



Executive Summary for additional Evaluation report by Cait Campbell, Project Manager, ASDC

Operation Earth 2.5 has built on all the training, knowledge, enthusiasm and partnerships for environmental science and sustainability currently with science centres and museums across the UK. This phase developed and focussed the content of the programme towards celebrating the UK's role in COP26 – as well as other Key Content Areas of biodiversity, oceans and clean air.

With the provision of the additional grant of £22,700 at the start of 2022, ASDC was able to expand the Operation Earth network to 16, increasing the reach of NERC science during a crucial year from environmental and climate science. The three centres that joined were Exeter Science Centre, Life Science Centre and Science Oxford who were offered grants of £3,000 to spend on equipment for the programme activities as well as an Earthy suit. Science Oxford had to turn down the suit due to lack of storage space, however their nearby fellow Operation Earth partner University of Oxford Museum of Natural History has one that they can borrow when needed and ASDC are storing the spare one that we will use for future events and can lend out to centres when required. ASDC was also able to provide grants of £500 to each of the other 2.5 centres to renew pieces of the kit that had become damaged.



Life Science Centre at STEMfest UK 2022

Along with the earthy suit and equipment grant ASDC offered the new partners an online kit training academy that went into detail about each activity and how to use the kit, an overview of the family show and how to adapt it to a one person show, and an opportunity to network with fellow Operation Earth partners. The training academy was also offered to the other 10 active Operation Earth centres who sent staff that were new to the programme to be trained as well. The training was carried out by previous Operation Earth project manager James Summers who is now at Techniquest and Conor Ellis, Learning and Engagement Manager, Dynamic Earth – both experts in delivery of the activities and family show.

The evaluation report highlighted the effectiveness of the training academy and handbook, *“the combination of the online training academy and the digital handbook gave a solid foundation to enable them to deliver the activities, with many also appreciating the opportunity to network with experienced professional from the other centres”* **Science Communicator, Science Oxford. Taken from the OnData Evaluation Report**

The three new partners were required to deliver at least one interaction, activity or event on climate and environmental topics by July, to then be able to contribute feedback and take part in an evaluation interview with our evaluators.

The On Data evaluation report demonstrated that all three centres had a positive experience with the programme and will be continuing to use the activities into the future. Each centre took a different approach to the activities based on their specific plans and opportunities for using Operation Earth resources. All activities were delivered in-person across the three new centres, reaching over 5700 people. This brings in-person engagement to 32,530 for phase 2.5, taking overall engagement to 140,587 for phase 2.5.



Exeter Science Centre Climate Pop-Up event March 2022

Particular highlights from the report were hearing about the positive affect that the activities can have to calm climate anxiety by informing participants of the work being done by environmental scientists and the role they as individuals can play, for example, through citizen science and making small changes to their daily lives. This was mentioned at Exeter Science Centre’s Climate pop-up event where they had a Climate booth where attendees could share their feelings about climate change. Another highlight was Science Oxford designing a new Biodiversity activity to fit with the vision and mission of the programme, this was the Operation Earth backpacks which included binoculars, specimen pots, compasses and an activity sheet, used to assist participants on a biodiversity trail. The activity proved very popular at the centre and helped them achieve a recent goal *“we’ve been looking at ways just to connect them with the outdoors a little bit more”*. One child posted a photo on their Instagram doing the trail saying *“Who knew science could be so fun!”* (image below). The backpacks have now become a permanent part of Science Oxford’s offer and the report notes that the team are *“now planning additional resources that can be used with the backpacks over the summer period with family audiences.”*



Science Oxford Operation Earth Backpacks

The evaluation report concludes noting that all the centres mentioned the “flexibility and high quality of the resources provided enabled them to have discussions with audiences of all ages about biodiversity and climate change, and how they could make positive choices or learn more about topic themselves” For example in the staff reflection feedback from Exeter Science Centre “We were surprised by how much ALL ages of girls enjoyed the biodiversity mat activity” referring to their girl guides event and “nearly all of them felt that it made them want to learn more about environmental science”.

In conclusion, it was beneficial to expand the Operation Earth network to include the three new centres increasing the engagement of phase 2.5 to 140,587 over the 10-month period during a crucial year for environmental science in the UK. In addition, renewing the kit for the other participating centres has enabled them to continue to deliver Operation Earth activities into the future, cementing its legacy across the UK. We are proud of the legacy of this project and look forward to it growing and evolving in the future with new phases of the programme with the aim to continue with the vision to engage, inspire and involve families with school-age children across the UK with the amazing stories, science and people of NERC’s world-leading environmental research.



Science Oxford Biodiversity Trail participant post on Instagram

“Who knew science could be so fun. Had a great day out at #ScienceOxford loads of activities and a great nature area. We were given a backpack with a clipboard, magnifying glass and binoculars to explore with. How cool.” **Mason**

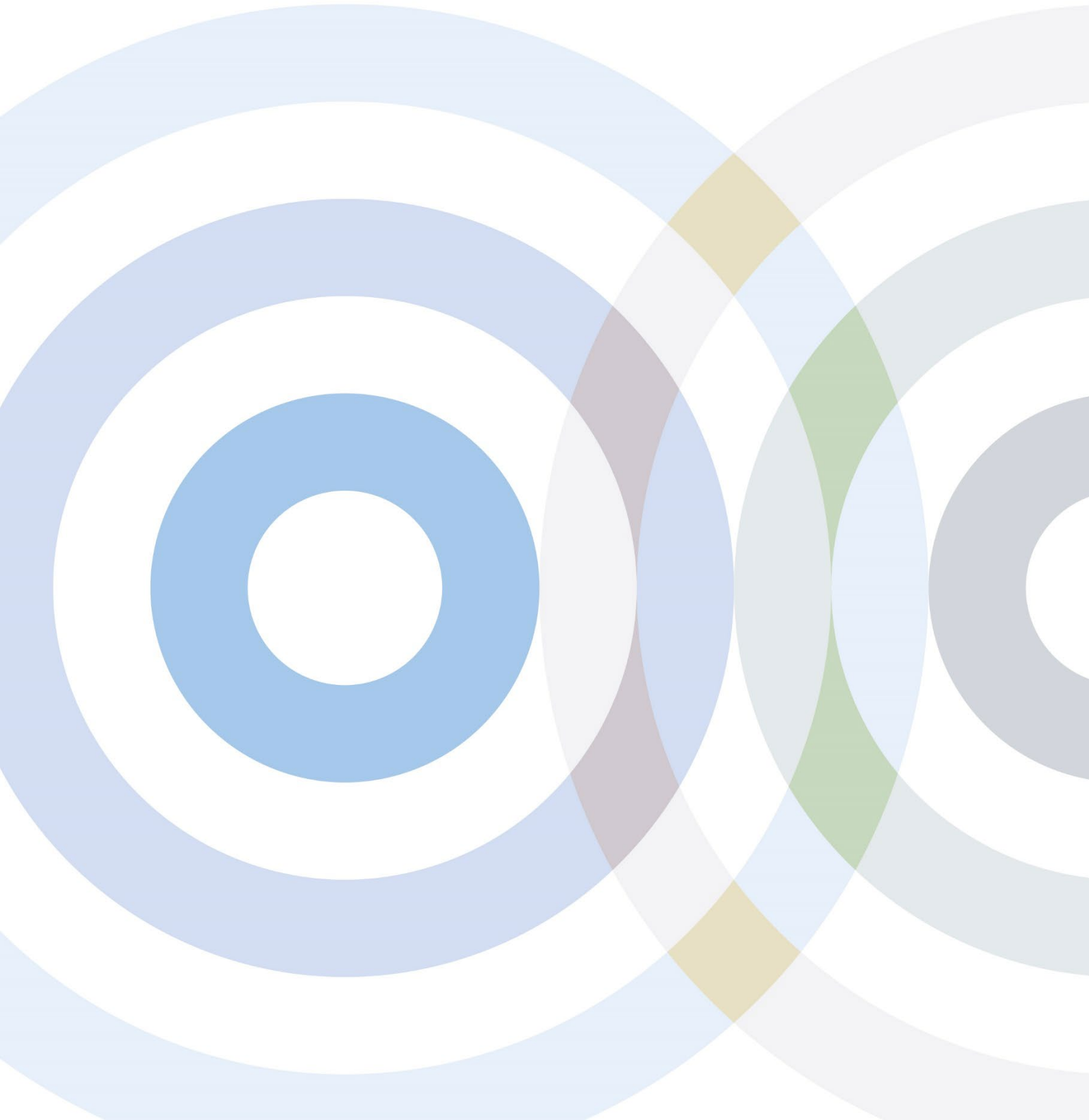


Ondata Research

Operation Earth Phase 2.5 Evaluation Report – Insights into Centre Experiences

By Clare Meakin

August 2022





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Executive Summary

Introduction

The Operation Earth programme is managed by the Association for Science and Discovery Centres (ASDC) and funded by the Natural Environment Research Council (NERC). Following the successful roll out of Phase 2.5, three additional centres (Exeter Science Centre, Science Oxford, and Centre for Life) were added to the project, each received a grant to deliver in-person events at their centres or in their local area from March 2022.

The vision for this phase remained the same as Phase 2.5 *“To enable science centres and collaborating NERC researchers, to reach widely across the UK during COP26 and into 2022, delivering interactive activities through innovative and blended approaches, that bring the relevance of the UK’s climate and environmental science and research to life.*

Evaluation focus

The key areas of interest for this evaluation report focused on how new centres were able to take on and integrate the Operation Earth resources into their programming, specifically exploring:

- How positive their overall experience has been.
- Whether the centres received enough training and support, especially as they are new to the project.
- What challenges or successes they experienced in relation to the project.
- What their plans are for the equipment in the future.

These areas of interest were explored via interviews and self-reflection with staff and audience feedback gathered by the science centres directly.

Activities and impact

Each centre took a different approach to the activities based on their specific plans and opportunities for using Operation Earth resources. All activities were delivered in-person across the three new centres, reaching over 5700 people. This brings in-person engagement to 32,530 for phase 2.5, taking overall engagement to 140,587 for phase 2.5.

- Science Oxford developed bespoke Explorer backpacks for early years and family visitors, which contained kit that enabled participants to explore the site and the topics of



biodiversity. Early years visitors explored pollination through the resources provided by the project which were adapted and included in early years school sessions. The backpacks were particularly impactful for the centre as a resource they have wanted to develop “for some time” (Staff interview), which has facilitated school and family audiences to explore the topics from Operation Earth project in reality across their site, encouraging them to make positive choices in their own lives.

- Exeter Science Centre brought climate science to life at a science themed pop up for a mixed audience, delivered a biodiversity themed activity as part of a Girl Guide fun day, and used Operation Earth kit to discuss climate science with Primary and Secondary school pupils. The Operation Earth resources provided the emerging centre with a range of new activities that they could use across multiple age groups and audiences. The activities themselves offered opportunities for wide ranging dialogues around personal responsibility and impact, with participants demonstrating excitement and interest to explore topics themselves after taking part in climate and biodiversity themed events.
- The Life Science Centre integrated Operation Earth drop-in biodiversity activities into their centre’s “Earth Day”, took resources to a primary and secondary STEMfest careers day, and included climate science resources in after school clubs for primary groups. The high quality of the resources and flexibility to choose elements that were most suited to the centre’s audiences means the resources will have legacy and be integrated into future activities. Participants were able to make connections to both local and global climate change topics, and to explore how technology they use everyday, e.g. satellites are used in climate science.

Conclusion

- All centres reported that taking part in the project had had a positive impact on their centre, from the support and training given to each centre, to the high-quality resources provided, and the positive engagement they’d had with families, schools and community groups.
- The flexibility and high-quality of the resources provided enabled all centres to have discussions with audiences of all ages about biodiversity and climate change, and how they could make positive choices or learn more about the topic themselves. All of the centres had their own mechanisms for extending engagement beyond the activity by linking to the Operation Earth website, the UK Climate Hub resources, local attractions or exhibits.



- All centres reported the resources would have real legacy in their programming, and all were keen to explore how to collaborate with climate science and biodiversity researchers and scientists in the future.
- The topic of climate change and environmental science continues to engage audiences of all types, and there is potential for future Operation Earth projects to focus on addressing climate anxiety, particularly in older age groups, and to continue help participants to make stronger links between different climate topics including cause and effect.

It is clear that the additional centres who participated in Operation Earth phase 2.5 have had a positive experience taking part, and the legacy of the resources provided or developed will allow them to continue to engage a variety of audiences with the core messages of the project, and to help participants make positive choices around climate science and biodiversity that affect their lives, and those around them.



Introduction

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The vision for this phase remained the same as Phase 2.5 *“To enable science centres and collaborating NERC researchers, to reach widely across the UK during COP26 and into 2022, delivering interactive activities through innovative and blended approaches, that bring the relevance of the UK’s climate and environmental science and research to life.*

The key areas of interest for this evaluation report focused on how new centres were able to take on and integrate the Operation Earth resources into their programming, specifically exploring:

- How positive their overall experience has been.
- Whether the centres received enough training and support, especially as they are new to the project.
- What challenges or successes they experienced in relation to the project.
- What their plans are for the equipment in the future.

This evaluation report also reviews the impact activities had on audiences taking part, and more broadly any themes around attitudes towards climate science that arose during delivery.

Each centre took a different approach to the activities they undertook based on their specific plans and opportunities for using Operation Earth resources. All activities were delivered in-person across the three new centres, reaching over 5700 people. This brings in-person engagement to 32,530 for phase 2.5, taking overall engagement to 140,587 for phase 2.5.



Methodology

The evaluation of this phase of Operation Earth was mainly based on semi-structured interviews conducted by Ondata Research with staff from each centre supplemented by event metrics and audience feedback collated by centres. Table 1 outlines the evaluation methods used.

Method	Purpose
Quantitative metrics	To provide a basic overview of activities including audience type, number of participants
Audience feedback	To capture immediate feedback from participants around levels of engagement and enjoyment
Staff reflections	To provide additional perspectives from delivery or project staff on activity success, audience engagement and opportunities for future development
Semi-structured interviews	To review overall impressions of the project including successes, challenges, legacy of activities and opportunities for future development

Table 1. Summary of evaluation methods

Data collected by centres was done so directly with participants, and in line with each centre's GDPR and privacy policies. All information gathered was anonymised, securely stored by Ondata Research Ltd and securely shared with ASDC. With regards to data analysis, descriptive statistics were used for the metrics and quantitative survey data whilst reflexive thematic analysis was used for the qualitative data¹.

Data provided by each centre has been aggregated with information gained from semi-structured interviews to develop a case study for each centre, outlining their unique position, activities undertaken, and the impact taking part in the programme had on staff and participants.

¹ Braun, V., Clarke, V. (2019) Reflecting on reflexive thematic analysis, *Qualitative Research in Sport, Exercise and Health*. 11:4, 589-597



Operation Earth activities

Each centre took a different approach to delivering Operation Earth, with some choosing to use resources as provided, and others taking elements of resources to incorporate into their existing learning offer. A summary of the types of activities undertaken across the three centres is provided in Table 2.

Activity type	n	Percentage
On gallery drop-in activities	3	30%
Outreach activity	2	20%
Group visit/interaction	2	20%
Workshop – primary aged children	2	20%
Workshop – secondary aged children	1	10%

Table 1. Summary of activities

Whilst none of the new centres reported delivering the family show (which totalled 25% for centres in phase 2.5), all three centres used elements of the show (e.g. films) in their activities. As centres focused on delivering activities in person, no synchronous or asynchronous digital activity took place (7% synchronous digital activity, 1% synchronous activity across centres in phase 2.5).

Topics covered by each of the three centres (Table 3) focused mainly on Climate Science and Biodiversity, with one centre covering a broader range of topics due to the flexible nature of the resource they developed (backpacks) with their grant funding.

Operation Earth topics	n	Percentage
Climate Science	6	60%
Biodiversity	3	30%
Other	1	10%

Table 2. Topics covered by centres

Topics such as COP26, oceans and clean air were not specifically discussed by the three new centres, as these topics (particularly COP26) were more of a focus in phase 2.5 due to the conference taking place around the time of delivery. However, all centres commented that their discussions with participants covered a range of climate science, and the flexibility of the resources enabled them to cover content across topics and help participants make connections between different areas of existing knowledge.



Case Studies

Overall, all three centres had a very positive experience with Operation Earth, they were able to incorporate the resources and activities into their offers in different ways.

- Science Oxford developed a bespoke resource to be used in their sessions as well as incorporating elements of the provided resources into their programming.
- Exeter Science Centre used different elements of the resources at outreach events. All centres commented on the high quality and adaptability of the resources being key to their integration, which allowed them to use resources across school and family groups.
- Life Science Centre used the resources as additional material in established or existing programming both within the centre and as outreach.

None of the centres reported any particular issues with using or integrating kit, with some centres experiencing minor challenges around increased cost of kit, or sourcing alternative kit where items were out of stock. All centres mentioned the bespoke approach to selecting kit that worked “for them” was a particularly useful part of being involved with the project, and ensured resources from Operation Earth had legacy and would be used again in the future.



Science Oxford

Science Oxford is “the UK’s first indoor-outdoor primary science education centre”². The team working on the Operation Earth project have been with the centre for several years, focusing on developing their outdoor education offer. Sitting in fifteen acres of woodland and ponds, the team run activities throughout the year on a range of STEM topics for early years, primary and family audiences.



Figure 1: Science Oxford backpacks on their storage station

Fit with centre ethos

With a wealth of natural resources surrounding the centre, the topic of climate science and biodiversity from Operation Earth was a great fit for the centre. Over the course of the project the team engaged with 3245 individuals as of July 2022 across family and school audiences. To complement their existing programme, the team developed bespoke backpacks containing age-appropriate investigation tools (binoculars, bug pots, compasses), that visitors could use to explore the site: “on our family day weekend visits, they have free use of the outdoor space as well as a bit of time indoors and we’ve been looking at ways just to connect them with the outdoors a little bit more” (Staff interview).

Resources used / produced

The centre also incorporated Operation Earth resources in their schools sessions “modifying some of the activities that were designed for Operation Earth, but to make them classroom focused or class focused” (Staff interview) to fit with their established delivery method. The pollinator suits and activity allowed the centre to engage younger visitors with the role of bees and biodiversity and to make connections with the outdoor spaces available at the centre: “the children love to dress up and this activity creates links

Science Oxford
22m · 🌐

We loved these busy bees 🐝 (and flowers! 🌸) who took part in our new #pollination activity in the woodland thanks to #OperationEarth UK Association for Science and Discovery Centres



Figure 2: School group using bee costumes as part of a visit to Science Oxford

² Science Oxford (2022) *About Science Oxford* Available: <https://scienceoxford.com/>



between our bee hive and our wildflower meadows. It emphasizes the importance to the animals to the flowers and the flowers to the animals. The ability to stress that some flowers would die out if it were not for this relationship is really powerful” (Staff reflection).

Linking to real life

Staff noted that with this topic in particular, even some of the youngest children were keen to learn what they could do to help: *“Although this was a school group rather than a family group, the children were keen to know about ways they could help bees and flowers” (Staff reflection).*

It also provided staff with an opportunity to think about how to discuss big issues, and to start to develop scientific literacy and critical thinking skills: *“I will continue to ask big questions within each activity as this really hands ownership of learning over to the children, and can lead to interesting discussions. It is a valuable experience for children to see how conversations about science can be regulated, allowing ideas to be voiced, considered and countered, without shutting the whole conversation down” (Staff reflection).*

Grant flexibility

The flexibility of the grant in providing the centre with materials and resources that worked specifically for their environment, as well as the project itself demonstrating sustainable values has been particularly important to the success of the project: *“the flexibility to spend it on things that were genuinely of use to us was so important to us. Even down to the fact that I think at one point someone asked if we wanted a hard copy of the manual...I mean, obviously, that’s particularly important when it’s an Operation Earth project... So I think those sort of approaches, you know, making sensible decisions are really good” (Staff interview).*

Challenges

The only small challenge experienced by the centre was price increases for some of the kit due to an unprecedented period of inflation, but the team were still able to access and develop all the resources they envisioned.

Future plans

The backpacks have been particularly impactful for the centre (*“They’ve been an absolute, I mean a real success. It’s been brilliant, we’ve had so much positive feedback from them.” (Staff interview)*) and will become a permanent part of their offer, with the team now planning additional resources that can be used with the backpacks over the summer period with family audiences.



Exeter Science Centre

As an emerging centre, the team in Exeter set up as a community interest company in 2020, becoming a charity in 2021 and a member of ASDC later that year.

Fit with centre ethos

Their involvement with Operation Earth started this year and the project themes were an excellent fit with their ethos.

Resources used / produced



Figure 3: Participants using the biodiversity mat at Guides fun day

Exeter used Operation Earth resources at a climate pop up event '*Breaking the Ice*', engaging over 1500 family participants and a Girl Guiding fun day, allowing them to engage young women of all ages with a range of Operation Earth resources.

As part of the girl guide 'fun day', the team used elements of the Operation Earth show to introduce climate science topics, followed by the biodiversity mat which was particularly successful with all guide age groups. The team noted: "*We were surprised by how much ALL ages of girls enjoyed the biodiversity mat activity*" (Staff reflection), which was also reflected in the event feedback where 100% Strongly Agreed or Agreed (86% strongly agreed, 14% agreed) 'children enjoyed taking part' with group leaders commenting "*Best session of the day. Girls from 5-14 in the group all completely engaged*" (Participant feedback).

Linking to real life

The format of the activities allowed connections to be made to everyday life "*I think it really related to the kinds of activities that they did in schools you know*" (Staff interview) and built curiosity in the participants to explore the topic further "*nearly all of them felt that it made them want to learn more about environmental science*" (Staff reflection).

Working with researchers

Coming from previous backgrounds in academia, although the delivery team did not work directly with NERC scientists for Operation Earth activities on this occasion, the team were very keen to make connections between activities they facilitated and real science being



undertaken in universities locally or across the UK. As their ideas and centre plans develop, they hope to develop more links with local scientists and incorporate this into future programming as they move forward: *“for example, in North Devon, there’s the North Devon biospheres....so hopefully, when we’re doing shows up there we’ll link with both the people involved in the North Devon Biosphere, but also biodiversity scientists from Exeter or Plymouth”* (Staff interview). They also commented that specifically for their emerging centre status, the high standard of resources provided through Operation Earth would be particularly effective for engaging scientists in the future: *“it’s nice to approach scientists with a package like that, that has a proof of success...Sometimes I think people feel like they might be taking risk with us otherwise, because we’re very new and stuff. But with this, it’s like no risk. It’s great.”* (Staff interview)

Additional learning: climate anxiety / climate disconnect

The pop-up event provided additional opportunities for the team to get a snapshot of audience feedback around climate anxiety. A ‘climate feelings booth’ at the event allowed participants to *“anonymously say how you felt about the climate before you engaged with anything”* (Staff interview). They noted that particularly with older groups *“the responses were really sad. You know a huge amount of anxiety”* but through conversations and interactions at the event they seemed to help with *“occasionally people saying, ‘I feel optimistic, because there’s loads of people working on this, and we’re gonna be okay”* (Staff interview) and this was reflected by a change in perceived levels of anxiety when participants left the event: *“when we surveyed them, as they left said, they felt more positive. They felt like they could do something about it.”* (Staff interview).

The team were also able to identify that whilst many participants at their events were highly engaged with climate science and the environment, there appeared to be a slight disconnect for audiences when combining topics: *“I think we were talking about the biodiversity thing saying ‘So what do you think we can all do?’ And a lot of people’s responses ‘use less electricity’...you know, yes, use less electricity, if it’s coming from fossil fuels, but they didn’t seem to link sort of fossil fuels and biodiversity. It was quite interesting”* (Staff interview). Additionally, they found: *“we would say something like, ‘what can we do to improve biodiversity?’ And they’d immediately go ‘stop throwing litter in the sea’... I think they have these certain things they latch on to”* (Staff interview) and centre staff were keen to explore further where these disconnects originated from.



Future plans

Exeter Science Centre plan to continue to deliver Operation Earth activities across the summer period and into the start of the new academic year. Plans include delivering activities as part of the Summer Reading Challenge at a local Exeter library focusing on “Gadgeteers” and they hope to use Operation Earth resources with local primary schools in the next academic year, targeting building new relationships in schools with high percentages of free school meals. Reflecting on ways to further enhance their offer in future: *“The sessions felt too short to fit everything in that we wanted to so in future we will aim to have at least an hour with the school/families for Operation Earth activities. We will also buy some quadrats to enhance the biodiversity mat activity... We will also aim to have at least one NERC scientist present with us for each event as it is so valuable for the children to meet a real scientist.”* (Staff interview)

The team very much enjoyed being part of the project and felt the level of training and support offered was appropriate for their needs, commenting: *“it is a really well structured and fantastic package of resources”* and *“we’re so excited about starting to deliver the full show”* (Staff interview).



Life Science Centre

The Centre for Life is an established science centre in Newcastle. The team have previously been involved with other ASDC projects, but this was their first time engaging with Operation Earth.

Fit with centre ethos

Climate change and biodiversity topics were felt to be a good fit for the centre, as climate science is key strand in their programming, particularly for those who regularly visit the centre: *“the people who come through our doors are already engaged with science topics....so we assume that they are already aware of climate change. So instead of teaching them the basics....it's actually: okay let's be on the same level, we are not the experts and you aren't the students. We are on the same level, what can we do in order to progress discussions around climate change?”* (Staff interview).

Resources used/ produced

The resources provided through the project were used with family audiences in the centre as part of an 'Earth Day', with schools on outreach at STEMfest (a STEM careers event for Primary and Secondary pupils) and as part of their after-school clubs, reaching 927 participants in total.

Linking with real life

The visually impactful nature of the resources provided the team with opportunities to draw visitors in to discussions around climate science in the centre: *“we had the biodiversity mat out on the floor. And that was an instant crowd pleaser”* (Staff interview). The “Earth-y” suit proved popular with a range of school groups *“the year fives and sixes immediately would go up and start pointing out places that they knew. And one child was pointing out that you could tell that these were mountain ranges because they have snow on the top.”* (Staff interview). The STEMfest event also provided opportunities to open up discussions around wider climate science topics such as future food habits: *“I was quite surprised that the primary school day, a lot of them, were very happy to just continue as we were, and keep flying food from all over the world and not really worrying about the environment, whereas the secondary school students that came in the next two days, voted quite differently.”* (Staff interview)



Working with Researchers

The events and activities didn't directly involve researchers in this phase, but the centre was able to make links with science going on locally (*"we did spotlight northeast research in the in the Earth day" (Staff interview)*) and with local universities such as Newcastle University which *"has a very strong hydrology department" (Staff interview)*.

Challenges

Staff at the centre faced some challenges when it came to sourcing items to use. In particular, the team sometimes found it difficult to find appropriate replacements of the correct specification and Health and Safety standard where suggested products were no longer available *"I did have a slight concern about from a health and safety point of view, lots of the links seem to be Amazon links....whether they're kind of reputable suppliers that you can record as meeting our kind of whatever non EU standards are." (Staff interview)*. Therefore, in the future it is perhaps possible to provide alternative sources of products or a more general description of what is needed to allow centres to go to multiple suppliers.

Future plans

The team also commented positively on the flexibility to choose the kit that was most relevant to them and that in itself provided legacy for the project (*"we are never going to not have climate change as part of our programme... so having a decent bank of quality resources, I think is has its own legacy." (Staff interview)*)



Conclusion

- All centres reported that taking part in the project had had a positive impact on their centre through developing or incorporating high quality resources that reflected their ethos and would have real legacy across their audiences.
- All centres reported that the combination of the online training provided and the digital Operation Earth handbook were very helpful (as reported in phase 2.5) and gave a solid foundation to enable them to deliver new activities, with many also appreciating the opportunity to network with experienced professionals from other centres.
- All of the centres reported that the high quality and flexibility of the resources (as reflected in the evaluation of phase 2.5) enabled them to have wide ranging discussions with audiences of all ages that helped them to make connections between the content and their own lives, with many asking questions about how they could make positive choices or learn more about the topic themselves. However, participants were sometimes unable to link different climate topics together, or make connections between cause and effect e.g. plastic in oceans and biodiversity.
- Minor challenges faced focussed mostly on kit availability or cost due to rapid inflation rates, therefore future phases could include alternative kit solutions where primary suggestions are either unavailable or for when centres needed replacements.
- All of the centres were provided with the evaluation tools from Phase 2.5. These included survey questions for gathering audience feedback. However, the feedback from audience groups was smaller than that received from centres in phase 2.5. This was mostly due to the small size of teams and availability of staff to collect data, however staff reflections were again well used by all centres and provided valuable additional insight into participant engagement.
- None of the centres worked directly with scientists during this phase, however all were keen to do this in future, with many stating they either had or intended to develop relationships with local industry/academia in this area. The potential for ASDC and NERC to assist with linking up researchers and the centres on this topic was also positively viewed.
- All of the centres had their own mechanisms for extending engagement beyond the activity through from linking to ASDC or other climate science web content, local attractions or exhibits. Some suggested there could be additional opportunities for providing more follow-on activities for different audiences, e.g. schools, uniformed groups and families that also highlighted key scientific messages, local science activities or links to activities participants could do at home.



- The topic of climate change and environmental science continues to engage audiences of all types, but there is potential for future Operation Earth projects to focus on addressing climate anxiety, particularly in older age groups.

It is clear that the additional centres who participated in Operation Earth phase 2.5 have had a positive experience taking part, and the legacy of the resources provided or developed will allow them to continue to engage a variety of audiences with the core messages of the project, and to help participants make positive choices around climate science and biodiversity that affect their lives, and those around them.

About the author

Ondata Research collaborates with clients to help them understand project impact, whilst also providing mentoring and support through the phases of project development and delivery.

Clare Meakin

Clare has worked in science engagement for national and local museums in London and across Scotland for the past 10 years. Working in both delivery and development, her museum-based projects have ranged from tinkering workshops for secondary students to science events for over 4,000 people. Most recently as Science Engagement Manager at National Museums Scotland, her work has focused on science engagement strategy development alongside evaluation of a wide range of funded STEM projects for funders such as Scottish Power Foundation, the Scottish Government and Children in Need. As a freelancer she has worked with regional museums such as Andrew Carnegie Birthplace museum on ASN and digital science engagement, and previously worked directly with primary schools for outreach, after school STEM clubs and teacher consultations

Produced for:



Ondata Research LTD 10 Douglas Terrace, Stirling, FK7 9LL
info@ondata.org.uk www.ondata.org.uk 07887920426

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