WPIF PROJECT REPORT 2025

THE SEARCH FOR THE SCIENTIST'S SECRET

HOMERTON COLLEGE
UNIVERSITY OF CAMBRIDGE

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SUMMARY

With the support of the Trust, we have continued to build and deliver an exciting educational "adventure" to students from around the country. 70 new puzzles have been added to the activity since last year, which has enabled scaling, refinement and improved scope of delivery: the activity can now be delivered to over 100 students in a session, from any secondary age group. We have completed three new "rooms" (Chemistry, Physics and Lateral Thinking), and a final stage in the adventure: a huge inflatable maze game. Over the last 10 months, we have delivered the activity in 48 "runs" to around 2,350 state-school students, both in Cambridge and in their own schools. Feedback has been very positive from participants and teachers, with them valuing the teamwork, challenge, fun, university insight and thinking skills involved in the activity.

GAME-CHANGING

Over this funding round, the game has gradually "evolved" with each run, improving both the ease and impact of delivery. A typical 2-hour game now consists of up to 5 phases:

1. INTRODUCTION

Before commencing the game, the host gives a 20-minute interactive discussion about the thinking skills that we look for at university. Different thinking skills are discussed (based on Bloom's taxonomy) and students are guided through a puzzle which is based on a past Cambridge interview question ("How many squares are on a chessboard?"). This is followed by a 5-minute video, introducing a crime that students must solve. Students are told to solve puzzles to win clues as to the perpetrator of the crime. As an incentive, students are told that anyone who solves the mystery will be invited to Cambridge for a special celebration event.

2. MAIN GAME

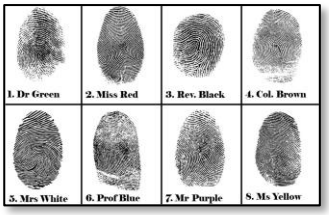
Each team then starts the game seated with 3-4 "core" puzzles on their table, covering a range of different thinking skills. This step necessitated the creation of 70 new puzzles, but it ensures that everyone gets off to a strong start. Further, it means that puzzles do not need to be rotated between groups as frequently, saving considerable time and effort. Students have 10 minutes with each puzzle set, before being moved to another table. For every puzzle solved, students get a "clue card" that they will later trade for a real clue.

3. SPIN-OUTS

Depending upon the age range present, subject specialisms, and speed of solving the puzzles, students can be directed to further puzzles on displays around the room. These include puzzles based on Geology, Zoology, Physiology, Physics, Chemistry and Lateral Thinking. Two of these new displays can be seen in Appendix 1.

4. END-GAME

After around 80 minutes, the game ends and students are asked to trade their clue cards for actual clues and fill out feedback forms. Students take the clues away to solve at home. This final clue-based puzzle is the most difficult, and requires participants to use skills in analysis, synthesis and evaluation. Students that submit correct solutions to the crime are invited to an August celebration event, where the "maze" is used as a final reward.



DELIVERY

The activity has been delivered to around 2,350 students in this funding round across 48 "runs" at 32 separate events (Table 1). There is a shortfall in the anticipated number of students reached thus far, but we are on the brink of reaching the proposed 50 runs. This shortfall was mainly caused by some deliveries being smaller than predicted. However, we have an additional 4 runs before July 2025 (starred), and a run in Scotland in October (which was delayed due to scheduling clashes). We will also be running it for two more events at Trinity College in August 2025 and on the Sutton Trust Biology Summer School 2025. We will reach 3,000 participants by the end of Summer, *without any further funding from the Trust.*

The majority of runs were for outreach events at Homerton College and Trinity College, and in state schools in Buckinghamshire, West London and South Yorkshire (our link areas) and in Hackney (as part of our Homerton-for-Homerton programme). Participants came from year groups 7-13.

Students attending events in Cambridge were recruited using the widening participation criteria of the event organisers (such as being from a state school, or having contextual flags such as IMD, Polar4, OAC and FSM). These participants have been uploaded to HEAT so that we can track their progress into Higher Education at a later date. For the deliveries in schools, targeting was difficult because of the number of students involved, but all were from state schools and many participants have the afore-mentioned contextual flags. The data from school runs will be uploaded to HEAT later in the year.

The funding has also helped support our Cambridge Biology Challenge, supporting the delivery of an online competition, and celebration day. This has helped reach a at least a further 3,500 students.
https://www.youtube.com/@CambridgeBiologyChallenge

Date	Delivery	Stud.	Year(s)	Runs
26/06/2024	All Saints School, Hackney	73	10-12	2
03/07/2024	Mercia School, Sheffield	85	11	2
11/07/2024	Elephant Group visit to Trinity College	64	12	2
12/07/2024	Homerton/Trinity Summer programme	54	12	1
07/08/2024	Sutton Trust Biology Summer School	29	12	1
17/08/2024	Cambridge Biology Challenge Morning	61	10-12	1
17/08/2024	Cambridge Biology Challenge Afternoon	66	10-12	1
18/08/2024	Cambridge Biology Challenge Morning	72	10-12	1
18/08/2024	Cambridge Biology Challenge Afternoon	83	10-12	1
19/08/2024	Cambridge Biology Challenge Morning	54	10-12	1
19/08/2024	Cambridge Biology Challenge Afternoon	69	10-12	1
19/08/2024	STEMSMART Evening (2 Colleges)	53	12	1
20/08/2024	STEMSMART Evening (3 Colleges)	49	12	1
23/08/2024	Homerton Sustainability conference	95	12	2
30/09/2024	Kings Bridging Programme	20	13	1
08/10/2024	Homerton Outreach Bus West London	48	10-11	1
09/10/2024	Homerton Outreach Bus Bucks	58	10-11	1
11/10/2024	Homerton Outreach Bus Yorkshire	64	10-11	1
14/01/2025	Urswick Academy, Hackney	132	10-13	3
28/01/2025	Excelsior Academy, Hackney	75	7	2
30/01/2025	Natural Sciences Dinner	32	Ugrad	1
11/03/2025	HE+ visit to Homerton	75	12	1
01/04/2025	Beaconsfield School, Hackney	99	7-10	2
02/04/2025	Dr Challoners School, Buckinghamshore	162	12	2
08/04/2025	Kings College London (collaborative programme)	69	12	2
25/04/2025	Cardinal Pole School, Hackney	75	10-12	2
26/04/2025	Future-ready Homerton Program	34	10	1
01/05/2025	All Saints School, Hackney	96	7-10	1
02/05/2025	Excelsior Academy, Hackney	75	7	2
09/05/2025	Coach visit, All Saints +Stoke Newington Schools	51	11	2
12/05/2025	St Bernard's Catholic High School, Rotherham	142	9	2
13/05/2025	Holy Trinity Catholic School, Barnsley	153	9	3
17/06/2025	Homerton Outreach Bus Bucks*	49	12	1
18/06/2025	Homerton Outreach Bus West London*	46	12	1
23/06/2025	Coach visit, Urswick School, Hackney*	42	11	1
30/06/2025	Homerton Outreach Bus West London*	54	12	1
	Totals	2558		52

Table 1. Deliveries to date

FEEDBACK

A summary of feedback from participants and teacher testimonials can found in Appendices 2,3 and 4. You will see that the activity was very well-received. For students above the age of 14, over 90% enjoyed the activity, and around 85% wanted to do an activity like this again (Figure 2A). Younger students had a higher tendency to report that the puzzles were too difficult (Figure 2E) and that they needed more time (Figure 2F). Even so, over 85% of students of ages 11-14 and still enjoyed the activity. Younger students were also significantly more likely to "strongly agree" that they would like to do an activity like this again in future (Figure 2H). It is worth highlighting that for many of the younger year-groups, students were not selected to undertake this activity based on perceived ability. For the year 9 students (aged 13-14) the activity was conducted for entire year groups, showing that the activity is not just useful for all ages of students, but also for students in a range of different academic "sets". Many teachers reported that they had seen unusually high levels of engagement from many of their students.

Across all age groups, over 70% of all participants thought that the activity helped them to identify the thinking skills that Cambridge looks for, 77% thought that they gained understanding, and 66% thought that they gained knowledge, Another clear conclusion from feedback was that students valued the teamwork element highly, and generally would not want to do this activity on their own. Data was also collected on the number of puzzles solved, and there are no clear differences between age groups. We can also identify which puzzles students of different ages groups found easier or harder, but with over 50,000 data points, this analysis will be reserved for a research paper later in the year.

KEY PEDAGOGICAL INSIGHTS

1. EDUCATIONAL ACTIVITIES CAN BE DESIGNED FOR ALL SECONDARY AGE GROUPS

Initially this project envisioned working with students in the latter stages of secondary education, but it was clear that this activity is also engaging for younger students. Future research will show that different age groups excel at different types of puzzle, but the pedagogical framework of the activity seems to work for any age.

2. TEAM-WORKING ACTIVITIES ARE BECOMING INCREASINGLY VALUABLE FOR SCHOOLS

Around 80% of student feedback responses stated that the teamwork element was important, and almost every teacher we encountered commented on how it was becoming increasingly difficult to undertake teamworking activities within the confines of the curriculum.

3. OUTREACH TOOLS CAN SCALE MASSIVELY, IF MANAGED CAREFULLY

In the early stages of this project, it was very difficult to run the activity for groups larger than 50 students, requiring significant help from teachers and ambassadors. However, small logistical changes now mean that it can easily be conducted for over 100 students at once. The most important changes were to give students multiple puzzles at a time, and then move students between puzzles, rather than moving puzzles. This has the added benefit of making sure that students always have puzzles to solve; students could get frustrated when waiting for their next puzzle!

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4. NEURODIVERSITY IS A HUGE ADVANTAGE

Testimonials from the teachers (and verbal feedback) indicate that this activity caters for neurodiversity very well. Some of the best performances this year were from groups that contained students that had previously encountered difficulties with more typical academic activities. This needs further investigation, but we suspect that the range of different thinking skills required for the puzzles is so wide that everyone can find their own strengths. When working together and pooling abilities, neurodiversity becomes a huge strength.

5. THERE IS HUGE PEDAGOGICAL RESEARCH POTENTIAL IN OUTREACH ACTIVITIES

Few previous outreach projects have delivered the same systematic activity to such a broad range of student ages and abilities. As an Admissions Tutor, with the support of the Trust, Dr Elliott has been hugely privileged to be able to iteratively develop a single activity that allows such an extensive reflection on different thinking skills. There is huge research potential here, which will be investigated further.

FINANCES

A summary of the expenditure on the project can be found in Appendix 5, and individual receipts can be passed on if necessary. There was a significant overprediction and underspend on travel reimbursements, but in most other areas we had overspend, including on other methods of transport. Any surplus costs (£1673) have been covered by Homerton. It is also worth noting that budget did not include the costs of any rooms that were donated by either Homerton or other venues, or the time that was taken to organize events, travel to events, set up the escape game, or to make and repair puzzles (around 600 hours in total).

THE FUTURE

Thanks to the generous funding from the Trust, the university now has an unusual, exciting and extensively play-tested resource at its' disposal for future outreach events. The next step is to secure a sustainable source of funding so that we can continue to deliver the activity for free to state schools around the country. Across the Summer, Dr Elliott will finish producing promotional materials to present to potential donors, and also write an academic paper on the results so far. We hope to raise around £50,000 per year, with the aim of delivering this activity to up to 10,000 students per year. Dr Elliott would like to thank the Trust and Homerton College for their support. They have made his own (admittedly somewhat strange) ideas come true.

APPENDIX 1: MEDIA

We have collected pictures from a number of events across the last year, but the activity is perhaps best showcased in a new promotional **video**, and in some professional photographs taken by David Tett at a shared outreach event at Kings College London in April 2025. This media can be accessed in the folder below, and more will be added across the coming year.

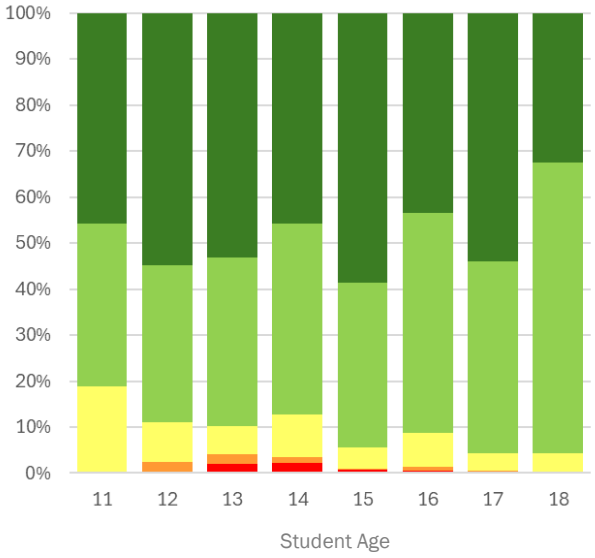
https://drive.google.com/drive/folders/1uLBiDDylOrDXghSV7dDuK4weSCoG_tiP?usp=sharing

The new Lateral Thinking and Chemistry "rooms" at an event at Kings College London in April 2025.

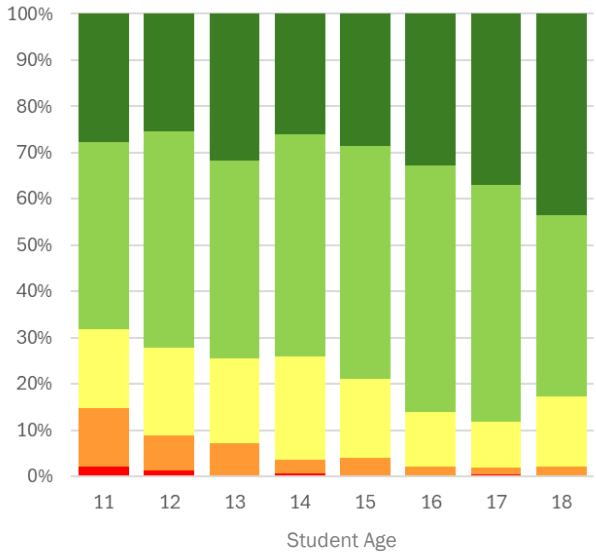
The escape game allows a) huge scale events but b) small scale team-working and communication. Images taken from a collaborative event at Kings College, London in April 2025.

APPENDIX 2: STUDENT FEEDBACK

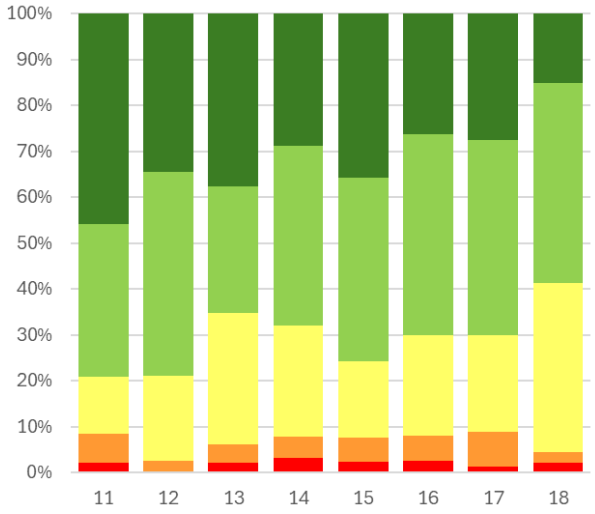
The feedback presented below comes from 1998 individuals who participated in the escape game activity (from a total of around 2,350 students). This feedback was collected through anonymous paper surveys, and students were asked 9 questions, The results are presented as percentages who agree or disagree with certain statements, sorted by age. For deliveries after March 2025, students could also give short written statements about the activity



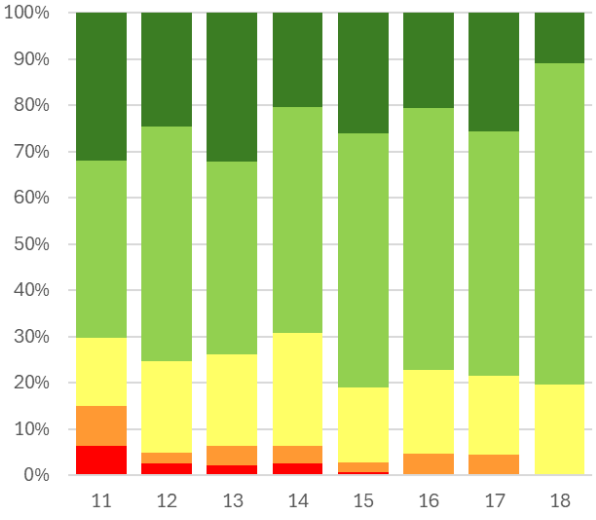
2.A. "I ENJOYED THIS ACTIVITY"



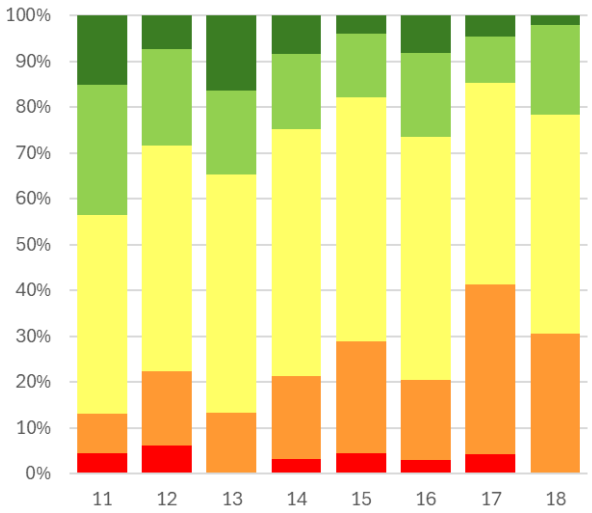
2.B. "THE ACTIVITY WAS AN UNUSUAL WAY OF LEARNING"



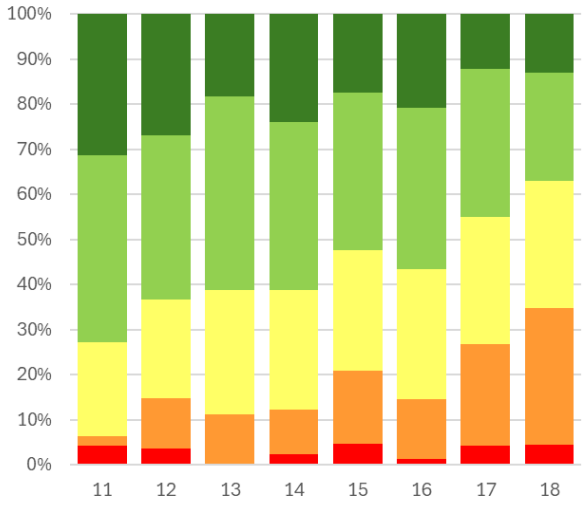
2.C. "THIS ACTIVITY HELPED ME KNOW WHAT CAMBRIDGE LOOKS FOR IN APPLICANTS"



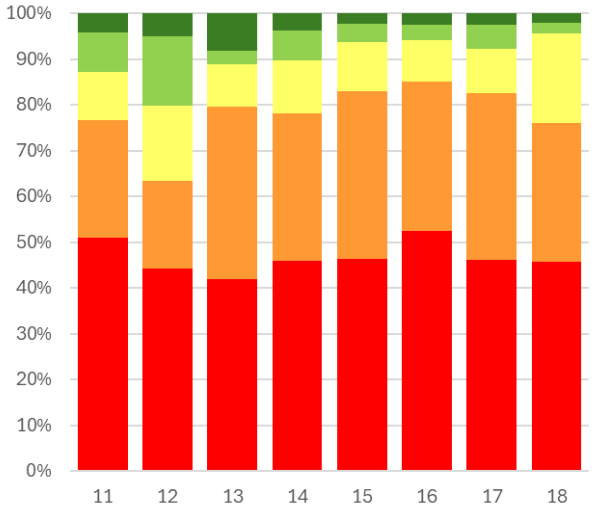
2.D. "I GAINED UNDERSTANDING"



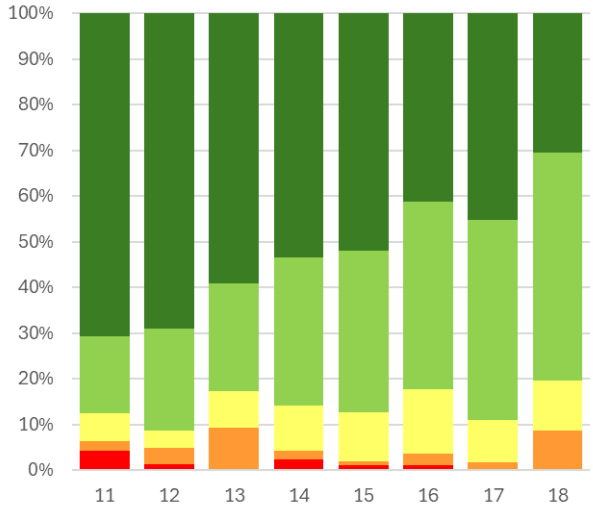
2.E. "THE PUZZLES WERE TOO DIFFICULT"



2.F. "WE NEEDED MORE TIME"



2.G. "I WOULD HAVE PREFERRED TO DO THIS ON MY OWN"



2.H. "I WOULD LIKE TO DO AN ACTIVITY LIKE THIS AGAIN"

2.I. WORD-CLOUD OF KEY WORDS IN STUDENT FEEDBACK (n=621)

APPENDIX 3: STUDENT COMMENTS

"It was an exhilarating experience filled with excitement and challenge"

Year 12 Student, Kings College London (collaborative outreach event)

"The activity was a very interesting and unique experience.... there nothing like it in schools"

Year 12 Student, Cardinal Pole School, Hackney

"It was overwhelming in a positive way, and allowed me to explore activities that I wouldn't usually explore."

Year 11 Student, All Saints Catholic School Hackney

"I'd describe this as funky. But in a good way. It made me feel like an idiot, but also like a genius."

Year 10 Student, Cardinal Pole School Hackney

"I really want to do this again as it made you think but was fun at the same time"

Year 9 Student, Holy Trinity Catholic School, Barnsley

"I thought that this activity gave me a vision of what Cambridge has to offer"

Year 9 Student, St Bernard's Catholic High School, Rotherham

"It was very fun and gave me an understanding of what Cambridge Students have to go through. It was challenging, but overall I enjoyed it a lot."

Year 7 Student, Excelsior Academy, Hackney

*"BEST BIRTHDAY EXPERIENCE EVER!"**

Year 7 Student, Excelsior Academy, Hackney

***Please note that this was not done at a birthday party, but in a school setting where it just happened to be one of the students' birthdays.**

APPENDIX 4: TEACHER TESTIMONIALS

"The escape room day was fantastic! All students were fully engaged in team-working and problem-solving activities. The variety of the activities kept students motivated throughout the day, developing their communication and aiming-high skills".

Jayne Collins, Vice Principal, St Bernard's Catholic High School, Barnsley

"The escape room was an excellent opportunity for students to be out of their normal classroom-based activities. The format supported students to collaborate and work together to solve the puzzles and all students were engaged throughout - not something that is always easy to achieve! The nature of the puzzles also appealed to a wide range of students; it was not only the more 'academically successful' students who thrived. As one of the most disadvantaged schools in the country, it was amazing to be able to host without cost, and the impact on the students was clear!"

Jonathan Khoo, Assistant Headteacher, The Urswick School, Hackney

"Thank you for providing and hosting the Escape Games last week. It was so refreshing to see our students fully immersed in all the activities. Even more so when they found it difficult to 'open the box'. It showed their true resilience and capabilities. I think some of the students even surprised themselves!."

Helen Milnes, Careers Advisor, Holy Trinity School, Barnsley

"The feedback from students was incredibly positive and this experience has opened doors to new possibilities, empowering our young people to envision and pursue their educational goals"

Leefiya Begum, Deputy Director of Sixth Form, Stoke Newington School, Hackney

"The Search for the Scientist's Secret - STEM Adventure" was a fantastic opportunity for our Year 7 students—not only as their first introduction to Homerton College, Cambridge, but also as a dynamic and challenging experience that encouraged problem-solving, teamwork, and a growing interest in STEM. The event provided a valuable platform for students to engage with complex tasks in a fun, collaborative setting, while beginning to build essential soft skills. It has been a meaningful addition to our CEIAG programme, enhancing early exposure to future academic and career pathways"

Ashae Mederick, Careers Leader, The Excelsior Academy, Hackney

"The science escape room offered an engaging, hands-on experience that challenged students' critical thinking skills beyond the A level syllabus. By immersing participants in interactive puzzles, it not only made learning fun but also provided a glimpse into academic life at Cambridge. The opportunity was designed to be inclusive, welcoming students from diverse backgrounds and fostering a broader interest in science and higher education. Such a brilliant idea - we would love to have the opportunity again!"

Liz King, UCAS Coordinator, Dr Challoner's High School, Buckinghamshire

"We have had the Escape Room at our school twice now, and as a Science teacher, it has been wonderful to see students challenged in ways which force them to think outside the box. As a class teacher, sometimes due to time constraints within the curriculum, finding ways to test the students' analytical skills and critical thinking can be a challenge. The Escape Room provides exactly that for students and on top of that, it has enabled them to build their team-working skills as they work in groups to find the solutions to these exciting tasks.

Natasha William, Assistant Headteacher. All Saints Catholic High School

"I took a group of students to participate in the Escape Room during the 2024 STEM SMART residential and it was a huge success! The activity is the perfect combination of academically challenging, stimulating, and entertaining and its flexible set-up makes it suitable for a range of ages, group sizes, and events. The activity also provides students a way to develop skills other than their technical/academic abilities, such as teamwork, critical analysis, and creative flexible thinking. The students who participated from my group were engaged throughout and thoroughly enjoyed the activity – many even took notes on extra problems away with them to carry on working through once we'd left Homerton!"

Libby Prodger, Schools Liaison and Widening Participation Officer
Pembroke College

"I took a group of STEM SMART residential students to the STEM Escape Room at Homerton in Summer 2024 and thought it was absolutely fantastic. The students found the set up really engaging and were clearly working together very effectively to problem-solve throughout the evening"

Naomi Walker-Pearl, Deputy Admissions Tutor, Corpus Christi College

"Such an inclusive activity…especially in terms of neurodiversity"

Toni Dolan, Assistant Headteacher, Holy Trinity School, Barnsley

APPENDIX 5: FINANCES

EXPENDITURE FOR GRANT 24xii(a) H037 WPIF MAY 2024

A summary of expenditure can be found below. As can be seen, by far the biggest underspend was on travel reimbursements, where we did not get high uptake. This was somewhat compensated for by us ordering an additional coach for a college visit, and supporting the transport of students on the STEMSMART programme to Homerton(just within Cambridge). Overall, there was a small overspend (although this is conservative, given that a lot of materials were sourced outside of this grant).

	Cost	Budget	
Travel and Meal costs			
Coaches (x6)	£6,475	£4,400	
Travel Reimbursements	£1,739	£6,000	
Lunches for students (575)	£6,325	£5,280	
Transport for School visits			
Van Hire	£1,794	£1,350	
Fuel	£782	£1,500	
Materials			
Printed Materials	£8,216	£6,978	
Banners	£601	£443	
Branding panels	£469	£431	
Staffing			
Host costs	£7,500	£7,500	
Student Support	£1,683	£750	
Challenge Programme	£2,900	£2,000	
Album design, video production	£4,821	£5,000	
			Balance
TOTAL	**£43,305**	**£41,632**	**-£1,673**

EXPENDITURE FOR GRANT 23.2vii H021 INT WPIF JUNE 2023

Upon request, it was agreed that we could include expenditure for the above grant in this report. This was all for additional materials for the Chemistry escape game which (which can be seen in Appendix 1)

	Cost	Budget
Chemistry Materials		
Banners, Cases, and additional equipment	£2,243	£2,095