Ondata Research

Our World From Space Evaluation Report

Laura Thomas, March 2025

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About the author

Laura Thomas has significant experience supporting organisations such as learned societies, professional bodies, science centres, education charities and universities in gaining an in-depth understanding of the impact of their programmes and activities. Following a first degree in Astrophysics, Laura's career was in physics outreach and public engagement before she moved into the social sciences. After completing her MRes in Educational Research she has progressed on to part-time doctoral research into teacher professional learning and retention at the University of Stirling where she is also a Research Fellow. This is carried out alongside her work leading Ondata Research.

Executive Summary

The evaluation methodology for Our World from Space was Mixed Methods, using a combination of quantitative and qualitative data. An evaluation plan was agreed with each delivery partner depending on their programme of activities. The evidence available for the evaluation included participation numbers, survey responses from different audience groups, reflections from delivery staff, project managers and researchers along with observations made by the external evaluator and ASDC programme manager. Support with evaluation was available for the delivery partners across the whole of the project, with regular check-ins and advice on data collection and reporting.

There is significant evidence from across delivery partners that the audience groups engaged in this project have been inspired “with a sense of curiosity and discovery about the UK’s role in space” (Programme goal 1). The Our World from Space activities and resources have been effective in showing the relevance of UK space science to daily life (Programme goal 3) and also in showing its importance for the future sustainability of Planet Earth (Programme goal 2). Over 90% of families responding to a survey (n=650) strongly agreed or agreed that following the activities they can see a connection between space science and their own lives and that space science is relevant to the health of the planet. When asked about *how* space science is relevant, many of the responses from families, school pupils and teachers focussed on how satellites are used to monitor the climate.

Staff in delivery partner organisations benefited from excellent professional development and the project has provided the opportunity for organisations to build capacity in terms of knowledge and skills (Programme goal 4). The success of conveying relevance and connection were particularly mediated through the ‘global to local’ message, with delivery partners tailoring content and making links to local issues and impacts as well as local research and industry. The Our World from Space content has a legacy within participating centres; it is embedded in programmes, the knowledge of topics and links made to local research and industry will continue to influence their activities in the longer term and the conversations and discussions between staff and participants will continue. It also provides a strong foundation for the sector to engage further in space science and climate science.

There were three elements which were core to the success of the project. First was the flexibility given to delivery partners to determine what activities and audience groups to target, second was the way in which delivery partners were able to connect the activities to their local context and thirdly, was the length of the project. ASDC has successfully curated a project which meets the needs of centres, helping to develop knowledge and skills to talk about space science and climate science. ASDC staff have also provided a high quality level of support and guidance to delivery partners in the sector.

1. Introduction

The Association for Science and Discovery Centres (ASDC) developed, co-ordinated and led the Our World from Space project with delivery beginning in June 2023 and concluding in December 2024. Funded by the UK Space Agency and the National Environment Research Council, (NERC, part of UK Research and Innovation) the programme vision was to “inspire and empower a society that embraces the value and relevance of space science for everyday life and the sustainable future of our planet.” This vision was supported by four programme goals:

1. To engage, inspire and involve school-aged children, their families and their teachers with a sense of curiosity and discovery about the UK’s role in space.
2. To promote an understanding of the value of Space for the future sustainability of Planet Earth.
3. To build on the previous phases of Destination Space and Operation Earth, effectively supporting science capital with a personalised and localised approach that promotes the relevance of UK space science to daily life, through a ‘from global to local’ narrative.
4. To provide professional development and build capacity for science and discovery centre and museum staff and organisations.

Organisations were invited to apply for funding from ASDC and across the eighteen months of delivery, a total of 25 delivery partners from across the UK took part. The map in Figure 1 shows the locations of the delivery partners. Although please note that Aero Space Kinross, Exeter Science Centre and Science Made Simple do not currently have a central physical location, instead going into schools and the community to deliver their sessions. Others, such as the Science Skills Academy have multiple locations they work from across the Highlands and Islands. Whilst much of the engagement from all of the delivery partners happened within their home base, just under one quarter of the events were listed as “outreach” meaning they took place in a school, community centre or other location as part of a festival.

Overall **263,847 participants** were engaged in **1700 different activities** over the eighteen months of delivery. This resulted in **166,553 interaction hours** (participants times length of activity in hours) with broad audience groups, ranging from early years and primary to the general public and families. Figures 2 and 3 show these proportions by participation numbers.

Figure 1. Our World from Space delivery partners

ID	Organisation Name	ID	Organisation Name
1	Aberdeen Science Centre	14	Royal Museums Greenwich
2	Aero Space Kinross	15	Science Oxford
3	Armagh Observatory and Planetarium	16	Science Skills Academy
4	Cambridge Science Centre	17	Scottish Association for Marine Science (Ocean Explorer Centre)
5	Dundee Science Centre	18	STEM Discovery Centre
6	Dynamic Earth Science Centre and Planetarium	19	Techniquest
7	Science Made Simple	20	The Living Rainforest/Trust for Sustainable Living
8	Exeter Science Centre	21	The Observatory Science Centre
9	Glasgow Science Centre	22	Thinktank
10	Jodrell Bank Centre for Engagement	23	W5
11	Life Science Centre	24	Wonderseekers (WSC)
12	National Space Centre	25	Xplore!
13	Oxford University Museum of Natural History		

Table 1. List of delivery partners and map ID

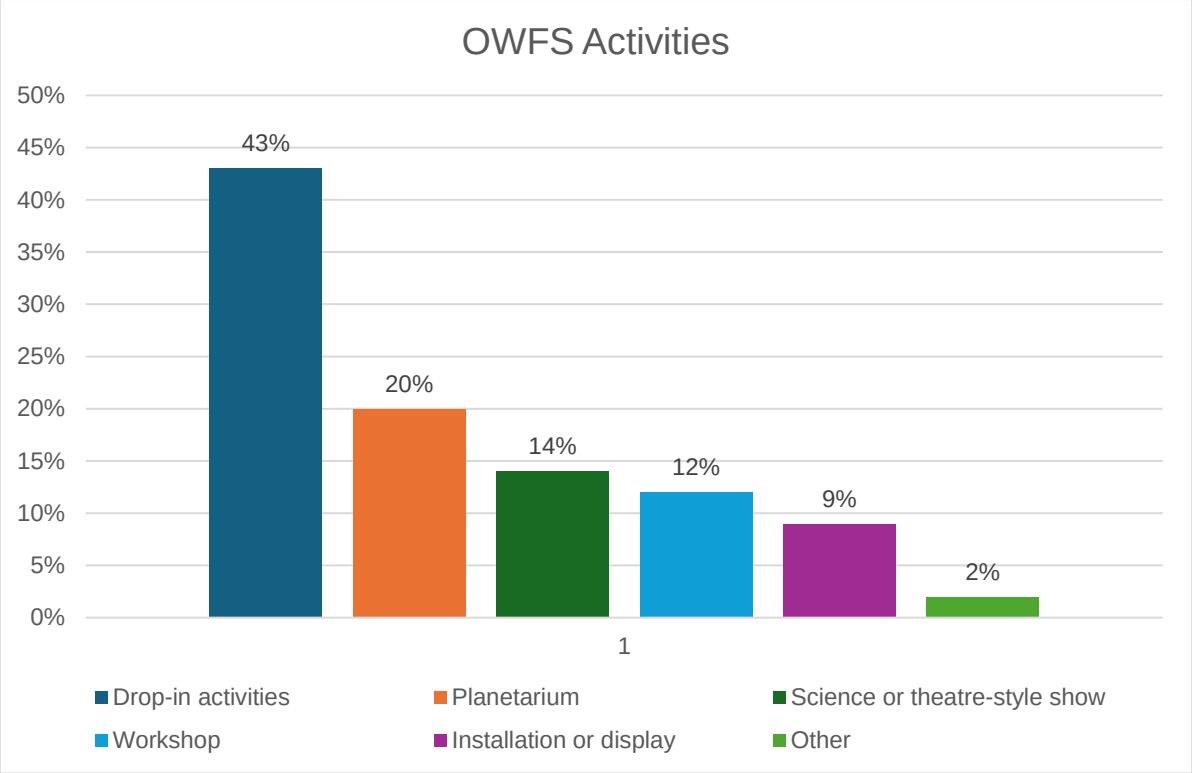

Figure 2. OWFS activities (by participation numbers)

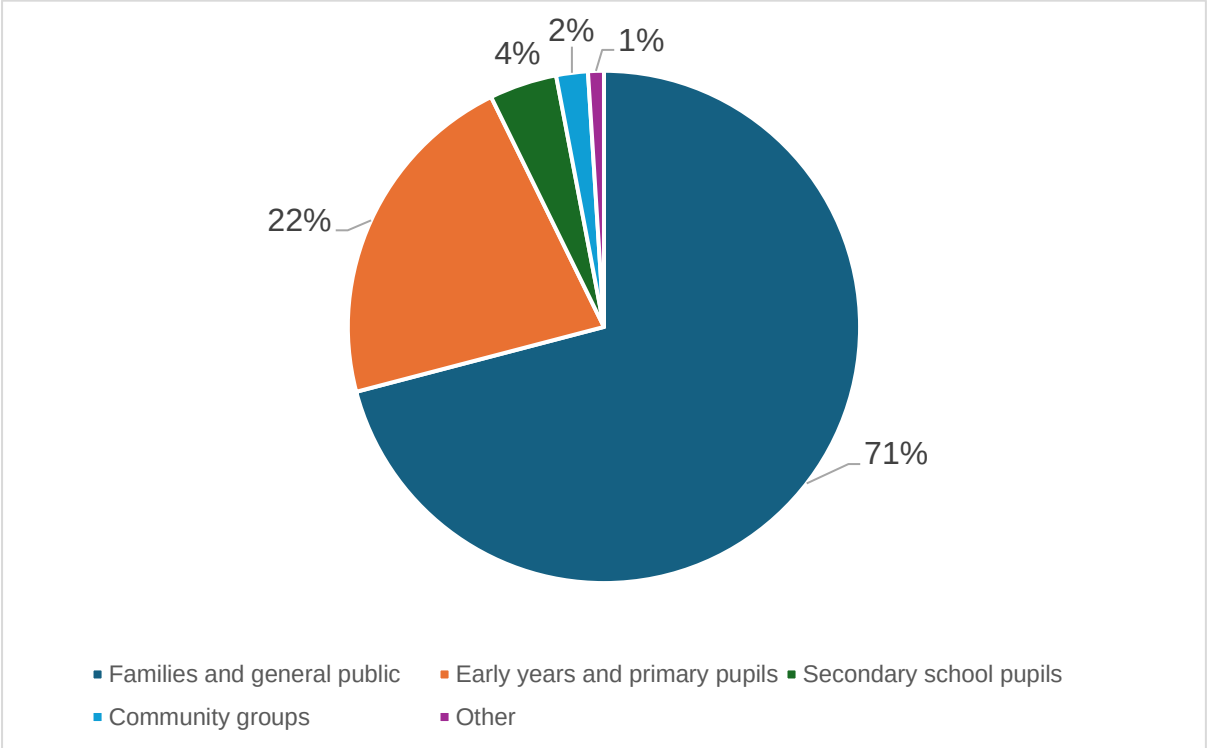

Figure 3. OWFS audience groups (by participation numbers)

Each delivery partner was able to determine what activities they wanted to run as part of the programme. This flexible method of delivery continues the approach taken by ASDC in recent years, introduced for a previous national programme, Destination Space 3[1]. ASDC provided a central set of resources and activities (forming a digital handbook), developed by ASDC in partnership with Dynamic Earth, the National Space Academy, Science Oxford and the National Centre for Earth Observation.

The co-ordination and project management was led by the ASDC Programme Manager. In terms of staff contributing from the delivery partners, there was a Project Manager who oversaw their involvement and then on the delivery side, there would be Science Communicators or other staff leading activities and sessions. In some cases the Project Manager and Science Communicator would be the same person and in others these would be different people. Two members of staff from each of the delivery partners in Our World from Space were invited to attend an in-person training session in Spring 2023. Following this there was then time for them to adapt and incorporate the resources and activities into their delivery. Twenty two delivery partners were involved across the full delivery period, with 3 further delivery partners (Jodrell Bank, Ocean Explorer Centre and Science Made Simple) joining in the final six months. Delivery partners were asked to deliver sessions which had an engagement of 3,000 interaction hours, although this did vary for some partners, e.g. those joining later had lower targets to meet. There were many different ways in which they could achieve this. This measure allowed for delivery partners to run shorter, drop-in sessions with hundreds or thousands of people or longer, repeated engagements with tens of people.

Whilst delivery partners were running varied programmes of activities, reaching different audience groups there were core topics in common. These were satellites, biodiversity, climate and oceans. The majority of the content for the activities was reported as being linked to satellites (over 60% of the sessions were reported as having satellites as a core topic). However, satellites were often used to link to the other topics and around 20% of the sessions used more than one topic. Full details on the types of activities and engagements undertaken by the different delivery partners can be found in the accompanying case studies and there is one available for each of the delivery partners who took part.

[1] Destination Space 3 report: https://www.sciencecentres.org.uk/documents/720/Destination_Space_Phase_3_Final_Report.pdf

Examples of the most common sessions are described below using wording provided by delivery partner staff and a summary of what types of engagements each organisation took part in can be found in Appendix A.

- School workshops:
    - “Workshop exploring impact of increasing CO2 levels and how satellites help us monitor our climate” (Project Manager)
    - “Workshop exploring habitats around the world and biodiversity” (Project Manager).
    - “Workshops linked to ocean acidification, population monitoring and global impact of climate change.” (Project Manager)
- Drop-in activities with families:
    - “As part of this ‘exhibit’, we compared temperatures of typical external materials (like brick, tile, tarmac, plastic grass and plants) - we gave people the infrared camera to look at each, and different groups were almost jostling to see the image and pulling their family members in - ‘come and look at the fake grass, you won’t believe how hot it gets’. This was a really good hook for this kind of event and led to a lot more conversations around urban cooling via plants, and how infrared satellite measurements can help identify problem areas.” (Science communicator)
    - “Using this [Infrared (IR) camera] technology as a part of the project, we’ve been able to have some really good conversations about how this technology can be used to look back at our planet, including looking at things like the ocean temperatures and how the effects that our daily lives might have on the climate around us. We've also been able to talk to them [the general public] about their homes and how they can use infrared technology to look at their own homes and the heat loss that they're being affected by and how they can improve the amount of heat loss from their homes. We've also had many opportunities to talk about how infrared technology can be also be used in space, how we can use the satellites that are out there, including the James Webb Space Telescope, to use infrared to be able to see through things that we would normally be able to see through, like massive dust clouds in space, and being able to use that to see our world and things very, very far beyond.” (Science communicator)
- We Are Guardians public planetarium show: “We Are Guardians is a 30 minute show about how satellites work, what ecosystems are, and climate change. It ranged from micro- to macroscopic views of how the world, and our place within it, works.” (Science communicator).

The following section outlines the evaluation methodology.

1.1 Methodology

The evaluation methodology for the project was Mixed Methods, using a combination of quantitative and qualitative data. Due to each delivery partner running a different programme of activities, one core aspect of the methodology had to be its flexibility. The evaluation framework is outlined in detail in Appendix B but the key themes for the evaluation evidence were identified as:

1. Impact of participation in activities on different audience groups.
2. Audience groups identify the value and relevance of space science for the sustainable future of planet Earth.
3. Audience groups take action or change behaviour following participation.
4. Centres develop locally-focussed activities and engagements in order to convey the from 'global to local' message.
5. Impact of project on Project Manager, centre staff and centre itself.

Against each of the themes, different areas of evidence were listed. For example, in relation to the first theme of impact of participation one of the areas of evidence was:

> Improved audience understanding of the UK's role in space. For example, through increased knowledge of skills required and the career routes into the space-related sectors or increased awareness of local research and innovation.

The following table summarises the different sources of data available for this evaluation. Delivery partners were able to select suitable evaluation tools based on a library of methods available to them, but they were all expected to engage in the Project Manager reflections and to submit participation metrics quarterly. The evaluation approach is outlined in more detail in Appendix B. There is a breadth of rich evidence available and the evaluation was designed to draw on multiple sources ensuring that there was not a reliance on one source of information. Drawing from multiple sources also helps to corroborate and validate findings or to highlight where there are differences. The evaluation method was also selected to be appropriate to the activity. For example, surveys were recommended for workshops and longer engagements. For drop-in activities which were around 10 minutes, staff reflections were recommended. This meant staff could feedback on their discussions with visitors, indicating popular topics and how they felt audience groups had engaged with the activities.

Whilst there were of course quantitative approaches and data available, the analysis and discussion in this report are formed on a significant base of qualitative evidence. The descriptions provided via the staff reflections were incredibly valuable and allowed for significant insight into the experiences of staff and participants. The evaluator spent the entire

duration of the project working with ASDC and organisation staff and so the discussion in this report is informed both by the evidence but also by the experiences of the evaluator.

Quantitative data			
Description	**Purpose**	**Data available**	**Comment**
Quarterly metrics from centres outlining participant numbers, interaction hours, type of activity and other contextual information such as school postcode.	To record levels of engagement with different audience groups.	Over 1700 entries, one for each event or activity delivery partners ran.	These metrics were analysed and reported on quarterly to ASDC and funders.
Closed survey questions	To get an indication of impact of participation with respect to the programme's goals.	Over 2000 individual responses from pupils, teachers and members of the public.	Delivery partners chose survey questions suitable for their audience group. This represents a 5% sample, based on the sub-set of activities where a survey would have been used. The survey findings were cross-referenced and validated using the other sources of evidence.
Qualitative data			
Description	**Purpose**	**Data available**	**Comment**
Open-ended survey questions	To get an insight into participants' opinions in relation to the activities.	Over 2000 individual responses from pupils, teachers and members of the public.	
Staff self-reflection following activities	To gather feedback and impressions from staff involved in delivery.	106 responses from staff running OWFS activities, including drop-in sessions, workshops and planetarium shows.	Especially important for shorter activities such as 10 minute drop-in activities where a post-participation survey would not be suitable.
Project manager quarterly self-reflection	To provide context and further information about the organisation's experiences during the programme delivery period.	138 responses from Project Managers leading on OWFS in their organisation.	These responses were received every 3 months across the 18 month delivery period.

Focus groups	To gain further insight into the experiences of the delivery partners.	5 focus groups were held with staff from delivery partners.	These were held following the conclusion of delivery.
Observations and visits	To become more familiar with the different content being delivered by the delivery partners.	7 delivery partners were visited by Ondata or a member of ASDC staff.	General impressions of these visits were recorded to aid with context when carrying out data analysis.
Partner feedback	To better understand the experiences of external organisations and volunteers partnering and supporting OWFS activities.	21 responses to a reflection tool for delivery partners and 1 interview with a volunteer who contributed to one organisation's programme of delivery.	
Other participant-related data	To provide evidence for impact of participation on different audience groups.	Several delivery partners provided a range of other pieces of data from schools, including short interviews (vox pops), thank you letters, links to blog posts and pictures of responses to open-ended questions within activities.	

Table 2. Summary of evaluation data available

In addition to the feedback being gathered from staff and participants, another important aspect of the evaluation was a case study from each organisation. This was outlined to the centres from the beginning via their evaluation plan and organisation staff were supported in identifying a topic and in writing their case study which was completed in the final months of delivery in 2024. These case studies have been collated by ASDC in an accompanying report and provide details of the experiences of the different delivery partners. This report does not repeat any information from these case studies but highlights examples and links to specific activities and experiences reported by delivery partners.

2. Key findings

The key findings explore the experiences of organisation staff and participants from a range of audience groups in the Our World from Space (OWFS) sessions. As outlined earlier, descriptions of the activities undertaken by the individual delivery partners can be found in the accompanying case studies which have been produced by each organisation as part of the evaluation process. The evaluation findings link to broader themes arising from the experiences across all participants and delivery partners drawing on a range of evidence.

The first area of discussion (section 2.1) summarises the outcomes and impacts for all of the participating audience groups, looking at the experiences of primary and secondary pupils and teachers, families and the general public, community groups, uniformed groups and others such as interns and volunteers. This section links to Programme Goals 1 and 2 relating to audience engagement.

This is then followed by the first of two case studies (section 2.2). This focusses on primary school aged children and the activities they engaged with, which tended to be workshops. This explores the workshops from the perspective of the staff leading them and the delivery partner Project Managers, identifying where there were particular successes in engaging pupils and where there were challenges. The perspectives of pupils and teachers are included here, giving a sense of the outcomes of the sessions and the lasting messages being taken away.

The second case study (section 2.3) is on drop-in activities for families. The family and general public audience group accounted for 71% of participants and 22% of engagements (see Table 3) were via drop-in activities. Again, we begin with delivery partner staff experiences of these sessions but also bring in those of partner organisations and volunteers before looking at the family feedback.

The final area of discussion (section 2.4) explores the experiences of staff within delivery partners and links mainly to Programme Goal 4 around building capacity within the delivery partners and the sector but also to Programme Goal 3 and the localisation of the content of the activities and engagements. The delivery partners all involved different numbers of staff depending on their size and operational approach. Some smaller delivery partners had one or two members of staff responsible for all delivery and project management, whilst larger delivery partners had a Project Manager who co-ordinated the session activities across multiple teams and departments. This discussion then concludes with a further analysis by Dr Charlotte Thorley as she discusses engagement with underserved audiences and what OWFS delivery partners understand these to be.

2.1 Inspiring and engaging audiences

We begin with a discussion of the experiences of the participants across the different audience groups. The main audience groupings engaged with were families and the general public, primary school pupils and teachers, secondary school pupils and teachers, community groups and uniformed groups (e.g. Scouts, Guides). There were also tens of people who contributed to the programme as interns who were students from further or higher education or in secondary school (included in 'Other'). Table 3 shows the broad breakdown of groups and the detailed numbers can be found in Appendix A.

	Participation numbers	
Group	**n**	**%**
Early years and primary pupils	58700	22%
Secondary school pupils	11134	4%
Families and general public	186987	71%
Community groups	5214	2%
Other	1812	1%
	263847	

Table 3. Participation numbers by broad audience groups

Across the delivery period Project Managers consistently reported on successful engagements with their target audiences. One core part of the activities has been the opportunity for delivery partners to get into conversations and discussions with the different participants. In many instances, Project Managers report sessions running over because of the enthusiasm and interest from the audience. Many different topics related to space science and climate change resulted in conversations and this was the case regardless of the setting, whether it was a recently refurbished and reopened science centre or a more traditional museum setting.

There was extensive evidence of enjoyment of the activities, an increase in knowledge across many different audience groups and an enthusiastic engagement with the topics through discussion and conversation. This engagement can result in an increased confidence in space science and climate science, with Project Managers and other delivery partner staff reporting on the intentions of different audience groups to go away and find out more about the topics and the potential career opportunities available.

2.1.1 Inspiring curiosity in space science and climate science

There was a strong sense of enjoyment recorded by staff and group leaders:

> “A few children said to us that they hadn’t previously enjoyed science but now they really did.” (Science communicator).
>
> “The children really enjoyed themselves and would love to come again.” (Uniformed group leader)

100% of teachers (n=79) strongly agreed or agreed that they had enjoyed the activity they were involved in and 97% strongly agreed or agreed that their pupils had enjoyed taking part. Similarly, 94% of uniformed group leaders (total n=34) enjoyed their sessions and 91% of the uniformed group participants enjoyed their sessions (total n=76).

Through the discussions in the sessions, participants would sometimes indicate an intention to go away to do more research or to talk to friends and family about what they had learned. Across many of the delivery partners, one of the clear impacts for the participants was an increased awareness in how research and industry local to them was involved in space science and climate science.

> “I think the participants have an improved understanding of the UK's role in space science through both meeting practitioners who use satellite data and through the profiles and mission tasks we have designed based around real local researchers.” (Project Manager)
>
> "Most people of all ages I spoke to wanted to talk about climate - quite a lot interested in the science of monitoring as well as of taking action." (Researcher)

Along with this was the opportunity for delivery partners to highlight potential career paths. Many of the activities were designed to outline the different roles of scientists and engineers but also linked to local work. When asked whether they had a better understanding of careers available to their pupils, 68% of teachers strongly agreed and 18% agreed (total n=32). In the feedback from Project Managers, it was clear that much of this was new knowledge for the audience groups, with many expressing “surprise and interest” in the opportunities available within the space sector, especially in terms of the range of roles available and that the opportunities are in the UK and local to them.

> “We are lucky to have many space related companies and organisations close to us, and so signposting how close some of the tech being created actually is we can link students to space by where they live.” (Project Manager)
>
> "Some audience members had a strong interest in the UK Space Sector, and specifically sought out companies like ours to ask detailed questions." (Industry professional)

One significant outcome for the project is that there are participants who are going away with an increased confidence in talking about space science and climate science and also that they have a curiosity about the topics that they want to explore further.

> "Following participation in our OWFS activities, audiences are far more confident in talking about space science and how it is incorporated in our everyday lives. Children suggested further ideas as to how satellites can be used e.g. how migration patterns can be further investigated. Adults seemed to be happy to discuss in further depth how satellites monitoring planet Earth could better help us to study and maybe reduce the effects of climate change on our planet, and plan for a better future outcome with the help of satellites." (Project Manager)

2.1.2 Improving understanding of the relevance of space for the health of the planet

The OWFS activities also challenge existing perceptions and assumptions.

> "Family groups specifically mentioned a change in perspective when looking at the world from a space point of view." (Project Manager)

> "Many audience groups were more confident in talking about space science, realising that space technology wasn't all to do with looking out away from our world and that space science was helping us monitor climate and environmental science changes. This seemed to give the audience less eco-anxiety knowing that we could monitor much more than what we could monitor even a decade ago." (Project Manager)

We can see from the feedback from families and the general public attending a range of events that over 90% of respondents strongly agreed or agreed that they can see a connection between space science and their own lives and that space science is relevant to the health of the planet.

We can see a connection between space science and our own lives.	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Total
	368	253	20	8	1	650
	56.6%	38.9%	3.1%	1.2%	0.2%	
We can see that space science is relevant to the health of the planet.	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Total
	437	170	20	5	3	635
	68.8%	26.8%	3.1%	0.8%	0.5%	

Table 4. Family feedback

The content of the resources and activities provided to the delivery partners also met the needs of a range of audience groups.

> "Younger audiences seem particularly interested in searching for penguin poo, while older students and adults enjoyed the challenge of the satellite card game." (Project Manager)

> "Children were able to recognise GPS and satellite maps and associate their use in cars. Teenagers and adults were able to see further in depth at how satellite imagery

> can also help with the production of food as well as areas with weather prediction systems and GPS monitoring." (Project manager)

An example of the way in which delivery partners engaged with audience groups can be found in the Armagh Observatory and Planetarium case study.

Delivery partners told us that being able to use satellite imagery that they could say came via the European Space Agency and UK Space Agency funded projects was very helpful in highlighting the role of the UK in contributing to research and industry. It was very commonly reported across the lifetime of the project and across different audience groups that there was not a well-known understanding of the UK's role.

> "Many audiences were less aware of UK's involvement in space in any way and we have had some great comments and conversations about potential UK careers in the space sector." (Project Manager)

> "I don't think many of the visitors who have taken part realised before the work the UK space agency has been doing, they all seem surprised when they realise these are UK or ESA images and data." (Project Manager)

There were many different ways in which delivery partners engaged audiences and explored the relevance of space science to their daily lives. This included looking at how space-related technology is integrated into people's lives such as GPS. Other delivery partners looked at the data coming from satellites, including climate and weather but others looked at typical food items and how coffee, chocolate and bananas are sourced and where they come from. This had implications for tracking habitat and deforestation but also trade routes and shipping data.

In terms of the conversations with different audience groups, more than one staff member noted that whilst some certainly had an awareness of the existence of satellites they had no understanding of how they worked. For many, they know they get satellite TV but hadn't questioned how. This person commented that they felt the 'We Are Guardians' planetarium show particularly contributed to improving peoples' understanding of how satellites work and what they are.

> "There were loads of conversations that our team had with people about, 'oh, I had no idea that satellites were being used to do that'". (Project Manager)

Turning now to evidence for longer term behaviour change, it is difficult to identify specific areas of change mainly due to the shorter nature of many of the activities and the lack of opportunity to follow-up with participants. However, one of the core areas of impact which should have a lasting effect is that many participants have gone away with an increased confidence and interest in discussing space and climate science and this was reported across all of the different types of audience groups. Some participants commented to organisation staff that they felt they had more agency to go away and consider how they could contribute to making a difference and expressed an intention to find out more about satellites and Earth

Observation. Some audiences commented that they would go away to consider how they could reduce their own emissions. For some schools this meant thinking about their lunch menu, for others it was about the means of transport they use.

In relation to eco-anxiety, there were limited explicit references to this but staff reported there were some people who were reassured in learning about the technology available to address and monitor climate change however a small number of people said they felt more anxious as they were now aware of the severity of the situation. Staff also observed instances where children and their families would perhaps feel more anxious following the We Are Guardians planetarium show but that they would go away having learned a lot about the topic and often deep in conversation about what they saw, with adults spending time on further explaining the concepts to the children. Staff reported that there were difficult and challenging conversations at times and that many people participated in discussions that they would not have had the opportunity to previously without the OWFS activities. These discussions were often intergenerational and there was often a difference in opinion between generations with younger generations seeming to be more accepting and older generations being more sceptical but this was by no means a generalisable experience, more that differences in opinion tended to fall out in this way.

The following sections explore the experiences of two audience groups in more detail, the first are workshops for primary schools and the second are drop-in activities with families.

2.2 Case study 1: workshops for primary school pupils and teachers

Early years and primary pupils made up 22% of the overall audience numbers. The activities they participated in tended to be workshops, science shows and full day events or visits to a science centre (making up two thirds of the activities by this age group). Around 10% of this audience group participated in planetarium shows. The remaining activities were then a mixture of online talks and access to resources such as loan kits. The main focus for this case study are the workshops and science shows, where the interaction time with the group was a minimum of one hour but in some cases extended to a whole day.

There are a core group of seven science centres who provided reflections from staff involved in delivery and feedback from pupils and teachers which form a basis of the evidence discussed in this case study. This is supplemented by the quarterly reflections from the Project Managers and the end of programme focus groups with Project Managers along with other elements of feedback from the other 18 science centres in the form of pictures, social media posts and thank you letters.

Delivery partners were asked to provide the postcodes for schools participating in workshops either in their physical location or when they went out to visit them. The data was then sorted by nation and the indices of multiple deprivation were looked up. For England, 43% of the schools whose postcode was provided (total n=409) came from the 40% most deprived areas (quintiles 1 and 2), in Wales this was 62% (total n=16) and in Northern Ireland this was 43% (total n=89). These are excellent proportions to see as often those in the 40% most deprived areas are under-represented. Indeed, this was the case in Scotland where 26% of the schools (n=109) were from the 40% most deprived. The detailed proportions can be found in Appendix C.

The topic of satellites seemed to be prevalent, regardless of whether the workshop itself was explicitly about satellites, all of the workshop content discussed in the staff reflections had some element connecting to satellites. For more detail on the workshop content and engagement please refer to the case studies from Aberdeen Science Centre, Aero Space Kinross, Cambridge Science Centre, Glasgow Science Centre, Jodrell Bank, National Space Centre, Royal Observatory Greenwich, STEM Discovery Centre, Thinktank and Wonderseekers.

Within the workshops the content related to habitats and biodiversity, weather and climate, satellite tracking and space exploration as well as Earth observation, effects of climate change and future career opportunities within the space sector. There were different elements within the workshops which stood out to the staff leading them but generally the hands-on and

interactive nature of the activities helped to positively engage both pupils and teachers. Having a task or demonstration provided a focus for discussion and conversation between the staff leading the session and the participants. Staff noted that pupils were keen to show them their existing knowledge and therefore made connections between the session content and their work in the classroom. Teachers were encouraged to see the strong curriculum links present within the sessions, with many of them being cross-curricular. One staff member noted that in one particular workshop type, the physical task given to pupils of building a satellite within certain constraints resulted in a highly positive level of engagement with maths which “can be rare”. For younger pupils in another workshop, they were able to explore the links between climate and their local area:

> “Each child gets a cuddly toy of each of the animals that is explored in the workshop which they then need to place in each of the correct habitats, one of which is red squirrels in [local] parks. This really helps the children to have a connection to their own lives”. (Staff reflection)

In terms of demonstrations, infrared cameras were particularly popular with some teachers expressing interest in getting one for their own school. All of the staff reported excellent levels of engagement in the sessions, with pupils being actively involved in all aspects. One common marker for assessing this by staff was the level of questions being asked by the pupils.

> “They were constantly asking questions or were providing answers before I got the chance to ask the question.” (Staff member)
>
> “Throughout all the activities, there was a wealth of insightful questions.” (Staff member)

There were many different ways in which the pupils and teachers were able to explore space and climate science in these workshops but again, the ways in which they were able to identify the connections between space science and their own lives and the relevance of space for the health of the planet were mediated by the discussions with the staff leading the workshops. The specifics of what those connections were and what the relevance was depended on the content of the workshop, with some taking away a clear understanding of how satellites are used to monitor the weather or how Earth observation is used to track animal habitats.

For many, there was an increased awareness of the challenges but not necessarily a clear indication of behaviour change and given the length of the interactions this would not be expected. However, it’s clear that the experience has provided a foundation for future exploration and potential action. One project manager provided the following feedback from a school showing the pupils’ responses to the question “Will you do anything differently after taking part in this workshop?"

> “Will do more research about science and put more effort into my science learning"
> "I think I will research satellites where before I had no interest"

"use paper less because of deforestation"
"yes because I know more about space and science and it will help me in the future"
"yes, save the planet"
"Look after the world".

One of the centres asked the schools they worked with whether teachers agreed with the following statement, “Pupils have been given tools or have been inspired to make positive changes at home or in the local community” and 100% of respondents (n=32) strongly agreed (47%) or agreed (53%).

We can see how the discussions and conversations from the workshops carried through into the feedback from pupils and teachers. Seven science centres which ran OWFS workshops gathered feedback directly from participants. The table below shows the responses from pupils when asked about how they feel following their experiences in the workshop. The respondents to this survey tended to be Year 5 and above.

I can spot links between space science and my own life.	Yes	No	Unsure	Total
	404	60	221	685
	59.0%	8.8%	32.3%	
I can spot links between space science and monitoring the health of the planet	Yes	No	Unsure	Total
	405	72	198	675
	60.0%	10.7%	29.3%	

Table 5. Pupil feedback following OWFS workshops

Whilst there is some uncertainty amongst the respondents about whether or not they can spot these links, there was a significant majority of pupils who positively responded. To help provide insight into what they were taking away from the workshops, those who answered yes to the space science and monitoring the health of the planet question were also asked to give some examples of how space science and the health of the planet are linked. Around half of those who responded ‘Yes’ provided some examples.

The responses show that the young people had an awareness of climate change following the workshops and the specifics of many of their answers showed their positive engagement with the content of the sessions. As we would expect, the most common topic amongst the examples were how satellites are used to monitor the climate.

> "The satellites up in space are taking pictures of Earth's physical health and reporting it down to us." (Primary pupil)

> "Satellites track temperature and measure the height of the ocean." (Primary pupil)

Following this, there were then many different mentions of the impacts and consequences of climate change. This included specifics such as melting ice caps, wildfires and pollution and some examples identified individual satellites and their roles.

> "The Sentinel 5P watches air pollution, and the Sentinel 3 watches for wildfires." (Primary pupil)

Tracking weather, animal migrations and deforestation were also amongst the identified roles of satellites and along with helping with the climate response, some of the examples related to managing responses to natural disasters.

In addition to this feedback from pupils, teachers were also asked to make an assessment of the impact of the content of the workshop on their pupils and on themselves. The following table shows the level of agreement the teachers had.

My pupils are now more able to identify connections between space science and their own lives.	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Total
	23	43	5	4	0	75
	30.7%	57.3%	6.7%	5.3%	0.0%	
Pupils can see that space science is relevant to the health of the planet.	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Total
	23	23	11	0	0	57
	40.4%	40.4%	19.3%	0.0%	0.0%	

Table 6. Teacher feedback on their pupils

Over 80% of the teachers responding to these questions indicated that they agree or strongly agree that their pupils are able to make connections between space science and their own lives and that they are also able to see that space science is relevant to the health of the planet. This provides corroboration of the positive indications from the pupil survey responses, with both pupils and teachers indicating a positive outcome as a result of their engagement with the session content.

Teachers were also asked to consider their own individual response to these questions and their level of agreement is summarised in the following table.

I can spot links between space science and my own life.	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Total
	52	37	3	0	0	92
	56.5%	40.2%	3.3%	0.0%	0.0%	
I can spot links between space science and monitoring the health of the planet	Strongly agree	Agree	Unsure	Disagree	Strongly disagree	Total
	64	26	2	0	0	92
	69.6%	28.3%	2.2%	0.0%	0.0%	

Table 7. Teacher feedback on impact on themselves

Only very small proportions of teachers are unsure about the individual impact on themselves following the sessions and there is particularly strong agreement that they can now see links between space science and monitoring the health of the planet. When asked to how these aspects are linked, the topics mirrored those reported by the pupils. The most common theme was again how satellites were used for climate monitoring and environmental protection.

> “Being able to collect invaluable research and information to inform us of the changes to our ecosystems.” (Teacher)

> “Remote monitoring allows us to see the impact of human activity.” (Teacher)

There was also a strong theme within the comments from teachers of the interconnectedness of the planet.

> “Science and our planet are interlinked. Science can help us understand the 'how' and 'why'.” (Teacher)

> “Everything is interlinked and I thought this was shown and explained very clearly.” (Teacher)

From several of the comments, it was clear that the use of photographs and visualisations had an effect on the teachers.

> “Visual impact of photographs of Earth are powerful.” (Teacher)

The experiences of teachers translated into a number of impacts for them, including an improvement of their own knowledge of space science but also that they are more likely to engage with their class on space science topics, survey details outlined in Table 8 below.

	I improved my own knowledge of space science (n=79)	**I am more likely to read, discuss or watch items about space science with my class (n=65)**	**I am more likely to talk to my class about space science (n=35)**
Strongly Agree	65%	57%	40%
Agree	29%	42%	43%
Neither agree or disagree	4%	1%	9%
Disagree	1%	0%	9%
Strongly disagree	0%	0%	0%

Table 8. Teacher feedback following workshops

Pupils and teachers have improved their knowledge of range of topics, but especially in relation to satellites. They have been able to identify connections between space science and their own lives and have an increased curiosity and confidence in talking about space science and climate science.

2.3 Case study 2: drop-in activities with families

The most common activity, engaging over 43% of participants, were drop-in activities. This category covered a broad range of scenarios, from on-floor busking activities in the science centres and museums either as part of regular daily programming or as part of a themed event, to attendance at a range of fairs, festivals and community events in locations such as community centres or pop-up venues as part of festivals.

The typical length of interactions was around ten to fifteen minutes. However, there were many instances where staff reported much longer conversations and discussions with people, lasting more than 30 minutes. The audience for these activities tended to be families and the general public and often had multiple generations taking part in the conversation. In the accompanying case studies, there is further discussion of these activities in the reports from Dynamic Earth, Observatory Science Centre, Oxford University Museum of Natural History, Science Made Simple, Techniquest and The Living Rainforest.

Drop-in activities were highly successful in encouraging a deeper discussion and engagement with space science and climate science. The evidence from staff and the participants shows that the hands-on activities allowed for conversation and discussion to flow, in which staff were able to draw out the participants' own knowledge and experiences and relate it to the activities.

As a result of these discussions, there have been some very insightful and interesting observations from organisation staff about the assumptions and prior knowledge people have of satellites.

> "I'd say that although people are familiar with the term satellite, I don't think they knew much more than a surface level of other than they're in space, they're going around the planet." (Project Manager)

> "Lots of people looking genuinely excited by using an infrared camera. Some really long and good conversations about the ethics and sustainability of satellite missions. […] It surprised me that many people hadn't realised how important satellites are." (Science Communicator)

There were also lots of instances where staff noticed adults taking pictures of the information and materials and making comments to their family about their intention to go away and find out more about the topics.

> "The intergenerational nature of the family programme was a great success, I think. The activities span a huge range of ages and abilities, but they shine when grown-ups take an interest and conversations (and competitions!) can start. It's also been a great way for us to showcase [the centre]'s interest in and commitment to talking about both climate science and space science. It's been a fixture in the main foyer of our building, showcasing the importance of these areas of science." (Project Manager)

As noted earlier, some staff observed differences between generations when it came to the discussions of climate change. There were some adults who “disengaged” when the topic came up whereas children were still more positively engaged in the activity.

In addition to using equipment such as IR cameras to engage people, using local satellite imagery and linking it to local issues was also very effective in showing the relevance of space science to climate.

Being able to take these activities out into the community was extremely important in helping to reach new audiences who wouldn’t necessarily visit a science centre. For one organisation who attended an event with a largely agricultural audience group they reported having some very interesting conversations about their perceptions of how satellites were used and in contrast to a more general audience there was a more negative attitude and consideration that satellites were “spying” on farmers. Staff felt that they got a lot out of these interactions with the different audience groups with and that they themselves often learned something too. It was also noted that being in community centres or hubs where people were coming in to find out other information was a great way of meeting different audience groups. This allowed delivery partners to make other connections and there was one example where the OWFS activities were shared with a local community-led sustainability group which was a chance meeting but allowed for relationship building and awareness raising.

Engaging families and intergenerational groups with drop-in activities provided an opportunity for in-depth discussion and conversation, where staff tailored and linked the content to the participants’ own experiences and prior knowledge, with the outcome that people would go away with an increased knowledge and curiosity about space science and climate science topics.

2.4 Building capacity in the sector

This section looks at the experiences of the delivery partners in terms of their engagement with training, the project topics and a discussion of the legacy of the project. The section concludes with a look at how delivery partners have engaged with the 'Global to local' approach. This is then followed by an additional piece of analysis by Dr Charlotte Thorley, who has examined the work of the delivery partners from an inclusion perspective.

This section draws on staff reflections and Project Manager focus groups along with observations made by the evaluator and the ASDC Programme Manager.

2.4.1 Training and resources

Delivery partners made extensive use of the OWFS resources. The information from the handbook was incorporated into new activities and resources, with staff adapting the content depending on the audience group. Project Managers commented on the benefits of having the explicit links to the UK Space Agency and European Space Agency content. It was also commonly reported by Project Managers that they were able to take the content and activities and develop them to sit closely within their existing content or subject focus. Some delivery partners have a subject focus on climate or a specific area such as animals and habitats whereas for others they cover a broad range of STEM topics. Science centre staff involved in the development of the OWFS content for this project were very aware of the need for the resources to have flexibility to allow them to be adapted, but at the same time this goal meant that they weren't going to be able to meet all of the needs of every organisation and their context, instead trusting the professionalism of their colleagues to make the right decisions for them on how to apply the content and activities and this was a very successful approach.

> "with this particular one [the OWFS project], it was great that you had all those ideas with all the different activities you could or you didn't necessarily need to use. You just built it around your own particular needs and wants, which was great."
> (Project Manager)

Two members of staff from each delivery partner were able to attend the Training Academy in Spring 2023. Typically these staff would then be responsible for coming back to their organisation to cascade the training and learning to others who would be involved in delivery. The handbook was found to be particularly helpful in supporting training of colleagues and the online version of this content was definitely preferred over a physical handbook as it was easier to share.

An extremely important and popular element of the Training Academy are the networking opportunities and the chance to find out more about the work of other delivery partners. This was popular regardless of the size of organisation the staff came from. Across the lifetime of

the project the evaluator observed interactions between colleagues across the different delivery partners involved it was clear there was a lot of collegiality and collaboration between organisations and ready offers of advice and guidance to others. In discussion with Project Managers at the end of the project, one gave an example of how their workshop had evolved out of a suggestion from the handbook but had then been further developed by themselves with advice and support from two other delivery partners participating in OWFS. This culture of collegiality can begin at the Training Academy and set the tone for the remainder of the project.

2.4.2 Project topics

Whilst there were several topics coming under the OWFS project, the satellites topic acted as an anchor or a springboard for many of the activities. The satellites topic was also a new area of focus for many delivery partners and for some this also provided an opportunity to provide more climate science content or to revisit their existing offer and integrate their climate, biodiversity and space topics.

> "We wouldn't broadly talk about satellites until this" (Project Manager)

For one organisation where they already had a range of exhibits and activities around space exploration they commented on the benefit of being able to have a change of emphasis from:

> "looking out […] to having a looking in aspect from space as well" (Project Manager).

This change of "angle" or "viewpoint" was referenced by several other Project Managers in terms of how they started to see their own content.

The role of space science in terms of climate and sustainability was new to some of the staff involved so not only have the audience groups benefited from this expansion of content but staff also. The delivery partners incorporated many references and links to their local universities and research institutes and other local industry involved in space and climate-related science and one Project Manager noted that the local links they were able to highlight were also new to their colleagues and the range of activity was an "eye opener" for staff.

It was very clear from the focus groups with the Project Managers that they had an excellent understanding and knowledge of local, regional and national connections to space and climate science. They were able to comfortably discuss specific companies and universities, referring to their research and comment on the relevance of this work and how it fitted into the OWFS activities they ran. This knowledge and connections will of course continue beyond the funding of this project and benefit other activities they are involved in. For several, they were also connecting their knowledge of spaceports from previous projects and making it relevant within the OWFS activities.

When asked about other topics and areas they'd be interested in seeing more information and support on, Project Managers noted the audiences' enthusiasm for finding out more about how satellite data is used. For example, audiences really engaged with animal tracking but were interested in how that information is used and applied by scientists and policy makers in practice. For one Project Manager they were keen to be able to build on the information and knowledge from OWFS and look deeper into their local context, such as the effect of climate on their local coastline.

2.4.3 Project legacy

Several of the delivery partners had been involved in Destination Space and Operation Earth and there were explicit mentions of kit and content being carried forward into activities related to OWFS. There was also recognition that some of the content from OWFS has clear "roots" in those projects too. This shows expansion and evolution of topics and content for the sector, with ASDC able to support delivery partners by identifying where there are opportunities such as this. An important ongoing influence will be the integration of climate science into ongoing activities in the sector.

> "The project has allowed us to integrate climate science into our programme even more, and we will be continuing in the direction we have taken." (Project Manager)

The accompanying case study from Science Oxford describes how the project has expanded their offering and built capacity within their organisation.

There will be continuing use of the OWFS kit and activities. Delivery partners are continuing to use the content in many different ways:

- "[OWFS] is part of our busking kit now […] our presenters when they're on busking can go in […] and continue to engage people with the subject".
- OWFS workshops, science and planetarium shows "are part of the programme now".
- "the school [activities] will stay there, the online content will stay on our website, and then the public activities will probably be rotated".
- "We will keep the drop-in activities on ocean warming and tracing satellites as part of our suite of public engagement activities."
- "The altimetry activity will be used in upcoming family holiday activities in a slightly different format, and we also have the IR cameras that were bought as part of the project which will be used for family, community, and school activities."
- "The project has significantly enhanced our current offerings. The 'Penguin Poo' segment provided an interactive and engaging conclusion to our presentation."

The case study from Xplore! outlines how they used the grant funding to put together and support the use of loan kits for schools and uniformed groups.

For one delivery partner who'd taken part in multiple national ASDC projects previously, they felt the combination of the flexibility of the content and the length of time available to deliver meant that the activities and resources developed provided a lot of value for money as time

was invested into developing quality activities which are embedded within their programme for the longer term. Project Managers also reported that this longer timeline allowed them to identify all of the different ways in which the project content could be integrated across their offer for their audience groups. One delivery partner talked about how they were able to expand their regular content to include the space focus but that instead of running everything from OWFS all together they were able to integrate the space science activities across multiple dates. This had the benefit for annual members that when they came back again and again they were seeing different content. This also had another benefit for visitors that space science content was being featured in different ways within a range of different themes, further emphasising the role of space science and how it is used in different contexts in research and industry.

The length of time made available for this project was a significant benefit to delivery partners. Training in Spring 2023 was followed by a period of development of activities and ideas with audience engagement launching variously in Summer or Autumn of 2023. Several delivery partners have set times of year for different themes, for example a space focus in October to link with Space Week or they build their workshop offers around the school year with options for schools during term time also for families during holiday periods. So for those running school workshops this meant they had time to develop and promote the new workshops and then introduced these over the course of 2023 and 2024 where appropriate. This timeline encouraged an investment in and longevity for the activities and many went in with the intention of developing new workshops which would sit within their offer well beyond the funded period for the project. This investment of time by organisation staff was often not part of the grant funding and covered by their own organisation. So whilst the grants were very necessary to fund this work, they also helped to leverage further investment by other organisations. In one instance the funding received meant that they were able to access other grant funding which expanded the reach of the OWFS activities.

The longer time period also meant that staff had space to iterate and evolve workshops and drop-in activities, improving the quality of the experience for the participants and providing more time for confidence to build amongst staff:

> “it gives us more time to develop things a bit further as well. If we find that one activity was a little bit too difficult, we can develop it and use it again and carry on the process.” (Project Manager)

> “it gave us plenty of time to train our other colleagues, and not only for me to get confident with it, but for my other colleagues to get confident with delivering it.” (Project Manager)

Taking part in this project has allowed some staff to manage a project for the first time, build their own skills and develop their professional network. The skills developed and the knowledge for staff will continue to have an impact. Staff within the delivery partners collaborated on content development across many different activities. They worked together to create workshops, write scripts for shows and adapt ideas from the OWFS resources. There were several instances of peer support and training, of shared expertise within delivery partners and iteration and improvement of activities. They also took onboard feedback from colleagues and audiences, developing their communication skills.

> “Our team have attended training with myself to confidently deliver a professional, informative presentation to all attendees.” (Project Manager)
>
> "We have an incredibly strong team. Our team has used their existing professional experiences to integrate OWFS into our daily delivery. We have developed new ways to adapt OWFS resources to work with exhibits, such as a floor projector and touchscreen monitor." (Project Manager)

For many delivery partners this was a cross-organisational effort with marketing, education and communications responsibilities coming together for this project. Although for some of the smaller delivery partners these responsibilities would sometimes fall to one or two people, rather than the dedicated teams found in the larger centres. In addition to the skills associated with these areas of working, some staff also developed their technical skills in relation to presentations for shows and planetaria and for one project manager they also spent time learning Gaelic. There was also a significant amount of time dedicated to development of subject knowledge relating to the project topics.

> “I have completed a lot of further research and study to upskill, from materials suggested by my colleague and ASDC.” (Project Manager)
>
> "I have deepened my understanding of space topics through delivering OWFS while using my existing knowledge to support delivery." (Project Manager)
>
> "Overall, this project has enhanced an already sound baseline of knowledge within the team. We have used presentation, delivery, and engagement skills to embed these materials within our programme."

A lot of these areas have combined to improve confidence amongst staff.

> “The OWFS context has helped presenters become more confident in talking about satellites.” (Project Manager)
>
> “The training and the project as a whole increased my confidence in discussing the themes with both the general public and when delivering training to our team.” (Project Manager)

Project management and leadership skills were important areas of development for many as they gained experience managing budgets, liaising with and managing colleagues and taking responsibility for reporting back to ASDC.

> “It’s the first time I’ve been involved in this sort of project, so I’ve definitely been developing new skills—managing people, delegating, organising a stand at a large-scale fair, and reporting." (Project Manager)

For others, they used their existing experience to successfully deliver the project.

> “[I have not] needed new skills. Organisational skills, problem-solving, and administration—such as managing bookings and collating feedback—are all part of my day-to-day role." (Project Manager).

The flexibility of being able to determine what audience groups and activities to run “worked really well” (Project Manager). This made it easier for delivery partners to engage with the project as they could tweak the activities and make it applicable for their setting. For many this allowed the organisation to have a centre-wide contribution engaging all staff and being able to collaborate and involve colleagues was a really positive experience providing a sense of ownership amongst staff.

> “you kind of curated how you wanted it to run, whether that’d be focusing on, you know, the biodiversity, the climate satellites themselves, you could kind of dictate where you wanted to go” (Project Manager)

> “Our science communicators have had the opportunity to take part in a national programme and feel part of ‘something bigger.’” (Project Manager)

There was also clear differentiation achieved with the content, with delivery partners being able to tailor it for different age groups and purposes. Some smaller delivery partners used this as an opportunity to work with new audience groups and adapt their style of engagement from being focused only on delivery of workshops to also facilitating discussions as part of drop-in activities. In the focus groups some Project Managers were talking about how they were thinking of evolving the content they have and sustainability around satellites and space junk, especially was a common topic in questions in sessions and it seemed one of the reasons for their interest in this was that they would receive some “pushback” from audience groups about the sustainability of space exploration. This was perceived to be a positive thing by the Project Managers:

> “It certainly promotes good conversation. It gets you into all the ethics and the morals.” (Project Manager)

They also found this specific area a good opportunity to highlight the work of the UK Space Agency and the work they are doing on this aspect.

One significant area of legacy are the links and relationships which have been developed with local universities, research institutions, and industry. For one organisation, they have benefitted from being part of a national programme, giving them status and allowing them to raise their profile.

> “This project has really helped to put our small STEM education charity on the map and has given us focus.” (Project Manager)

Our World from Space has significantly influenced delivery partners by embedding climate science and sustainability topics across their programmes. Space science has been effectively connected to climate science in an engaging way, helping to broaden the audience for climate change education.

2.4.5 Global to local

One core feature of the activities and work being done by delivery partners, was the consideration of how to bring out local connections and relevance for audience groups. In the discussions and feedback from Project Managers, there were common starting points when it came to the ‘Global’ but what it meant to bring that into the local context for them and their audiences varied broadly.

Some delivery partners working in remote and rural locations were motivated to show the potential employment opportunities which were emerging in their regions, especially where there was maybe a lack of awareness and aspiration to work and live locally. There were many instances where research from local universities was referenced or featured in events and activities. Sometimes the researchers themselves were able to get involved in events or the content of the activities reflected the work being done. These researchers got a lot out of these experiences, building their confidence in talking to different audience groups and improving their communication skills. To read more about how centres connected to local activity, please refer to the Exeter Science Centre, Life Science Centre, Ocean Explorer Centre, and Science Skills Academy case studies.

One further benefit of the longer term project has been the ability for delivery partners to take on interns from their local universities, providing another kind of local connection. Project Managers have talked about how working with undergraduates allowed them to expand the reach of the content from OWFS as the interns were able to develop online content and games targeted at different age groups. Interns would complete this work as part of a credit-bearing module.

The content provided as part of the OWFS activities also supported this connection to the local and there were many comments about how the local satellite imagery helped audiences to strongly connect to the topic and discussions. Some centres used the imagery to highlight locations of companies and research institutes to reinforce how local some of them were and this approach especially connected with adults. Being able to have a local focus “was a very compelling story to tell” (Project Manager).

There have been many new experiences within delivery partners as a result of participation in this project and lots of lessons learned. There are also lots of opportunities to still share this learning and continue the collegiality and collaboration, especially around conversations relating to how space science is used and how climate science and local impacts are seen. There was also a strong sense of supporting staff in feeling able to have uncomfortable and difficult discussions.

> “what tools can we give the teams to be able to have those [controversial] conversations and facilitate quite nuanced discussions which can impact their community […] so I'm mindful of putting my team out into those situations and them being prepared for that”. (Project Manager)

However, Project Managers certainly didn’t feel as though it was ‘job done’ when it came to highlighting the UK’s role and indeed the more local regional opportunities and connections available. They felt there was still a lack of complete understanding of just how local and within reach some of the opportunities were. It was also almost universally reported that there continues to be a low level of awareness and understanding about the UK’s involvement in the space sector. However, what is clear is that the delivery partners and their staff are committed to highlighting and sharing these opportunities with their local communities and this knowledge of local place and local identity is core to this.

In the following section, Dr Charlotte Thorley discusses this connection to place and the important role science centres play. Dr Thorley reviewed data relating to how delivery partners describe underserved audiences and the metrics they use to identify them.

2.1.6 Considering audiences and relevance – Dr Charlotte Thorley

Dr Charlotte Thorley has been working in science communication, education and public engagement for 20 years. She started out as an astrophysicist, but considers herself to be more of a social scientist these days; her EdD was done whilst working as public engagement lead at Queen Mary University of London, looking at the impact of public engagement work on the researchers she was working with at the time. Freelancing now, Charlotte works with universities, charities, funders and community groups to improve the impact of collaborative and inclusive engagement programmes through better understanding of what makes them work.

The Our World from Space (OWFS) centres commit a great deal of time and effort to recruiting their participant groups, and making sure that their offerings are engaging and relevant to them. The content navigated global issues in ways that might become more relevant on a local level, yet science centres must constantly navigate hyper localised issues with access to their programmes. "Underserved" audiences in particular are often sought out for engagement, but yet the term has some vagueness about it. The evaluation data collection for the programme allowed an opportunity to reflect on what this means to each site, and how it manifests in their captured delivery.

"Communities of identity and communities of place"

The data shows that the OWFS project was an opportunity for centres to reach out to communities of various definitions in the promotion of their activity. As one Project Manager put it so succinctly, these are most easily understood as "communities of identity and communities of place". Whilst there was no initial requirement that the OWFS activities be targeted to particular groups, the general ethos and purpose for most centres, aligned with the indications of preferred targets from funders, means that many efforts are made to reach audiences that might be considered to be "underserved". Each centre was asked to define "underserved" as it applies to their work, and their responses are summarised in Table 9.

<table>
<tr><th>Place</th><th>Identity</th></tr>
<tr><td>Places not seen proportionately in visitor tracking</td><td rowspan="4">Identities who are not proportionately seen in visitor tracking

Identities considered to be underserved by the system:
- Protected characteristics, as per equalities act
- Social marginalisations, such as socioeconomic status, carers, language
- STEM specific marginalisations, e.g. girls, Afro-Caribbean boys</td></tr>
<tr><td>Places that are likely to have difficulty reaching a site, e.g. rural, islands</td></tr>
<tr><td>Places that experience barriers to reaching a site, e.g. lack of transport, cost of travel</td></tr>
<tr><td>Places considered to be underserved by the system, e.g. IMD</td></tr>
<tr><td>Places populated by people considered to be underserved by the system, e.g. High Free School Meals or Pupil Premium schools</td><td></td></tr>
<tr><th colspan="2">Both</th></tr>
<tr><td colspan="2">Identities who are underserved and also are from a place that is underserved</td></tr>
</table>

Table 9. Summary of centre responses when asked to define underserved

The majority of offerings from the centres are built to be open and accessible, as is good practice for engagement activities; it is in the advertising and recruitment where most efforts are seen to develop engagement with underserved audiences, and this seems primarily to be centred around place. Project reflections indicate that the centres really value communities of identity, and that their foci vary greatly depending on staff or centre interests. However, to achieve recruitment targets tends to rely on communities of place, and then their additional association with various identities.

The Indices of Multiple Deprivation (EIMD, NIMD, SIMD and WIMD for England, Scotland, Northern Ireland and Wales respectively) are the most common indicators used, normally identified before they come on site through advertising or booking. Some record postcodes that reaffirm bookings were well targeted. The relative ease of postcode tracking and comparison makes this a valuable tool in ensuring efforts are well directed, and aligns nicely with other measures such as the STFC Wonder audiences as being in the 40% lowest quintiles (e.g. 40% most deprived areas). In the OWFS data we see a range of IMD priorities from 10%-40% lowest quintiles, depending on local focus. In Scotland additional use of the Urban Rural and Remote Rural categories are also used. It is not obvious as to why some sites are more narrowly focussed than others.

IMD is also the common measure across public and schools programming being used to indicate that schools are both likely to be populated by people who are experiencing multiple deprivation and that the school itself also experiences this. Some other schools measures within England are also used, primarily numbers of students receiving Free School Meals (FSM) and/or Pupil Premium (PP). In general, centres appear to be aiming for schools where 50% or higher of the students are in receipt of FSM or PP; in practice they come in a little lower. The measures used seem to be governed by instruction from funders, but IMD tends to

be the one the organisations use for themselves. Sometimes the different measures are used for triangulation, narrowing down the prospective target schools.

In addition to describing the general approach taken, some example approaches to considering underserved audiences from different organisations have been identified and are described below.

Organisation A have a strong understanding of what underserved means to them. As well as having an established community programme in place, and dedicated staff for community engagement, they demonstrate wider valuing of engaging underserved audiences through all of their learning and engagement. The direction of this has been driven in part by leadership from ASDC, citing various publications as influential “including Science Centres of the Future, Missions and Opportunities, Valuing Inclusion and Inclusion Handbooks from ASDC”. The community programme allows for the building of strong connections with groups in their area who are brought together either by their experiences of various marginalisations, which they list as including, but not limited to:

- Refugees and Asylum Seekers
- People affected by and who experience racism
- LGBTQ+ People
- People with physical Additional Support Needs
- People living with dementia and their families
- Older people at risk of isolation and loneliness
- Care experienced children and young People
- Children and young people with caring responsibilities for someone at home
- Adults with caring responsibilities
- Members of the D/deaf community
- People who are partially sighted or visually impaired
- Children and Young People with Autism
- Children and young people who are unwell
- People at risk of homelessness or who are homeless
- Children and young people at risk of poverty/living in poverty

OWFS provided an opportunity to create spaces where their groups could be brought together for a shared activity not about their marginalisation, and foster their own interests and passions.

Organisation B cite themselves as not having a strict definition of underserved, but a clear sense of purpose. “as an organisation, we recognise that for some of our local communities,

there are barriers that prevent them from visiting. [Organisation B] doesn't have an official definition for underserved audiences, but we use these barriers to visit as a guide. These include access to transport, financial or language barriers, cultural differences, or a perception that the centre is 'exclusive' and only for certain groups of people." As well as their own perceptions of the priorities, they acknowledge the need to respond to funder requests, such as working with girls, or those in remote locations.

For OWFS they chose to add in a focus on home education, putting on some events that were only for home education groups. Their main programme of activities was able to reach the numbers that make developing new programming worthwhile, whilst dedicated days for certain groups expanding the audience accessing the resources offered.

Organisation C started from scratch when considering who to target for their activities. As well as leaning on IMD to identify areas of need, this was "followed with a schools mapping activity (Free school meals, EAL, SEND proportions alongside OFSTED reports) and a walk around the areas to see what was available." Using this information they identified priority communities (3 with IMD 10% most deprived and 1 with IMD 30% most deprived but other challenges) and committed to an additional focus on intersectional SEND groups. OWFS became part of the longer term offer they were able to make as they built relationships and partnerships with groups in those areas. Starting off with schools work, they were able to extend to intergenerational sessions, and explore the relevance of the topics to individuals and their wider groups of influencers.

Organisation D were already working primarily with groups from the lowest 4 Welsh IMD quintiles, and often the lowest 2. The nature of the organisation being in Wales results in a needed focus on Welsh speaking schools, and offerings are made in English, Welsh or bilingually. This was true for OWFS, and the project was used as an opportunity for the organisation to trial working with youth and uniformed groups, offering CPD to teachers and group leaders, as well as the new format of loan boxes. Working with those groups has expanded not only the reach of their programmes, but adds a layer into the young people's networks of connection to STEM and STEM topics. This creates an environment supportive of a stronger sense of science capital, and ownership of science activities. The connections to the groups have been sustained through contact over the loan boxes, and will hopefully mean future projects will be welcomed too.

Organisation E instigated a repeat contact schools club for their OWFS work, leaning on their existing use of IMD to help define who they were targeting. When discussing the idea of underserved more widely, they pointed out the value of their hyper local knowledge in terms

of understanding what it really means to live in their city, and how diverse an area might be despite perceptions from the outside.

> “We also try to make individual decisions as much as possible, as no one metric truly captures a situation. We tend to avoid metrics based on wider geographical calculations that lose local resolution and don't allow us to see variation in deprivation (e.g., the BSA Science Engagement Mapping, which provides no differentiation across the city - masking pockets of underserved communities).” (Project Manager)

For this particular project, the repeat contact seems to have been influential on giving their group the time they needed to really understand the power and permission they had in the spaces created. Over time students became more able to ask questions, and build a sense of how and why the OWFS content might be not just relevant to them, but theirs to do something, or care, about.

In conclusion

The centres are naturally working with groups that might be considered underrepresented for the majority of their work, and that includes OWFS. The majority of those being targeted fall within the lowest 40% in the indices of multiple deprivation. Being more specific than 40% lowest IMD as a priority would possibly be detrimental to projects; what is valuable about a steer like this is that it sets the tone, but you want and need centres to feel empowered to work with those groups that they understand will find it valuable to engage with them. The reflective nature of the evaluation for OWFS has allowed centres involved to tell us how and why they have chosen their target groups, and what difference they are hoping to make to them, whilst underpinned by a central core of shared purpose and content. This seems like the Goldilocks-point for targeting any project, a good balance of meeting funder needs whilst being relevant for the individuals involved. If this aspect is to be better reported in the future then it would be desirable to include a strategy setting and audience targeting activity for project leaders at the application stage or early on after awards are made. Final reporting could usefully include not just who their audiences were, but how they were chosen, why the activities delivered were considered to be right for that audience, and how their practice has been informed moving forward. Whilst those questions have been added they were not the focus of OWFS, so we are lucky that the practitioners have been able to reflect at all. Finally, not all of the centres have found it as easy to reflect on the who’s and why’s of their projects as others; we might infer that this is down to time or resource pressures, but equally might be the individual natures of the staff involved or the local working environments. Planning in these reflective processes, and the regular contact evaluation support as has been in place for OWFS, are essential to building a strong and shared understanding of how centres might continue to best serve those most in need.

Examples of the ways in which delivery partners have engaged with diverse audience groups and the different outcomes can be explored in the case studies from Cambridge Science Centre, Dynamic Earth, Science Skills Academy and Wonderseekers (Winchester).

The final section of the report summarises the findings.

3. Conclusion

There is significant evidence from across delivery partners that the audience groups engaged in this project have been inspired “with a sense of curiosity and discovery about the UK’s role in space” (Programme goal 1). The Our World from Space activities and resources have been effective in showing the relevance of UK space science to daily life (Programme goal 3) and also in showing its importance for the future sustainability of Planet Earth (Programme goal 2). Across the delivery period, staff in delivery partner organisations have benefited from excellent professional development and the project has provided the opportunity for organisations to build capacity in terms of knowledge and skills (Programme goal 4). ASDC has successfully curated a project which meets the needs of centres, helping to develop knowledge and skills to talk about space science and climate science. ASDC staff have also provided a high quality level of support and guidance to delivery partners in the sector.

There are three main areas which are highlighted as being key to the success of the project.

1. The first was the flexibility given to the centres in terms of how they met their participation numbers and interaction hours. The incredibly broad range of activities and audiences which resulted from this approach demonstrates how each organisation was able to adapt to their own needs and those of their audience groups.
2. The second was the way in which delivery partners were able to connect space science and climate science to their own local context, linking to relevant research and industry but also by connecting to their audience groups through their detailed knowledge and understanding of who those audience groups are and what their needs are. The local context and connections changed from one organisation to another, with relationship development being an enabling factor.
3. The third area was the length of the project. Knowing that they had eighteen months for development and delivery of activities resulted in excellent value for money as centres invested in activities that were going to be part of their offer in the longer term. The length of the project also allowed for a higher quality of activity and engagement as staff had the time and space to evolve and iterate based on the feedback they received. This length of project also meant that there was buy-in and contributions from staff across departments within delivery partners.

Through participation in the Our World from Space activities, participants have increased their knowledge and understanding of space science and climate science (especially in relation to satellites). Many have been inspired to further action, with a curiosity to find out more and consider how they themselves may contribute to the efforts to reduce emissions and to better

understand the effects of climate change through Earth observation. Following their participation there was a very strong sense about the value and relevance of space science for the health of the planet. Participants were able to describe this connection and also made connections to their own lives. This relevance and connection were particularly mediated through the ‘global to local’ message, with delivery partners tailoring content and making links to local issues and impacts as well as local research and industry. The Our World from Space content has a legacy within participating centres; it is embedded in programmes, the knowledge of topics and links made to local research and industry will continue to influence their activities in the longer term and the conversations and discussions between staff and participants will continue. It also provides a strong foundation for the sector to engage further in space science and climate science.

Appendix A: Activity types and audience groups

Activity type	Participants		Interaction hours	
	n	%	n	%
CPD/Professional learning for teachers	41	0.02%	46.5	0.03%
Event / Conference	2587	0.98%	1813.28	1.09%
In person led activity: Science or theatre-style show	36450	13.81%	23077.4	13.86%
In person: drop-in activities	112884	42.78%	40568.6	24.36%
In person: planetarium	51448	19.50%	40990.5	24.61%
In person: workshop	30746	11.65%	45361.4	27.24%
Installation or display	23492	8.90%	4848.26	2.91%
Internship	28	0.01%	749	0.45%
Resource used	4370	1.66%	6689.25	4.02%
Staff training	342	0.13%	967	0.58%
Video views	76	0.03%	31.2	0.02%
Virtual led activity: talk/Q&A	1383	0.52%	1410.5	0.85%
Total	263847		166553	

Table 10. Activities by participants and interaction hours

Audience group	Participants		Interaction hours	
	n	%	n	%
Adults: FE or HE students	63	0.02%	286.2	0.17%
Adults: Member of the public	745	0.28%	394.817	0.24%
Adults: other	405	0.15%	990.01	0.59%
Adults: teachers	1058	0.40%	564.22	0.34%
Early years: 3 to 4 years old	752	0.29%	224.567	0.13%
Group: community	3828	1.45%	2710.52	1.63%
Group: families	165634	62.78%	62091.3	37.28%
Mixed age groups	46094	17.47%	47289.9	28.39%
Schools: 12 to 14 years old	9101	3.45%	14736.1	8.85%
Schools: 15 to 18 years old	1267	0.48%	2499.25	1.50%
Schools: 5 to 7 years old	1942	0.74%	1333.83	0.80%
Schools: 8 to 11 years old	32672	12.38%	32511.2	19.52%
Staff	286	0.11%	921	0.55%
Total	263847		166553	

Table 11. Audience groups by participants and interaction hours

Audience groups:	Early years	Primary pupils and teachers	Secondary pupils and teachers	Adults: FE or HE students	Adults: Member of the public	Group: community	Group: families
Aberdeen Science Centre		x	x			x	x
Aero Space Kinross		x	x	x	x		x
Armagh Observatory and Planetarium		x	x				x
Cambridge Science Centre		x					x
Dundee Science Centre		x	x			x	x
Dynamic Earth Science Centre and Planetarium	x	x	x			x	x
Exeter Science Centre		x	x	x	x	x	x
Glasgow Science Centre			x				
Jodrell Bank Centre for Engagement		x					x
Life Science Centre		x	x			x	x
National Space Centre	x	x	x		x		x
Oxford University Museum of Natural History			x				x
Royal Museums Greenwich		x	x				x
Science Made Simple							x
Science Oxford			x				x
Science Skills Academy		x	x			x	x
Scottish Association for Marine Science		x				x	
STEM Discovery Centre		x	x			x	x
Techniquest		x				x	x
The Living Rainforest/Trust for Sustainable Living	x	x	x	x	x	x	x
The Observatory Science Centre			x	x	x		x
Thinktank		x					x
W5		x	x		x	x	x
Wonderseekers (WSC)		x					x
Xplore!		x	x		x	x	x

Table 12. Audience groups engaged by different delivery partners

Activity types	CPD/Professional learning for teachers	Event / Conference	In person: drop-in	In person: planetarium show	In person: Science or theatre-style show	In person: workshop	Installation / display	Internship	Resource used	Video views	Virtual led activity: workshop or talk/Q&A
Aberdeen Science Centre			x			x	x		x		
Aero Space Kinross			x	x		x				x	
Armagh Observatory and Planetarium			x	x	x	x					
Cambridge Science Centre		x				x	x				
Dundee Science Centre			x	x		x			x		
Dynamic Earth Science Centre and Planetarium			x	x		x	x				
Exeter Science Centre			x			x		x		x	
Glasgow Science Centre	x		x		x				x		x
Jodrell Bank Centre for Engagement						x					
Life Science Centre			x	x		x					
National Space Centre		x	x		x	x					x
Oxford University Museum of Natural History			x					x			
Royal Museums Greenwich		x	x	x	x	x			x		
Science Made Simple			x		x						
Science Oxford		x		x		x					
Science Skills Academy			x			x					
Scottish Association for Marine Science			x			x					
STEM Discovery Centre					x	x					
Techniquest		x	x	x	x	x					x

The Living Rainforest/Trust for Sustainable Living	x	x	x			x	x	x	x		
The Observatory Science Centre		x	x	x	x	x	x	x	x		
Thinktank	x	x	x	x	x	x					
W5		x	x		x	x					
Wonderseekers (WSC)			x	x	x	x					
Xplore!	x		x	x	x	x			x		

Table 13. Activity type engaged in by organisation

Region	Participants		Interaction hours		Number of centres (based on location of organisation)
	n	%	n	%	n
Northern Ireland	16511	6.3%	27750	16.7%	2
Scotland	104634	39.7%	58092	34.9%	7
Wales	14413	5.5%	8641	5.2%	3
North West	1831	0.7%	838	0.5%	1
North East	23474	8.9%	11432	6.9%	1
Yorkshire & Humber	1600	0.6%	520	0.3%	0
West Midlands	15889	6.0%	6718	4.0%	1
East Midlands	20349	7.7%	7717	4.6%	3
East of England	10589	4.0%	6716	4.0%	2
South West	3661	1.4%	2895	1.7%	1
South East	46206	17.5%	32443	19.5%	3
Greater London	4690	1.8%	2791	1.7%	1
	263847		166553		25
England	128289	48.6%	72070	43.3%	

Table 14. Participation numbers and interaction hours by region and nation

Appendix B: Evaluation framework and approach

The following table outlines the evaluation framework for this project. The framework was co-designed in Spring 2023 with staff from five science centres. Ondata worked with the centres to describe the themes and evidence to support the four programme goals which had been outlined by ASDC.

Programme Key Goal	Theme	Evidence
PG1. To engage, inspire and involve school-aged children, their families and their teachers with a sense of curiosity and discovery about the UK's role in space.	**T1.1.** Impact of participation in activities on different audience groups.	**E1.1.** Successful delivery of sessions in science centres, with audience groups being engaged and involved in activities and participating in discussions, this can include engaging with new audiences.
		E1.2. Improved audience's understanding of the UK's role in space. For example through increased knowledge of skills required and the career routes into the space-related sectors or increased awareness of local research and innovation.
		E1.3. Audience groups indicate increase in science capital. For example, by undertaking behaviours relating to the science capital dimensions such as talking about science with friends and family, watching science related content.
PG2. To promote an understanding of the value of Space for the future sustainability of Planet Earth.	**T2.1.** Audience groups are able to identify the value and relevance of space science for the sustainable future of planet Earth.	**E2.1.** Audience groups are able to make connections to their own lives and recognise value and relevance of Space for Planet Earth using the following topics as context: 1. Space for Planet Earth – From global to local – Earth Observation, geoinformation and UK expertise that contributes to the understanding of and solutions for climate, clean air, oceans, biodiversity. 2. UK Spaceports becoming operational, satellite technology and applications, and data use across a wide diversity of sectors and careers (including environmental science careers). 3. Satellites, including Satellite-related research, building and launch occur in the UK.
	T2.2. Audience groups take action or change behaviour following participation.	**E2.2.** Audience groups change behaviour as a result of participation. For example, audience groups display increased confidence in their own knowledge and skills or feel increased agency or ownership/responsibility following participation. This could also include

		increased awareness of potential for involvement of citizen science projects based in the local community.
		E2.3. Following participation, audience groups attitude shifts from that of eco-anxiety to action.
PG3. To build on the previous phases of Destination Space and Operation Earth, effectively supporting science capital with a personalised and localised approach that promotes the relevance of UK space science to daily life, through a 'from global to local' narrative.	**T3.1.** Centres develop locally-focussed activities and engagements in order to convey the from 'global to local' message.	**E3.1.** Centres identify activities and partnerships in order to reflect the 'from global to local' narrative which is most relevant to them. For example, engagement with local industry organisations, research institutes, UK spaceport location or university research group, involvement of STEM Ambassadors and researchers. This can be existing partnerships or those newly developed for this project.
		E3.2. Centres build on previous experience with relevant ASDC projects and use science capital as a basis for developing their 'global to local' narrative.
PG4. To provide professional development and build capacity for science and discovery centre and museum staff and organisations.	**T4.1.** Impact of project on project manager.	**E4.1.** This could include development of project management skills for a newly involved member or staff. For an experienced member of staff this is an opportunity to use existing skills on new project content.
	T4.2. Impact of project on centre staff.	**E4.2.** Relevant staff engage with training, provided by ASDC directly or cascaded from colleagues, with the aim of developing skills, knowledge and experience in relation to engaging with different audience groups on the project topics. This can include increased confidence talking about climate-related topics helping to reduce 'eco-anxiety' amongst audience groups.
	T4.3. Impact of project on centre.	**E4.3.**There is an ongoing impact in relation to capacity building within the centre resulting in a legacy beyond the scope of the project. This could include, new or updated activities, resources, skills development for staff, new partnerships.

Table 15. Our World from Space Evaluation Framework

In support of the evaluation framework, a library of evaluation methods was developed. Central to this were a set of key questions which centres were asked to incorporate in feedback from participants as far as possible. The questions were:

Following the show/visit/activity:	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1. We can see a connection between space science and our own lives.					
2. We can see that space science is relevant to the health of the planet.					
3. How do you think space science plays a role in the health of the planet?	Open-ended response				

Table 16. Example key questions

These questions were for a family audience and the language of the questions was adapted depending on the audience group. For younger audiences, the responses to questions 1 and 2 became Yes/No/Unsure.

Individual delivery partners had their own set of activities and audience groups they were engaging with using the OWFS resources and topics. This meant that the evaluation of the activities had to be adaptable to the different circumstances. To account for this, each organisation had their own evaluation plan which was written by Ondata in collaboration with staff at the organisation. Table 17 below shows an example of the type of evaluation methods identified in the evaluation plans.

Activity name	**Activity type**	**Who?**	**Number of interactions or sessions**	**Evaluation framework link**	**Evaluation method with link**	**Activity complete by**
OWFS satellites workshop	Workshop	Primary schools	10	**E1.1, 1.3, 2.1, 2.2**	• Post-visit survey for teachers • Staff reflection	November 2024

Table 17. Example excerpt from an evaluation plan

Across the lifetime of the project, Ondata held check-in meetings and set aside time for office hours to allow the OWFS delivery partners to come along with any issues, questions or queries. The evaluation plan became the core reference document for check-ins and managing expectations for delivery partners in terms of what they were aiming to achieve. Delivery partners were very positive about their experiences of the evaluation process and the

support they received. Having regular check-ins and being available to answer queries or questions as we went along worked very well. We were also able to adapt the metrics reporting in the early months depending on feedback on what the delivery partners were delivering in terms of both activities and recording audience groups. For many of the delivery partners, getting feedback from participants was a challenge, especially when encouraging people to complete a survey after an event. Another limiting factor was lack of time and staff availability. Where delivery partners were able to gather survey returns from a higher proportion of participants, they had to dedicate time to following up with people to encourage them to respond.

Descriptive statistics were used to summarise the findings from the quantitative returns (metrics and closed survey questions) whilst reflexive thematic analysis[2] was used on the qualitative data. BERA's ethical guidelines[3] were used for this project and in terms of data storage, files and information was shared and stored securely with protocols set up as part of ASDC's project management processes. AI was used to generate transcripts of interviews and focus groups which were then reviewed by the evaluator for accuracy. AI was also used to categorise some qualitative data but the analysis and conclusions drawn were all the work of the evaluator.

[2] Braun, V., Clarke, V. (2019) Reflecting on reflexive thematic analysis, Qualitative Research in Sport, Exercise and Health. 11:4, 589-597
[3] BER (2024) Ethical Guidelines. Available: https://www.bera.ac.uk/publication/ethical-guidelines-for-educational-research-fifth-edition-2024

Appendix C: IMD for the four nations

	English school postcodes	
Quintile	**Number of Schools**	**Proportion of schools**
1	85	21%
2	89	22%
3	75	18%
4	66	16%
5	94	23%
	409	

	Scottish school postcodes	
Quintile	**Number of Schools**	**Proportion of schools**
1	16	15%
2	12	11%
3	33	31%
4	28	26%
5	19	18%
	108	

	Welsh school postcodes	
Quintile	**Number of Schools**	**Proportion of schools**
1	5	31%
2	5	31%
3	1	6%
4	4	25%
5	1	6%
	16	

	Northern Ireland schools	
Quintile	**Number of Schools**	**Proportion of schools**
1	21	24%
2	17	19%
3	16	18%
4	23	26%
5	12	13%
	89	

Table 18. IMD for the four nations

Appendix D: Project delivery

This section discusses some of the project management and logistical elements. These are brought together in this Appendix as a summary for ASDC in order to support planning and development of future activities.

There were a number of successes highlighted.

- There was effective communication from ASDC.

  Once the project was underway, staff from the delivery partners were brought together in a Microsoft Teams space curated by ASDC. This was also a place for staff to ask questions of colleagues and share their experiences. The ASDC Programme Manager was also very active in liaising with staff and Project Managers commented on how proactive they were and quick to respond to queries or issues. Some of these issues were technical, e.g. a change in 3D printer schematics, finding a suitable satellite image of the local area around the science centre or questions about the We Are Guardians planetarium show.
- Regular reporting was welcomed.

  Due to the length of the project delivery partners were asked to report quarterly metrics on the numbers and activities which they were running and this was accompanied by a Project Manager reflection tool providing context about how delivery was going, what was going well and what they needed support with. This content was used both to monitor the operational side of the project and as a source of information for the evaluation. In the feedback from the Project Managers the quarterly reporting and the combination of metrics and reflection was very positively received. It had the added benefit that if there was a change in staff member they knew what had been delivered and how it had gone.

  “I thought the shorter term, interim reporting pieces were really good as was the opportunity to reflect each time. And I think it was time for the staff who were involved in delivery to get together and talk about where we were, where we're heading.” (Project Manager)
- Reflection and reporting supported effective project management and development of activities.

  For smaller delivery partners this reflection played an important role in the Project Manager’s professional development as they were encouraged not only to think about the activities on offer and the successes but how they personally have perhaps developed new skills or knowledge. For another Project Manager, having regular “touchpoints and interactions” with ASDC and the evaluator has “massive value” when it comes to helping them feel supported and listened to. The shorter term reporting

also encouraged staff to be accountable for their progress and think about what the next steps were in terms of planning. This was especially useful for those who were new to project management. The move to interaction hours has also been a positive one and some delivery partners have expanded the use of this more widely in their work as it helps to indicate the depth of engagement achieved. However, staff noted some limitations to this as a sole measure especially where delivery partners are providing online resources, loan kits for community groups and physical posters for schools.

- Longer delivery period supported high quality interactions and allowed for activities to be embedded in the longer term.

  The length of time made available for this project was a significant benefit to delivery partners. Training in Spring 2023 was followed by a period of development of activities and ideas with audience engagement launching variously in Summer or Autumn of 2023. Several delivery partners have set times of year for different themes, for example a space focus in October to link with Space Week or they build their workshop offers around the school year with options for schools during term time also for families during holiday periods. So for those running school workshops this meant they had time to develop and promote the new workshops and then introduced these over the course of 2023 and 2024 where appropriate. This timeline encouraged an investment in and longevity for the activities and many went in with the intention of developing new workshops which would sit within their offer well beyond the funded period for the project. This investment of time by organisation staff was often not part of the grant funding and covered by their own organisation. So whilst the grants were very necessary to fund this work, they also helped to leverage further investment by delivery partners. In one instance the funding received meant that they were able to access other grant funding which expanded the reach of the OWFS activities. The longer time period also meant that staff had space to iterate and evolve workshops and drop-in activities, improving the quality of the experience for the participants and providing more time for confidence to build amongst staff:

  “it gives us more time to develop things a bit further as well. If we find that one activity was a little bit too difficult, we can develop it and use it again and carry on the process.” (Project Manager)

  “it gave us plenty of time to train our other colleagues, and not only for me to get confident with it, but for my other colleagues to get confident with delivering it.” (Project Manager)

  The longer delivery period also provided flexibility in meeting the interaction hours target. For example, one of the smaller delivery partners said that the longer time

period helped them to meet their target because of their limited physical capacity in the centre but also the capacity of the smaller delivery team. Another observation for many of the delivery partners was that public visitor numbers were lower than expected in the 2024 Summer months, so having the longer period of time to reach their target allowed for them to continue to reach people with OWFS activities without undue stress as numbers of participants and interaction hours could continue to accumulate over time. The target numbers delivery partners committed to tended to be based on visitor numbers and interactions from the previous year. Project managers reported that these had been affected by many different factors including marketing, pricing and the weather. However, new audiences have been reached.

> "The Our World from Space club is bringing in new visitors that wouldn't normally come to the planetarium, families take in the rest of the science centre after their sessions. This shows that they are enthused by the session and want to stay on longer" (Project Manager)

There were several challenges reported to us over the course of the project via the quarterly Project Manager reflections. These returns were reviewed each quarter with any concerns being followed up either by the ASDC Programme Manager or Ondata as the external evaluator. There were some challenges being experienced which were operational or logistical which were not due to OWFS but there were some challenges which related specifically to the project. General challenges are discussed below.

- Understaffing, including staff and volunteer availability. Several delivery partners reported issues with recruiting staff, however this has not ultimately affected the reach of the delivery partners but it will have created additional stress and workload within these organisations over the period of delivery.
- Lower than expected visitor numbers.
- Event management issues such as finding a suitable space for the audience size and activity type.

The challenges which related more specifically to the project included:

- Being able to have enough time to train staff on the content and activities.
  One request from staff regarding training was for more preparatory material about the project and some background information on the topics which formed the project to be provided ahead of the Training Academy. There was also interest in having a follow-up training session halfway through to allow for newly joined staff or those being involved for the first time to benefit from the broader content at the Training Academy. For many attendees of the training, they were responsible for project management and delivery, but another colleague had perhaps put the application for the project together without

their involvement. One of the Project Managers commented that this pre-participation information would have helped them identify ways in which they were potentially going to use the content and would have shaped the questions and queries they had at the training event. Another Project Manager commented that even having some of the content recorded and available to share with their colleagues afterwards would have reduced the training burden on them.

- Many schools preferring traditional space topics (e.g., rockets and planets), making it harder to book workshops on less familiar themes such as satellites.
- Development of OWFS activities sometimes taking longer than expected in order to make them relevant for the target audience: "The activities offered as part of OWFS required more development to make them relevant to our audiences. In some cases, not all the information was available within the packs." (Project Manager).
- Some of the concepts and topics were difficult to convey and communicate to younger audiences: “The biggest challenge is making it accessible for all ages. It's a lot for our younger audiences to comprehend, but we try to adapt it to their level." We Are Guardians was highlighted by some families as having difficult concepts for younger children to understand. There was also pushback from some adults on the content in We Are Guardians, feeling it was one-sided.
- Delivery partners would have liked a second opportunity to place an equipment order. Delivery partners had to make decisions around equipment quite early in the project (July 2023) and many found that they would have put in a different order based on how their ideas were developing over the Summer and Autumn. An increased budget allocation for equipment along with staff training and delivery would always be welcome as Project Managers noted they can always do more with more money. For example, one organisation would have invested in more IR cameras, allowing them to run school workshops and drop-in activities at the same time rather than having to choose one or the other. As indicated above, there were many different costs which were borne by the delivery partners beyond that which was covered by the grant, mostly for staff time.
- One organisation was unsure whether they would apply for this level of funding again as they found it challenging to meet the commitment for the grant. Another found that they needed additional grant funds from other sources to meet the interaction hours for the grant. This was mainly due to the audience numbers at events they attended being significantly lower than expected and this was something completely outside of their control. In terms of the target numbers, there was a comment from one Project Manager about the uncertainty around attendance numbers at community events and

asked that there could perhaps be some flexibility in targets (e.g. a range to meet rather than a total fixed number). Being able to work in the community and have a presence is important to science centres but this does come with increased cost and risk as it takes time and effort to build trust. A review of how the target numbers are expressed is recommended, especially where delivery partners are working with community groups and attendance numbers are more uncertain.

- Delivery partners felt that the Our World from Space project allowed them the time and resources to develop relationships with new audience groups but that the issue was the lack of certainty about who and how many would engage with a new activity. The longer time period also meant that delivery partners were able to factor in time to help them build relationships which would support the successful delivery of the project and for some it is very important for them to see funders recognise the time and effort required for relationship building to be factored in as part of the expectations, especially where delivery partners are working with new audiences.
- One further implication for this length of project has been the timing of payments. Some delivery partners would have liked more regular payments instead of larger payments at the beginning and the end. There may also be a consideration of providing different levels of grant funding depending on the size of the organisation or reducing the target numbers which need to be reached.
- Project Managers also asked to have more information about the people involved in research and industry, especially in relation to careers information for UK space and climate-related careers and routes into them. This would help them to be more informed in conversations with audience groups.

Based on this feedback, the following recommendations are made to ASDC:

1. For future projects, maintain the ‘little and often’ approach to reporting which saw delivery partners checking in quarterly with participation numbers combined with a reflection piece providing context and insight about what happened during that period.
2. Add further context to reporting of audience groups, in order to provide context on why they were chosen and why the activities were considered to be suitable for this group.
3. Consider introducing a second ordering point for kit to allow delivery partners more time to develop their ideas for activities and consider the consequences of ordering certain items.
4. Review how the grant targets, such as interaction hours are described. There was the suggestion by one organisation to consider the potential of moving to a range, rather than an overall number, especially where work is being done in the local community.

5. ASDC to continue to provide support and guidance to delivery partners on space science and climate science. Whilst there is now excellent knowledge and confidence within the sector in relation to these areas, there is room and enthusiasm for further exploration of these topics, especially with regards to sustainability of space missions and information on the uses and applications of satellite data. Support for engaging people around eco-anxiety should also continue, so that staff can continue to build their confidence in having conversations with different audience groups.

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