/request/statistics_for_applicants_for_ph)  
[www.SmashingScience.org](http://www.SmashingScience.org)

## NSAA and Veterinary Medicine<sup>37</sup>

It is not clear if these average scores are of those made offers, accepted or successful, or just the overall average of all applicants.

Also, the score may be out of 18 (raw total) or 10, which would be calculated, like the UMS/PUM from the raw score. It seems likely that this Section 1 scores are out of 9 (like for GCSEs), which would put them roughly in line with the averages seen from more clearly explained data<sup>38</sup>.

More information about averages (this time for the Veterinary Science course) can be found here:

Course	Accepted	Apply Year	NSAA Section	Section	Average score	Average %
Veterinary Medicine (D100)	NSAA	2018	Advanced Maths	1	5.4	
Veterinary Medicine (D100)	NSAA	2018	Biology	1	4.3	
Veterinary Medicine (D100)	NSAA	2019	Biology	1	4.6	
Veterinary Medicine (D100)	NSAA	2020	Biology	1	4.4	
Veterinary Medicine (D100)	NSAA	2021	Biology	1	5.0	
Veterinary Medicine (D100)	NSAA	2018	Chemistry	1	4.1	
Veterinary Medicine (D100)	NSAA	2019	Chemistry	1	4.6	
Veterinary Medicine (D100)	NSAA	2020	Chemistry	1	4.8	
Veterinary Medicine (D100)	NSAA	2021	Chemistry	1	2.6	
Veterinary Medicine (D100)	NSAA	2018	Maths	1	3.7	
Veterinary Medicine (D100)	NSAA	2019	Maths	1	3.5	
Veterinary Medicine (D100)	NSAA	2020	Maths	1	3.4	
Veterinary Medicine (D100)	NSAA	2021	Maths	1	3.7	
Veterinary Medicine (D100)	NSAA	2018	Physics	1	3.8	
Veterinary Medicine (D100)	NSAA	2019	Physics	1	3.3	
Veterinary Medicine (D100)	NSAA	2020	Physics	1	5.0	
Veterinary Medicine (D100)	NSAA	2021	S2 Biology	2	4.4	
Veterinary Medicine (D100)	NSAA	2021	S2 Chemistry	2	3.6	
Veterinary Medicine (D100)	NSAA	2018	Section 2 B1	2	11.8	59
Veterinary Medicine (D100)	NSAA	2019	Section 2 B1	2	11.4	57
Veterinary Medicine (D100)	NSAA	2020	Section 2 B1	2	8.3	42
Veterinary Medicine (D100)	NSAA	2018	Section 2 B2	2	12.2	61
Veterinary Medicine (D100)	NSAA	2019	Section 2 B2	2	12.4	62
Veterinary Medicine (D100)	NSAA	2020	Section 2 B2	2	11.6	58
Veterinary Medicine (D100)	NSAA	2018	Section 2 C1	2	12.7	64
Veterinary Medicine (D100)	NSAA	2019	Section 2 C1	2	15.2	76
Veterinary Medicine (D100)	NSAA	2020	Section 2 C1	2	10.7	54
Veterinary Medicine (D100)	NSAA	2018	Section 2 C2	2	14.7	74
Veterinary Medicine (D100)	NSAA	2019	Section 2 C2	2	11.4	57
Veterinary Medicine (D100)	NSAA	2020	Section 2 C2	2	11.2	56
Veterinary Medicine (D100)	NSAA	2018	Section 2 P1	2	7.5	38
Veterinary Medicine (D100)	NSAA	2018	Section 2 P2	2	9.0	45

A good explanation for this wide variability in scores is the emphasis this course places on other things, most likely a strong personal statement and portfolio of experiences related to the subject.

<sup>37</sup> [https://www.whatdotheyknow.com/request/admission\\_statistics\\_for\\_undergr\\_23#incoming-1995334](https://www.whatdotheyknow.com/request/admission_statistics_for_undergr_23#incoming-1995334)

<sup>38</sup> [https://www.whatdotheyknow.com/request/statistics\\_for\\_applicants\\_for\\_ph](https://www.whatdotheyknow.com/request/statistics_for_applicants_for_ph)  
[www.SmashingScience.org](http://www.SmashingScience.org)



## Analysis of MCQ answer frequencies

Averages																				
All subjects	s1 & s2%	s1	s2	2020+ %	s1 2016SP %	s1 2016 %	s1 2017 %	s1 2018 %	s1 2019 %	s1 2020sp %	s1 2020 %	s1 2021 %	s1 2022 %	s1 2023 %	ESAT %	s2 2020sp %	s2 2020 %	s2 2021 %	s2 2022sp %	s2 2022 %
A	12.9	12.9	13	12.8	14 16	10 11	11 12	14 16	8 9	12 15	10 13	11 14	9 11	10 13	6 21	6 20	5 8	4 7	6 20	6 10
B	14.2	14.3	14	13.8	14 16	11 12	16 18	11 12	12 13	14 18	9 11	12 15	11 14	14 18	2 7	3 10	10 17	8 13	5 17	8 13
C	17.2	17.9	16	15.5	18 20	20 22	16 18	20 22	17 19	13 16	12 15	11 14	12 15	10 13	7 24	5 17	10 17	11 18	5 17	7 12
D	16.5	18.2	13	14.4	22 24	16 18	17 19	9 10	17 19	20 25	12 15	12 15	15 19	12 15	6 21	1 3	14 23	11 18	1 3	11 18
E	17.9	16.2	21	19.1	13 14	12 13	14 16	20 22	16 18	12 15	10 13	14 18	14 18	19 24	6 21	9 30	8 13	10 17	8 27	11 18
F	9.8	10.2	9	11.1	6 7	9 10	8 9	8 9	9 10	3 4	17 21	11 14	7 9	8 10	2 7	1 3	6 10	7 12	2 7	8 13
G	7.2	6.3	9	9.0	1 1	7 8	4 4	4 4	5 6	4 5	7 9	5 6	11 14	4 5	0 0	2 7	5 8	6 10	2 7	7 12
H	4.3	4.0	5	4.4	2 2	5 6	4 4	4 4	6 7	2 3	3 4	4 5	1 1	3 4	0 0	3 10	2 3	3 5	1 3	2 3
Totals	1119	100.0		100.0	90	90	90	90	90	80	80	80	80	80	29	30	60	60	30	60
Chemistry	s1 & s2%	s1	s2	2020+ %	s1 2016SP %	s1 2016 %	s1 2017 %	s1 2018 %	s1 2019 %	s1 2020sp %	s1 2020 %	s1 2021 %	s1 2022 %	s1 2023 %	ESAT %	s2 2020sp %	s2 2020 %	s2 2021 %	s2 2022sp %	s2 2022 %
A	13.7	8.0	6.6	12.5	4 22	2 11	2 11	4 22	1 6	4 20	1 5	3 15	3 15	2 10	5 19	2 20	1 5	1 5	2 20	3 15
B	13.2	6.1	9.4	15.6	1 6	0 0	2 11	3 17	3 17	2 10	2 10	3 15	2 10	2 10	2 7	1 10	5 25	3 15	2 20	4 20
C	17.5	11.0	9.1	15.0	4 22	7 39	2 11	5 28	1 6	4 20	2 10	4 20	3 15	4 20	7 26	2 20	4 20	4 20	1 10	1 5
D	18.7	12.2	7.6	15.0	3 17	5 28	7 39	2 11	4 22	5 25	4 20	2 10	3 15	3 15	6 22	1 10	3 15	4 20	1 10	4 20
E	20.7	11.7	11.7	21.3	6 33	1 6	3 17	3 17	4 22	5 25	4 20	5 25	4 20	6 30	5 19	3 30	3 15	3 15	3 30	3 15
F	9.2	5.6	3.1	11.3	0 0	3 17	1 6	1 6	2 11	0 0	5 25	3 15	2 10	1 5	2 7	0 0	1 5	3 15	0 0	4 20
G	4.7	1.2	4.6	7.5	0 0	0 0	0 0	0 0	1 6	0 0	2 10	0 0	2 10	1 5	0 0	1 10	2 10	1 5	1 10	1 5
H	2.3	1.2	1.3	1.9	0 0	0 0	1 6	0 0	2 11	0 0	0 0	0 0	1 5	1 5	0 0	0 0	1 5	1 5	0 0	0 0
Totals	297	100.0		100.0	18	18	18	18	18	20	20	20	20	20	27	10	20	20	10	20
Numbers of MCQs in Chemistry that have a certain number of answers:					s1 2016SP	s1 2016	s1 2017	s1 2018	s1 2019	s1 2020sp	s1 2020	s1 2021	s1 2022	s1 2023	ESAT	s2 2020sp	s2 2020	s2 2021	s2 2022sp	s2 2022
2020+ % s1 Only Possible answer # s1 & s2					%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
1 4 0					13 72	4 22	2 11	4 22	6 33	14 70	3 15	9 45	3 15	3 15	17 63	1 10	3 15	5 25	1 10	4 20
25 34 5 28					5 28	7 39	9 50	8 44	5 28	6 30	5 25	6 30	6 30	7 26	3 30	6 30	6 30	3 30	5 25	5 25
28 33 6 32					8 40	2 11	1 6	3 17	1 6	1 5	1 5	1 5	1 5	2 7	1 10	1 10	1 5	5 25	1 10	3 15
9 5 7 8					37 27 8 32	5 28	7 39	3 17	6 33	0	10 50	5 25	10 50	10 50	0	5 50	10 50	4 20	5 50	8 40
100 100 Totals					18 100	18 100	18 100	18 100	18 100	20 100	20 100	20 100	20 100	20 100	27 96	10	20	20	10	20
Biology	s1 & s2%	s1	s2	2020+ %	s1 2016SP %	s1 2016 %	s1 2017 %	s1 2018 %	s1 2019 %	s1 2020sp %	s1 2020 %	s1 2021 %	s1 2022 %	s1 2023 %		s2 2020sp %	s2 2020 %	s2 2021 %	s2 2022sp %	s2 2022 %
A	10.7	6.8	5.2	10.6	1 6	1 6	3 17	2 11	2 11	3 15	2 10	4 20	2 10	3 15		1 10	3 15	1 5	1 10	1 5
B	12.7	8.0	6.0	11.3	2 11	4 22	3 17	2 11	2 11	3 15	1 5	4 20	3 15	3 15		0 0	3 15	4 20	1 10	1 5
C	12.6	7.2	7.2	13.8	1 6	3 17	4 22	1 6	3 17	0 0	4 20	3 15	2 10	0 0		1 10	3 15	2 10	2 20	2 10
D	14.5	8.8	5.8	13.1	5 28	2 11	2 11	1 6	4 22	4 20	1 5	4 20	4 20	3 15		0 0	5 25	3 15	0 0	4 20
E	15.2	6.5	12.3	16.3	1 6	4 22	1 6	5 28	2 11	2 10	1 5	1 5	1 5	5 25		4 40	1 5	4 20	3 30	4 20
F	13.7	8.4	6.4	14.4	5 28	1 6	2 11	3 17	0 0	3 15	7 35	1 5	4 20	4 20		1 10	2 10	2 10	2 20	1 5
G	11.7	5.4	6.3	13.1	1 6	1 6	1 6	2 11	2 11	4 20	2 10	1 5	4 20	2 10		1 10	2 10	3 15	1 10	5 25
H	9.0	6.0	4.0	7.5	2 11	2 11	2 11	2 11	3 17	1 5	2 10	2 10	0 0	0 0		2 20	1 5	1 5	0 0	2 10
Totals	270	100.0		100.0	18	18	18	18	18	20	20	20	20	20		10	20	20	10	20
Mathematics	s1 & s2%	s1	s2	2020+ %	s1 2016SP %	s1 2016 %	s1 2017 %	s1 2018 %	s1 2019 %	s1 2020sp %	s1 2020 %	s1 2021 %	s1 2022 %	s1 2023 %						
A	12.2	7.4	####	15.0	4 22	2 11	0 0	2 11	1 6	4 20	4 20	3 15	1 5	2 10						
B	15.9	8.8	####	16.3	3 17	4 22	4 22	2 11	1 6	3 15	4 20	2 10	4 20	4 20						
C	19.6	11.2	####	15.0	5 28	4 22	3 17	5 28	4 22	5 25	2 10	1 5	4 20	4 20						
D	18.1	10.0	####	20.0	5 28	2 11	3 17	2 11	3 17	5 25	3 15	3 15	5 25	4 20						
E	16.5	9.2	####	16.3	1 6	3 17	3 17	4 22	4 22	2 10	3 15	4 20	4 20	4 20						
F	9.4	5.9	####	10.0	0 0	2 11	3 17	1 6	2 11	0 0	3 15	5 25	0 0	1 5						
G	5.9	3.1	####	5.0	0 0	1 6	2 11	1 6	2 11	0 0	1 5	1 5	2 10	0 0						
H	2.3	1.5	####	2.5	0 0	0 0	0 0	1 6	1 6	1 5	0 0	1 5	0 0	1 5						
Totals	190	100.0		100.0	18	18	18	18	18	20	20	20	20	20						

## Major takeaways from this analysis

- The trends are stronger in chemistry than all (green indicates bias towards that letter answer), and weaker in biology (red indicates that that letter is less common).
- In chemistry ESAT 5 answers, A-E, is the most common question type. Previously 8 answers were more common.
- These trends exist across all papers from 2016sp to 2022, as well as for exam papers 2020sp and onwards.
- A correct answer could be any letter, but seems less likely if it is the first or the last option. So pure guesses at answer E would be optimal if these trends persist. If you had a fifty-fifty feeling for two answers, and one was at the end of the options, maybe go for the other answer.
- These trends are often found in other MCQ tests; it **WAS** in AS Chemistry offered by CAIE (but that pattern was totally removed in 2023).



## Entrance statistics for selected non-UK applicants

Table 3.2 Applications, offers and acceptances to Cambridge by country 2022<sup>39</sup>

This table counts applications from outside the UK only.

Country of domicile	Applications		Offers		Acceptances and success rates		
	No.	%	No.	%	No.	%	Success rate (%)
China	2,169	28.7	294	29.5	224	30.4	10.3
Singapore	573	7.6	141	14.2	114	15.4	19.9
Hong Kong	572	7.6	91	9.1	73	9.9	12.8
United States of America	427	5.7	39	3.9	23	3.1	5.4
India	377	5.0	41	4.1	23	3.1	6.1
Malaysia	252	3.3	19	1.9	17	2.3	6.7
France	181	2.4	12	1.2	11	1.5	6.1
Canada	158	2.1	18	1.8	12	1.6	7.6
Ireland	156	2.1	17	1.7	13	1.8	8.3
Korea, Republic of	144	1.9	10	1.0	9	1.2	6.3
Spain	140	1.9	11	1.1	7	0.9	5.0
Germany	138	1.8	19	1.9	16	2.2	11.6
Pakistan	134	1.8	12	1.2	8	1.1	6.0
Australia	117	1.6	22	2.2	18	2.4	15.4
Poland	104	1.4	18	1.8	13	1.8	12.5
Italy	103	1.4	8	0.8	4	0.5	3.9
United Arab Emirates	92	1.2	11	1.1	7	0.9	7.6
Switzerland	91	1.2	14	1.4	13	1.8	14.3
Cyprus (European Union)	89	1.2	13	1.3	8	1.1	9.0
Thailand	79	1.0	9	0.9	8	1.1	10.1
Hungary	66	0.9	19	1.9	12	1.6	18.2
New Zealand	61	0.8	7	0.7	5	0.7	8.2
Romania	59	0.8	12	1.2	4	0.5	6.8
Belgium	51	0.7	6	0.6	5	0.7	9.8
Russian Federation	50	0.7	4	0.4	3	0.4	6.0
Other EU	387	5.1	52	5.2	37	5.0	9.6
Other International	775	10.3	77	7.7	51	6.9	6.6
<b>Totals</b>	<b>7,545</b>	<b>100.0</b>	<b>996</b>	<b>100.0</b>	<b>738</b>	<b>100.0</b>	<b>9.8</b>

<sup>39</sup> <https://www.undergraduate.study.cam.ac.uk/apply/statistics>



International, China, HK/TW/MAC and Singapore for 2019 to 2022 years of entry<sup>40</sup>

Notable is Singapore's success rate, which has grown in 2022 to around twice that of the international average.

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offer	Accept.	Offer rate %	Apps.	Offer	Accept.	Offer rate %	Apps.	Offer	Accept.	Offer rate %	Apps.	Offer	Accept.	Offer rate %
2019	Totals	6843	1127	852	18	1156	207	142	17	561	91	53	17	467	99	65	23
2020	Totals	6973	1110	827	17	1328	266	188	21	591	101	75	19	462	105	55	22
2021	Totals	7962	1088	800	15	1999	284	217	17	686	100	72	17	533	129	84	23
2022	Totals	7679	1042	771	15	2181	294	225	19	617	90	56	16	615	145	103	30

The numbers here for this table come from a Freedom of Information (FOI) request from the University, but they don't exactly line up with the universities published statistics in the previous table (Table 3.2), which will be produced to include more information, so ought to be considered more accurate to the message the University of Cambridge intends to deliver.

Proportion of total, %	China			Hong Kong/Macao/Taiwan			Singapore		
	Apps %	Offer %	Accept %	Apps %	Offer %	Accept %	Apps %	Offer %	Accept %
2019	16.9	18.4	16.7	8.2	8.1	6.2	6.8	8.8	7.6
2020	19.0	24.0	22.7	8.5	9.1	9.1	6.6	9.5	6.7
2021	25.1	26.1	27.1	8.6	9.2	9.0	6.7	11.9	10.5
2022	28.4	28.2	29.2	8.0	8.6	7.3	8.0	13.9	13.4

For more details about applications and colleges see at the back of this book: "Appendix - Admissions statistics for China, Hong Kong, Singapore and all International Students for 20109 to 2022 entry".

<sup>40</sup> [https://www.whatdotheyknow.com/request/undergraduate\\_admission\\_statisti\\_90](https://www.whatdotheyknow.com/request/undergraduate_admission_statisti_90)  
[www.SmashingScience.org](http://www.SmashingScience.org)





## AS and A2 CAIE 9701 Chemistry & 9700 Biology analysis

Each exam paper, or combination, like "Papers 1, 2 and 3" use the weighting, as a fraction of the whole A Level (AS and A2 years) given in the syllabus:

Paper	% of AS/ A2	% of ALvl	Marks	Time in min	secs/ marks	% YEAR	% ALL A-Level/ mark (weighting)
1	31	15.5	40	75	112.5	0.78	0.39
2	46	23.0	60	75	75.0	0.77	0.38
3	23	11.5	40	120	180.0	0.58	0.29
4	77	38.5	100	120	72.0	0.77	0.39
5	23	11.5	30	75	150.0	0.77	0.38

PUM =Percentage Uniform Mark; UMS = Uniform Mark Scale (UK version of PUM)

UMS/PUM allows 2 scores from 2 different versions of the same exam paper that may have been slightly different in terms of difficulty, to be made. A student sitting a slightly harder exam paper will have a lower grade threshold compared to a student, for instance doing their exam papers in a different time zone that is slightly easier. Each grade always has the same UMS score, so an A\* is always 90% UMS, but the raw score can be different, often a lower percentage. The table below shows how this threshold has changed in the last 10 years.

### Variability in UMS/PUM grade thresholds in CHEMISTRY from 20214s to 2023w

Grade:		A*	A	B	C	D	E
UMS/PUM %		90%	80%	70%	60%	50%	40%
2014s to 2023w	Highest Raw % Score	79	70	62	53	44	35
	Lowest Raw % Score	62	54	46	38	30	21
	Variability	17	16	17	15	14	14
	Average Raw % Score	73	64	55	46	37	29

Grade:		A*	A	B	C	D	E
2020m and before:	Highest Raw % Score	79	70	62	53	44	35
	Lowest Raw % Score	72	63	54	46	37	28
	Variability	7	7	8	7	7	7
	Average Raw % Score	76	67	58	49	41	32

Grade:		A*	A	B	C	D	E
2020w and later:	Highest Raw % Score	74	65	56	46	37	28
	Lowest Raw % Score	62	54	46	38	30	21
	Variability	12	11	10	9	7	7
	Average Raw % Score	69	59	49	41	32	23

Most courses and almost all universities generally do not explain if they use your UMS/PUM score, with the exception of Cambridge, which always requires you to give your UMS/PUM as additional information when you apply, but not through the UCAS form. They have also created and published a report analysing 14,000 applicants dated July 2015:

[https://www.cao.cam.ac.uk/sites/www.cao.cam.ac.uk/files/ar\\_ums\\_performance\\_the\\_destination\\_of\\_cambridge\\_applicants.pdf](https://www.cao.cam.ac.uk/sites/www.cao.cam.ac.uk/files/ar_ums_performance_the_destination_of_cambridge_applicants.pdf)

The mean average UMS/PUM score for a successful Cambridge applicant was 92% average (for the best 3 AS level subjects), but that average was about 95% for (natural) science applicants, a bar chart using their statistics is provided in this book in the section: *UMS(/PUM) performance and the eventual HE destination of Cambridge applicants*



## Appendix: Admissions statistics for China, HK/TW & SG and all Internationals for 2019-22 entry<sup>41</sup>

Applications, Offers and Acceptances by Domicile – ordered by year of entry, then by college

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2019	Christ's	285	60	43	21	38	6	4	16	22	1	0	5	27	8	6	30
2019	Churchill	363	49	29	13	70	12	5	17	33	5	4	15	21	3	<3	14
2019	Clare	223	31	28	14	29	7	7	24	15	1	<3	7	14	1	<3	7
2019	Corpus Christi	200	27	19	14	41	3	<3	7	13	4	<3	31	15	1	<3	7
2019	Downing	246	30	26	12	53	7	7	13	25	3	3	12	14	1	<3	7
2019	Emmanuel	202	28	23	14	18	4	<3	22	28	5	4	18	15	4	4	27
2019	Fitzwilliam	194	33	24	17	70	17	14	24	18	1	<3	6	17	1	<3	6
2019	Girton	215	35	22	16	42	7	5	17	15	3	<3	20	9	5	4	56
2019	Gonville and Caius	289	40	35	14	37	5	4	14	27	3	3	11	18	1	<3	6
2019	Homerton	297	68	54	23	80	15	13	19	33	9	9	27	8	0	0	0
2019	Hughes Hall	131	47	30	36	<3	5	<3		5	1	<3	20	22	17	13	77
2019	Jesus	224	18	14	8	27	1	<3	4	22	5	5	23	11	1	0	9
2019	King's	375	32	23	9	51	5	3	10	26	1	<3	4	22	1	<3	5
2019	Lucy Cavendish	83	26	23	31	<3	1	<3		0	1	<3		3	1	<3	33
2019	Magdalene	216	37	25	17	55	13	9	24	32	6	5	19	20	4	4	20
2019	Murray Edwards	193	40	27	21	35	11	7	31	7	4	3	57	12	5	<3	42
2019	Newnham	190	37	30	19	53	8	6	15	14	1	<3	7	14	3	3	21
2019	Pembroke	247	32	22	13	35	3	<3	9	20	1	<3	5	14	1	<3	7
2019	Peterhouse	208	37	27	18	34	10	7	29	18	0	0	0	16	4	3	25
2019	Queens'	264	45	36	17	54	10	9	19	12	4	<3	33	15	3	3	20
2019	Robinson	217	31	25	14	58	14	11	24	27	3	<3	11	12	1	<3	8
2019	Selwyn	159	25	19	16	38	7	7	18	15	4	3	27	15	1	<3	7
2019	Sidney Sussex	159	30	28	19	28	4	4	14	13	1	<3	8	4	3	3	75
2019	St Catharine's	281	34	29	12	38	3	<3	8	26	1	<3	4	19	1	<3	5
2019	St Edmund's	117	36	27	31	9	1	0	11	7	1	<3	14	17	11	10	65
2019	St John's	372	58	42	16	66	7	7	11	35	9	7	26	24	4	3	17
2019	Trinity	627	99	77	16	80	16	13	20	31	7	3	23	34	1	<3	3
2019	Trinity Hall	155	27	16	17	17	4	<3	24	18	6	4	33	15	1	<3	7
2019	Wolfson	111	35	29	32	<3	1	<3		4	0	0	0	20	11	9	55
2019	Totals	6843	1127	852	18	1156	207	142	17	561	91	53	17	467	99	65	23

<sup>41</sup> [https://www.whatdotheyknow.com/request/undergraduate\\_admission\\_statistics](https://www.whatdotheyknow.com/request/undergraduate_admission_statistics)

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2020	Christ's	305	61	44	20	61	11	7	18	14	4	4	29	22	9	5	41
2020	Churchill	391	65	36	17	78	21	11	27	33	4	3	12	31	1	<3	3
2020	Clare	206	31	23	15	39	6	6	15	27	1	<3	4	13	1	<3	8
2020	Corpus Christi	173	19	14	11	38	6	6	16	15	1	<3	7	18	1	<3	6
2020	Downing	237	36	30	15	40	6	5	15	47	7	5	15	22	5	4	23
2020	Emmanuel	192	27	20	14	25	6	5	24	15	1	<3	7	17	3	<3	18
2020	Fitzwilliam	216	36	26	17	96	21	16	22	22	1	<3	5	17	1	0	6
2020	Girton	254	43	32	17	66	8	5	12	25	4	4	16	10	1	<3	10
2020	Gonville and Caius	258	37	30	14	34	6	4	18	23	3	3	13	19	3	<3	16
2020	Homerton	332	62	47	19	113	23	18	20	35	4	<3	11	18	4	0	22
2020	Hughes Hall	149	46	33	31	10	4	3	40	10	4	3	40	22	19	15	86
2020	Jesus	198	20	14	10	33	3	<3	9	17	1	<3	6	7	1	0	14
2020	King's	357	47	36	13	34	7	4	21	21	6	5	29	26	1	<3	4
2020	Lucy Cavendish	69	21	18	30	<3	1	<3		3	0	<3	0	<3	1	<3	
2020	Magdalene	218	55	36	25	50	18	11	36	34	11	7	32	18	6	3	33
2020	Murray Edwards	197	26	15	13	49	7	6	14	4	3	3	75	15	4	<3	27
2020	Newnham	188	38	26	20	45	12	5	27	19	4	4	21	12	1	<3	8
2020	Pembroke	220	26	20	12	34	6	3	18	20	1	<3	5	10	1	0	10
2020	Peterhouse	191	40	34	21	40	9	8	23	20	5	5	25	8	1	<3	13
2020	Queens'	279	31	23	11	54	11	9	20	23	4	3	17	11	1	<3	9
2020	Robinson	219	32	24	15	77	13	9	17	22	1	<3	5	5	1	<3	20
2020	Selwyn	176	29	28	16	47	9	8	19	22	5	6	23	11	1	<3	9
2020	Sidney Sussex	205	27	17	13	53	8	7	15	14	1	<3	7	6	1	<3	17
2020	St Catharine's	255	33	28	13	47	7	5	15	22	4	4	18	25	5	5	20
2020	St Edmund's	107	26	20	24	7	4	<3	57	3	1	<3	33	11	11	9	100
2020	St John's	453	49	38	11	38	6	4	16	35	8	8	23	18	4	<3	22
2020	Trinity	660	97	72	15	85	17	14	20	30	9	8	30	44	10	5	23
2020	Trinity Hall	182	24	20	13	35	9	9	26	16	3	<3	19	12	1	3	8
2020	Wolfson	86	26	23	30	<3	1	<3		<3	0	0		14	6	6	43
2020	Totals	6973	1110	827	17	1328	266	188	21	591	101	75	19	462	105	55	22

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2021	Christ's	365	54	38	15	66	13	8	20	31	5	4	16	36	8	6	22
2021	Churchill	448	48	30	11	143	16	11	11	39	6	4	15	31	1	<3	3
2021	Clare	257	25	20	10	55	8	7	15	18	3	3	17	17	0	0	0
2021	Corpus Christi	224	23	21	10	52	9	9	17	20	3	<3	15	20	3	3	15
2021	Downing	291	27	25	9	60	9	9	15	46	5	5	11	28	3	3	11
2021	Emmanuel	195	22	15	11	54	6	4	11	17	4	3	24	11	3	3	27
2021	Fitzwilliam	295	43	34	15	131	25	20	19	24	3	3	13	28	4	4	14
2021	Girton	265	29	19	11	89	10	7	11	20	3	<3	15	11	1	0	9
2021	Gonville and Caius	284	31	24	11	70	6	6	9	25	1	<3	4	16	0	0	0
2021	Homerton	423	60	48	14	200	27	21	14	46	5	5	11	18	1	<3	6
2021	Hughes Hall	168	60	37	36	10	7	3	70	7	6	4	86	22	20	14	91
2021	Jesus	210	21	15	10	40	1	0	3	20	1	<3	5	11	1	<3	9
2021	King's	388	38	26	10	53	5	3	9	11	1	<3	9	24	1	<3	4
2021	Lucy Cavendish	167	65	46	39	43	9	8	21	14	6	5	43	<3	11	6	
2021	Magdalene	250	33	19	13	73	12	7	16	41	6	6	15	19	6	3	32
2021	Murray Edwards	219	27	20	12	76	10	9	13	8	1	<3	13	9	4	3	44
2021	Newnham	185	30	24	16	58	11	9	19	9	1	<3	11	7	1	0	14
2021	Pembroke	264	24	17	9	50	8	4	16	28	4	<3	14	16	0	0	0
2021	Peterhouse	210	38	25	18	48	6	4	13	20	5	4	25	9	1	<3	11
2021	Queens'	308	34	23	11	74	6	5	8	33	6	4	18	18	3	3	17
2021	Robinson	266	30	26	11	111	16	15	14	30	3	3	10	10	1	0	10
2021	Selwyn	204	22	16	11	75	8	6	11	18	3	3	17	12	1	0	8
2021	Sidney Sussex	194	21	18	11	67	7	6	10	18	0	0	0	9	1	<3	11
2021	St Catharine's	271	25	23	9	80	9	7	11	31	1	<3	3	20	3	<3	15
2021	St Edmund's	122	51	35	42	7	3	0	43	6	1	<3	17	13	23	17	177
2021	St John's	441	39	31	9	65	7	7	11	45	6	6	13	35	4	<3	11
2021	Trinity	718	108	77	15	94	21	15	22	31	5	5	16	53	12	10	23
2021	Trinity Hall	194	23	17	12	46	5	4	11	22	5	5	23	12	1	<3	8
2021	Wolfson	136	37	31	27	9	4	3	44	8	1	<3	13	18	11	9	61
2021	Totals	7962	1088	800	15	1999	284	217	17	686	100	72	17	533	129	84	23

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2022	Christ's	369	60	47	16	83	13	9	16	20	1	<3	5	55	11	9	20
2022	Churchill	428	38	32	9	116	9	7	8	35	4	4	11	37	6	5	16
2022	Clare	249	24	17	10	53	7	7	13	21	3	<3	14	10	1	<3	10
2022	Corpus Christi	209	20	15	10	67	6	4	9	17	1	<3	6	14	1	<3	7
2022	Downing	248	28	20	11	38	3	4	8	35	6	7	17	26	4	3	15
2022	Emmanuel	253	29	26	11	60	6	5	10	24	5	5	21	24	3	3	13
2022	Fitzwilliam	327	29	27	9	167	14	13	8	11	1	<3	9	29	3	3	10
2022	Girton	220	26	19	12	109	14	10	13	20	5	4	25	9	0	0	0
2022	Gonville and Caius	240	25	19	10	58	5	4	9	23	0	0	0	20	1	0	5
2022	Homerton	462	62	47	13	227	26	22	11	36	4	3	11	22	8	6	36
2022	Hughes Hall	150	59	38	39	7	6	4	86	6	4	3	67	22	22	18	100
2022	Jesus	206	17	14	8	34	1	<3	3	13	1	<3	8	14	0	0	0
2022	King's	336	26	22	8	54	1	<3	2	19	1	<3	5	25	5	5	20
2022	Lucy Cavendish	226	61	40	27	91	18	11	20	18	4	<3	22	4	9	8	225
2022	Magdalene	263	37	25	14	96	17	13	18	34	6	5	18	20	1	<3	5
2022	Murray Edwards	156	26	14	17	84	16	8	19	6	1	<3	17	3	3	<3	100
2022	Newnham	197	26	22	13	70	13	10	19	14	4	3	29	13	1	<3	8
2022	Pembroke	238	25	17	11	50	4	3	8	24	4	3	17	27	3	<3	11
2022	Peterhouse	218	37	25	17	48	7	6	15	22	1	<3	5	18	3	<3	17
2022	Queens'	343	37	28	11	91	12	8	13	24	1	<3	4	23	6	6	26
2022	Robinson	241	29	22	12	110	14	11	13	25	5	3	20	10	0	0	0
2022	Selwyn	218	33	26	15	84	12	8	14	18	4	3	22	15	3	<3	20
2022	Sidney Sussex	177	25	20	14	70	9	7	13	20	5	4	25	12	1	<3	8
2022	St Catharine's	291	24	17	8	81	11	10	14	39	1	<3	3	28	3	<3	11
2022	St Edmund's	97	38	31	39	10	3	<3	30	7	1	0	14	16	14	15	88
2022	St John's	357	46	31	13	65	15	11	23	40	8	5	20	27	6	3	22
2022	Trinity	644	107	69	17	82	22	19	27	27	5	4	19	59	13	7	22
2022	Trinity Hall	213	14	11	7	71	5	7	7	19	3	<3	16	10	1	<3	10
2022	Wolfson	103	34	30	33	5	5	4	100	0	1	<3		23	13	12	57
2022	Totals	7679	1042	771	15	2181	294	225	19	617	90	56	16	615	145	103	30



## Appendix: Applications, Offers and Acceptances by Domicile – ordered by success rate for non-UK students

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
<b>2019</b>	<b>Totals</b>	<b>6843</b>	<b>1127</b>	<b>852</b>	<b>18</b>	<b>1156</b>	<b>207</b>	<b>142</b>	<b>17</b>	<b>561</b>	<b>91</b>	<b>53</b>	<b>17</b>	<b>467</b>	<b>99</b>	<b>65</b>	<b>23</b>
<b>2020</b>	<b>Totals</b>	<b>6973</b>	<b>1110</b>	<b>827</b>	<b>17</b>	<b>1328</b>	<b>266</b>	<b>188</b>	<b>21</b>	<b>591</b>	<b>101</b>	<b>75</b>	<b>19</b>	<b>462</b>	<b>105</b>	<b>55</b>	<b>22</b>
<b>2021</b>	<b>Totals</b>	<b>7962</b>	<b>1088</b>	<b>800</b>	<b>15</b>	<b>1999</b>	<b>284</b>	<b>217</b>	<b>17</b>	<b>686</b>	<b>100</b>	<b>72</b>	<b>17</b>	<b>533</b>	<b>129</b>	<b>84</b>	<b>23</b>
<b>2022</b>	<b>Totals</b>	<b>7679</b>	<b>1042</b>	<b>771</b>	<b>15</b>	<b>2181</b>	<b>294</b>	<b>225</b>	<b>19</b>	<b>617</b>	<b>90</b>	<b>56</b>	<b>16</b>	<b>615</b>	<b>145</b>	<b>103</b>	<b>30</b>
2021	St Edmund's	122	51	35	42	7	3	0	43	6	1	<3	17	13	23	17	177
2021	Lucy Cavendish	167	65	46	39	43	9	8	21	14	6	5	43	<3	11	6	
2022	Hughes Hall	150	59	38	39	7	6	4	86	6	4	3	67	22	22	18	100
2022	St Edmund's	97	38	31	39	10	3	<3	30	7	1	0	14	16	14	15	88
2019	Hughes Hall	131	47	30	36	<3	5	<3		5	1	<3	20	22	17	13	77
2021	Hughes Hall	168	60	37	36	10	7	3	70	7	6	4	86	22	20	14	91
2022	Wolfson	103	34	30	33	5	5	4	100	0	1	<3		23	13	12	57
2019	Wolfson	111	35	29	32	<3	1	<3		4	0	0	0	20	11	9	55
2019	Lucy Cavendish	83	26	23	31	<3	1	<3		0	1	<3		3	1	<3	33
2019	St Edmund's	117	36	27	31	9	1	0	11	7	1	<3	14	17	11	10	65
2020	Hughes Hall	149	46	33	31	10	4	3	40	10	4	3	40	22	19	15	86
2020	Lucy Cavendish	69	21	18	30	<3	1	<3		3	0	<3	0	<3	1	<3	
2020	Wolfson	86	26	23	30	<3	1	<3		<3	0	0		14	6	6	43
2021	Wolfson	136	37	31	27	9	4	3	44	8	1	<3	13	18	11	9	61
2022	Lucy Cavendish	226	61	40	27	91	18	11	20	18	4	<3	22	4	9	8	225
2020	Magdalene	218	55	36	25	50	18	11	36	34	11	7	32	18	6	3	33
2020	St Edmund's	107	26	20	24	7	4	<3	57	3	1	<3	33	11	11	9	100
2019	Homerton	297	68	54	23	80	15	13	19	33	9	9	27	8	0	0	0
2019	Christ's	285	60	43	21	38	6	4	16	22	1	0	5	27	8	6	30
2019	Murray Edwards	193	40	27	21	35	11	7	31	7	4	3	57	12	5	<3	42
2020	Peterhouse	191	40	34	21	40	9	8	23	20	5	5	25	8	1	<3	13
2020	Christ's	305	61	44	20	61	11	7	18	14	4	4	29	22	9	5	41
2020	Newnham	188	38	26	20	45	12	5	27	19	4	4	21	12	1	<3	8
2019	Newnham	190	37	30	19	53	8	6	15	14	1	<3	7	14	3	3	21
2019	Sidney Sussex	159	30	28	19	28	4	4	14	13	1	<3	8	4	3	3	75

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2020	Homerton	332	62	47	19	113	23	18	20	35	4	<3	11	18	4	0	22
2019	Peterhouse	208	37	27	18	34	10	7	29	18	0	0	0	16	4	3	25
2021	Peterhouse	210	38	25	18	48	6	4	13	20	5	4	25	9	1	<3	11
2019	Fitzwilliam	194	33	24	17	70	17	14	24	18	1	<3	6	17	1	<3	6
2019	Magdalene	216	37	25	17	55	13	9	24	32	6	5	19	20	4	4	20
2019	Queens'	264	45	36	17	54	10	9	19	12	4	<3	33	15	3	3	20
2019	Trinity Hall	155	27	16	17	17	4	<3	24	18	6	4	33	15	1	<3	7
2020	Churchill	391	65	36	17	78	21	11	27	33	4	3	12	31	1	<3	3
2020	Fitzwilliam	216	36	26	17	96	21	16	22	22	1	<3	5	17	1	0	6
2020	Girton	254	43	32	17	66	8	5	12	25	4	4	16	10	1	<3	10
2022	Murray Edwards	156	26	14	17	84	16	8	19	6	1	<3	17	3	3	<3	100
2022	Peterhouse	218	37	25	17	48	7	6	15	22	1	<3	5	18	3	<3	17
2022	Trinity	644	107	69	17	82	22	19	27	27	5	4	19	59	13	7	22
2019	Girton	215	35	22	16	42	7	5	17	15	3	<3	20	9	5	4	56
2019	Selwyn	159	25	19	16	38	7	7	18	15	4	3	27	15	1	<3	7
2019	St John's	372	58	42	16	66	7	7	11	35	9	7	26	24	4	3	17
2019	Trinity	627	99	77	16	80	16	13	20	31	7	3	23	34	1	<3	3
2020	Selwyn	176	29	28	16	47	9	8	19	22	5	6	23	11	1	<3	9
2021	Newnham	185	30	24	16	58	11	9	19	9	1	<3	11	7	1	0	14
2022	Christ's	369	60	47	16	83	13	9	16	20	1	<3	5	55	11	9	20
2020	Clare	206	31	23	15	39	6	6	15	27	1	<3	4	13	1	<3	8
2020	Downing	237	36	30	15	40	6	5	15	47	7	5	15	22	5	4	23
2020	Robinson	219	32	24	15	77	13	9	17	22	1	<3	5	5	1	<3	20
2020	Trinity	660	97	72	15	85	17	14	20	30	9	8	30	44	10	5	23
2021	Christ's	365	54	38	15	66	13	8	20	31	5	4	16	36	8	6	22
2021	Fitzwilliam	295	43	34	15	131	25	20	19	24	3	3	13	28	4	4	14
2021	Trinity	718	108	77	15	94	21	15	22	31	5	5	16	53	12	10	23
2022	Selwyn	218	33	26	15	84	12	8	14	18	4	3	22	15	3	<3	20
2019	Clare	223	31	28	14	29	7	7	24	15	1	<3	7	14	1	<3	7
2019	Corpus Christi	200	27	19	14	41	3	<3	7	13	4	<3	31	15	1	<3	7
2019	Emmanuel	202	28	23	14	18	4	<3	22	28	5	4	18	15	4	4	27
2019	Gonville and Caius	289	40	35	14	37	5	4	14	27	3	3	11	18	1	<3	6

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2019	Robinson	217	31	25	14	58	14	11	24	27	3	<3	11	12	1	<3	8
2020	Emmanuel	192	27	20	14	25	6	5	24	15	1	<3	7	17	3	<3	18
2020	Gonville and Caius	258	37	30	14	34	6	4	18	23	3	3	13	19	3	<3	16
2021	Homerton	423	60	48	14	200	27	21	14	46	5	5	11	18	1	<3	6
2022	Magdalene	263	37	25	14	96	17	13	18	34	6	5	18	20	1	<3	5
2022	Sidney Sussex	177	25	20	14	70	9	7	13	20	5	4	25	12	1	<3	8
2019	Churchill	363	49	29	13	70	12	5	17	33	5	4	15	21	3	<3	14
2019	Pembroke	247	32	22	13	35	3	<3	9	20	1	<3	5	14	1	<3	7
2020	King's	357	47	36	13	34	7	4	21	21	6	5	29	26	1	<3	4
2020	Murray Edwards	197	26	15	13	49	7	6	14	4	3	3	75	15	4	<3	27
2020	Sidney Sussex	205	27	17	13	53	8	7	15	14	1	<3	7	6	1	<3	17
2020	St Catharine's	255	33	28	13	47	7	5	15	22	4	4	18	25	5	5	20
2020	Trinity Hall	182	24	20	13	35	9	9	26	16	3	<3	19	12	1	3	8
2021	Magdalene	250	33	19	13	73	12	7	16	41	6	6	15	19	6	3	32
2022	Homerton	462	62	47	13	227	26	22	11	36	4	3	11	22	8	6	36
2022	Newnham	197	26	22	13	70	13	10	19	14	4	3	29	13	1	<3	8
2022	St John's	357	46	31	13	65	15	11	23	40	8	5	20	27	6	3	22
2019	Downing	246	30	26	12	53	7	7	13	25	3	3	12	14	1	<3	7
2019	St Catharine's	281	34	29	12	38	3	<3	8	26	1	<3	4	19	1	<3	5
2020	Pembroke	220	26	20	12	34	6	3	18	20	1	<3	5	10	1	0	10
2021	Murray Edwards	219	27	20	12	76	10	9	13	8	1	<3	13	9	4	3	44
2021	Trinity Hall	194	23	17	12	46	5	4	11	22	5	5	23	12	1	<3	8
2022	Girton	220	26	19	12	109	14	10	13	20	5	4	25	9	0	0	0
2022	Robinson	241	29	22	12	110	14	11	13	25	5	3	20	10	0	0	0
2020	Corpus Christi	173	19	14	11	38	6	6	16	15	1	<3	7	18	1	<3	6
2020	Queens'	279	31	23	11	54	11	9	20	23	4	3	17	11	1	<3	9
2020	St John's	453	49	38	11	38	6	4	16	35	8	8	23	18	4	<3	22
2021	Churchill	448	48	30	11	143	16	11	11	39	6	4	15	31	1	<3	3
2021	Emmanuel	195	22	15	11	54	6	4	11	17	4	3	24	11	3	3	27
2021	Girton	265	29	19	11	89	10	7	11	20	3	<3	15	11	1	0	9
2021	Gonville and Caius	284	31	24	11	70	6	6	9	25	1	<3	4	16	0	0	0

Entry Year	College	International (non-UK)				China				Hong Kong/Macao/Taiwan				Singapore			
		Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %	Apps.	Offers	Accept.	Success rate %
2021	Queens'	308	34	23	11	74	6	5	8	33	6	4	18	18	3	3	17
2021	Robinson	266	30	26	11	111	16	15	14	30	3	3	10	10	1	0	10
2021	Selwyn	204	22	16	11	75	8	6	11	18	3	3	17	12	1	0	8
2021	Sidney Sussex	194	21	18	11	67	7	6	10	18	0	0	0	9	1	<3	11
2022	Downing	248	28	20	11	38	3	4	8	35	6	7	17	26	4	3	15
2022	Emmanuel	253	29	26	11	60	6	5	10	24	5	5	21	24	3	3	13
2022	Pembroke	238	25	17	11	50	4	3	8	24	4	3	17	27	3	<3	11
2022	Queens'	343	37	28	11	91	12	8	13	24	1	<3	4	23	6	6	26
2020	Jesus	198	20	14	10	33	3	<3	9	17	1	<3	6	7	1	0	14
2021	Clare	257	25	20	10	55	8	7	15	18	3	3	17	17	0	0	0
2021	Corpus Christi	224	23	21	10	52	9	9	17	20	3	<3	15	20	3	3	15
2021	Jesus	210	21	15	10	40	1	0	3	20	1	<3	5	11	1	<3	9
2021	King's	388	38	26	10	53	5	3	9	11	1	<3	9	24	1	<3	4
2022	Clare	249	24	17	10	53	7	7	13	21	3	<3	14	10	1	<3	10
2022	Corpus Christi	209	20	15	10	67	6	4	9	17	1	<3	6	14	1	<3	7
2022	Gonville and Caius	240	25	19	10	58	5	4	9	23	0	0	0	20	1	0	5
2019	King's	375	32	23	9	51	5	3	10	26	1	<3	4	22	1	<3	5
2021	Downing	291	27	25	9	60	9	9	15	46	5	5	11	28	3	3	11
2021	Pembroke	264	24	17	9	50	8	4	16	28	4	<3	14	16	0	0	0
2021	St Catharine's	271	25	23	9	80	9	7	11	31	1	<3	3	20	3	<3	15
2021	St John's	441	39	31	9	65	7	7	11	45	6	6	13	35	4	<3	11
2022	Churchill	428	38	32	9	116	9	7	8	35	4	4	11	37	6	5	16
2022	Fitzwilliam	327	29	27	9	167	14	13	8	11	1	<3	9	29	3	3	10
2019	Jesus	224	18	14	8	27	1	<3	4	22	5	5	23	11	1	0	9
2022	Jesus	206	17	14	8	34	1	<3	3	13	1	<3	8	14	0	0	0
2022	King's	336	26	22	8	54	1	<3	2	19	1	<3	5	25	5	5	20
2022	St Catharine's	291	24	17	8	81	11	10	14	39	1	<3	3	28	3	<3	11
2022	Trinity Hall	213	14	11	7	71	5	7	7	19	3	<3	16	10	1	<3	10

## Appendix: Changes to the Natural Sciences Entrance Requirements webpage through time

Comparing 2016 with 2020 versions of the website:

<https://web.archive.org/web/20200811000352/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>

### “Changes to the assessment format

Please be aware that Section 2 Biology was updated in 2022. Section 2 Biology now tests knowledge of advanced topics, bringing it in line with Section 2 Physics and Chemistry. You should take this into consideration when looking at past papers.(2023)”<sup>42</sup>

“A specimen paper has been produced to allow you to sample the written assessment format and practice under timed conditions. It is not expected that you will answer every question correctly; the written assessment is designed to be challenging. Even some strong candidates may not complete the paper in the time allowed; it is designed to distinguish across our field of high-calibre applicants.

Experience with similar assessments and from trials indicates that, on average, typical applicants to the most highly selective undergraduate courses (who are by definition academically very able) will gain approximately half of the available marks. The best applicants will score more highly, but only relatively few are expected to gain more than 80% of the available marks.

Written assessments help admissions tutors to assess whether candidates have the skills, aptitudes and any required subject knowledge and understanding required to study the relevant course at Cambridge. They are only one of the elements used in the admissions process. Others include a candidate’s academic record and forecast grades in school-leaving examinations; UCAS application form; examples of recent written work submitted to the College to which they are applying; and performance at interview, if invited to attend.”<sup>43</sup>

Comparing two versions of the Entrance Requirements from 03/08/2016<sup>44</sup> (differences highlighted green) and 21/03/2021<sup>45</sup> (differences highlighted in red)

<https://web.archive.org/web/20210323162554/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>

For further information about studying Natural Sciences at the University of Cambridge see the Natural Sciences Tripos website.  
Typical offers **and requirements** require  
A Level: A\*A\*A  
IB: **40-42** **40-41** points, with 776 at Higher Level  
**Other qualifications: See** For other qualifications, see our **main** Entrance requirements **and International qualifications.**  
**Science/mathematics** pages.  
**Course requirements**  
Please note that in the following 'science/mathematics' subjects' refers to Biology, Chemistry, Physics, Mathematics and Further Mathematics. It does not include Psychology.  
Required by all **Colleges: A** **Colleges: A** Levels/IB Higher Levels in at least two science/mathematics, see also **the Part IA paper descriptions for specific** subject requirements for **the** Year 1 options  
Required by some Colleges: AS or A Level/IB Standard or Higher Level in a third science/mathematics subject and/or particular **subjects**

<sup>42</sup> From: <https://www.undergraduate.study.cam.ac.uk/apply/how/natural-sciences-admission-test> (accessed September 2023)

<sup>43</sup> <https://web.archive.org/web/20160828130710/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences#entry-requirements>

<sup>44</sup> <https://web.archive.org/web/20160803045320/http://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>

<sup>45</sup> <https://web.archive.org/web/20210323162554/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>  
[www.SmashingScience.org](http://www.SmashingScience.org)





Other examination systems

We expect applicants taking other recognised qualifications to have a level of understanding in science and mathematics roughly equivalent to those applying with A Levels.

Refer to our main Entrance requirements pages and consult a College Admissions Tutor for further advice.

Admission assessment

For 2022 entry, all All applicants for Natural Sciences (including applicants to mature Colleges) are required to take a the pre-interview written assessment in early November 2021, for Natural Sciences at an authorised centre local to them (for a lot of applicants, this will be their school/college).

Please see the Cambridge Admissions Testing website for information about registration deadlines, and check admission assessments for further details.

Assessment format

The format for the 2021 assessment will be as follows:

Section 1: Multiple choice questions in mathematics plus one science (Biology, Chemistry or Physics) (60 1 content

Maths and Science MCQs (80 minutes)

Section 2: Extended multiple choice 2 content

Science-specific longer questions in Biology, Chemistry or Physics (60 (40 minutes)

PDF icon Natural Sciences Admissions Assessment Specification 2021 Specification

You must be registered in advance (separately to your UCAS application) to take the assessment – the registration deadline is 15 October 2016. Your assessment centre must register you for the pre-interview assessment; you're not able to register yourself. See the written assessments page for information about assessment centres and registration.

The pre-interview written assessment for Natural Sciences will be taken on 2 November 2016. Please check the Admissions Testing Service website for scheduled start times.

Please note that your performance in the pre-interview assessment will not be considered in isolation, but will be taken into account alongside the other elements of your application.

In addition to the pre-interview assessment, applicants who are invited to the following Colleges interview are required to take a College-set written assessment at interview at the following Colleges (see individual College websites for details):

Magdalene

St John's

Trinity

Mature students (aged 21 or over) applying to one of the mature Colleges should refer to the relevant information about pre-interview assessments on the written assessments page.

Specimen and past papers

A specimen paper has been produced to allow you to sample the written assessment format and practice under timed conditions. It is not expected that you will answer every question correctly; the written assessment is designed to be challenging. Even some strong candidates may not complete the paper in the time allowed; it is designed to distinguish across our field of high-calibre applicants.

Experience with similar assessments and from trials indicates that, on average, typical applicants to the most highly selective undergraduate courses (who are by definition academically very able) will gain approximately half of the available marks. The best applicants will score more highly, but only relatively few are expected to gain more than 80 per cent 80% of the available marks.

Comparing 21/03/2021<sup>46</sup> (red highlighted) with 02/06/22<sup>47</sup> (green highlighted)

Required: a laptop – cost if purchased new will depend on choice, but existing laptops if less than four years old are likely to be completely adequate for the course needs.

Optional: textbooks (available in libraries), specialist equipment (can be borrowed)

Optional – for Part IA Evolution and Behaviour: field course – Estimated cost £65 £50 + travel

Years 2, 3 and 4

Required and optional additional costs are dependent on the options taken

Information about additional costs is available on the Natural Sciences website. Refer to the individual Departments' websites for further details.

Changing course

In the first year, a number of students take Mathematics with Physics and then change to Natural Sciences to continue with Physics from their second year.

In contrast, some students take Part IA Natural Sciences and change to the Computer Science course or Chemical Engineering in their second year. It's also possible

Entry Requirements

This page details the standard entry requirements for this course. However, variations may exist between Colleges and you should check the documents below for details:

PDF icon Natural Sciences (Biological) entry requirements by College for 2023 entry (these are subject to change and will be finalised by early July 2022).

PDF icon Natural Sciences (Physical) entry requirements by College for 2023 entry (these are subject to change and will be finalised by early July 2022).

Typical offers and requirements require

A Level: A\*A\*A

IB: 40-42 points, with 776 at Higher Level

<sup>46</sup> <https://web.archive.org/web/20210323162554/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>

<sup>47</sup> <https://web.archive.org/web/20220602102835/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>

#### Admission assessment

For 2022 entry, all All applicants for Natural Sciences (including applicants to mature Colleges) are required to take a pre-interview written assessment in early November 2021, the Natural Sciences Admissions Assessment (NSAA) at an authorised assessment centre local to them (for a lot of applicants, this will (usually your school or college), for which you must be their school/college), registered in advance.

Please see the Cambridge Admissions Testing website for information about dates and registration deadlines, and check admission assessments for further details. Assessment format

The NSAA Section 2 Biology component is being updated for 2022. From November 2022, Section 2 Biology will assume knowledge of advanced topics. This brings it in line with Section 2 Physics and Chemistry, which already assume knowledge of advanced topics. The topics to be included will be detailed in an updated test specification, to be published here in May 2022 together with a revised specimen question paper and explained answers.

The NSAA format for the 2021 assessment will be as follows:

Section 1: Multiple choice questions in mathematics plus one science (Biology, Chemistry or Physics) (60 minutes)

Section 2: Extended multiple choice questions in Biology, Chemistry or Physics (60 minutes)

PDF icon Natural Sciences Admissions Assessment Specification 2021

Please note that your performance in the pre-interview assessment will not be considered in isolation, but will be taken into account alongside the other elements of your application.

In addition to the pre-interview assessment, addition, applicants to the following some Colleges are may be required to take a College-set written assessment at interview (see individual College websites for details):

Magdalene  
Trinity details).

Specimen and past papers

A specimen paper has been produced to allow you to sample the written assessment format and practice under timed conditions. It is not expected that you will answer every question correctly; the written assessment is designed to be challenging. Even some strong candidates may not complete the paper in the time allowed; it is designed to distinguish across our field of high-calibre applicants.

Experience with similar assessments and from trials indicates that, on average, typical applicants to the most highly selective undergraduate courses (who are by definition academically very able) will gain approximately half of the available marks. The best applicants will score more highly, but only relatively few are expected to gain more than 80 per cent of the available marks.

Written assessments help admissions tutors to assess whether candidates have the skills, aptitudes and any required subject knowledge and understanding required to study the relevant course at Cambridge. They are only one of the elements used in the admissions process. Others include a candidate's academic record and forecast grades in school-leaving examinations; UCAS application form; examples of recent written work submitted to the College to which they are applying; and performance at interview, if invited to attend.

## Comparing 30/04/23<sup>48</sup> (green highlights) with 02/06/22<sup>49</sup> (red highlighted)

#### Subject requirements

'Science/mathematics subjects' refers to Biology, Chemistry, Physics, Mathematics and Further Mathematics. It does not include Psychology.

Required by all Colleges: All Colleges require: A Level/IB Higher Level Mathematics and A Levels/IB Higher Levels in at least two science/mathematics, other science subjects, see also subject requirements for Year 1 options

Required by some Colleges: AS or A Level/IB Standard or Higher Level in a third Further guidance: In exceptional circumstances, applicants with only two science/mathematics subject and/or particular subjects

PDF icon Natural subjects and Biological Sciences (Biological): Subject Requirements and Typical Offer by College

PDF icon Natural Sciences (Physical): Subject Requirements and Typical Offer by College

All undergraduate admissions decisions are the responsibility of the Cambridge Colleges. Please contact the relevant College admissions office if you have any queries about College-specific requirements. applicants without Mathematics may be considered.

See Entrance requirements and PDF icon The Subject Matters Choosing your post-16 subjects for additional advice about general requirements for entry, qualifications guidance and offers. conditions of entry.

#### A Levels

Most students have Your subject choices at least three science/mathematics A Levels. The minimum requirement is two, but this will Level may restrict your choice of Part IA options. In these circumstances, you'll normally be expected to achieve A\* in both of the science/mathematics subjects and encouraged to take an additional science/mathematics AS Level. subject choice. The more useful subject combinations are:

A Level Biology, A Level Chemistry, and AS Level Mathematics or Physics

A Level Chemistry, A Level Mathematics, Mathematics and AS A Level Biology or Physics

A Level Physics, A Level Mathematics and AS A Level Further Mathematics

If you don't have A Level Mathematics, you're required to complete some preparatory work before the start of the course Biology, A Level Chemistry and must take Mathematical Biology as your mathematics subject in Year 1. A Level Mathematics

#### International Baccalaureate

The advice above about A Level subject combinations also applies to the IB. For these purposes:

Standard Level subjects will satisfy AS Level subject requirements. IB.

Higher Level subjects will satisfy A Level subject requirements

IB For Natural Sciences (Physical), if taking Higher Level Mathematics, applicants are expected to take IB Higher Level 'Analysis Analysis and Approaches' for any course where Mathematics is a requirement. Approaches. If this option is not available at your school, please contact the College that you wish to apply to directly for further advice and guidance.

For Natural Sciences (Biological), if taking Higher Level Mathematics, we recommend Analysis and Approaches for the most competitive application, however Applications and Interpretations will also be considered.

<sup>48</sup> <https://web.archive.org/web/20230430054945/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>

<sup>49</sup> <https://web.archive.org/web/20220602102835/https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences>  
[www.SmashingScience.org](http://www.SmashingScience.org)



#### Admission assessment

For 2022 entry, all All applicants for Natural Sciences (including applicants to mature Colleges) are required to take a pre-interview written assessment in early November 2021, the Natural Sciences Admissions Assessment (NSAA) at an authorised assessment centre local to them (for a lot of applicants, this will (usually your school or college), for which you must be their school/college), registered in advance.

Please see the Cambridge Admissions Testing website for information about dates and registration deadlines, and check admission assessments for further details.

#### Assessment format

The format NSAA Section 2 Biology component is being updated for the 2021 assessment 2022. From November 2022, Section 2 Biology will be as follows: assume knowledge of advanced topics, bringing it in line with Section 2 Physics and Chemistry, which already assume knowledge of advanced topics. See the updated specification document and specimen papers below for details.

PDF icon Natural Sciences Admissions Assessment Specification 2022

Section 1: Multiple choice questions in mathematics plus one science (Biology, Chemistry or Physics) (60 minutes)

Section 2: Extended multiple choice questions in Biology, Chemistry or Physics (60 minutes)

PDF icon Natural Sciences Admissions Assessment Specification 2021

Please note that your performance in the pre-interview assessment will not be considered in isolation, but will be taken into account alongside the other elements of your application.

In addition to the pre-interview assessment, applicants to the following Colleges are required to take a College-set written assessment at interview (see individual College websites for details):

Magdalene

Trinity

#### Specimen and past papers

A specimen paper has been produced to allow you to sample the written assessment format and practice under timed conditions. It is not expected that you will answer every question correctly; the written assessment is designed to be challenging. Even some strong candidates may not complete the paper in the time allowed; it is designed to distinguish across our field of high-calibre applicants.

Experience with similar assessments and from trials indicates that, on average, typical applicants to the most highly selective undergraduate courses (who are by definition academically very able) will gain approximately half of the available marks. The best applicants will score more highly, but only relatively few are expected to gain more than 80 per cent of the available marks.

Written assessments help admissions tutors to assess whether candidates have the skills, aptitudes and any required subject knowledge and understanding required to study the relevant course at Cambridge. They are only one of the elements used in the admissions process. Others include a candidate's academic record and forecast grades in school-leaving examinations; UCAS application form; examples of recent written work submitted to the College to which they are applying; and performance at interview, if invited to attend.

When using the specimen Specimen papers and past papers below, please for the Natural Sciences Admission Assessment are available below. Before you attempt the papers, make sure you read the related specimen papers information and guidance.

Please note that the following changes to the Natural Sciences admissions assessment Admissions Assessment (NSAA) were introduced in 2020:

Natural Sciences Admission Assessment NSAA





## Appendix: Calendars and time management

April						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

May						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

June						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

July						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

August						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

September						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November						
S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

December						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

January						
S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

February						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	

March						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

April						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

May						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

June						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					



# CAMBRIDGE

International Education

## Cambridge Final Exam Timetable November 2024

### Administrative zone 5

Cambridge IGCSE™

Cambridge O Level

Cambridge International AS & A Level

Cambridge Final Exam Timetable November 2024

### Syllabus view (A-Z)



CAMBRIDGE  
International Education

#### Cambridge International AS Level

Syllabus/Component	Code	Duration	Date	Session
<b>A</b>				
Accounting (Multiple Choice)	9706/12	1h	Tuesday 12 November 2024	PM
Accounting	9706/22	1h 45m	Thursday 17 October 2024	PM
Afrikaans Language	8679/02	1h 45m	Tuesday 08 October 2024	AM
Afrikaans Language	8679/03	1h 30m	Tuesday 01 October 2024	AM
<b>B</b>				
Biblical Studies	9484/13	1h 30m	Thursday 24 October 2024	EV
Biology (Multiple Choice)	9700/13	1h 15m	Tuesday 12 November 2024	AM
Biology	9700/23	1h 15m	Tuesday 22 October 2024	AM
Biology (Practical - Advanced)	9700/35	2h	Tuesday 08 October 2024	AM
Biology (Practical - Advanced)	9700/36	2h	Tuesday 05 November 2024	AM
Business	9609/12	1h 15m	Monday 07 October 2024	PM
Business	9609/22	1h 30m	Thursday 10 October 2024	PM
<b>C</b>				
Chemistry (Multiple Choice)	9701/13	1h 15m	Thursday 14 November 2024	AM
Chemistry	9701/23	1h 15m	Friday 18 October 2024	AM
Chemistry (Practical - Advanced)	9701/35	2h	Tuesday 01 October 2024	AM
Chemistry (Practical - Advanced)	9701/36	2h	Tuesday 29 October 2024	AM
<b>D</b>				
Biblical Studies	9484/43	1h 30m	Monday 11 November 2024	EV
Biology	9700/43	2h	Friday 25 October 2024	AM
Biology	9700/53	1h 15m	Tuesday 22 October 2024	AM
<b>E</b>				
Chemistry	9701/43	2h	Monday 04 November 2024	AM
Chemistry	9701/53	1h 15m	Friday 18 October 2024	AM

Syllabus/Component	Code	Duration	Date	Session
<b>G</b>				
Geography (Core)	9696/13	1h 30m	Monday 21 October 2024	AM
Geography (Core)	9696/23	1h 30m	Friday 25 October 2024	AM
German Language	8683/23	1h 45m	Monday 28 October 2024	AM
German Language	8683/33	1h 30m	Thursday 03 October 2024	AM
Global Perspectives & Research	9239/12	1h 30m	Tuesday 01 October 2024	PM
<b>H</b>				
History	9489/12	1h 15m	Thursday 17 October 2024	PM
History	9489/22	1h 45m	Monday 21 October 2024	PM
<b>I</b>				
Information Technology	9626/13	1h 45m	Friday 11 October 2024	AM
<b>L</b>				
Language & Literature in English	8695/13	2h	Thursday 31 October 2024	AM
Language & Literature in English	8695/23	2h	Monday 14 October 2024	AM
Law	9084/12	1h 30m	Monday 30 September 2024	PM
Law	9084/22	1h 30m	Wednesday 02 October 2024	PM
Literature in English	9695/13	2h	Monday 14 October 2024	AM
Literature in English	9695/23	2h	Friday 25 October 2024	AM
<b>M</b>				

<b>M</b>				
Marine Science	9693/33	1h 45m	Tuesday 29 October 2024	AM
Marine Science	9693/43	1h 45m	Friday 01 November 2024	AM





## Planning your days V1.0

Period	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	5:00 am							
	5:30 am							
	6:00 am							
	6:30 am							
	7:00 am							
Regstn	7:25 am							
1	7:50 am							
2	8:40 am							
3	9:30 am							
4	10:20 am							
5	11:00 am							
Lunch	11:50 pm							
6	1:10 pm							
7	2:00pm							
8	2:50 pm							
9	3:40 pm							
	4:20 pm							
	5:00 pm							
	5:30 pm							
	6:00 pm							
	6:30 pm							
	7:00 pm							
	7:30 pm							
	8:00 pm							
	8:30 pm							
	9:00 pm							
	9:30 pm							
	10:00 pm							
	10:30 pm							



## Planning your days – v2.0

Period	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	5:00 am							
	5:30 am							
	6:00 am							
	6:30 am							
	7:00 am							
Regstn	7:25 am							
1	7:50 am							
2	8:40 am							
3	9:30 am							
4	10:20 am							
5	11:00 am							
Lunch	11:50 pm							
6	1:10 pm							
7	2:00pm							
8	2:50 pm							
9	3:40 pm							
	4:20 pm							
	5:00 pm							
	5:30 pm							
	6:00 pm							
	6:30 pm							
	7:00 pm							
	7:30 pm							
	8:00 pm							
	8:30 pm							
	9:00 pm							
	9:30 pm							
	10:00 pm							
	10:30 pm							



## Planning your days – v3.0

Period	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	5:00 am							
	5:30 am							
	6:00 am							
	6:30 am							
	7:00 am							
Regstn	7:25 am							
1	7:50 am							
2	8:40 am							
3	9:30 am							
4	10:20 am							
5	11:00 am							
Lunch	11:50 pm							
6	1:10 pm							
7	2:00pm							
8	2:50 pm							
9	3:40 pm							
	4:20 pm							
	5:00 pm							
	5:30 pm							
	6:00 pm							
	6:30 pm							
	7:00 pm							
	7:30 pm							
	8:00 pm							
	8:30 pm							
	9:00 pm							
	9:30 pm							
	10:00 pm							
	10:30 pm							



## Planning your days – v4.0

Period	Time	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
	5:00 am							
	5:30 am							
	6:00 am							
	6:30 am							
	7:00 am							
Regstn	7:25 am							
1	7:50 am							
2	8:40 am							
3	9:30 am							
4	10:20 am							
5	11:00 am							
Lunch	11:50 pm							
6	1:10 pm							
7	2:00pm							
8	2:50 pm							
9	3:40 pm							
	4:20 pm							
	5:00 pm							
	5:30 pm							
	6:00 pm							
	6:30 pm							
	7:00 pm							
	7:30 pm							
	8:00 pm							
	8:30 pm							
	9:00 pm							
	9:30 pm							
	10:00 pm							
	10:30 pm							



## Appendix: Performance in standardised tests of English language proficiency such as IELTS

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If you are a learner where English is not your first language than you are likely to need to sit a standardised tests of English language proficiency such as IELTS.

A good and effective command of English will help drive success in these kinds of exams. For a variety of reading lists and activities to help improve your English language skills in a non-specific but still important way, especially for top universities, go here: <https://www.smashingscience.org/expanding-your-mind>

Regardless of which English language speaking university you eventually attend<sup>50</sup>, and even if it not English is not a national language<sup>51</sup>, scoring higher in your English language standardised test has deep and powerful value to your success at university. It will not only improve the easier-to-measure things like academic success, but also have a potentially more valuable impact on your ability to interact positively and productively with other students, academics and professionals while you are at an English language university.

For specific strategies for the various kinds of standardised test, talking to your English teacher should be your starting point. As with any kind of skilful action, like making a great UCAS application, you should **start preparing early**, and map out when the deadlines are going to land in your weeks, months and years so you can properly plan around them and for them.

One thing that sometimes surprises students is how inflexible some universities are about the English language requirements. But your time at university ought to be a transformative experience, and in a good way; an eye opening and amazing time of growth. This change becomes less and less likely when the language barriers get higher and higher.

## Appendix: Individual contextual factors

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This includes this form, which allows you to describe and explain how the pandemic impacted your education:

Additional Applicant Information Form (AAIF) – 2024 entry<sup>52</sup>

It looks like a fairly straightforward form.

## Appendix: Contextual data

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"The University of Cambridge [is committed](#) to ensuring that we offer admission to students of the highest academic potential, irrespective of social, racial, religious and financial considerations."

There are only a small number of points that a student will have an input for this part of the Cambridge selection process. In the "[My Cambridge Application](#)" you can include if "you have been eligible for Free School Meals", one way that economic disadvantage is measured and tracked in the UK, and if "they have spent time in local authority care"<sup>53</sup>, a measure of educational disadvantage.

"However, academic achievement remains central to all admissions decisions - 'flagged' applicants won't necessarily be invited to attend an interview, be made an offer or be made a conditional offer at lower grades."

It is possible therefore that some of the small number of offers and acceptances with non-A\*A\*A\* profiles (see *A Level grade profiles for 2022*, at the start of this book) may come from a cohort identified here. **If you have succeeded despite these challenges and your grades are not quite there, then this program is designed to give you credit for overcoming the kinds of challenges that most Oxbridge applicants have not, and you ought to apply.**

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<sup>50</sup> <https://www.tandfonline.com/doi/full/10.1080/13803611.2024.2314533#abstract>

<sup>51</sup> <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10404714/>

<sup>52</sup> [https://www.undergraduate.study.cam.ac.uk/files/aaif\\_guide.pdf](https://www.undergraduate.study.cam.ac.uk/files/aaif_guide.pdf)

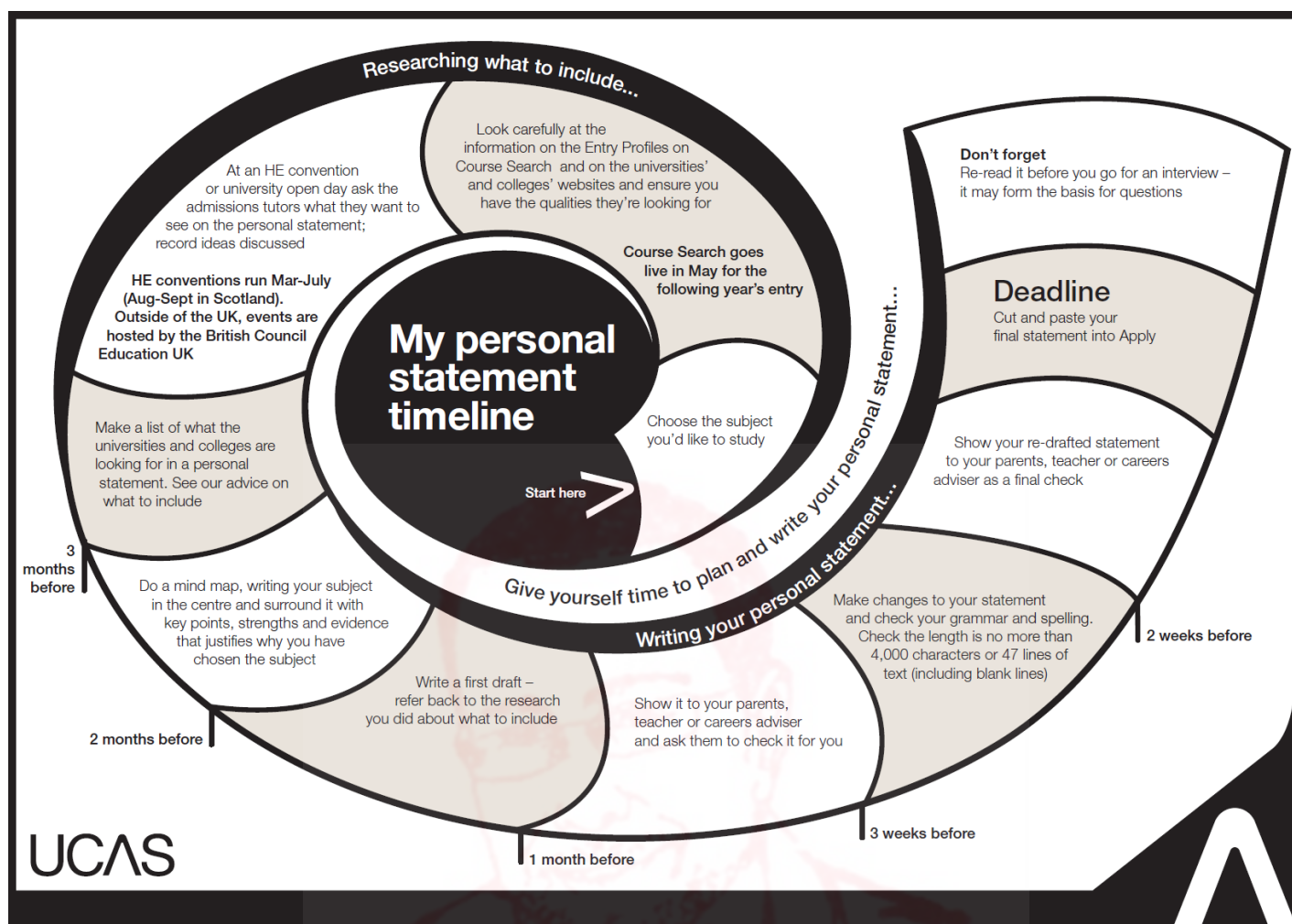
<sup>53</sup> <https://www.undergraduate.study.cam.ac.uk/apply/after/contextual-data>





## Appendix: Personal Statement advice and information

From UCAS a possible timeline for a good top 50 university application, but especially helpful with the writing aspect of it, which is the least important part:



The best personal statements are the not result of great writing, but magnificent living.

For a good Oxbridge application, the work needs to be started much, much earlier than your AS year of study.

It is essentially a highlight list of interesting, difficult to achieve and important things you have done outside of the classroom that explains how passionate, curious and hardworking you are about the subject you are applying for.

Some experiences, for instance 3 years of being the most active member of an evidently successful and obviously active extracurricular Chemistry Society are difficult to achieve, and normally only the most organised and goal oriented Oxbridge applicants. But a much, much larger proportion of those who are offered a place will be offering those kinds of things.

It can be helpful to think about it as blocks of time. You need to start thinking about whichever subject you are thinking of applying to study at university normally when you chose your GCSEs, and you should have good idea of what you could do when you chose your A Levels in your final year of GCSEs.

### Organising your years to create the life experiences that the best personal statements contain

You will begin gaining important life experiences years before your UCAS application year, but a magnificent amount of growth will come through your failures, some of which take months or even years to appreciate. For instance, how do you learn when is too late to apply for a summer program? If it is something really awe-inspiring, rare and worthwhile, learning that the application deadline was last week will give you the most long lasting and powerful lesson in the value of proactive time management. If this happens in a GCSE year it can help you with your all-important summer going into your A2 year.

Cambridge has suggestions of things you could do that they would value, though they don't explain how they would rank two otherwise identical applications with two different kinds of experiences here:

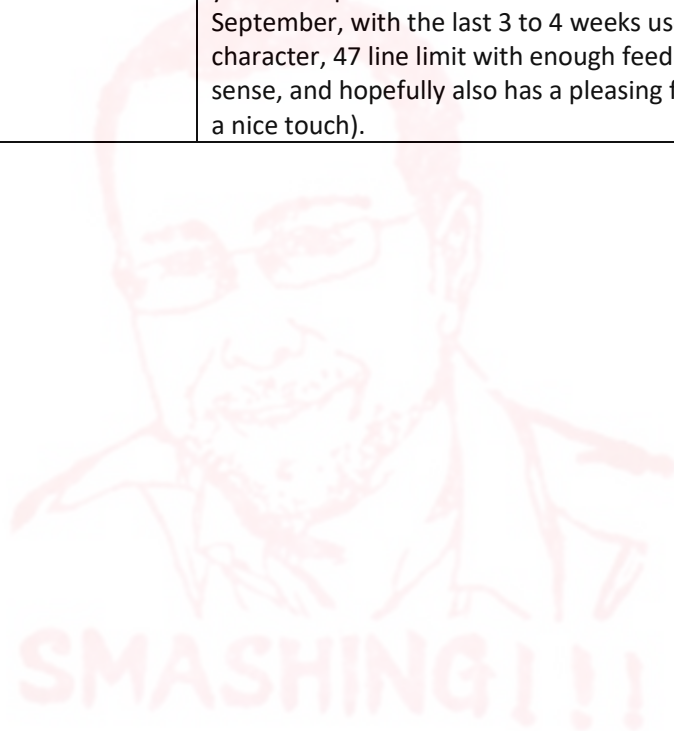
[https://www.undergraduate.study.cam.ac.uk/files/publications/super-curricular\\_suggestions.pdf](https://www.undergraduate.study.cam.ac.uk/files/publications/super-curricular_suggestions.pdf)

A general rule that can help is if the activity is easy to do, fun and/or impossible to verify, like watching a video, then it is less likely to be helpful in a personal statement. Some summer camps run by private companies for instance, but even ones that are held in the University buildings, and especially the ones where the main way of selecting their participants is centred around paying a usually large fee, are less useful, perhaps even useless. Chasing squirrels in a park or watching a nice movie would both be considerably cheaper activities, and probably deliver as much, if not more, positive value to your Oxbridge application than these kinds of expensive, challenge-free holiday-like experiences.

The kinds of activities that are more valuable, when done well, will have overlapping and reinforcing effects on your learning. Talking to your teachers about their subjects, and the harder parts of the syllabus, for instance, won't only help improve your eventual UCAS reference. And learning about academic competitions and working towards their deadlines to prepare for their tests, will also help you with your academic exams, especially the value and power of starting early to deliver your strongest performance. And learning about working to deliver a positive, productive and successful performance within predictable but sometimes challenging deadlines is the single best thing the best applicants will get out of their Oxbridge application, regardless if they get an offer or not.

Block of time	Main events	What you can do
The year before GCSEs start	Decide optional GCSE subjects What are you best at	<b>Start learning about careers</b> (how much they pay, how long do you need to train, what are the typical working hours, are you interested in the work?)
First year of GCSE	Start a more serious qualification. Learn about the power of past exam questions in delivering academic success.	<b>Learn about careers</b> – Are you still interested in that kind of work? What degrees help achieve that career? <b>Start learning about extracurricular activities</b> , participate in school, learn about what can be done outside of school. Find out how they work well, and when they don't work, or are not productive ( <b>zombie societies</b> and clubs that exist but achieve nothing). How could you show later on that you made an active and successful contribution? <b>Learn about deadlines for academic competitions</b> , some have junior or intermediate versions that are suitable for GCSE students
Summer going into final GCSE year	<b>Learning about summer activities</b>	<b>Discover summer activities</b> - what can be done, and when you need to apply. Discover how hard it is to do worthwhile things in the summer that are difficult to achieve (need very early applications, few opportunities, difficult to organise into your life). Think about how different these hard to get selected for and hard to organise activities are from the kinds of activities where the only qualification is paying the usually large fee.
Second year of GCSEs	<b>Learn about effective time management to deliver success</b> in your: <ul style="list-style-type: none"> <li>months</li> <li>weeks</li> <li>days</li> </ul> <b>Start reading one news article a week</b> in your favourite subjects	<b>Participate in academic competitions</b> , learn how to organise your time to compete as well as succeed in all of your GCSE subjects <b>Learn about the most impressive academic clubs</b> and societies in your school, what can you do to have a senior position next year. If the perfect society for you doesn't exist, create it in this year. <b>Think about which teachers could be your UCAS reference</b> and start talking to them about your subject inside and outside of lesson time, ideally about harder parts of the course and occasionally about new scientific advances. Often teachers are busy, so take the care to ask them if they are busy, or if they can talk about something you find interesting at that moment.
Summer going into AS year	Do something useful, interesting and valuable with your summer	Use your experiences trying to organise something interesting and worthwhile in your previous summer to apply better for this summer: <ol style="list-style-type: none"> <li>1. be early (start in September)</li> <li>2. learn about realistic opportunities</li> <li>3. know requirements (e.g. references, essays etc)</li> <li>4. know the deadlines</li> </ol>

Block of time	Main events	What you can do
		<p>5. learn about opportunities only available to students a year older (so you can get a head start this next year)</p> <p>This could be a good sentence or two in your personal statement, but hopefully the experiences closer to the application would be too valuable to give this experience the space. A really great personal statement will leave out many excellent achievements.</p>
First year of AS	<p><b>Academic competitions</b></p> <p><b>Extracurricular societies, clubs and activities</b></p> <p><b>Read academic books</b> recommended by Oxbridge</p>	<p><b>These experiences, especially building on previous years will deliver a complete and strong paragraph in your personal statement.</b></p> <p><b>Read 3 to 6 books</b> about your subject that are (not textbooks) about recent advances that you enjoy (and take notes on them):  <a href="https://www.ox.ac.uk/admissions/undergraduate/courses/suggested-subject-resources">https://www.ox.ac.uk/admissions/undergraduate/courses/suggested-subject-resources</a> <b>This can deliver a strong sentence</b>, or add to another paragraph in your personal statement.</p>
Summer going into AS year	Most important summer for activities and accomplishments	Participate and complete something amazing, fascinating and really hard to achieve this summer. <b>This will be a solid paragraph in your personal statement.</b>
A2 year	Apply for UCAS	Nothing much for an Oxbridge personal statement can be done in this year. Your personal statement should be essentially finished in early September, with the last 3 to 4 weeks used to fit within the 4000 character, 47 line limit with enough feedback so that it still makes sense, and hopefully also has a pleasing flow to it (less important, but a nice touch).



## Appendix: Oxbridge Reading Lists for Chemistry and Biology

For a digital version of this scan this QR code for clickable links (in e.g. MS Word app):

### Chemistry in the news – Where to learn about recent important events.

Try to read **3 interesting** and **2 useful** articles every week of A2 (or 1 of each type every week at AS):

UK – Royal Society of Chemistry Magazine (recommended by Oxford Uni):

<https://www.chemistryworld.com/news>

US – American Chemical Society Magazine:

<https://www.acs.org/education/resources/highschool/chemmatters.html>

### Science news websites

International News – Associated Press (less focused on the science of “chemistry”): <https://apnews.com/hub/chemistry>

<https://www.sciencenews.org/topic/chemistry>

Requires subscription (possibly worth it in A2):

<https://www.newscientist.com/article-topic/chemistry/>

Especially good if also interested in business and finance: <https://www.economist.com/science-and-technology>

### Oxford research in chemistry (recommended by Oxford Uni):

- [Turning orange into grapefruit](#)
- [Fuel cells inspired by nature video](#)
- [Chemistry in the garden video](#)

### Science Podcasts

NPR: Short Wave - Short (10min) episodes on a single science news topic. Very good.

NYT: Hard Fork – Weekly technology with a focus on Silicon Valley news. Outstanding.

Economist: Babbage – Weekly science podcast (subscription may be necessary) focusing on a single topic. 40minutes. Excellent

Universe Today: Fraser Crain – A focus on astronomy, cosmology, and space news. Reliably Excellent, often outstanding.

BBC: In our Time with Melvyn Bragg – Sometimes covers science, always outstanding.

New Scientist: Podcast – Science news. It can be good.

Freakonomics M.D. – Investigating the intersection of economics and medicine. Excellent.

BBC: The Infinities Monkey Cage – Panel talk show on big science topics. Often very good.

Stephen Fry’s Great Leap Years – History of science and technology. Outstanding.

BBC Discovery – “An in-depth look at the most significant ideas, discoveries and trends in science”. Often good.

BBC: History Extra Podcast – Sometimes covers the history of science or scientists, always excellent, often outstanding.

Nature Podcast – Outstanding science packaged into a relentlessly mediocre podcast.



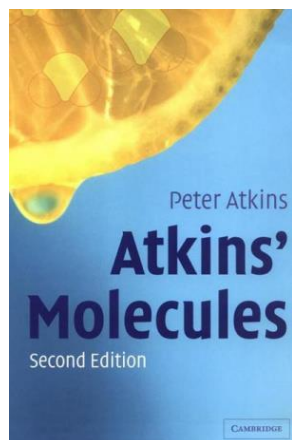


## General and Popular Chemistry Books

These books are all from this site:

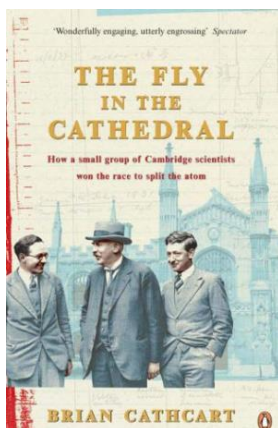
<https://www.univ.ox.ac.uk/applying-to-univ/reading-bank/?category=maths-physical-life-sciences&subcategory=chemistry>

If you click on each you can get a review by the Oxford student (their degree subject is in brackets)



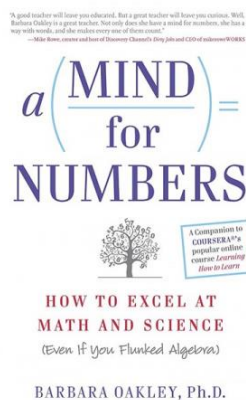
### [Atkins' Molecules](#)

By Peter Atkins



### [The Fly in the Cathedral](#)

By Brian Cathcart



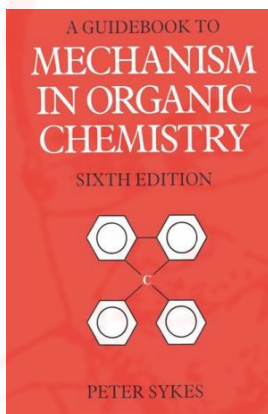
### [A Mind for Numbers](#)

By Barbara Oakley



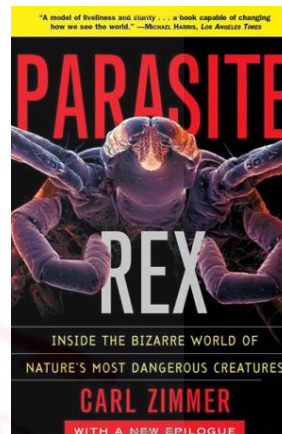
### [Chemistry Review](#)

By Hodder Education



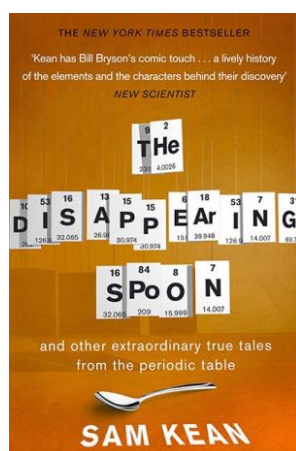
### [Guidebook to Mechanism in Organic Chemistry](#)

By Peter Sykes



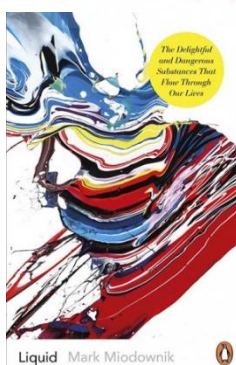
### [Parasite Rex](#)

By Carl Zimmer



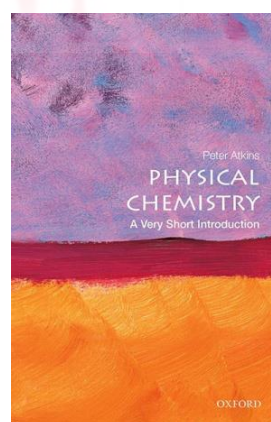
### [The Disappearing Spoon](#)

By Sam Kean



### [Liquid](#)

By Mark Miodownik

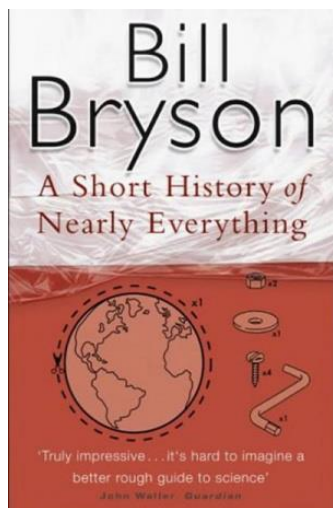


### [Physical Chemistry: A Very Short Introduction](#)

By Peter Atkins

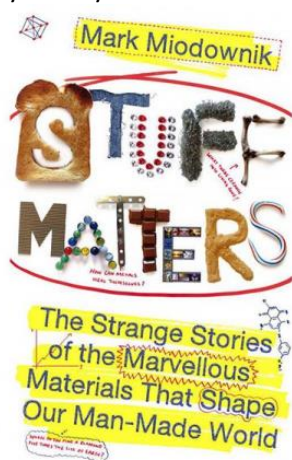






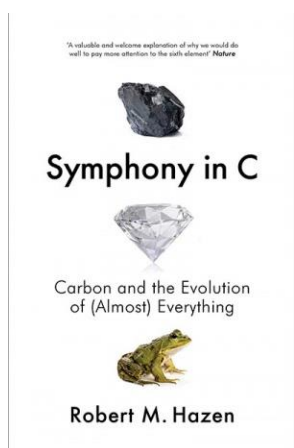
### [A Short History of Nearly Everything](#)

By Bill Bryson



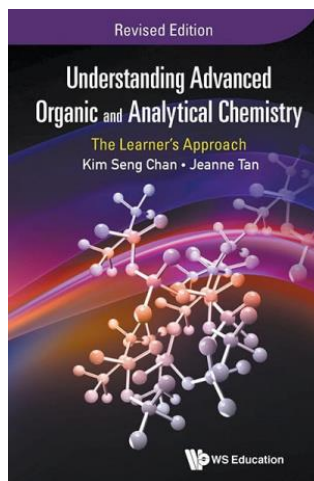
### [Stuff Matters](#)

By Mark Miodownik



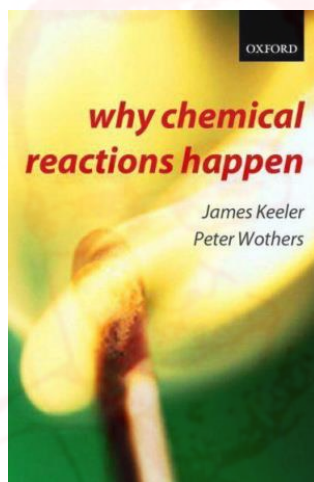
### [Symphony in C: Carbon and the Evolution of \(Almost\) Everything](#)

By Robert M Hazen



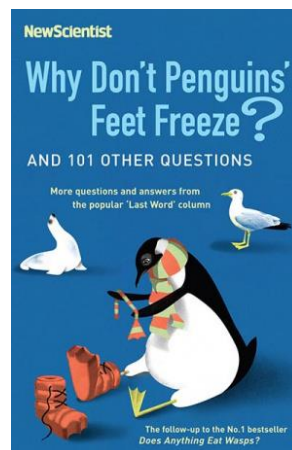
### [Understanding Advanced Organic and Analytic Chemistry](#)

By Kim Seng Chan and Jeanne Tan



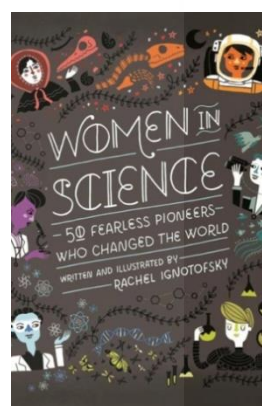
### [Why Chemical Reactions Happen](#)

By James Keeler and Peter Wothers



### [Why Don't Penguins' Feet Freeze?](#)

By New Scientist



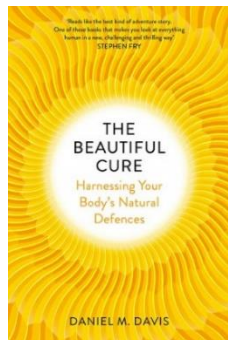
### [Women in Science](#)

By Rachel Ignotofsky

## General and Popular Biology Books

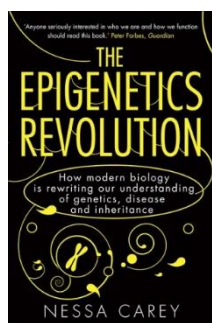
These books are all from this site: <https://www.univ.ox.ac.uk/applying-to-univ/reading-bank/?category=maths-physical-life-sciences&subcategory=biology>

If you click on each you can get a review by the Oxford student (their degree subject is in brackets)



### [The Beautiful Cure](#)

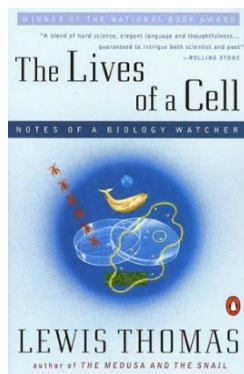
By Daniel M Davis



### [The Epigenetics Revolution](#)

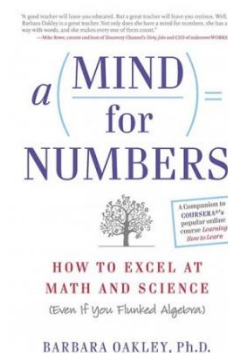
By Nessa Carey

Reviews by Katie H



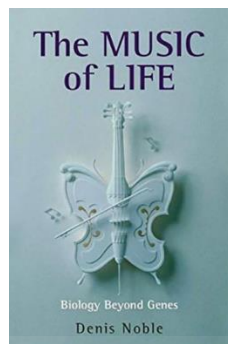
### [The Lives of a Cell](#)

By Lewis Thomas



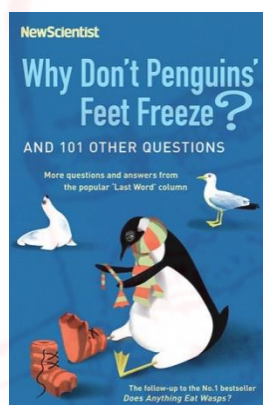
### [A Mind for Numbers](#)

By Barbara Oakley



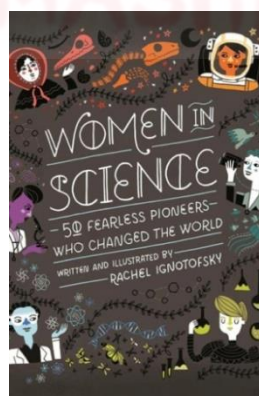
### [The Music of Life – Biology Beyond Genes](#)

By Denis Noble



### [Why Don't Penguins' Feet Freeze?](#)

By New Scientist



### [Women in Science](#)

By Rachel Ignotofsky



## Chemistry Textbooks

These books can be of help to further pursue ideas you find fascinating at A2, but you should probably try these online textbooks:

For A level chemistry: <https://www.chemguide.co.uk/>

For some A level and mainly undergraduate chemistry (also has online textbooks about other subjects):  
<https://chem.libretexts.org/>

For the Wikipedia Portal for everything chemistry: <https://en.wikipedia.org/wiki/Portal:Chemistry>

### From Oxford University (accessed 29<sup>th</sup> Aug 2023):

<https://www.ox.ac.uk/admissions/undergraduate/courses/suggested-subject-resources>

### Introductory reading for Chemistry.

\*Physical Chemistry, P W Atkins, Oxford University Press (8th edn.) 2006, [7th edn. 2001]

\* Inorganic Chemistry, Shriver and Atkins, Oxford University Press (4th edn) 2006, (previous edn., 1999]

Chemistry of the Elements, Greenwood & Earnshaw, Pergamon (2nd edn.), 1997 [1st edn. 1985]

Foundations of Organic Chemistry, Hornby & Peach, Oxford Chemistry Primer, OUP, 1996

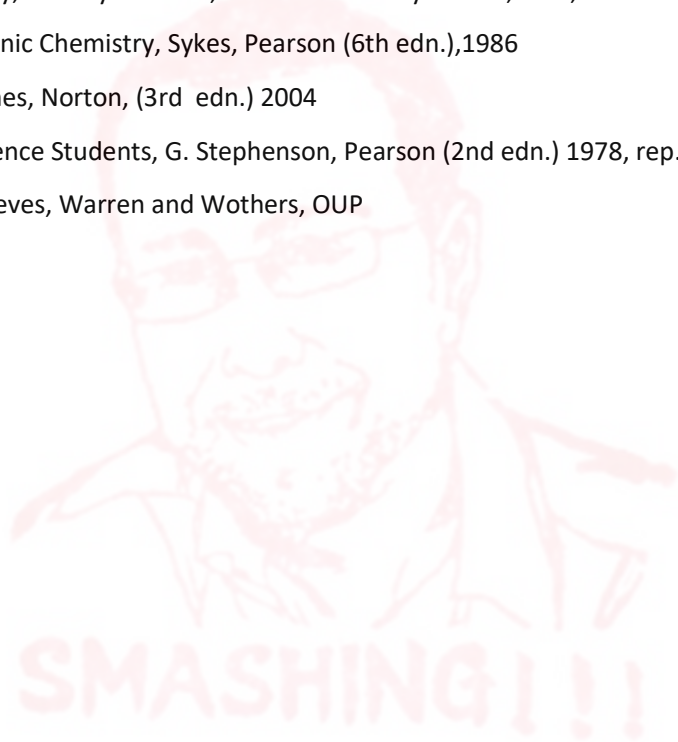
\* A Guide to Mechanism in Organic Chemistry, Sykes, Pearson (6th edn.), 1986

Organic Chemistry, Maitland, Jones, Norton, (3rd edn.) 2004

\* Mathematical Methods for Science Students, G. Stephenson, Pearson (2nd edn.) 1978, rep. 1984

Organic Chemistry, Clayden, Greeves, Warren and Wothers, OUP

\*especially useful



## Appendix: Degree subjects which require interviews

If done before you submit your UCAS application this worksheet can help you learn which universities and courses interview prospective students and what that means.

Like any exam or assessment, to excel you need to understand what is being measured or investigated in order to deliver your best performance. Filling out this completed form not only will help you prepare better, you will also feel more prepared, so less stressed. But this work you do learning about this process also can help others who are helping you succeed, like parents, guardians and teachers be better informed.

For the courses that you intend to study, complete this table for the degrees and universities you are most interested in to find out if they interview. Normally effective would be a Google search with: "[university name] interview undergraduate".

For completed versions of these tables accurate as of November 2023 see the same table filled in for some universities further along here.

University	Course name	UCAS code	Department undergraduate website	Do they interview?
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				

Now read through each webpage above for those that interview, then close your web browser and write out the key details from memory in the space below. Then go back to the website and fill in, with a different colour, the information you missed. A completed version for some course as of November 2023 follows on

University & course	Online?	Key interview details

University & course	Online?	Key interview details

Learning more about your chosen course and the best universities that offer it  
Using Admission report to better understand your potential university choices

<https://www.admissionreport.com/schools>

University & course	Admissions report information		UCAS information	
	Offer rate	Year data comes from	Required A Level Grades	GCSE requirements
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				



University	Course name	UCAS code	Department undergraduate website	Do they interview?
Birmingham	Most subjects		<a href="https://www.birmingham.ac.uk/students/ug-admissions/solution?answered=4171&amp;nodeid=4171">https://www.birmingham.ac.uk/students/ug-admissions/solution?answered=4171&amp;nodeid=4171</a>	No
Bristol	Chemistry		<a href="https://www.bristol.ac.uk/study/undergraduate/after-you-apply/interviews/chemistry/">https://www.bristol.ac.uk/study/undergraduate/after-you-apply/interviews/chemistry/</a>	Yes, & all non-standard applications
Bristol	Biology		<a href="https://www.bristol.ac.uk/study/undergraduate/after-you-apply/interviews/">https://www.bristol.ac.uk/study/undergraduate/after-you-apply/interviews/</a>	No
Cambridge	Natural Science	BCF0	<a href="https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences">https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences</a>	Yes
Durham	All courses (except Primary education)		<a href="https://www.durham.ac.uk/study/undergraduate/how-to-apply/what-happens-to-your-application/interviews-and-selection-days/">https://www.durham.ac.uk/study/undergraduate/how-to-apply/what-happens-to-your-application/interviews-and-selection-days/</a>	No
Imperial College	Chemistry	F100	<a href="https://www.imperial.ac.uk/study/courses/undergraduate/chemistry-bsc/">https://www.imperial.ac.uk/study/courses/undergraduate/chemistry-bsc/</a>	Yes
Imperial College	Biochemistry	C700	<a href="https://www.imperial.ac.uk/study/courses/undergraduate/biochemistry-bsc/">https://www.imperial.ac.uk/study/courses/undergraduate/biochemistry-bsc/</a> - "Generally, the department does not hold interviews."	No
Imperial College	Biology	C100	<a href="https://www.imperial.ac.uk/study/courses/undergraduate/biological-sciences/">https://www.imperial.ac.uk/study/courses/undergraduate/biological-sciences/</a> - "Generally, the department does not hold interviews."	No
Imperial College	Material science & engineering, MEng	JFM2	<a href="https://www.imperial.ac.uk/study/courses/undergraduate/materials-science-engineering-meng/">https://www.imperial.ac.uk/study/courses/undergraduate/materials-science-engineering-meng/</a>	Yes
Imperial College	Chemical engineering, MEng	H801	<a href="https://www.imperial.ac.uk/study/courses/undergraduate/chemical-engineering/">https://www.imperial.ac.uk/study/courses/undergraduate/chemical-engineering/</a>	Maybe
Manchester	Biology	C100	<a href="https://www.manchester.ac.uk/study/undergraduate/courses/2024/00524/bsc-biology/application-and-selection/#course-profile">https://www.manchester.ac.uk/study/undergraduate/courses/2024/00524/bsc-biology/application-and-selection/#course-profile</a> "How your application is considered Applications are considered on the basis of the UCAS form. Some candidates may be interviewed online or by telephone, or asked to complete an alternative admissions statement."	Probably not
Oxford	Chemistry, MChem	F100	<a href="https://www.chem.ox.ac.uk/admissions">https://www.chem.ox.ac.uk/admissions</a>	Yes
UCL	Chemistry	F100	<a href="https://www.ucl.ac.uk/chemistry/study-here/undergraduate">https://www.ucl.ac.uk/chemistry/study-here/undergraduate</a>	No
UCL	Pharmacy		<a href="https://www.ucl.ac.uk/prospective-students/undergraduate/how-apply/how-we-assess-your-application">https://www.ucl.ac.uk/prospective-students/undergraduate/how-apply/how-we-assess-your-application</a>	Yes
Warrick	Most subjects		<a href="https://warwick.ac.uk/study/international/admissions/help/do_all_applications_include_an_interview/">https://warwick.ac.uk/study/international/admissions/help/do_all_applications_include_an_interview/</a>	No

University & course	Online?	Key interview details
IC Chem, F100	Probably, (can't say, previously always was for international students)	<p><b>Time:</b> Morning and Afternoon (to cater to different time zones)</p> <p><b>Date:</b> Ongoing it seems, but given offers only made after all interviews are complete at the end of March, has to be before then.</p> <p><b>Purpose:</b> Assess motivation for studying chemistry and potential for the future. Also how they think and how they reason through a problem</p> <p><b>Format:</b> Individual interview with an academic</p> <p><b>Additional information:</b> Pre-recorded talk by the admissions department</p> <p><b>Add info:</b> Online Q and A sessions</p> <p><b>Add info:</b> Virtual tour of department: <a href="https://virtual-tour.imperial.ac.uk/explore/chemistry/wider-department-2?study_level=undergraduate&amp;subject_area=chemistry">https://virtual-tour.imperial.ac.uk/explore/chemistry/wider-department-2?study_level=undergraduate&amp;subject_area=chemistry</a></p> <p><b>Content assessed:</b> Personal statement initially, then could be about "unfamiliar topics"</p> <p><b>Offers:</b> only made after all interviews are complete, by email, end of March</p>
IC Material science and engineering, JFM2	Probably, (can't say, previously always was for international students)	<p><b>Time:</b> 10:30 to 15:30</p> <p><b>Date:</b> Between November and March</p> <p><b>Format:</b> Happens in a single whole "Applicant Day", which includes talks by Director of Undergraduate Studies then the Admissions Tutor</p> <p><b>Content 1 to 1 interview:</b> with a lecturer for 30minute. "We aim for the interview to be more of a conversation.", so perhaps about the personal statement?</p> <p><b>Content group task:</b> a 45minute engineering based problem solving challenge working in a team. <b>[Not on the website]</b> but previous years students have given a topic, like "What is the material of the future?" 24hours in advance and then required to deliver a 90second introduction to a material you have researched, with the group time also used to explore your research and understanding of your chosen material].</p> <p><b>Content Q&amp;A:</b> With current student ambassadors for 60minutes.</p> <p>Most international students, including Chinese nationals, need to get an ATAS certificate to get student visa</p>
UCL Chem, F100		<p>Not on this list (therefore does not use interviews for this course): <a href="https://www.ucl.ac.uk/prospective-students/undergraduate/how-apply/how-we-assess-your-application">https://www.ucl.ac.uk/prospective-students/undergraduate/how-apply/how-we-assess-your-application</a></p> <p>Use "gathered field" approach to assess UCAS applications: "All applications submitted by 6pm UK time on 25 January 2023 are given equal consideration."</p> <p>They then say:</p> <p>"Gathered fields - A gathered field allows us to assess all applications in the same fair and consistent manner, whether they are received in October or January (by the UCAS deadline). This means we will need to wait until we have enough comparable applications to make a final decision."</p> <p>What is logically possible from these statement:</p> <ol style="list-style-type: none"> <li>1. They clearly want it known that they believe equal consideration is given to any applicant delivered at any time before the UCAS deadline.</li> <li>2. The final decision will be delivered after they have "enough comparable applications", <b>which can be before the UCAS deadline.</b></li> </ol>
IC, Chem Eng, MEng H801	Probably	<p>This was accessed on 31<sup>st</sup> October 2023:</p> <p>"Interview days</p> <p>The Department plans to hold interview days as part of the selection process. Check back soon for more information."</p>
Oxford	Probably, did in 2023, but may have changed since	<p>[Like Cambridge,] use interviews to see if students are suited to the <b>small class tutorial</b> structure of their undergraduate course [no other university uses it].</p> <p>Shortlisting: At least 2 interviews at their first-assigned college (could also be interviewed by their second-assigned college, or other colleges).</p> <p><b>Best 10,000 applicants</b> are invited for interview <b>for 3,300 places</b> (total 22,000 applicants; most do not get an interview)</p> <ul style="list-style-type: none"> <li>• Middle November to early December interview notices emailed</li> <li>• Early to mi-December interviews carried out</li> <li>• Candidates interviewed by a different college finish in mid-December, soon after initial interviews (none of Cambridge's perplexing "Winter Pool" business)</li> </ul>

		<p><b>Shortlisting:</b> At least 2 interviews at their first-assigned college (could also be interviewed by their second-assigned college, or other colleges)</p> <p><b>Content of interview</b></p> <ul style="list-style-type: none"> <li>• First, about personal statement or why you chose that course</li> <li>• Subject specific, including about a text, graph, object [e.g. image]</li> <li>• Can also include content about your current A Levels</li> <li>• Can also include what you have read around the subject and your interests beyond syllabus</li> </ul> <p><b>If you don't know the answer:</b></p> <ul style="list-style-type: none"> <li>• Exploring your thought process [by speaking your thoughts] will interest them [but they may not only be interested in ways you succeeded at interview]</li> <li>• Apply logic and reason to the question</li> <li>• Tell them if you have not covered it yet, but remain enthusiastic about wanting to find the answer [don't use that stamen "I've not covered that yet" as the solution, or the reason you don't have to be interested in the idea; if it is not from A Level, then they may be assessing your general interest in the subject]</li> <li>• Evidence of your ability to think about an idea differently could be what the examiner is trying to uncover. So, eagerness, intellectual flexibility and a capacity to bear being stretched while solving a problem allows them to assess your potential</li> <li>• Finally "just be yourself", advice that will be interpreted wildly differently by different demographics. If everyone in your life has a competitive, professional highly educated background, than this could mean "display your best self, and avoid highlighting your faults". It highlights the profound tension that exists in everything that they write about this selection process, they are likely aiming for it to come across as a merit based, fair, rigidly logical process that is highly successful at selecting the very best students, regardless of their background. Saying you should "just be yourself" is like saying "be honest" which is an ideal that we all should aspire towards, but it is a striking thread they are pulling on.</li> </ul> <p><a href="https://www.ox.ac.uk/admissions/undergraduate/applying-to-oxford/guide/interviews">https://www.ox.ac.uk/admissions/undergraduate/applying-to-oxford/guide/interviews</a></p>
Cambridge	Probably, did in 2023, but may have changed since	<ul style="list-style-type: none"> <li>• Invitations for interview in November.</li> <li>• Interviews in December.</li> <li>• Potential additional interview in early January (Winter Pool).</li> </ul> <p>All students with an offer have an interview. 35-50minutes total interview time Most applicants offered an interview, number of interviews (usually 1 or 2) not connected with chances of offer. Normally get at least one subject specific interview, essentially an exam in spoken form. Some questions you are not expected to know the answer to, but to use the information provided to work it out in the moment.</p> <p><b>Content assessed:</b></p> <ul style="list-style-type: none"> <li>• Personal statement</li> <li>• Using existing knowledge to solve unknown problems</li> <li>• News in your subject</li> </ul> <p><b>General academic interview content assessed:</b></p> <ul style="list-style-type: none"> <li>• Personal statement</li> <li>• Why Cambridge, why [your subject]</li> <li>• Other academic interests or work</li> <li>• Your plans after your degree</li> </ul> <p><a href="https://www.undergraduate.study.cam.ac.uk/apply/after/cambridge-interviews">https://www.undergraduate.study.cam.ac.uk/apply/after/cambridge-interviews</a></p>

## Appendix: Science subjects that require an entrance exam

### Imperial College<sup>54</sup> Science Subjects Entrance Exams

Unlike Oxford or Cambridge, there is an opportunity to take the test at the start of January

#### Test format

The ESAT is a computer-based assessment. It is made up of individual multiple-choice modules lasting 40 minutes each. You will sit these back-to-back on the day of the test.

Mathematics 1 is compulsory for all candidates.

The remaining modules will depend on the Imperial course you are applying to.

In most cases, you will complete two additional multiple-choice modules, making the test 120 minutes in total. For the Dyson School of Design Engineering you will only be required to complete one additional module, which is Mathematics 2. Details of which modules to select for each Imperial department can be found in the table below:

Department	Test	Module 1	Module 2	Module 3
Aeronautics	ESAT	Mathematics 1	Physics	Mathematics 2
Chemical Engineering	ESAT	Mathematics 1	Chemistry	Mathematics 2
Civil and Environmental Engineering	ESAT	Mathematics 1	Physics	Mathematics 2
Dyson School of Design Engineering	ESAT	Mathematics 1	Mathematics 2	N/A
Electrical and Electronic Engineering	ESAT	Mathematics 1	Physics	Mathematics 2
Mechanical Engineering	ESAT	Mathematics 1	Physics	Mathematics 2
Physics	ESAT	Mathematics 1	Physics	Mathematics 2

There is no pass or fail for ESAT. You should aim to do the best you can.

Your final scores are based on the number of correct answers you give. You do not lose marks for wrong answers, so it's worth attempting all questions.

#### Test dates

You must register and book a time slot in advance of the test taking place.

You can choose whether you sit the test in October or January.

- **Test sitting 1:** 15 and 16 October 2024; or
- **Test sitting 2:** 7 and 8 January 2025.

We will only accept the results from your first test sitting per admissions cycle (even if you sit the test twice), so you should aim to do the best you can.

There is no advantage to sitting the test in the first or second sitting. However, we strongly encourage you to register for test sitting 1, where possible, to have access to the widest choice of time slots in your chosen location.

### University of Cambridge<sup>55</sup> Science Subjects Entrance Exams

Natural Sciences (Physical Sciences) and the Natural Sciences (Biological Sciences): require the ESAT.

For Chemical Engineering and Biotechnology, BA (Hons) and Meng: require the ESAT.

<sup>54</sup> <https://www.imperial.ac.uk/study/apply/undergraduate/process/admissions-tests/esat/>

<sup>55</sup> <https://www.undergraduate.study.cam.ac.uk/courses/natural-sciences-ba-hons-msci>  
[www.SmashingScience.org](http://www.SmashingScience.org)



Psychological and Behavioural Sciences, BA (Hons): “There is an admission assessment at some Colleges for this course. You do not need to register in advance. Check the [College admission assessments page](#) for more information. ...Applicants to some Colleges are required to submit written work prior to interview.”<sup>56</sup>

Medicine, MB and Bchir<sup>57</sup>: “You will need to take the [University Clinical Aptitude Test](#).”

## University of Oxford<sup>58</sup> Science Subjects Entrance Exams

<p>Which course are you applying for?</p> <p>Biology</p> <p>Test(s) required</p> <p>There is no admissions test for your chosen course.</p>	<p>Which course are you applying for?</p> <p>Biomedical Sciences</p> <p>Test(s) required</p> <p><a href="#">Biomedical Sciences Admissions Test</a></p>
<p>Which course are you applying for?</p> <p>Chemistry</p> <p>Test(s) required</p> <p>There is no admissions test for your chosen course.</p>	<p>Which course are you applying for?</p> <p>Computer Science</p> <p>Test(s) required</p> <p><a href="#">MAT (Mathematics Admissions Test)</a></p>
<p>Which course are you applying for?</p> <p>Engineering Science</p> <p>Test(s) required</p> <p><a href="#">PAT (Physics Admissions Test)</a></p>	<p>Which course are you applying for?</p> <p>Materials Science</p> <p>Test(s) required</p> <p><a href="#">PAT (Physics Admissions Test)</a></p>
<p>Which course are you applying for?</p> <p>Medicine</p> <p>Test(s) required</p> <p><a href="#">UCAT (University Clinical Aptitude Test)</a></p>	<p>Which course are you applying for?</p> <p>Medicine (graduate entry)</p> <p>Test(s) required</p> <p><a href="#">UCAT (University Clinical Aptitude Test)</a></p>
<p>Which course are you applying for?</p> <p>Physics</p> <p>Test(s) required</p> <p><a href="#">PAT (Physics Admissions Test)</a></p>	<p>Which course are you applying for?</p> <p>Physics and Philosophy</p> <p>Test(s) required</p> <p><a href="#">PAT (Physics Admissions Test)</a></p>
<p>Which course are you applying for?</p> <p>Psychology (Experimental)</p> <p>Test(s) required</p> <p><a href="#">TSA (Thinking Skills Assessment)</a></p>	<p>Which course are you applying for?</p> <p>Psychology, Philosophy and Linguistics</p> <p>Test(s) required</p> <p><a href="#">TSA (Thinking Skills Assessment)</a></p>

<sup>56</sup> <https://www.undergraduate.study.cam.ac.uk/courses/psychological-behavioural-sciences-ba-hons>

<sup>57</sup> <https://www.undergraduate.study.cam.ac.uk/courses/medicine-mb-bchir>

<sup>58</sup> <https://www.ox.ac.uk/admissions/undergraduate/applying-to-oxford/guide/admissions-tests>





## Appendix: Goal setting and introducing yourself at A2

Please complete this brief introduction to yourself and your background and what you hope to study later on and why.

Name, English and Chinese (in pinyin): \_\_\_\_\_ Class: \_\_\_\_\_

Intending to apply to (circle): Cambridge/Oxford Yes/No

Intending to apply for medicine? Yes/No

Have you finished your Personal Statement? Yes/No

Are you interested in tutoring AS students (chem OR biology)? Yes/No

Email address: \_\_\_\_\_

Subject	IGCSE Grade	AS Grade	AS %	A2 Target grade

### What do you want to do after high school?

- What kinds of subjects might you be interested in studying at university?
- Which universities are you hoping to go to?
- What type of career, or profession, are you hoping to do after that university degree?

Rank possible subjects you might study and include what kind of career you might hope it could lead to, as well as the universities you are interested in (1 = 1<sup>st</sup> choice, your favourite, 5 = 5<sup>th</sup> choice, least favourite):

Number	Degree subject	Country	University	Career
1		UK		
2		UK		
3		UK		
4		UK		
5		UK		

## Achievements, goals and interests

What are your interests outside of the classroom?

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Which competitions/awards have you got (e.g. International Chemistry/Maths/Physics Olympiad etc)

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Which competitions/awards do you intend to do, and date you will get the result

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Which activities (at school or outside of school, like music or sport) have you done before?

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---

What career would you like (if you are not sure yet, what careers might you be interested in?)

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---

What are your targets (what do you hope to achieve or find out about) for the first few weeks of term?

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Academic Targets for this term (and what you will do to achieve them):

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What are the last 3 good books you have read?

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Can you think of anything that has happened in science recently in the news that you thought was amazing?

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## Appendix: Organising your interview preparation

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### Goals for this kind of preparation for your interview

1. Be able to speak better about what you know and how you solve problems (including stronger grasp and easier use of technical language).
2. Learn more facts about your subject.
3. To understand how different parts of the subject relate to each other (understand and analyse what you know).
4. Grow your confidence thinking and speaking at the highest level in your subject at your age.
5. Learn to use your notetaking skills to learn about things that are not directly related to a lesson.

There are three main sources for finding out about your interview: the university website, the academic department website and the college you are applying to website.

### Your university website:

<https://www.ox.ac.uk/admissions/undergraduate/applying-to-oxford/guide/interviews>

<https://www.undergraduate.study.cam.ac.uk/apply/after/cambridge-interviews>

Describe the additional information given here:

**Your notes:** \_\_\_\_\_

Describe and explain how you could use this extra information to better lead your interview preparation:

**Your notes:** \_\_\_\_\_

### Your department website

Cambridge Natural Science – No information I can find for the interview process (searched 9/11/23), so you could use the Oxford Chemistry Department

<https://www.chem.ox.ac.uk/admissions>

Describe the additional information given here:

**Your notes:** \_\_\_\_\_

Describe and explain how you could use this extra information to better lead your interview preparation:

**Your notes:** \_\_\_\_\_

### Your college website

URL:

Describe the additional information given here:

**Your notes:** \_\_\_\_\_

Describe and explain how you could use this extra information to better lead your interview preparation:

**Your notes:** \_\_\_\_\_

## Organising your preparations and research for your interview

Add here your notes to yourself about the things that your chosen university has stated that you think are important to improving your performance in the interview process. You can start this process by answering these questions.

Time (when is it?):

Important dates:

1. When are you notified you have one:

**Your answer:**

2. When is it likely to be:

**Your answer:**

3. When do you get the result:

**Your answer:**

Their stated purposes for interviewing (how do they explain this?):

**Your answer:**

Their actual purposes for interviewing (if different):

**Your answer:**

Your purposes for this process:

**Your answer:**

Format of interview:

**Your answer:**

Additional information:

**Your answer:**

Content assessed in the interview process:

**Your answer:**

What questions to they say you need to be prepared for?

**Your answer:**

Describe and explain what you know about “winter pool”, (what is it, why does it exist, how could it help you etc.):

**Your answer:**

Add info: Online Q and A sessions with current student ambassadors (ask at least 3!):

Your Questions	Their answers
1. E.g. What helped you most when you were preparing for your interview?	
2.	
3.	
4.	
5.	
6.	

Things you have gained and learned by taking the virtual tours (if available) of:

1. Department:

Your notes: \_\_\_\_\_

2. College:

Your notes: \_\_\_\_\_

3. University:

Your notes: \_\_\_\_\_

## Organising your research about the college you are applying for

College you are applying for:

Does selecting your college through “open applications” affect their expectations about how much they think you should prepare?

Your answer: \_\_\_\_\_

What are the reasons for choosing a college (see here)?

<https://www.undergraduate.study.cam.ac.uk/choosing-your-college>

<https://www.ox.ac.uk/admissions/undergraduate/colleges/do-you-choose-a-college>

Your answer: \_\_\_\_\_

What reasons should not use when choosing a college?

Your answer: \_\_\_\_\_

How do they describe themselves?

Your answer: \_\_\_\_\_

How do they describe their strengths?

Your answer: \_\_\_\_\_

How do they see themselves as different to other colleges?

Your answer: \_\_\_\_\_

How are they the same as others?

Your answer: \_\_\_\_\_

Now with all of this research try to answer these questions as fully as you can:

*What skills, attributes and attitudes do you think they are more interested in seeing in their successful applicants?*

Your answer: \_\_\_\_\_

*What skills, attributes and attitudes will they be selecting against?*

Your answer: \_\_\_\_\_



## Organising your revision and learning program for your interview

In addition to general revision of ALL AS Level material, you should also be learning about A2 and slightly beyond material in the subject you are applying for.

Try to select a more junior academic from your college's staff directory, they might be more likely to be involved in the interviewing process. If you are splendidly lucky, you will have researched their work before you find out that they are interviewing you. If not, you have developed and expanded on your research skills which will allow you to more effectively and efficiently research whoever becomes your interviewer.

You are not aiming to be able to answer their hardest questions, rather you are using this interview experience to expand your science learning to A2 level and even beyond. You will also be growing your confidence levels in science.

It may be possible in some circumstances to do this process in conjunction with the teachers and or university advisor who are helping you with your UCAS application, so talk to them and ask them if they think it would be a good fit for how they prefer to coach students.

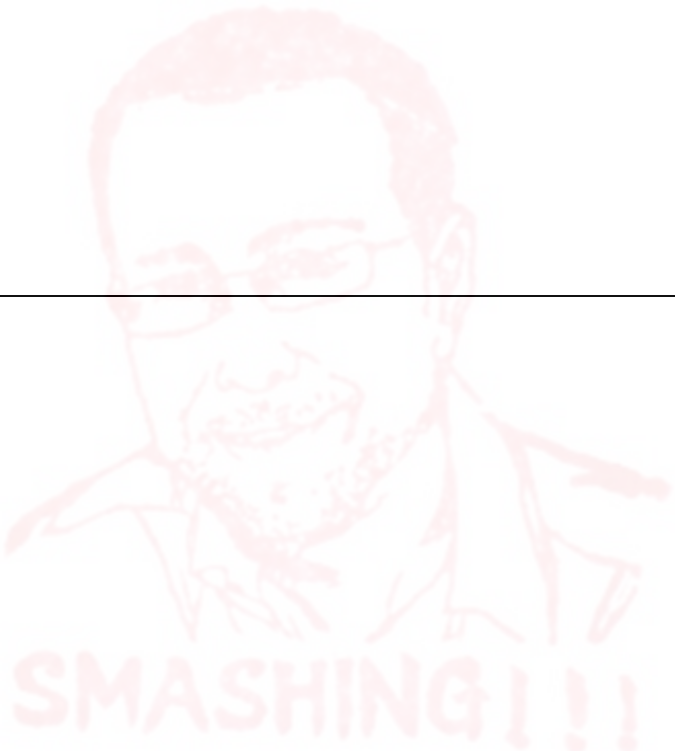
This will allow you to practice speaking what you know, as well as to help embed and consolidate your learning so that you understand it in a deeper way and are more likely to remember it for longer. This, in fact, is very much what the Oxbridge small group tutoring approach to university education is about. A major reason for the interview itself is to assess how well you would learn in a system like this, so while you are improving your ability to demonstrate your passion and understanding for your subject, you are also developing essential tutorial skills that the interviewers are strongly selecting for.


Longer term, this structured and highly organised approach to revision, learning and preparation will help you make the most competitive applications in your future, for instance, for your dream job one day.

If you find you have more time, it is better to go more deeply into one of these research projects, so learn more and better about a single topic, than to simply copy and past words into the table. You will be asked questions about this, after all, so successful work here should be measured in how well you talk about this science and answer questions, rather than how much text you pour into these tables.

Try to write in pen, or in electronic pen, it leaves a deeper impression on the brain and you can show yourself, and possibly your teacher how seriously and how hard you are working.

Name of college fellow	
Position	
Their college webpage	
Their lab's website	
Your notes about their work (3 most accessible areas)	
Most suitable area to learn more about, both at A2 and slightly beyond	
A2 CAIE Syllabus Topic name and number	

<p>A2 Summary notes on the hardest parts of this in the syllabus (2-3 paragraphs of your own writing)</p>	
<p>Notes on research, e.g. from <a href="#">LibreText</a> and Wikipedia website going a little beyond the A2 syllabus (2-3 paragraphs of describing and explaining with your own words)</p>	

Name of college fellow	
Position	
Their college webpage	
Their lab's website	
Your notes about their work (3 most accessible areas)	
Most suitable area to learn more about, both at A2 and slightly beyond	
A2 CAIE Syllabus Topic name and number	
A2 Summary notes on the hardest parts of this in the syllabus (2-3 paragraphs of your own writing)	
Notes on research, e.g. from <a href="https://libretext.org/">LibreText</a> and Wikipedia website going a little beyond the A2 syllabus (2-3 paragraphs of describing and explaining with your own words)	

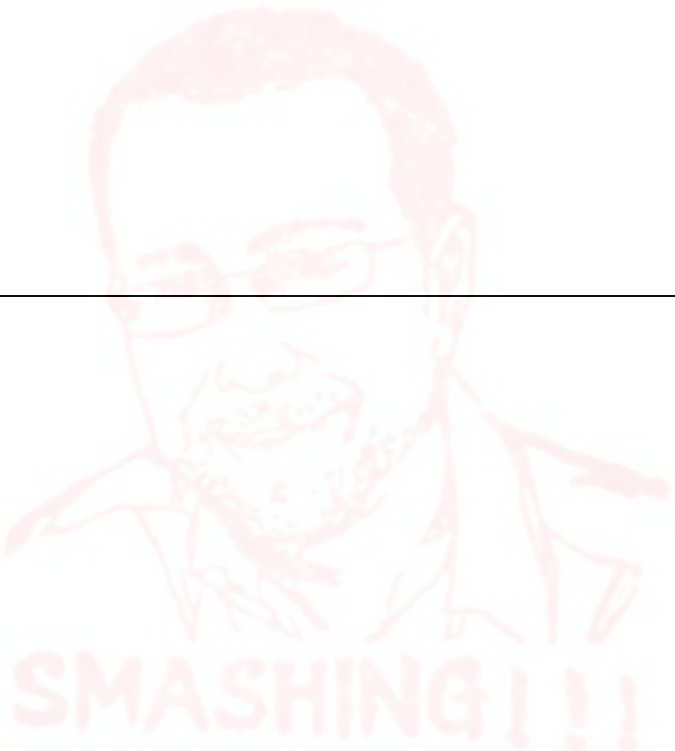
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Name of college fellow	
Position	
Their college webpage	
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Their lab's website	
Your notes about their work (3 most accessible areas)	
Most suitable area to learn more about, both at A2 and slightly beyond	
A2 CAIE Syllabus Topic name and number	



<p>A2 Summary notes on the hardest parts of this in the syllabus (2-3 paragraphs of your own writing)</p>	
<p>Notes on research, e.g. from <a href="#">LibreText</a> and Wikipedia website going a little beyond the A2 syllabus (2-3 paragraphs of describing and explaining with your own words)</p>	

Name of college fellow	
Position	
Their college webpage	
Their lab's website	
Your notes about their work (3 most accessible areas)	
Most suitable area to learn more about, both at A2 and slightly beyond	
A2 CAIE Syllabus Topic name and number	
A2 Summary notes on the hardest parts of this in the syllabus (2-3 paragraphs of your own writing)	
Notes on research, e.g. from <a href="https://libretext.org/">LibreText</a> and Wikipedia website going a little beyond the A2 syllabus (2-3 paragraphs of describing and explaining with your own words)	

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## Appendix Mock Interview Feedback Form

This is one example of a kind of feedback form that you might get after a mock interview. It can help you by highlighting areas where you can improve, and what you could do to become better at this skill. Ticks in the *Interview skill/ability* box indicate a proven example of that skill in that interview, if the Yes is circled in the *Do you need to improve?* box you can think about the things suggested in the *What you can do to improve this skill*.

*General interview kinds of skills are in italics and highlighted in grey* (address the most predictable questions), **academic abilities are in bold** (usually more commonly tested in interviews). If the **skill can be tested by both types of interviews question it is both grey and bold**.

Student name:

Type of interview: Academic/General

Universities interested in:

Course:

### Areas to improve:

Interview skill/ability	What you can do to improve this skill	Do you need to improve?
<i>Understanding of course structure</i>	<i>Find out essential details about your course from the university website.</i>	Yes
<i>Ability to explain well why you applied to Oxford/Cambridge/Imperial</i>	<i>Make sure your answers to predictable questions often asked are filled with details of things you have learnt; these will demonstrate that you are an enthusiastic student that wants to find answers because of your curiosity. You are interested in finding out how and why things work.</i>	Yes
<i>Ability to explain why you chose your college</i>	<i>Find out details about a science researcher and learn about how that relates.</i>	Yes
<i>Ability to explain why you chose your subject at university</i>	<i>This is an excellent opportunity to explain through the details you provide that you are curious about the subject and knowledgeable. A strong personal answer could even deliver a demonstration of your excitement about your subject.</i>	Yes
<b>Ability to display outside reading</b>	<b>Some questions, like why Cambridge/Chemistry are easier to show this than others.</b>	Yes
<b>Curiosity in science</b>	<b>Questions where you do not know the answer are straightforward to display your curiosity, but it is a really difficult skill to show, especially if it isn't really there. But you can build your curiosity through hard work and commitment, but it takes time and a great deal of passion for excellence to grow, but perhaps the most valuable skill to have at university.</b>	Yes
<b>Ability to answer the question asked, and not talk about not relevant</b>	<b>Think carefully before you answer, and never pretend you have misunderstood the question. At best, you are wasting your own interview time, at worst you are demonstrating an ability to be dishonest.</b>	Yes
<b>Ability to demonstrate a quick honesty when you don't know the answer</b>	<b>Think about the question and if you discover you don't have the answer, your next thing you need to help deliver the answer is to ask for help. If you waste time thinking about something with almost no chance of success you are demonstrating an inability to work effectively with ideas you are unfamiliar with. This is at the core of what these interviews are trying to find out about you.</b>	Yes



<b>Interview skill/ability</b>	<b>What you can do to improve this skill</b>	<b>Do you need to improve?</b>
<b>Confidence</b>	Strong, consistent success at A level can help, but so too will talking to others effectively. Confidence is all about knowing your limits and working within them. Arrogance is the opposite, not knowing your limits and working beyond them. Being good at AS level compared to others in your school is very different from being a strong Oxbridge candidate.	Yes
<b>Strong English listening skills</b>	Talk to your teachers in English about their subject, often and regularly. Talk to your friends and classmates in English about your favourite subjects, often and regularly.	Yes
<b>Strong English-speaking skills</b>	Talk to your teachers in English about their subject, often and regularly. Talk to your friends and classmates in English about your favourite subjects, often and regularly.	Yes
<b>Waiting before you start to talk to think through the structure of your answer</b>	Record yourself speaking your answer to a 3- or 4-mark exam question (either Paper 2 or even Paper 4), ideally without writing down anything. You can start with easier 1-mark questions. If it is a calculations question, you should also write out our answer.	Yes
<b>Speaking out loud what you are thinking when you start answering a question</b>	Mock interview practice is especially useful for this.	Yes
<b>Ability to ask for help early and interact effectively with hints</b>	Asking for help allows you to demonstrate a quickness and clarity of thought, and asking well for hints shows you can learn in the tutorial system which Oxbridge uses to teach undergraduates.	Yes
<b>Ability to display strong command of subject syllabus knowledge</b>	Sit your A2 exams in November (or at least plan and prepare to) and do the work necessary to get a strong A* at least in the subject you are applying to university for.	Yes
<b>Ability to talk about larger and more complex science ideas effectively and in English</b>	Talk to your teachers in English about their subject, often and regularly. Talk to your friends and classmates in English about your favourite subjects, often and regularly.	Yes
<b>Understanding of the scientific method</b>	Papes 3 and 5 (any science A Level) can help.	Yes
<b>Ease and accuracy of use of technical terms</b>	When you are talking with your teachers and friends, try to introduce 2 or 3 new technical terms into a conversation. Plan this before your conversation.	Yes
<b>Ability to learn new information in the interview</b>	This is a skill connected to learning, confidence and experience. A large amount of experience talking with knowledgeable people about things you are less knowledgeable can help. A wide and deep outside interest (curiosity) in your subject, for instance always and often watching excellent documentaries your whole life.	Yes



## Appendix: Organising your best reference

Your reference will be about you and should include the best things you have done. It is vital that you help whoever is writing your reference write the best possible one they can.

In addition to giving them your personal statement answers to some or all of these questions will help!

Some of these questions you can also ask yourself at the start of your AS year, **and before you write your personal statement**, if you struggle to answer them well, then **GET ACTIVE** and do the things needed to allow you to answer them well!

Try to answer these questions as well as you can, with as much detail as possible. This form will help make all of the extra things you have done inside and outside of school help make your university application even better!

Name, English and Chinese (in pinyin): \_\_\_\_\_ Class: \_\_\_\_\_

Email address: \_\_\_\_\_

Which subject is writing your references (usually the subject you are applying for at degree level): \_\_\_\_\_

Which teacher is writing it? \_\_\_\_\_ Have you spoken to them about this? Yes/No

### Getting to know your Choices.

1. **Where** do you want to study?  
Answer: \_\_\_\_\_
2. **What:** first choice subject?  
Answer: \_\_\_\_\_
3. Second and third choice subjects (if any)?  
Answer: \_\_\_\_\_
4. What do you **like** most about that subject?  
Answer: \_\_\_\_\_
5. What has happened that you find interesting in this field? (What's been in the news?)  
Answer: \_\_\_\_\_
6. Top 3 ideas for a career?  
Answer: \_\_\_\_\_
7. Why do you want to pursue your top career choices?  
Answer: \_\_\_\_\_

### Getting to know your Interests

8. What have you done, seen, experienced that makes you more interested in this subject choice?  
Answer: \_\_\_\_\_
9. What do you **like most** about studying this subject at A Level?  
Answer: \_\_\_\_\_
10. What do you find most **interesting** about this subject and why?  
Answer: \_\_\_\_\_

11. What was the **last interesting** conversation you had with your teacher in your subject of interest?  
Answer:
12. What was the **most interesting** conversation you had with you teacher in your subject of interest?  
Answer:
13. How often do you talk about this subject with your friends?  
Answer:
14. What are the top 3 **biggest ideas** you have encountered?  
Answer:
15. What are the **3 most important** ideas to you that you have ever thought about?  
Answer:
16. What are your 3 favourite books you have read?  
Answer:
17. What are the 3 most important books to your development of your mind, that have had the biggest impact on how you think that you have read?  
Answer:

## Getting to know your Achievements

18. What achievements do you have within the school? (e.g. helping out with school events, promoting the school, mentoring students, participating in events like maths day etc.).  
Answer:
19. Are you a member of any societies?  
Answer:
20. Have you lead any societies? How?  
Answer:
21. Have you achieved anything important with any society that you worked really hard at and are really proud of?  
Answer:
22. What after school events, like plays or sports competitions have you participated in? What did you learn from those experiences?  
Answer:
23. What are the top 3 reasons for going to or experiences you want to get out of your time at university?  
Answer:
24. When you imagine yourself after succeeding at university, how are you different? How are you the same?  
Answer:
25. What are the 3 things you are most proud about yourself?  
Answer:

Name:

Class:

Date:

## Achievements

Include anything like academics/school involvements, school productions, music performances, extracurricular activities: summer school, research project, school clubs, internship, community service, sports, skills, hobbies. Rank them according to how important you think they are (1=most important, 5 least important).

Your Rank	Grade	Hour/week	Week/year	Activity Type	Year/Break	Organization Name	Position	Activity Description
1	11	21	4	Academic	Summer break	Summer school with topic ****	Participant	<p>Took lessons in *** taught by ***.</p> <p>Made 2 projects: *** &amp; ***, which I presented to a group of 30 students and teachers at the end of the course.</p> <p>Achievements/what you took away from it: Worked as a team to learn about a topic beyond the syllabus for 3 weeks at a university in a city that I do not live in. Learnt the importance of effective and timely communication when working towards a deadline in a group setting with highly competitive people.</p>



Your Rank	Grade	Hour/ week	Week /year	Activity Type	Year/ Break	Organization Name	Position	Activity Description

## Competitions and Awards

Rank	Grade Level	Year	Honor Title	Awards	Level(s) of recognition	Additional notes
1	10	2020	UKMT Senior Mathematical Challenge	Merit	National	



## Getting to know what you think about yourself

Be sure to give concrete examples to back up more general statements. Specificity is very important in a letter of recommendation.

And be as positive about yourself as possible!

### Intellectual ability

Think about: overall intelligence, analytical skills, creativity, academic record, retention of information.

Answer:

### Performance in class

Think about depth and breadth of knowledge, grade results, ability to analyze and apply what you have learnt

Answer:

### Communication skills

Writing skills (what did you write?), spoken skills, e.g. in presentations given

Answer:

### Self-discipline

To what extent are you persistent, efficient and motivated? Are you able to work independently?

Answer:

### Personal qualities

Industry, self-discipline, motivation, maturity, initiative, flexibility, leadership qualities, team working skills, perseverance, energy, competitiveness, etc.

Answer:

### Most important strengths and weaknesses

What do you expect to achieve at university. What things are you excited about doing whilst there?

Answer:

### Any other things that make you stand out

Anything that is unique, important and good

Answer:



## Getting to know your education history:

When did you come to High School?

Answer:

What's your primary and secondary school? Are they international schools or domestic schools?

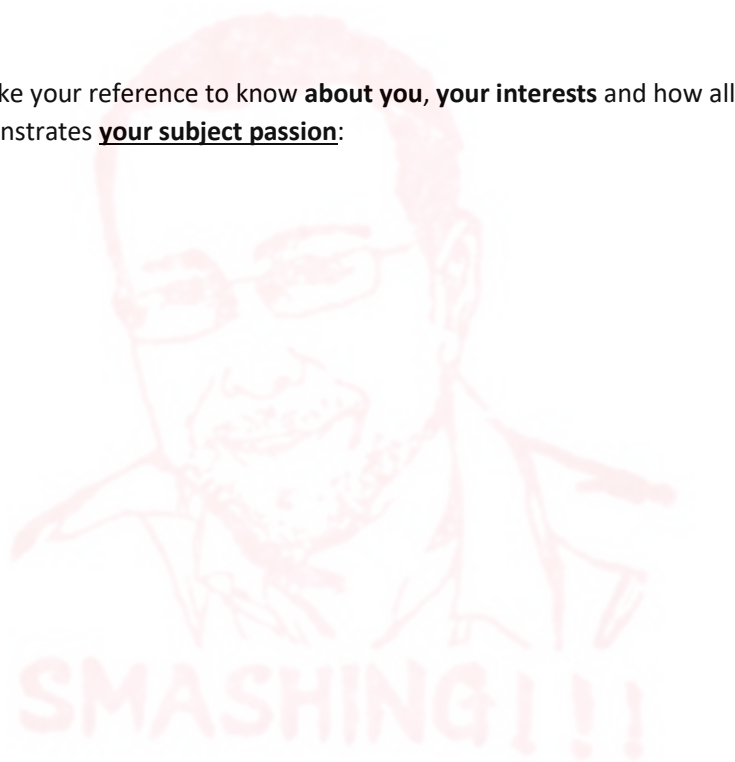
Answer:

When did you decide to study abroad?

Answer:

## Final opportunity

Further information you would like your reference to know **about you, your interests** and how all of this relates to **things you have done** that demonstrates **your subject passion**:



## Getting to know what is on your UCAS form:

Intended degree subjects:

Number	Degree subject	Country	University
1		UK	
2		UK	
3		UK	
4		UK	
5		UK	

## Grades

For the final column “Confirmed?”, write yes if you have spoken to the teacher who is responsible for making that prediction and they are 100% sure they will give you that prediction.

Subject	iGCSE Grade	AS Grade	AS %	A2 Target grade	Predicted A Level grade	100% Confirmed?

If any of your predictions have not been 100% confirmed, add any additional details here that you would like your reference to know about:

## Discussions with your referee

Ways to make talking with your teachers more positive and more productive:

- Talking with people in your life like teachers is a skill, if you find it difficult, don't worry, you just need to build this skill through careful practice!
- Be respectful, you are asking someone for something, their time, that they usually have very little of!
- Choose your time to ask them for their time carefully. Ask them “are you are free to talk now?”, if they are usually busy, **ask them when they prefer to talk.**
- Write out what you would like to ask them, using the table that follows. This can help you feel less nervous. It will also mean that you are thinking much harder about your subject (active learning) which will improve your academic performance.
- Prepare your questions, based on what was taught last lesson, or recently. Try to pick a subtopic your teacher is obviously interested.
- Try to make your questions open ended, giving them the freedom to talk about their passion. Avoid questions like how many atoms are in the amino acid tryptophan, instead pick up on something they said in class “you said that tryptophan is an essential amino acid, what makes it essential?”
- The easiest kinds of questions are connected to what they like most about what they are teaching now, or what they teach in general.
- You should not be trying to catch them out, or get them onto parts of a subject they are less comfortable with. You want at the end of this for them to have the evidence to suggest that they think you would fit in well in any future academic setting. If you are going out of your way to make their work life more difficult than you are making it harder for them to write you a good reference, the opposite of a good idea.
- Start early, ideally at the start of your AS year! If you do, just one question a week per teacher will deliver a whole year's worth of outstanding engagement in all subjects form you
- As you get more experience talking to a teacher, try to talk to your other teachers. You might discover that they are quite different people when you take the care to get to know them! Showing an interest in your studies can also really help build positive and productive relationships that can prevent all kinds of problems that come from misunderstandings. You will also be building your skills in forming and maintaining professional relationships, a key life skill.
- Getting good at asking interesting questions is the essence of a thoughtful intellectual, and will help you stand out, even in the most intellectually competitive environments, like university and beyond.

## Record of your conversations with your teacher in this table

Date	Day	Time	Topic discussed	Questions you asked, and the answers you got
26 <sup>th</sup> Aug	Monday	Afterschool, 4:45pm	T12: Energy and respiration	Could life ever be an endothermic process? Last lesson you mentioned that aerobic respiration using oxygen took a long time to evolve, why? What was the Great Oxidation Event (GOE) 2.4 billion years ago you mentioned last lesson? Why might human egg cells NOT have mitochondria?

Ideally this form should be typed out, but it could also easily just be used written out by hand.

To download an electronic version of the activities in MS Word format scan  
this:

File name: *Oxford, Cambridge and Top 20 University UCAS **Activities ONLY***



Or go here: <https://www.smashingscience.org/uni-guidance>  
[www.SmashingScience.org](https://www.SmashingScience.org)

Patrick Brannac

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