

Developing pathways to support more diverse participation in STEM
in partnership with Science and Discovery Centres around the UK

Valuing inclusion:

learning about
science my way



Association for
**Science and
Discovery Centres**



Science and
Technology
Facilities Council



Foreword



Shaaron Leverment

**Chief Executive, Association for
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From 'Science Orchestras' to 'Science and Supper', this report showcases a three month snapshot of community engagement projects that took place during Spring 2023. Sixteen Science and Discovery Centres worked in partnership with local communities across England, Northern Ireland, Scotland and Wales to reach young people and families who are often marginalised or underserved in Science Technology, Engineering and Maths (STEM) engagement. They aimed to support participants to explore STEM on their terms in fresh, inclusive, and exploratory ways, and to nurture a sense of belonging and agency for people who may not feel that UK science, technology, research and innovation has relevance or benefit for them, or their communities. These projects were funded by the Science and Technology Facilities Council (STFC) part of UK Research and Innovation (UKRI), working in partnership with ASDC to put audiences at the centre of STFC public engagement.

Over 10,000 children, young people and families took part. Many projects promoted multiple and sustained STEM engagements, co-creating content with young people with great depth of impact and legacy for both participants and practitioners. The case studies within this report tell different and incredible stories of STEM engagement, from one young boy's aspirations being brought to life for him and his community with the National Space Centre in Leicester, settling in with Cambridge Science Centre's 'STEMtots' community pop-ups in a vacant shopping centre unit, to exploring, platforming and valuing teenagers' complex, insightful and diverse opinions on space science with We The Curious in Bristol.

External evaluator OnData Research Ltd. surfaced key themes across the sixteen projects, including their ability to support participants sense of belonging, ownership, positive relationships, value (e.g. improved knowledge, skills and raised aspirations) and to promote transformational and long-lasting change within the Science and Discovery Centres themselves.

Science enhances lives – not only as a potential career choice – but as a set of valuable life skills and a force to be leveraged for community wellbeing and social good. Greater diversity in STEM comes as a reward for more equitable and inclusive STEM practice. UK Science and Discovery Centres are on a journey to challenge power dynamics within our processes, structures, and strategies of STEM engagement and to implement evidenced methods that push inclusive practice forward to support a flourishing and diverse STEM sector for the UK's future.

The Association for Science and Discovery centres (ASDC) has a collective vision for a society where science is accessible, inclusive, and valued as a fundamental part of everyday life. ASDC stands for the power within the informal science learning sector to challenge inequalities of access and opportunity, to open up choices and pathways, and support more diverse participation in STEM for all.

External evaluation

Laura Thomas, Ondata Research

Following a review of the projects undertaken across the centres participating in this project, a set of five themes has emerged. Each is described in turn, summarising the experiences of community and school participants. Alongside each theme is an example from one of the case studies in this report.

In terms of approach, all participating organisations were committing significant time to developing longer term relationships with community partners, community groups and schools, with many funded projects providing the 'seed' from which future work will develop and grow. They worked to understand the needs of participants in order to help them overcome barriers to taking part in activities either in the community or within the Science and Discovery Centres, ensuring the content and space being used was inclusive and accessible. Alternatively, some organisations used the sessions as an opportunity for participants to contribute to making the spaces and activities more inclusive and accessible. There was evidence of the application of place-based understanding by staff, with the support and collaboration of community leaders and school teachers. When it came to the delivery of activities or sessions, on the day these were adaptable and responsive to the circumstances arising and the needs of participants. These sessions were described by Centres as being "audience-centred", often with no script and with the topic chosen by the audience, community leaders or teachers.

1. Belonging

Many of the projects undertaken supported the development of a sense of belonging amongst participants in relation to the venue or with the people they were working with.

- Participants felt comfortable and welcomed.
- They met like-minded people.
- They had the opportunity to socialise and develop friendships.
- For many, they were motivated to return to the venue and ensure a continued engagement with the organisation.
- Trust developed between participants and the Science and Discovery Centre staff.

Glasgow Science Centre works closely with community partners to overcome barriers to visiting the centre. This extends from supporting transport costs to providing meals and ensuring the facilities on-site are accessible and suitable for the group. This also extends to providing a space to socialise and use as a base throughout their visit. One of the community partners commented that *"It's so nice to have a room where you can 'reconnect' with friends and meet new people before heading to the science mall."* This gives participants confidence and a sense of belonging within the centre.

2. Ownership

Participants were given opportunities by Science and Discovery Centre staff to take ownership of the content and direction of the projects.

- Projects were often co-created with partners. Science and Discovery Centre staff reported that they felt the most successful projects were those co-created directly with participants rather than community leaders or teachers.
- Participants developed a sense of responsibility and pride in what they were doing.
- Topics identified in partnership were relevant to the participants' interests, needs or everyday lives and had meaning to them.
- Participants were often empowered to take a role within the sessions.
- In order to develop sustainable projects and relationships, participants were encouraged to take an organisational role.

Dynamic Earth worked in partnership with Tinderbox Collective in a highly co-created project where young people in an orchestra "completely steer the direction of the project" (Fran, Senior Community Engagement Officer, Dynamic Earth). The young people composed and performed two pieces to accompany visuals shown in Dynamic Earth's planetarium. In addition to the sense of ownership, young people also found somewhere they belonged: "*Some people have really found their tribe through this, have made great friendships, and have found 'their thing'*" (Jed, Tinderbox Collective Assistant Director).

3. Relationships

The projects supported relationship development at multiple levels.

- Science and Discovery Centres aimed for partnerships which were collaborative and co-creative, where the power dynamics were equitable or moved towards becoming more equitable.
- There were many instances where Science and Discovery Centres were able to connect with new audiences, particularly those who would not normally visit their location.
- Another key measure of success was the consistency of relationships between organisations, as many established new partnerships and were aiming to continue these beyond the lifetime of this project. In some cases there was a growth in networks/partnerships as a result of a project or activity's success being shared through word of mouth.
- For participants, the projects provided opportunities for connections to develop between people from different backgrounds and also strengthened relationships between family members and friends.
- Science and Discovery Centre staff aimed for genuine and authentic relationships with participants. Getting to know the participants to understand their background and needs better in their own environment and community was a useful first step in developing science engagement activities suited to the groups being worked with.

Techniquest, like many other centres, has dedicated staff who spend time developing relationships in the community. They spend time creating authentic relationships and supporting the development of STEM skills and knowledge through a range of events. Through this project they were able to bring some groups into the centre for the first time. Being able to provide visits for free meant some families were able to come along to see if it was something they and their children would enjoy and parents were extremely appreciative to have this opportunity.

There were many ways in which the Science and Discovery Centres, community partners and schools benefited from participation. The following two themes describe these benefits.

4. Value

Participants gained a range of different benefits through their experiences.

- Through their experiences participants gained genuine experience, resulting in improved knowledge and skills which could be applied in a variety of settings in the future and may have also improved employability and raised aspirations.
- Participants also had the opportunity to try new things and understand whether or not they are interested in them.
- In several projects there were genuine opportunities to contribute to producing usable outcomes. Science and Discovery Centres were very keen to ensure the contributions of participants were valued and acknowledged and that their experience and expertise was also valued.
- For participants, through a changed perception of topics they developed a sense of curiosity and wanted to learn more.
- For some partners, they observed improved mental health and wellbeing amongst participants.

Science Oxford Centre used this project as an opportunity to engage with *"a cohort of communities that I think it's safe to say wouldn't really come to see us without us helping them with transport and setting up the date"* (Andy, Head of Education, Science Oxford Centre). By planning bespoke activities suited to the groups attending, participants were able to try new things and increase their understanding and experience of STEM topics. One parent commented: *"Great opportunity to try new skills in a safe and welcoming environment. Encourages his independence and social experiences. Amazing opportunity as fully funded."*

5. Transformations

For staff and their organisations, there were a variety of ways in which they have been influenced by the participants and the projects.

- Changed behaviour of participants or staff members as a result of increased knowledge and diversified experienced.
- Participants influenced decisions, policy and practice within the Science and Discovery Centres.
- There was also changed practice in centres or in community groups as a result of the experiences within projects.

The Royal Observatory Greenwich (ROG) ran a range of activities with local groups which have impacted on their own practice. Bespoke events were organised for local Muslim communities, a South Asian adult group, an Asian and African youth group and members of the Empowering Deaf Society. These were considered by ROG staff as "ground floor test events" and based on the feedback from participants and observations of staff, future events and activities will emerge. The experiences of the events themselves were positive with one participant commenting: *"I enjoyed the respectful environment and the way science and religion was linked together."*

The case studies provide detailed descriptions of the different ways in which these aspects were achieved. Overall the evidence was provided through insights and observations from staff in Science and Discovery Centres along with those in partner organisations.

Across the projects participants felt a sense of belonging in relation to the place they visited or as a result of the relationships they developed. There were also many opportunities for participants to take ownership of the projects, empowering them and giving them a sense of pride. There were many benefits to participants through the development of skills and knowledge and for the organisations there were changes to their practice. For many organisations, this work was a foundation on which future work will build.

Contents

Coming out of their shells, Aberdeen Science Centre	9
Engaging family groups through intergenerational play, Cambridge Science Centre.....	11
Breaking down barriers, boosting confidence, Dundee Science Centre	13
The power of music and finding your tribe, Dynamic Earth	15
New perspectives; co-creation with unheard voices, Exeter Science Centre	17
Fostering a sense of belonging, Glasgow Science Centre	19
Making a difference through representation, Jodrell Bank	21
Nurturing new friendships, Life Science Centre	23
Young boy's dream takes off, National Space Centre	25
Learning from each other, with Royal Observatory Greenwich	27
Building on foundations, Science Oxford	29
Welcoming new faces, Techniquist	31
One size does not fit all, W5	33
One provocation, lots of opinions, We The Curious	35
Opening doors creates opportunities for innovation, Winchester Science Centre	37
Changes in the making, Xplore!	39
What's next?	41
Annexe	42
Acknowledgements and thanks	43

Coming out of their shells

Aberdeen Science Centre



An opportunity for families to explore the science centre together, at their own pace

Aberdeen Science Centre's (ASC) aim was to promote science education and foster a sense of ownership and curiosity among participants and young children exploring all areas of science through bespoke sessions – from planetary science and geology, to space, telescopes, and aliens.

Thanks to its highly inclusive, and community driven and led approach, ASC successfully delivered 27 workshops and activity sessions, engaging with over 500 individuals from family groups within the top 20% of the Scottish Index for Multiple Deprivation. The three month programme (Feb – Apr 2023) demonstrated the power of community-led initiatives in fostering scientific literacy and empowering underrepresented groups in society.

ASC's commitment to building meaningful relationships with community partners was evident throughout the project. Multiple interactions over several weeks helped establish familiarity and comfort for the participants within spaces they already knew well. The warm reception from children eagerly welcoming the ASC staff at their community centres showcased the level of acceptance and integration achieved through their outreach efforts.

This programme is important because they are really vulnerable families. They started saying science is not for them and finishing asking for more sessions and making questions about things they are curious about.

Aberdeen City Council Family Learning leader



From the outset, ASC recognised the significance of tailoring its engagements to meet the needs and interests of the local communities it was serving. Vanessa Vazquez, the Community Engagement Coordinator for ASC, listened to and coordinated with participating families, allowing them to guide the content and pace of the sessions, empowering them to be in control of their own learning experiences.

This ultra-participatory approach led to some unexpected, and highly positive outcomes for both the families taking part and all the teams involved in delivering the workshops. Soon after the advent of the programme several Early Learning and Childcare practitioners from across the county contacted ASC for professional development training in maths and science. This request demonstrated the impact of ASC's engagements, with the practitioners acknowledging the need to enhance their knowledge and skills to deliver effective STEM activities to young children.

27 workshops and activity sessions delivered

More than 500 engagements over 3 months

Over 60 hours dedicated to fun and learning

Worked with family groups within the top 20% of the Scottish Index for Multiple Deprivation



The relaxed approach made everyone feel much more connected to the theme, comfortable and not scared of 'doing something wrong'

We are constantly receiving enquiries about when the next science block will be at Inchgarth. It is important to engage for a few sessions so they can come out of their shells.

**Inchgarth Community
Centre Manager**



Pre-school children experience ooblek (a non-Newtonian fluid) as part of the STEMtots programme

Engaging family groups through intergenerational play

Cambridge Science Centre

Cambridge Science Centre (CSC) is at an ambitious stage of its story, asking questions fundamental to the whole sector including “what is a science centre?” and “who is it for?”, finding novel ways of exploring the impact they can have across the Cambridge region. With the funding from STFC they created STEMtots community hub; a pop-up science centre embedded within a community outside of their usual sphere of influence. Transforming a vacant shopping centre unit on the outskirts of the city, they have worked to attract parents and carers of young children to visit, free of charge, for exploration and play in a safe and welcoming environment. Visitors to the community hub experience rotating weekly themes that incorporate STEM skills and intergenerational play-based learning is encouraged. This is linked to higher level topics, such as STFC science for grownups to engage with, aided by “what’s happening here?” cards that describe the real-world applications of the STEM content and

Adult participants: 2,252

Young participants (0-5 years old): 2,204

Young participants (6 years and older): 199

Average Dwell Time: 71 minutes

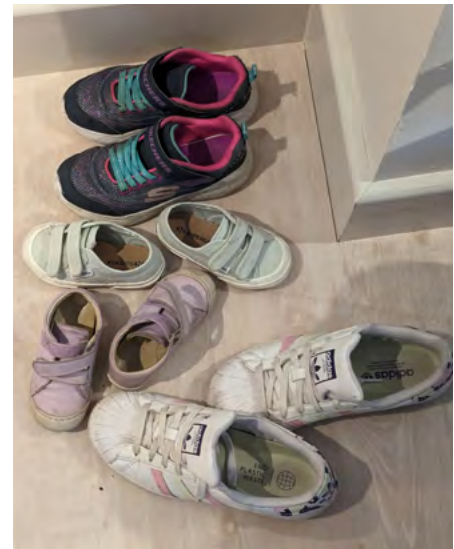
skills, including the role of play in child development. CSC science communicators are also a vital part of the picture, facilitating this learning by providing extra games and challenges, guiding play, and discussing contemporary research with adults.

A research-led approach: This innovative project was born from ongoing conversations with communities through CSC's charity and local authority partners, uncovering the need for engaging and hospitable community-based locations for parents of young children in central and north Cambridge. Particularly prevalent were the voices of young parents and those from lower income groups who reported struggling to find free family-focused opportunities to engage with their children. Within these new community hubs, the CSC team continue the research, finding out from visitors what they want from the space, and of course what impact a visit or visits has on them and their young children.

I didn't realise how sociable my child is!

Parent

An unanticipated yet significant outcome was the importance of this opportunity for parents to better understand their own children. Numerous visitors remarked to staff that they rarely observed their child engaging in social play and interacting with STEM content. One individual noted that they had "underestimate[d] what a 14-month old might enjoy or engage with" and added that they would "not be afraid to explain things happening around", suggesting the child would now receive more opportunities to learn about the world. Other visitors highlighted the sense of safety within the space and the intention to incorporate more science play at home. This demonstrates that the space and activities provided parents and carers with valuable insights and confidence to engage their children in science topics.



CSC staff noticed shoes came off when visitors felt comfortable and when they planned on staying for a longer visit.



The STEMtots pop up hub in Grafton Shopping Centre, Cambridge

CSC's success in meeting a community need and creating an inclusive and attractive space is clearly demonstrated by how many visitors they get simply due to word-of-mouth. Visitors consistently have mentioned to the team the lack of similar spaces for young children in Cambridge, appreciating the centre's role in facilitating time spent in the city, in promoting social interaction between children and amongst the parents and carers.

Legacy Impacts: This project plays into bigger and longer-term plans of CSC. STEMtots community hub has taught the team a lot about what they can offer communities by embedding themselves into community locations, and they have plans to continue with this in the same and new locations. The relationship with the Grafton Shopping Centre where STEMtots was hosted also provides opportunity for legacy, with Grafton management interested in transforming their mall, possibly to include spaces for start-ups businesses and playing a new role in the community. CSC's success in the donated unit could provide evidence for them and malls across the country to learn more about this opportunity.

Breaking down barriers, boosting confidence

Dundee Science Centre



Children and their families enjoying the hands on science activities at the Big Spring Bash weekend provided by Dundee Science Centre

As a community worker it was great having the sessions in the centre. I observed children who wouldn't talk at the start of the session but soon were talking, asking questions and generally came to life and were having fun.

Community practitioner

Dundee Science Centre (DSC) works closely with community service providers throughout Dundee and neighbouring regions to enhance the value of those community services through equitable and inclusive STEM offerings. STFC funding was used by DSC to expand existing programmes, helping to reach new audiences through collaborative outreach, provide resources and skills training for community practitioners, and to welcome new and returning groups to the centre. Throughout March and April, the team welcomed Early Years practitioners from Caird View Nursery for a multi-week training course in STEM engagement skills.





March also saw the team busy with a focus on place-based engagement activities, taking activities into the heart of communities where parents remarked at how pleased they were to have the science centre visit. They also joined forces with St Andrews Botanic Gardens for their Big Spring Bash weekend which saw DSC reach audiences in Fife and strengthen this new impact-driven partnership. As well as all of this, there was even time to fit in events within the science centre for targeted community families, and a Women in STEM Day for Rainbows, Brownies, and Guides powered by an all-female DSC team!

Making a difference through confidence building

An important measure of impact observed by DSC across the project was the confidence levels of the participants. Within the Early Years Practitioners training, the team noted how relaxed the practitioners became in asking staff questions over the duration of the course. They also became noticeably more confident in answering young people's STEM questions, something that DSC took as a mark of success in the delivering of what the practitioners had signed up for.

Growing the confidence of community leaders is also a legacy point for the project. Along with on-going support, community partners have been supplied with resources and instructions to be able to re-run DSC workshops by themselves and on their own timetables. This is just one more way that the team at Dundee Science Centre are embedding themselves into communities and service provisions.



13 events or sessions

745 participants

More than 31 hours of engagements

3000 interaction hours

The power of music and finding your tribe

Dynamic Earth

In 2022 and the start of 2023, Edinburgh's **Dynamic Earth Science Centre**, in partnership with Tinderbox Collective's Sparks Youth Orchestra, embarked on a groundbreaking collaboration funded by the Science and Technology Facilities Council (STFC). The team created a resident "science orchestra" to compose accompanying music for the films shown in Dynamic Earth's planetarium. With the STFC funding, they were able to bring this ambitious project to life with young people from across Edinburgh – some with no previous musical experience and many with no interest in science.

The output of the workshops, planning sessions and rehearsals was the composition of two remarkable pieces of music. "Sunscapes" was created to synchronize with satellite imagery of the sun, capturing sunspots and solar flare activity. "Seascapes" is a haunting score, written to accompany footage of deep-sea creatures



It helps them to join in, connect with others. They find this very difficult. The music brings them together with others.

Parent

Special live performance of the piece 'Sunscapes' composed and played by the young orchestra to family and friends





Young people finding their tribe and experiencing the power of music inside the planetarium at Dynamic Earth

filmed by the Schmitt Ocean Institute. The two pieces have been recorded and permanently incorporated into the planetarium shows and, alongside a performance of 'Sunscares' for friends and family, a recording has been made for a tour around Scotland with Dynamic Earth's portable planetarium.

The collaboration between music and science introduced a new way of working for both Dynamic Earth and Tinderbox. Whilst Dynamic Earth focuses on increasing access to science learning through their community programme, Tinderbox specializes in music and tech workshops. The bringing together of the two organisations brought rich, new experiences to young participants, giving them access to, and appreciation of, STEM and music. Parents of participating children reported that their children had found their tribe through the orchestra, as the shared experiences created a comfortable and nurturing environment for building relationships.

This is one of our most co-created projects, as the young people comprising the orchestra completely steer the direction of the project and the musical compositions that result at the end. Whilst Dynamic Earth provides the visuals to inspire and accompany the music, the youth orchestra take it from there and call the shots about how they want the music and the sessions to play out.

Fran Hutchinson, Senior Community Engagement Officer, Dynamic Earth

Looking ahead the next term of Tinderbox Sparks will involve composing music for Dynamic Earth's new planetarium show on climate change, titled "Don't Panic" to continue to the success of the partnership. The young musicians will also receive science communication training, enabling them to confidently explain the science topics that inspire their music during public concerts across Edinburgh.



20 young people

2 unique pieces of music

1 youth 'science orchestra'

3 live performances, recorded and available to watch on YouTube (see annex p40)

Over 390 interaction hours



Spending time with the Pelican Project group highlighted the importance of having tactile objects to explain concepts

New perspectives; co-creation with unheard voices

Exeter Science Centre

Exeter Science Centre (ESC) has a great track record of taking STEM engagement into the heart of communities around Exeter, as demonstrated in 2022 with the STFC Sparks Award-funded climate exhibition. With this additional funding they quickly seized the opportunity to revisit this piece of work to make it better, more representative, and more attractive to local communities than before. Ross, the science centre's Project Officer, set out with colleagues to gather the interests and views of young people all from underserved backgrounds. They did this via their network of youth groups, community organisations, and schools, consulting with them on the exhibits, features, and content that they would like to see. Ross explains that they wanted to work with people that the centre doesn't typically "see a lot of – they're the ones that we really wanted to communicate with... to see what they wanted in an exhibition and in a wider science centre". Ross further explains that he was conscious to keep principles and measures of social inclusion at the forefront of his mind. "We tried to make it really clear to

the groups that we're working with that they are having a direct impact on forming this exhibition", Ross says, emphasising that "their contribution will be used". Ross believes that this was an important factor that helped to build people's sense of ownership over the content, and their agency to share their ideas.

12 youth consultation events

Over 200 young people involved

Over 475 interaction hours

1 community climate exhibition to be created

Q&A

Opinions and preferences were gathered via a variety of engaging methods which included digital questionnaires, chalkboards, tablecloths for writing on, interactive tasks, and informal discussions. Below is a snapshot of some of the learning that ESC will put towards their exhibition and their science centre of the future.

What do people want/not want in a climate themed science exhibition?

Across the different groups asked, interactive elements were an unsurprising winner for what would draw people to visit an exhibition or a whole science centre, with VR, games, and arts and crafts coming out top amongst this category. The inclusion of food was also highly rated as a big plus by all groups! Amongst the most common themes for what would disinterest people were too much reading and writing, and PowerPoint presentations.

How do they best like to learn?

It was clear from this question that a lot of the participants asked agreed that tactile, hands-on learning is enjoyable. Popular responses to "Other" included playing games and listening to podcasts or audio.

What questions do they have about climate and planetary science?

Questions from participants varied widely, but the most common interests captured related to the Sun (specifically how hot it is and why), human exploration of Mars, the Big Bang, weather mechanisms, and solutions to climate change.

Making a difference by engaging the youth voice

Ross expresses his admiration for the young people he met with and describes their ability to have constructive and self-guided conversations amongst each other, reflecting that it is vital to not "underestimate the intelligence and maturity of young people". With this approach, ESC is giving a voice to this often overlooked and underrepresented demographic on important topics such as climate change. A technique that Ross found worked very well with the pupils at Newtown Primary School was to tell them that that he wasn't very good at his job and so needed their help; something he says "they loved" (but hopefully didn't fully believe) and it clearly empowered them. Backing this up, the teacher reported that they were still talking about their ideas for the exhibition for some time after the session.

Another important learning point for the ESC team was around being flexible, especially when meeting a new group of young people whose confidence you want to encourage and ideas you want to hear. In describing his interaction with 14-18 year olds from Space Youth Service, Ross shares that "they were really interesting, passionate young people so you sort of had to just go with the flow a bit with where the conversation went". However, on the other side of this, working with 9-11 year olds with physical and learning disabilities through Ellen Tinkham College showed the need to be prepared, and that sometimes taking the time to get to know the workings of a group through detailed conversations with teachers and carers ahead of time can help make the most of short sessions.

What's next?

With the opening of the new and improved climate exhibition planned for September 2023, there's plenty to be keeping the ESC team busy. Revisiting some groups while engaging with new ones is a priority, giving as much voice to underrepresented groups as possible while monitoring how young people feel about the exhibition and their likeliness to visit. There is also a longer-term vision for all this work with the eventual design and construction of a fixed location for Exeter Science Centre. The inclusion of a dedicated youth space will be a clear legacy of this consultation work, ensuring that Exeter Science Centre remains a place designed by and for its local young people.

I think for our Year 6, it worked well. Giving them a chance to provide feedback and to have a hand in naming the Exhibition was very well received (they were still talking about the names during lunch!).

Teacher



Fostering a sense of belonging

Glasgow Science Centre



British Deaf Association organise a trip to Glasgow Science Centre for children from Windsor Park School for the Deaf in Falkirk

Great for the Science Centre to give us the opportunity to have a voice and make it all accessible, I had a fantastic time taking part in this!

Glasgow Disability Alliance Participant

Glasgow Science Centre (GSC) saw STFC funding as the perfect opportunity to cultivate new relationships. Those that they subsequently worked with were groups they hadn't previously connected with, or who had expressed an interest in engaging with their services but had been unable to until now. Through this project, the centre's already highly effective community engagement programming reached even more people who often face barriers to visiting, including disabled people, black and minority ethnic groups, religious groups, and English for speakers of other languages (ESOL) learners. They also made a concerted effort to engage individuals who could benefit most from these opportunities including school refusers, disengaged young people, and young STEM enthusiasts from low Scottish Index of Multiple Deprivation (SIMD) areas. Overall, the STFC funding allowed GSC to connect with a wider audience and make a positive impact on their community.

Removing barriers: Sally who leads the community learning team at GSC says that removing barriers like cost, transport, and anxiety was vital to this project. "We spend a lot of time working with the practitioners before we bring a group in", Sally explains. In these conversations, the GSC team establish precisely what support they can offer to bring in a group that simply wouldn't be able to visit otherwise. Requests often amount to covering the costs of transportation, offering meals, and ensuring the provision of accessibility requirements. Articulating the importance of this, Sally goes on to say: "that went a really



It's so nice to have a room where you can 'reconnect' with friends and meet new people before heading to the science mall.

**May,
Glasgow Disability
Alliance organiser**

long way to building that relationship because with all barriers removed the practitioners knew exactly what to expect when they came, they were able to really clearly communicate that to their groups". During their visit, groups are also offered the use of the centre's dedicated community space, The Bothy – a calm and welcoming space for them to call their own throughout the day. This extra touch allows people to settle in, socialise, and wind-down from the busy science centre environment. All of these combined shows that GSC really cares and is not asking for anything in return. "I don't think anything quite compares to that when it comes to that relationship building piece", says Sally.

Promising returns: The GSC team use a number of factors and measures to gauge the success and impact of their work, but one very telling indicator is a group's desire to return following a visit. From the groups that GSC were able to work with through this project, several have got in touch to arrange more visits, giving the GSC team hope of more fruitful, long-term relationships to add to their existing portfolio. To give just a few examples, Interfaith Glasgow, with have expressed a desire to return with their family and adult groups; Glasgow Disability

Alliance's young people have expressed interest in a longer-term climate activism course; and City of Glasgow College's ESOL tutor has invited the team to deliver more Climate Cafe workshops at their campus after receiving glowing feedback from the initial workshops.

16 community groups

294 people

**Over 60 hours of engagements
between January and March 2023**

1127 interaction hours

Making a difference through representation

Jodrell Bank



Essentially, it's been enabling us to offer something that has been off the table post-pandemic.

Julia Riley, Head of Education and Interpretation at Jodrell Bank telling of the importance of the STFC funding

Jodrell Bank Centre for Engagement recognised the impact of financial constraints on experiences often deemed as luxuries, such as school trips or family outings due to the current cost-of-living crisis. In response, they utilised the STFC funding to offer free visits to their site, enabling access to those who would otherwise miss out due to the current economic challenges.

With the STFC funding, Jodrell Bank facilitated over 500 school participants and 80+ family and community group participants between March and September 2023. During their visits, participants engaged with exhibitions, educational programmes, and events that provided insight into live astronomy research conducted at the site. These unique experiences contextualised STEM and often sparked new interests, igniting excitement and passion among the participants.

To help those in low-income households, Jodrell Bank targeted school groups that were known for having a significant portion of pupils who received pupil premium grants, as well as community groups and families from low-income areas. The funding also enabled the establishment of partnerships with organisations, such as the Cheshire East Council Foster Service and INTO University. These collaborations helped reach groups previously unfamiliar with Jodrell Bank who faced multiple barriers to visiting.

One of the most special events organised was Jodrell Bank's 'Girls Night Out' event – celebrating women in science from the past, present, and future. The night also focused on inspiration and aspiration, encouraging and supporting women to pursue STEM careers. Thanks to the STFC funding, the event was offered free of charge, allowing over 40 female school students, their teachers, and parents to attend. The event created an electric atmosphere filled with excitement, laughter, and enthusiasm, as the students interacted with Manchester University physics students. The event had a profound impact, with one student exclaiming, "I didn't even know jobs like that existed!" Teachers expressed gratitude for the opportunity, highlighting the meaningful and impactful experience provided.

Recognising the need to go beyond inspiration, Jodrell Bank also initiated a work experience programme. By engaging with year 11 and 12 students, the team provided opportunities for more involvement and a taste of STEM education and engagement careers. Julia Riley, Head of Education and Interpretation at Jodrell Bank, expressed hope that the students they recently worked with as part of this project would reach out for further engagement. These roles not only enhance the students' experiences but also help them develop skills and experiences that are valuable for university and job applications. This initiative opens up possibilities for young people, broadening their horizons and paving the way for future success.



An all-female visit to Jodrell Bank for 'Girls Night Out', inspiring the next generation of female physicists.

**500+ school participants booked
March to September 2023**

**80+ family and community group
participants**

2241 Interaction hours



The evening focused on inspiration and aspiration, encouraging and supporting women to pursue STEM careers



Nurturing new friendships

Life Science Centre

Supporting equitable access

The team at **Life Science Centre**, part of the International Centre for Life, are experts in the delivery of a variety of community engagement programmes working with groups of people who are less likely than others to visit the centre due to sensory, cultural, or financial barriers. They opted to use their STFC funding to support multiple strands of their community programme, running several different events to provide opportunities to young people and families who might otherwise struggle to access such days out. A 'STEMtastic' day gave over 350 pupils from a local school trust a fun-filled day of workshops and interactions with STEM experts and professionals. Families from some of the lowest income areas of Newcastle attended the expert 'takeover' days, during specially adapted 'quiet days', and by using free passes distributed via a partnership with community partner Children North East.

Autistic young people from North East Autism Society attended the Science Club over three months, also giving

parents a chance to meet and socialise. Additional to all of this, the team are developing a toolkit with the aim to "think more strategically about those events" as Jenny Search, Head of Schools and Community Engagement explains, "and think about why we're doing them... and how we can make our future practice a little more streamlined around running those events". Jenny also describes the plan to share the toolkit "with other organisations who might wish to do similar things", therefore increasing the reach and impact that this project will have in the long term.

It felt like they were comfortable with the concept of not being right and prioritised sharing ideas with peers, teachers and facilitators.

**Life Science Centre
Facilitator**

Measuring Outcomes

The use of “light touch” methods of collecting feedback from community participants is important to the team at Life. A combination of techniques such as participant observations, pictorial feedback forms, staff reflections, and informal discussions with participants have provided invaluable datasets to inform and guide staff working across the centre. For example, feedback collected during the “Relaxed Sunday” sessions – during which the centre is adapted for the enhanced comfort of autistic visitors, with fewer people and less noise – has shown what changes can be made for people with sensory needs. Some of the most effective features of those days as reported by visitors, such as sensory signage, can then be trialled ready to roll out around the centre. Interestingly, some of the changes made, e.g. reduced visitor numbers and turning off the loud hand dryers, have also proved popular with other groups such as Deaf/deaf community groups invited to visit on these inclusivity days.

Taking a similar approach to collecting feedback from school groups has also offered some helpful insights leading to clearer definitions of activities and their outcomes, and the inclusion of advice for adapting sessions for different groups evidencing the overall value of the toolkit. For instance, teacher feedback shows that the involvement in the activities increased pupils’ confidence in and connection to STEM, as well as reporting an increase in their own confidence levels.

The children spoke about how much they enjoyed the sessions and couldn’t wait to come back.

Teacher

Making a difference through positive relationships

One of the highlight outcomes of the events and activities at Life is the creation of new friendships. Staff tell the story of two girls working together at the science club where one asked the other “Are you autistic too?”. The other girl confirmed she was, and they asked their parents to arrange a playdate together between the science club sessions. Similarly, school pupils who have mixed with peers from other schools have built fast friendships, choosing to stay in mixed groups even when given the choice to go back to their known classmates. Teachers report similarly heart-warming stories, with one describing a class’s excitement about their visit and the support children familiar with the centre wanted to offer their classmates: “A few that had been before were sharing what they had experienced with each other such as things they had seen or what they liked the most. They were keen to share with others who had not visited before their own experiences.”

667 engagements

7 community groups

1 schools STEMtastic event

1 researcher takeover day

3 science club sessions

1 Relaxed Sunday inclusion day

20 community passes

1 toolkit



School pupils meeting and interacting with STEM professionals

Young boy's dream takes off

National Space Centre



A Leicestershire boy was the inspiration behind the **National Space Centre's (NSC)** community space club. The club, in collaboration with Coalville C.A.N (CCAN), a locally focused engagement programme, was brought to life thanks to Science and Technology Facilities Council (STFC) funding. This ambitious initiative involved after-school sessions, family days, and more, providing a range of provisions for the local community.

Deana Bamford, the Network and Business Coordinator at CCAN, contacted Cevil J Bishop, the Community Engagement Manager at NSC, after hearing how a young boy contacted CCAN about creating a space club because he really wanted to learn more.

The two organisations decided to develop an After-School Space Club and conducted a local consultation in November 2022 to gather local input to better understand needs, interests and desired STEM provisions. Thanks to the consultation, the need for accessible

Space Up School assembly showcasing the UK's and Leicester's role in space, inspiring students about potential career opportunities in space science

We're interested to work with the space centre long-term. Colville is a place that is very disconnected; there is lots and lots of engineering and science around the edge, but the kids and the people in the middle are disconnected from it.

**Deana Bamford,
Coalville C.A.N**

science education was also identified, and the NSC team introduced a tailored STEM provision for post-16 pupils with special educational needs and disabilities. This group had not often had the opportunity to engage with or experience science in such an accessible manner, nor interact with influential figures in the space industry.

The project engaged children from 3-12 and teenagers through Space Up School assemblies, where demonstrations showcased the UK's and Leicester's role in space, and inspired students about potential career opportunities in the field. Additionally, a STEM evening filled with inspiring activities was organised in collaboration with STEM Ambassadors, Leicester Astronomical Society, the British Model Flying Association (BMFA), a local drone group, and local artists, with over 200 members of the Coalville community attending.

The partnership between NSC and CCAN proved highly valuable to Leicestershire's Coalville, providing short-term enjoyment with long-term impacts. The success of the programme led to the development of a Community STEM Hub and "Train the Trainer" workshops for volunteers and STEM Ambassadors. This expansion allows capable volunteers to run sessions, potentially sustaining the After-School Space Club and other offerings.

Future plans involve reaching out to additional partners and collaborators to occupy additional days and provide weekly STEM provisions for the community. The NSC-CCAN partnership, supported by STFC funding, has empowered the local community, expanded access to STEM education, and fostered a vibrant and engaging environment for all involved.

34 after school participants

Over 17 hours of after school delivery hours

2 volunteer opportunities created

200 attendances at a celebration day for families

400+ school pupils

1192 interaction hours



Child enjoys the space activities as part of the after school club

It's just been inspiration to work with these guys [NSC] – they've been reliable and awesome. Reliable is key... they deliver on what they say they are going to deliver, and that's what's so great working with the Space Centre.

**Deana Bamford,
Coalville C.A.N**

Learning from each other

Royal Observatory Greenwich

The team at **Royal Observatory Greenwich (ROG)** worked with five very different groups, creating unique, representative, and inclusive events that catered for the different audiences' interests, life experiences, and accessibility requirements, encouraging them to engage with the observatory, planetarium, and wider Royal Museums Greenwich museums. Ed Bloomer, Senior Astronomy Manager, describes these as "ground floor test events" on which new partnerships and ideas for future working have been launched.

1

South Asian stories, histories, cultural links, and custom planetarium shows for a group of **South Asian adults** who came together online for discussions, understanding and learning between the different parties.

2

A Planetarium show and a moon sighting attempt for members of the local Muslim communities as part of **The New Crescent Society's** nationwide Ramadan Moon events.

3

Astronomy & Islam – Hounslow Asian and African Youth Association attended for a planetarium visit, providing valuable viewpoints on the content.

4

A planetarium show and tour of the ROG site for members of the **Empowering Deaf Society** with a BSL interpreter.

5

A special showing of Morning Stars planetarium show designed for **autistic audience members**.

Making a difference through inclusivity

The ROG team are not afraid to try something a bit different if it means that audience members are made to feel more comfortable, and a sense of belonging is cultivated. The events run as part of this project are good examples of this. During the Hounslow group visit, one participant remarked: "I enjoyed the respectful environment, and the way science and religion was linked together." It can be a challenge when working with



Without putting too fine a point on it, for South Asian stuff to be at Greenwich Observatory has some obvious, historical significance.

South Asian Astronomy group member

Members of the local Muslim community watching the planetarium show featuring the New Crescent Moon and historic Islamic astronomy.

underrepresented faith groups to bring STEM learning together with religious and cultural aspects important to the group, but as the organiser of the South Asian Astronomy event puts it: “although you don’t want to necessarily talk about the astrology and the roots, that’s something that may sing to the older generations a bit more and then you can bring it on to the modern science. It’s a really nice way of appreciating and respecting the past and bringing in those older audiences, but actually giving them a current view of where astronomy has developed into now”. This event was by its design a consultation event, and Ed and his team were glad to have created an environment where honest comments such as this could be made.

Members of the local Muslim community attending a moon sighting attempt as part of The New Crescent Society’s nationwide Ramadan Moon events



Members of the Hounslow Asian and African Youth Association who gave their valuable viewpoints on the planetarium show content

Significant learning has also come from the event with Empowering Deaf Society. “Deaf groups and planetariums have always been a bit tricky just by the logistics of it” Ed explains, elaborating that Deaf audience members must shift their attention between looking up at the images on screen and back down to watch the BSL interpreter (if there is one!) in order to understand what they are seeing. One piece of feedback that was given was to have the BSL interpreter placed higher up, perhaps on a small stage, to reduce head shifts and down. Ed wants to do even better than this and “use this positive experience as a springboard and do some sign language interpretation recording and a sort of picture on picture [version]”. Through the Deaf group, ROG has contacted a BSL translator who can translate the show and provide interpretation embedded into the on-screen images. Ed’s long-term dream is to make BSL interpreted versions of shows available for sharing to any planetarium. The exact method of distribution is still to be decided but would be a truly great example of sector-wide collaboration with far reaching impacts for a group who currently face significant enjoyment barriers to engaging with science centres and planetaria.

STFC funding will also continue subsidising community planetarium shows for targeted low-income, underrepresented families throughout 2023.

5 bespoke community events

5 different participant groups

99 total participants

Over 211 interaction hours

Building on foundations

Science Oxford

Learning new STEM skills as part of the menu of tailored activities for community partners



The team at **Science Oxford** used STFC funding to offer a 'menu' of tailored activities to new and existing community partners to allow them to increase their participation with the centre's STEM programming. The team based this menu on aspects of their programme that they knew from previous work would be a good fit to the needs and interests of community groups, and it was anticipated that each would select one or two options. What resulted was families and young people visiting for specially tailored, free of charge activity days at the centre. These included showings of a new planetarium show focused on the James Webb Space Telescope, coding workshops, rocket making, and outdoor and woodland activities. The team were also able to offer free places at their Arti-techs after school club. Some of these

She says she has made new friends, learned new skills like soldering, and has really loved access to all the different materials and techniques each session. She comes home every Tuesday buzzing with what she's created! It's such a good fit for her — she loves to make things. Thank you so much for making this club possible!

Parent

were developed through previous STFC funded projects, and their ongoing success is evidenced by the readiness that the groups show to return to the centre when the opportunity arises. Andrew Kensley, Head of Education Outreach and Training describes them as “a cohort of communities that I think it’s safe to say wouldn’t really come to see us without us helping them with transport and setting up the date”, which makes this project so invaluable for the equitable access to STEM-based experiences for young people across Oxford.

Creating Space

Whether working with a new group or an established partner, creating an environment that is welcoming, safe and exploratory is evidently key at Science Oxford. One of the newest groups they welcomed was an Afghan refugee family group, and although language barriers were an initial concern, this didn’t seem to be an issue on the day. The team report: “The families visibly warmed and settled into the space after an hour...the barriers of language with the activities were minimal and were overcome through additional staff coming alongside families and exploring together to demonstrate activities”. This shows the benefits of strong planning and a focus on facilitation for some groups, not only to aid learning, but to provide comfort too. Other groups prefer a more free-play approach, as reported by one of the community

practitioner partners who joined a group of disabled and disadvantaged young people who are disengaged from formal education. They describe the group as being highly engaged with the day and stated that an important factor was the “freedom to self-explore the science area and woodlands”. This goes to show that the Science Oxford team are ready to create the right environment based on a groups needs. In fact, one of the advantages that the Science Oxford team recognise in being a small centre is their ability to focus attention on one group at a time, giving them entire reign of the centre and the activities. Dr Emily Fisk, Operations Manager, explains it as “if they want to just be here and experience it, for some families that was already enough and quite overwhelming, never mind having to sit down with someone who’s going to talk them through something specific”.

2 after school club sessions

5 activity days for families and young people

Over 200 participants

1314 interaction hours



Banbury Community Group families visiting Science Oxford for a STEM activity day

Great opportunity to try new skills in a safe and welcoming environment. Encourages his independence and social experiences. Amazing opportunity as fully funded.

Parent



Welcoming new faces

Techniquest

The team at **Techniquest** were just as excited as their young participants to have STFC funding available to support new activities and provisions. The science centre was able to maintain and build upon strong legacy partnerships first developed through Explore Your Universe – another STFC funded programme – delivering workshops in their community playgroup and youth spaces, extending invitations to the young people’s families, and welcoming groups for the first time to their building. James, Community Engagement Officer tells that “It is the first time I’ve been able to offer some of these groups the opportunity to come to Techniquest. They all know me by this point, most of these groups; I’ve worked with them all a fair while– some of them a couple of years now. So they know me and they know I come from Techniquest but a lot of the kids have never had an opportunity to visit the science centre.” Feedback from the young people shows that it was not a wasted opportunity, with one child beaming: “I loved going down the big slide and everything else about Techniquest”. James also explains some of the feelings he picked up from the parents whose first visit this also was: “The parents that came were really appreciative to have free

access to Techniquest, just to try it out; they had no idea if they would enjoy it”. James goes on to also explain that for many parents, paying for entry simply isn’t an option and it’s only through projects such as this that they get to bring their children to such attractions and days out.

On his outreach visits to the community spaces, James was sure to provide something new and exciting there too. Using balloons of different sizes, he ran a workshop during which the young participants problem-solved and worked together to create a scale model of the solar system. Participants at the Stephen and George Trust session coloured in different emoji faces that best

4 groups visited on outreach

3 follow up visits to the centre

155 total participants

346 interaction hours



I know they love you coming out and doing different projects with them, it has helped a deprived area very much and given these children opportunities that they may never have got.

matched their feelings, with the most popular ones being 'interested', 'welcome', 'excited', and 'science is for me'. (Showing that these were honest responses, a few recordings of 'bored', 'not for me', and 'frustrated' were also given!).

A key person

At the heart of Techniquest's strong relationships with community organisations is their Community Engagement Officer, James. James provides a good example of how relationships between science centres and their partner organisations are, ultimately, just relationships between people, with trust and honesty providing the strength and endurance. James himself explains it as "for so many of these organisations, a positive role model is a powerful thing and that is what I see in most of the leaders and volunteers here. It is a privilege to work alongside them".

Making a difference through connection

One of the key outcomes of Techniquest's engagements with community partner groups is the creation of human connections. "The key thing for me from these projects is building positive relationships", James explains. When asked about how the sessions help connect participants to STEM learning, he says "the human connections and soft skills that were displayed are far more important and have a greater effect on them". However, that's not to say that the two are mutually exclusive, and it is clear

Community group leader from the Fern Partnership (a playgroup set up in the town of Maerdy to provide new experiences and a safe environment for the local children)

that through these human connections and soft skills, the participants are supported and empowered to learn and develop in other ways too that are very much aligned with 'STEM skills'. For example, at one of the ACE groups (a youth group in Grangetown, Cardiff, supporting primary aged children across subject areas) James describes the high level of teamwork and resilience he witnessed when the children made mistakes and had to redo their scale model calculations. Without strong adult-to-children and peer-peer relationships in the group, dedication to a task is far less likely.

One size does not fit all

W5

A group of young people trying out experiments at the multi-day STEM camp



The team at **W5 Science and Discovery Centre** wanted to use eGaming and sport as a hook to encourage disenfranchised youth in North and West Belfast to engage with and participate in STEM. The project's aims were to explore the concept of big data, its links to sport, and how data analytics are used in practice across all aspects of our everyday lives. After putting feelers out across youth sport organisations, the W5 team connected with Karla, a youth and sport engagement specialist working across several different roles including with Rio Ferdinand Foundation, and as a Glentoran FC social partnership worker. This partnership resulted in W5 working with young people, mostly aged between 11 and 16, from the Connswater Community Centre (CCC), the Glentoran Youth Squad, Horn of Africa people's Aid



Northern Ireland (HAPNI), and Ashfield Girls School. Activities across the different groups were varied but centred around CCC and HAPNI young people engaging in a multi-day STEM camp. Over multiple sessions, the young people learned about data and sport and were introduced to gaming technology such as Microsoft Arcade and BBC Micro:bits which they used to make their own sport-themed games. To conclude the camp, they were given the opportunity to pitch their game to industry experts in a Dragon's Den style experience. All of this was held within W5 Life – W5's new "STEM pathways site", as Matt Craig, Learning and Engagement Lead, describes it. Housed within the shared complex where the main W5 Science and Discovery Centre is also situated, W5 Life is "dedicated to addressing the skills requirements of Northern Ireland's increasingly digitised economy", and thus provided the ideal location for this innovative project.

Making a difference by listening

W5's original plan had been to put on a multi-week programme delivered both in the community and at W5, but consultation with their community partner led to the creation of a holiday club instead which condensed the same number of engagement hours over just three days, all held at the science centre. This change was vital in making the partnership and the project a success, fitting better with the community groups' existing schedules and activities, and – most crucially – providing a meaningful experience for the young people within their Easter school break. Matt says this level of flexibility and the W5 team's ability to alter plans comes from years of learnings from their community engagement work. They recognise that to engage groups who don't normally visit places like Science and Discovery Centres, everything needs to be as

197 total engagements

Over 15 hours of activities

3 full-day club sessions

542 interaction hours

1 ice hockey match

logistically easy for the group as possible, and space given to listen to what is needed and wanted. Matt elaborates: "We'd been prepared to come out and do the first session out in the community centre and see how many times they want to come out to visit us, but Karla was very keen to get them straight out and into W5. In terms of her perception of the group, she wanted a new experience for them, rather than take that slowly." Matt recognises that a 'one size fits all' approach isn't right, and that different groups and group leaders will have different perspectives on what will work best and how much time should be invested in building trust.

Looking ahead

From the initial enquiries, four other organisations have since expressed interest in getting involved in a project of this nature, combining sport, data, and STEM skills development. "There's definitely scope there to work with sports organisations on a skills-based programme like this...so this could be become part of a regular community offering, locally and wider than that," says Matt.

There's definitely scope there to work with sports organisations on a skills-based programme like this...so this could be become part of a regular community offering, locally and wider than that.

Matt Craig, Learning and Engagement Lead, W5



One provocation, lots of opinions

We The Curious



I am very excited to hear young people's opinions on space science. I think it's so important that we listen to them and guide our efforts knowing that perspective.

**Gemma Kerr,
Content Creator,
We The Curious**

We The Curious (WTC) embarked on a journey to enhance their digital content by making it more participative. With the support of STFC funding, they partnered with City Academy Bristol to deliver a series of hands-on workshops to Year 9 and Year 10 pupils. The workshops encouraged participants to explore the question, "Should space science be a priority in the current time of crisis?"

The STFC funding allowed WTC to facilitate six workshop sessions involving two classes and three specialists. Over 14 hours of participatory discussions and debates took place, centred around the theme of space science. The workshops provided a platform for the students to interact with specialists working in research funding, environmental research, and the space industry. By engaging in these sessions, the students developed their ideas and explored various aspects of the topic, leading to the creation of TikTok-style videos to authentically express their perspectives.

The students surprised both the experts and the WTC team with their complex, insightful, and diverse thoughts and opinions. The range of space-themed videos produced by the young participants reflected the deep conversations and interactions that underpinned their creation. One group delved into exploring different aliens' cultures on Venus and Mars, influenced by conversations around cultural heritage and diversity in the UK. Another group highlighted the historical prejudices faced by



Pupils from City Academy Bristol creating TikTok-style videos to authentically express their views on space science

female astronauts and the gender biases in the design challenges faced by women in the International Space Station. Additionally, some students expressed scepticism about space exploration, believing that resources should be focused on solving problems and exploring Earth. They also discussed inequalities within the space industry and criticized the privileged position of billionaires in space travel.

The insights gained from the workshops surprised space industry specialist Adele Fox, who initially expected the students to be more excited and inspired by the sector. The negative views expressed by the students emphasised the need to challenge their perceptions and highlight the potential for the space industry to contribute to the betterment of humanity.

We want to do this with more schools...What has become clear is that just with one year difference, going from key Stage 3 to Key Stage 4, you see this huge difference in the way that the kids are responding. What happens when you talk to six formers, and what happens if you talk to groups from different schools? I think that is really interesting.

**Adam Richardson,
Digital Producer,
We The Curious**



6 workshop sessions

2 classes

3 specialists

14 hours of participatory discussions and debate

181 interaction hours

Opening doors creates opportunities for innovation

Winchester Science Centre

Winchester Science Centre (WSC) allowed their bold aspirations to take them further than they imagined with this STFC funding, designing a four week, repeat engagement model with four schools, exploring themes of climate and the scientific method.

> week 1

Whole school assembly themed on the science of protecting the Earth

> week 2

Three workshops focused on coding, materials and forces

> week 3

A climate tracking satellite project that pulled in all the skills developed in the workshops

> week 4

A testing, evaluation, communication and celebration event with science professionals and parents

Each school was also invited for a free visit to the science centre, where they enjoyed another workshop, time to explore the centre, and a show in the state-of-the-art planetarium. Throughout all of this, teacher support was given through lesson advice and dedicated CPD time.

The team reached out to these four select schools – all of which are within areas of significant deprivation and with a high percentage of learners with special educational needs – as schools they hope to work with long-term. This project allowed the team to start building trust and confidence between the schools and the science centre, something they identified as a vital first step towards meaningful partnerships. Whilst there were some initial struggles with communication and pinning down a primary contact to work with, the project has helped WSC to understand how these very different schools operate, something they can be more responsive to now.



I loved the satellite building and now the laser activity.... I can do the expert ones now!

School pupil participant

Making a difference through confidence and aspirations

From feedback collected post-workshops, the participants clearly enjoyed many aspects of WSC's visits to their school. Particularly high praise was given to the satellite building and materials testing activities. When asked



Pupils from Barton Primary School enjoying the experiments during the materials workshop

to name their favourite part, one child gave the honest response of “building satellites as I don’t enjoy science unless I am making something”. The science learning was in no short supply either, with pupils able to share things they had learned, such as: “Tin foil is really good at reflecting heat”; “Some materials absorb energy”; and “It doesn’t need to look nice, it just needs to work”! Andy Keenan, Head of Widening Participation and Engagement, shares that “This project has undoubtedly built the confidence of the children, both with science but also with the softer skills such as teamwork and oracy”, an idea which is backed up by student reflections such as “we didn’t work well together at the beginning, but we got better as we went on”. It is with confidence that the learners will be able to see STEM as something for them, as having value in their lives, and possibly even something they could believe themselves doing when they’re older.

The children’s aspirations were a consideration of the team and something they aim to have an influence on, starting with this project and into the future as the relationship with the schools and learners progresses. Data collected at this early stage shows that while 94% of the students surveyed agreed either ‘yes’ or ‘a bit’ to the statement ‘I like finding out how things work’, only 37% answered the same to the prompt ‘I think I could work in science when I am older’. Of course, there could be many reasons for this, but the WSC team are keen to see if access to regular STEM provision changes this at all and are also working on making connections with the pupil’s parents in the belief that this may help with raising the young people’s aspirations.

Added outcomes

Andy describes some of the far-reaching impacts of this project which go beyond their initial expectations. Originally, they had planned to work with just three

schools, but the project pushed them to reach out to a fourth, one which they hadn’t managed to work with before, despite efforts to do so, and this has had some positive effects all round: “We are looking more on our doorstep which we wouldn’t have done if we hadn’t engaged with that school because we’ve traditionally struggled with this area, all of a sudden doors opened for us”, Andy explains. “I think the timing was just perfect to get into that school.” Rachael Baker, Curiosity Officer at Winchester Science Centre, elaborates further: “Off the back of that, we’ve been able to do a slightly different project with the school as well. Using the contact we’ve made with this project we’re going to go in and do some testing of new workshops.”

Further to this, at one of the recent celebration events at a school in one of the most deprived areas on the Isle of Wight, the team had invited along a local tech industry employer who was so impressed they now want to do community engagement work with WSC. “It has been a vehicle for schools, teachers and children, and employers as well”, says Andy.

4 schools

1 week-long project in each school

380 learners

Over 70 parents

4340 interaction hours

620 pupils watched planetarium shows

Changes in the making

Xplore!



Quiet days, exclusive access and tailored experiences has propelled Xplore! into an exciting time of change and improvement

The team at **Xplore! Science and Discovery Centre** took a multi-pronged approach to using STFC funding to help improve their socially engaged practice across the organisation.

1

Designated Sundays for those with an additional need or disability, with reduced entry costs and specific adjustments to help make the centre fully accessible.

2

Exclusive access and tailored experiences offered to new and existing community organisations.

3

Collecting critique and feedback of the centre from families and community visitors, making immediate changes where possible.

4

Micro-grants for community partners to help with STEM learning provisions.

5

CPD for staff with external speakers delivering deaf awareness and autism awareness training.

The outcomes of this work were as diverse as the approach itself. For instance, new long-term, equitable relationships have been made with community organisations and their members, including Dynamic – a charity in Wrexham for children and young people with disabilities. Previously, Dynamic hadn't considered Xplore! as a suitable place to bring their group, as Clair explains: "When I first spoke to the activity provider at Dynamic,

she'd said how her opinion of Xplore! had changed from coming in and talking to us and that originally she had thought that we were just for little kids and that we were inaccessible". A visit to the centre seems to have secured an improved perception, with the Dynamic leaders feeding back: "The staff and young people enjoyed their time and the activities, and some did say that they would like to come back with their families". Similarly, individual families have also discovered Xplore! as a place they can visit with children who have complex needs. Clair describes one conversation with a parent during an Inclusion Sunday event: "I was speaking with a mum, and she said how their son does not stay anywhere for long and their trip to Xplore! has been the most successful one to date", going on to say that the family purchased one of their annual passes and so will definitely be back!

Making a difference by giving people a say

One of the key methodologies used over the course of this project was to facilitate visits in a way that empowered people to notice and report back on what did and didn't work for them. Dawn, Project Officer at Xplore! describes the impact of this approach, saying that the events were "really informative, helped us share quite a lot of skills with the rest of our delivery team, but gave us some really good feedback as well that we're implementing".

The team also give another example of where authentic input from an underrepresented group makes all the difference. The National Autistic Society of Wrexham were booked in for a Friday visit, only for no one to arrive at the centre. Following up with the group coordinator, she reported back: "I think the time and day didn't suit as we don't usually meet on that day. I had thought some may have taken us up on the offer." This allowed the Xplore! team to really push that they wanted to work with the group at a time that worked best for them, which turned out to be Sundays. The group are now booked in indefinitely for Sunday Lego workshops which are proving to be very popular!

By allowing so many different groups of people to have an honest say in how the science centre could better accommodate their needs, Xplore! has been propelled into an exciting time of change and improvement. It starts with the simple changes that that may not seem like much but make a big difference to people's STEM engagement experiences – such as adding new lights in places for visually impaired visitors, lowering lighting levels in others to better suit sensory sensitivities, and putting rubber feet on chairs to reduce the noise on the floor at the request of hearing aid users. Dawn describes them as "small changes but part of the package for how we're improving". There have also been larger operational changes to better accommodate certain groups, for example reducing visitor numbers or avoiding doing birthday parties on certain days. While the positive impacts are clearly felt by those they are designed to help, there are inevitable financial implications, all of which must be carefully considered.

Staff development has also been an important part of this project. A need for D/deaf awareness training, for instance, was identified following a visit from Chloe's and Sophie's Special Ears Fund, a charity working with children who are deaf or hard of hearing, and their families. Group leaders have said "It will be interesting to come back and visit once they have received the training to see what a difference it has made." Until their next visit, the young people are still being helped to feel represented within STEM through funds provided by Xplore! which the group have used to buy STEM books featuring a deaf main character.

We had a wonderful day. My children really benefit from a relaxed, unstructured environment and so they both had a brilliant time. The quiet, sensory room is a great idea and we spent some time in there – some nice activities to choose from too.

Parent



3 'Inclusion Sundays'

Over 300 visitors welcomed

542 interaction hours

4 community partners

1 staff training day



What's next?

“We want people to see that science is part of culture”

Recent research across the sector ⁽¹⁾ highlights the role of Science and Discovery Centres in society to empower, inspire and inform the citizens for the future, offering lifelong learning opportunities and moments to use, practice and question science and its connection to the world we live in.

Science and Discovery Centres are on a mission to matter. Their image from 20 years ago as children's visitor attractions for those already interested and engaged with science is changing as they become accessible, place-based STEM hubs nurturing the development of key skills such as creativity, critical thinking, perseverance,

and problem solving. Informal science learning develops these essential skills for a global society shaped by science and technology.

What's next is a future where Science and Discovery Centres become the natural go-to to support and amplify seldom heard voices; trusted spaces for meaningful dialogue with government, civic stakeholders and business that enable everyone to fully participate in UK science research, industry and policy.

What's fundamental is equitable engagement alongside inclusive institutional cultures where the creative thinkers of today are enabled to become the diverse and flourishing scientists, researchers, and innovators of our future.

⁽¹⁾ scienceanddiscoverycentrefutures.the-liminal-space.com

Annexe

Further resources



Dynamic Earth and Tinderbox
Sparks video: youtu.be/l8Wf0fjOBHY



National Space Centre Coalville
C.A.N. video: youtu.be/h4aw7NBzdvk



We The Curious blog post: Should we be exploring space?
wethecurious.org/curious-stuff/stargazing-night-sky/should-we-be-exploring-space

Acknowledgements and thanks

These 16 projects have been made possible thanks to the ongoing support and funding from the Science and Technology Facilities Council (STFC).

We are incredibly proud to mark over a decade of successful collaboration between STFC and ASDC with these excellent results. In order for UK science and innovation to thrive, it is essential that communities who are under-represented in the STEM sector are engaged with the amazing stories that the science and technology community has to tell. These collaborations between STFC, ASDC, and community groups, young people, and families have inspired people across the UK to take an active role in science and provided fantastic opportunities for the benefit of all of society.

**Neville Hollingworth,
STFC Public Engagement
Manager**

About the Science and Technology Facilities Council (STFC):

The Science and Technology Facilities Council (STFC), part of UK Research and Innovation (UKRI), is a world-leading multidisciplinary science organisation, and our goal is to deliver economic, societal, scientific and international benefits to the UK and its people – and more broadly to the world.

Our strength comes from our distinct but interrelated functions.

STFC funds and supports research in particle and nuclear physics, astronomy, gravitational research and astrophysics, and space science and also operates a network of five national laboratories as well as supporting UK research at a number of international research facilities including CERN, FERMILAB and the ESO telescopes in Chile. STFC is keeping the UK at the forefront of international science and has a broad science portfolio and works with the academic and industrial communities to share its expertise.

ukri.org/about-us/stfc/who-we-are/

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Our thanks to the valuing inclusion project team; Shaaron Leverment, ASDC Chief Executive and Project Director, Rachael Tapping, ASDC Head of Communications, project support from the team at ASDC, Craig Smith, Project Manager, Laura Thomas, Ondata Research and Justin Desyllas, design and layout.



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