



School students often experience biology as a subject in which there is a lot to remember, but not a lot to think about. Unlike physics, chemistry, and mathematics, school-level biology often prioritises the memorisation of terminology and processes at the expense of developing problem-solving, lateral-thinking, and quantitative reasoning skills. This is troubling for many reasons, but from a higher education context we were concerned that the ‘facts-first’ approach to biology in schools was poorly preparing students for the biological thinking needed at university and beyond. Specific to Cambridge, we also noted the mismatch between the skills we assess for at interview (thinking *critically* about biological phenomena) and the uncritical, unquestioning approach to biological phenomena found in many school curricula.

We have experience at delivering in-person outreach to small groups of school students to try and remedy this view of biology. However for this grant, we wanted to see whether we could deliver ‘training’ in biological problem-solving skills remotely, providing an educational opportunity to thousands of biology students across the country who would otherwise not have been reached by University of Cambridge outreach. We partnered with Isaac Science, an already highly successful platform which was looking to launch an ‘Isaac Biology’ section but was struggling to provide the same level of stretch-and-challenge questions that they had for their physical sciences offering. Isaac is a remote learning platform in which students can attempt questions and receive instant feedback and hints; the nature of their platform makes it easy to deliver the sorts of questions (e.g. use of equations, card sorts, graph interpretation) that are needed for STEM outreach. The INT funding allowed us to create questions to launch the Biology section of the website. The questions published thus far can be viewed here:

https://isaacscience.org/pages/biology_extension_questions

This was launched in August 2025. So far there have been approximately 5200 views per month and growing.

To turn views into real change we have created the ‘Isaac Biology Challenge’ programme. Twice a month, a new stretch-and-challenge question are released; aimed at A Level students, these challenge students to apply the content they have learned at A Level to solve unusual and interesting problems. By answering questions, students

earn branded certificates and can see their progress recorded on the Isaac platform. So far we have 1263 students participating in this first pilot year of the Challenge (2% of the UK A-level Biology Cohort), and we hope that we can grow this number to reach a significant proportion of the A Level cohort. These interactive questions also have significant potential to assist in providing interview practice for students who would otherwise struggle to access the ‘training’ that students from more privileged backgrounds can have access to. We are working with the Royal Society of Biology to try to raise awareness in schools of these resources and have a greater impact on school teaching.

Feedback so far has been very positive:

- *I didn't realise that biology was such a mathematical subject.*
- *These problems have been really fun.*
- *I love being able to puzzle my way through.*

The INT funding has been a launchpad for continued development. It created a “proof of concept” and in Michaelmas 2025 a new full time teaching associate was employed to continue development of the materials. We will be continuing to monitor the uptake and engagement, with a particular focus on whether it is reaching schools beyond the norm of those who apply to Cambridge. We also hope in the medium term to see an uptick in the numbers of students applying for Biological Natural Sciences which has been decreasing in recent years. We hope that a sizeable proportion of those signed up for the “Isaac Biology Challenge” will apply to Cambridge, and this would potentially provide evidence of impact in raising aspirations and interest in biology.