March 2019

The role of informal science in youth work

Findings from *Curiosity* round one

wellcome

BBC
Children in Need

CURIOSITY

LEARNING REPORT 2: ROUND 1 COMPLETION

FOR WELLCOME AND BBC CHILDREN IN NEED

March 2019

CONTENTS

EXECUTIVE SUMMARY

Curiosity is a £2.5m funding partnership between Wellcome and BBC Children in Need, which aims to improve disadvantaged children's and young people's lives through supporting increased use of informal science learning (ISL) by voluntary and community sector organisations. Curiosity programme activity includes making grants to organisations through BBC Children in Need's grant-making systems and processes, and gathering and sharing learning from the programme to influence the youth, science and funding sectors.

The first round of Curiosity grant funding was allocated to 32 projects[1], with a focus on learning more about how voluntary sector organisations used informal science as a tool for supporting young people, and what difference that made. The purpose of Round 1 was also to inform the shape, focus and structure of future funding rounds.

The Round 1 projects were delivered by voluntary and community sector organisations, some of which were in partnership with ISL providers, and offered a variety of science opportunities from surveying local weather to building a green-powered race car. Many projects explored multiple science themes, driven by the children and young people's interests. The environment and natural sciences, especially related to the local environment, were also popular topics.

All of the young people involved in the Curiosity projects were experiencing disadvantage, often of multiple types. The overwhelming majority were experiencing poverty and deprivation, and many faced a variety of other challenges too. While there were a small number of projects specifically aimed at young carers and young people with disabilities and long-term health conditions, several of the other projects also supported young people with these disadvantages, along with refugees, young people with behavioural difficulties and other marginalised groups.

Making a difference to disadvantaged children and young people

One of the core assumptions of the Curiosity programme is that science could be used in a similar way to other stimuli (such as sport and the arts) to support disadvantaged young people's development. The findings from Round 1 support this, with the vast majority of young people achieving positive outcomes as a result.

Projects reported the differences made to children and young people using BBC Children in Need's self-reporting framework, which included the three most important differences they intended to make in young people's lives. These differences were then coded using BBC Children in Need's Difference Framework, to analyse the difference made by each project[2]. Figures 1 and 2, below, show the intended differences made by the projects and young people's progress against those differences.

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[1] To a maximum of £10,000 per project
[2] For more detail on this analysis, please see the main report Chapter 2.

Figure 1   Differences intended to be made by the Round 1 Curiosity projects.
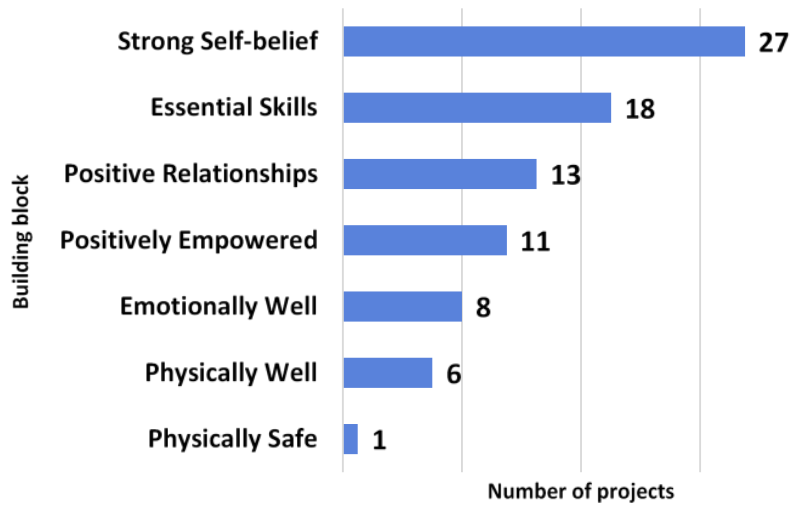
Based on 32 projects

Figure 2   The majority of young people made some progress against each of their differences, with over half making significant progress.
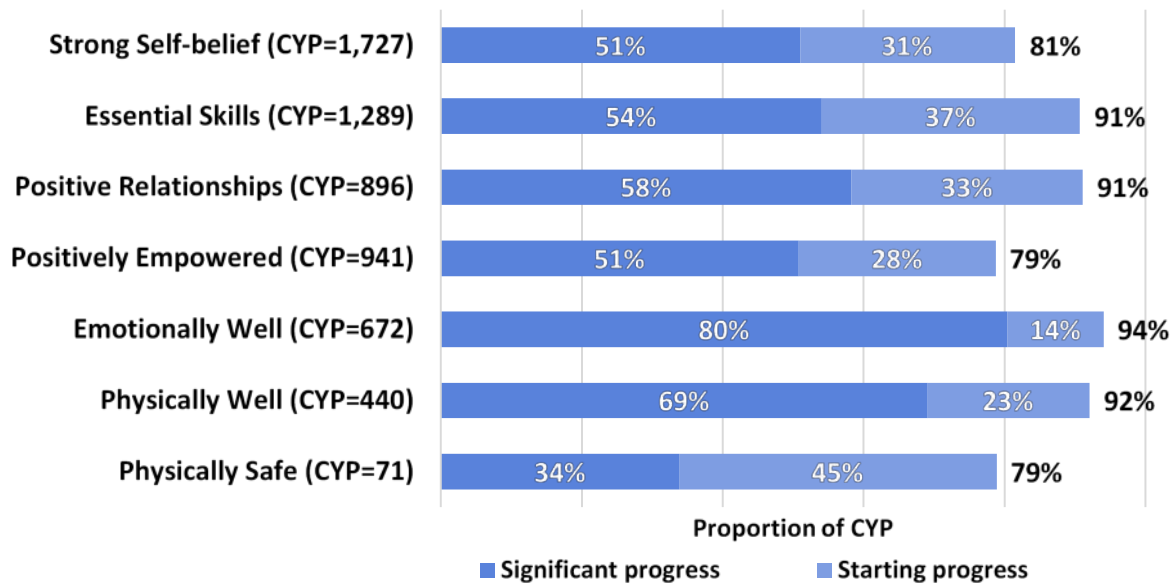
Based on data from 31 projects.

In addition to these planned outcomes, the Curiosity projects reported a number of unexpected positive outcomes from their activities:

★   peer support, improved peer relationships and valuing of each other's' differences: the quieter, more 'studious', scientifically-interested young people developed new roles in the group
★   problem-solving skills: science activities encouraged the development of these crucial skills, and also fostered comfort with failure and learning from things that hadn't gone as planned

★ willingness and ability to deal with challenge: the problem-solving approach pushed young people further out of their comfort zone than youth workers might ordinarily do, and they thrived on the challenge and sense of achievement

★ new career aspirations: science and science related careers became both interesting, relevant and attainable

★ environmental awareness and local stewardship: learning more about the local environment and their potential impact upon it, inspired positive activities to care for local spaces

★ engagement with parents: young people have shared the activities and the places they've visited with parents, and continued to do so

★ enabling other youth work: science activities have opened up dialogue with disengaged young people, enabling youth workers to support them with other issues.

Science's unique contribution

Beyond exploring whether science could be used similarly to other stimuli, the Curiosity programme wants to explore in the longer term whether science offers anything unique or different to supporting disadvantaged children and young people. This was not explored in depth in Round 1, and needs further exploration in the evaluation of Round 2, but our findings indicate some promise in three areas:

★ the opportunity to engage young people who are not so excited by other activities

★ encouraging young people to develop their problem-solving skills in ways that other activities don't

★ enriching other non-science activities such as the arts and sport, by incorporating a scientific element.

A youth development approach to science

The original idea for Curiosity involved partnerships between youth organisations and ISL providers to share practice and experience so that both could learn from the other about delivering informal science learning to disadvantaged children and young people. In reality, many of the grantee organisations did not form partnerships at all, or they formed lighter-touch arrangements with expert advisers. Where partnerships were formed, some were with ISL providers or other science organisations, but others partnered with organisations that wouldn't necessarily be considered ISL or science organisations.

While the partnerships that were formed have been mutually beneficial, it has been particularly interesting to see that those youth organisations without an ISL partner have also been able to deliver successful science projects. The principles of youth work are inherently exploratory and facilitative, and staff have harnessed these skills in delivering science activities where they and the young people have explored and learned together. Of course, the youth workers needed to suspend any discomfort about not being 'the expert in the room', but our findings indicated this wasn't a problem. In fact, in a small number of cases where the youth worker attempted to be the expert and deviated from their usual youth work approach, the sessions fell flat and they quickly reverted to a youth-led facilitative approach.

The Curiosity programme board has watched this development with interest during Round 1 and identified it as an area for further exploration in Round 2. It could offer interesting learning about what youth development practice can offer to ISL practice.

How to engage disadvantaged children and young people in science

The approaches and skills needed to engage disadvantaged young people in science are not dissimilar to those needed to engage this group in any developmental activity (Figure 3).

We have deliberately placed facilitation at the centre of the circle, as it underpins everything else. Whoever delivers, they need highly-developed facilitation skills to enable the approaches described in the outer circle.

Figure 3   The approaches and skills used in engaging disadvantaged children and young people in any developmental activity – including science.

The Curiosity partnership

Both Wellcome and BBC Children in Need have experience of working in partnership with other funders, and both already funded projects that might have met the Curiosity criteria. However, they recognised that there was a lack of impetus to bring the two sectors together at scale, and to gather and share learning about how science might support disadvantaged children and young people. As well as the obvious added value of bringing this new funding and focal point to the marketplace, our findings indicate a number of ways in which this partnership has added value thus far:

★ Leadership in bringing science and youth development together – most Curiosity grantees now say this seems completely obvious and they can't believe they hadn't done it before.

★ A mark of quality and credibility, both as large scale, trustworthy funders, but also in their respective realms as thought leaders – if these organisations back a project, others take it seriously; this has also converted into projects leveraging additional funding or in-kind support in some cases.

★ Supporting learning – providing grantees with practical support about how to evaluate and learn from their work and to learn from others, and genuinely valuing and giving space for learning even when things don't go to plan.

Finally, the team at Wellcome and BBC Children in Need gave Curiosity its name. The power of the word Curiosity should not be underestimated; projects have found it a powerful touchstone for inspiring and engaging young people and making science accessible.

1 INTRODUCTION

1.1   The Curiosity programme

Curiosity is a £2.5m funding partnership between Wellcome and BBC Children in Need, which aims to improve disadvantaged children's and young people's lives through supporting increased use of informal science learning (ISL) by voluntary and community sector organisations.

Wellcome exists to improve health for everyone by helping great ideas to thrive. They do this by funding medical and health research, and science public engagement and education activities. They are the second highest-spending funder in the world, with funding and investments derived from the legacy of Sir Henry Wellcome. In 2017 they spent £1.1bn.

BBC Children in Need, the BBC's UK corporate charity, exists to ensure that every child in the UK has a childhood which is safe, happy and secure, and allows them to reach their potential. They achieve this by funding community and voluntary sector organisations to provide a variety of activities and interventions for children and young people experiencing disadvantage. Their funding comes from public donations. In 2017 they spent £62.8m.

The two organisations began exploring the possibility of partnership in 2016, and agreed a memorandum of understanding in 2017, with a view to commencing grant making in January 2018.

Both organisations have experience of working in partnership with other funders to achieve shared goals. For example, BBC Children in Need is currently partnering with the Premier League on a youth violence programme and Wellcome partnered with The Prince's Trust to equip youth workers to introduce informal science learning to their clients.

1.1.1   Management and governance

In practical terms, Curiosity grants are administered by BBC Children in Need, with grants being awarded and reported on using their existing systems and processes. This maximises the value of their expertise and relationships with the community and voluntary sector in supporting disadvantaged children and young people. There is a programme manager leading the work from each organisation, and they meet regularly to discuss and agree operational aspects of programme delivery.

A programme board meets quarterly to oversee progress and make decisions about the programme. This comprises the programme manager, programme sponsor and evaluation lead from each organisation. In addition, the learning partner (Brightpurpose) and academic adviser (Emily Dawson, UCL) to the programme sat on the programme board for the duration of Phase 1 (May 2017 to the end of Round 1 of funding in October 2018), but had no decision-making authority or voting rights.

1.2   Learning and evaluation in Phase 1

The programme board commissioned a learning partner for Phase 1 of the programme. The purpose of the learning partner was to provide:

★   developmental learning support to the programme through its early development
★   evaluate the projects funded in Round 1 to understand the difference they make and how they achieve these differences

★ support the projects funded in Round 1 to identify, measure and reflect on their outcomes[3].

The three core questions underpinning the Phase 1 learning partner work are:

1   What does it take to set up the programme and deliver the first round of projects?
2   What differences are achieved?
3   What is working and why, at project and programme levels, that lead to positive outcomes (and the lessons about what does not work in making a difference)?

Detailed evaluation and learning questions have also been developed and are in Appendix 1.

1.2.1 Methodology

The methodology for the learning partner work was necessarily adaptive, as it responded to developments in the programme. However, there were a number of core components:

★ working alongside the programme managers and programme board: observation, meeting attendance and participation, facilitation and reflection
★ capturing learning and development of the programme on an ongoing basis, for instance capturing decisions and evolutions made, and the reasons for them
★ impact events to support all grantees to identify, measure and reflect on the differences they hope to make
★ evaluation calls and visits with projects
    • baseline and scoping call with all projects
    • Deep Dive visits with eight projects:
        • Abraham Moss Warriors
        • Eczema Outreach
        • Murray Hall Community Trust
        • Rathfern Community Regeneration
        • Scarborough and Ryedale Carers Resource
        • WAC Arts
        • YMCA Paisley
        • YMCA Swansea
    • midpoint calls with all other projects (not having a Deep Dive visit)
    • endpoint calls with all projects
★ analysis of all end of project reports; more information on the nature of the data and analysis undertaken can be found in section 2.2.

1.3 This report

The purpose of this report is to summarise the findings of our learning and evaluation work since the Round 1 grants were made. Inevitably, this focuses primarily on what we have learned from the delivery of the Curiosity projects themselves.

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[3] Projects were expected to report on their outcomes using BBC Children in Need reporting systems. Outcomes were categorised using the BBC Children in Need Difference Framework, which is further described in section 2.1.

1.4 Overview of Round 1 delivery

A detailed description of all the projects and the characteristics of the Curiosity grant portfolio can be found in Learning Report 1, produced in July 2018. In summary, 32 projects were funded across the whole of the UK, providing science activities for 2,491[4] children and young people, of whom 2,273 were experiencing disadvantage. Figure 4 and Figure 5 summarise the types of deprivation and age groups represented by the projects and a short description of each project is in Appendix 2.

Figure 4   The majority of young people were experiencing poverty and deprivation as their primary disadvantage.
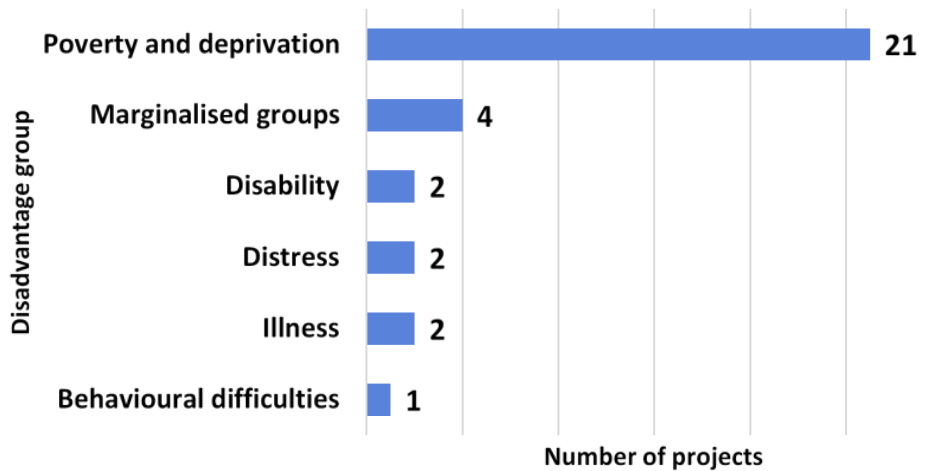
Based on all 32 projects

Figure 5   Most participants were aged between 5 and 15.
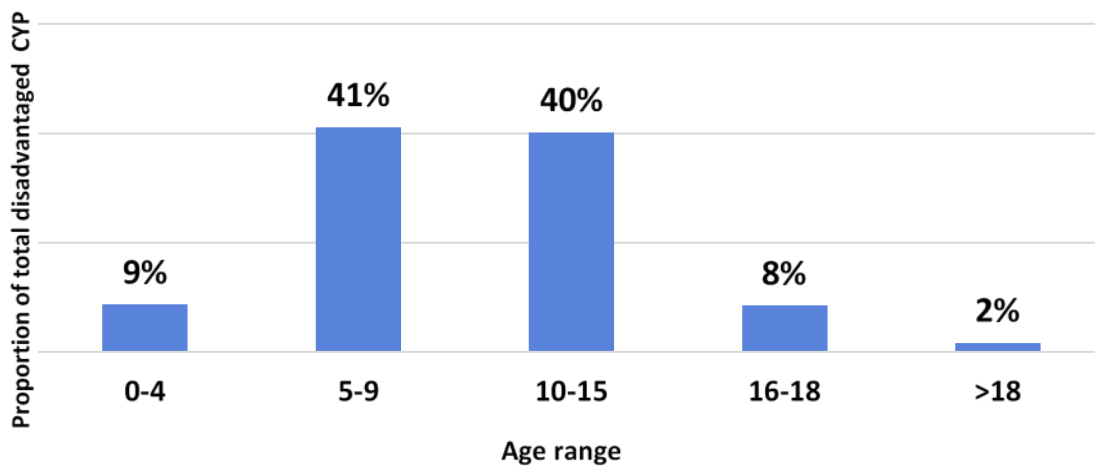
N=2,180 (data from 30 projects)

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[4] Data sourced from end of project reports from 31 of the 32 projects. This will be updated once the remaining report is received.

The intensity of those activities varied, from a three -hour one-off activity to more than 100 hours of intervention over the course of several months.

The types of science varied, with 12 projects covering multiple topics while 20 specialised in one topic only (Figure 6).

Figure 6   Many projects explored multiple science topics, led by the young people's interests, but environmental and natural sciences (especially the local environment) were also a popular focus.
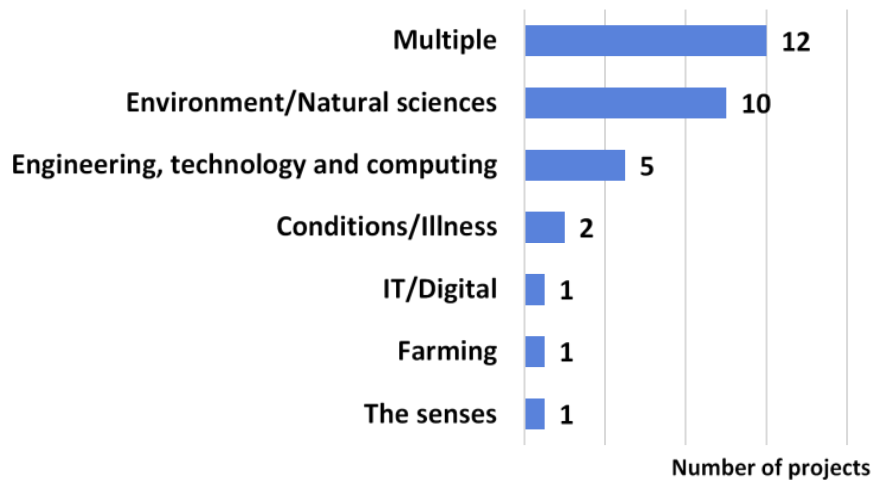
N=32

Data on the differences made by the projects are presented in Chapter 2.

2 DIFFERENCES FOR CHILDREN AND YOUNG PEOPLE

All Round 1 projects were asked to define three differences (outcomes) that they aimed to make for children and young people through their Curiosity project. This aligned with BBC Children in Need's usual reporting requirements, and each project was required to evidence the differences made through their own evaluation activity. At the end of the funding period, each project submitted an end of project report to BBC Children in Need, providing data on the children and young people supported, the differences achieved, and the learning generated by the project. These reports were provided to us to form part of our evaluation data set, along with the data we collected during our fieldwork with projects.

2.1 Introducing the BBC Children in Need Difference Framework

BBC Children in Need asks all grantees to define the differences they will make to children and young people, in their own words. They do this to ensure that grantees give careful thought to the ways in which they will support change in young people's lives, rather than trying to fit their projects into a predetermined set of funder outcomes. Each self-defined difference is coded by BBC Children in Need, mapping it to one of the differences in its Difference Framework. This allows them to aggregate and analyse the multiplicity of outcomes achieved for young people by their funding.

BBC Children in Need's Difference Framework was the product of a detailed analysis of many years' difference data from funded projects, combined with the expertise of BBC Children in Need's grant-making staff. It helps the organisation understand what contributes to the their vision of every child having a safe, happy and secure childhood where they have the chance to reach their potential.

The framework has seven 'building blocks' that every child and young person needs to have in place, as shown in Figure 7.

Each building block looks different for every child or young person, depending on their age, ability, experience and situation. BBC Children in Need identified a number of factors that contributed to each of the building blocks (Figure 8).

Figure 7   The Building Blocks of BBC Children in Need's Difference Framework.

Figure 8   The differences that underpin each building block.
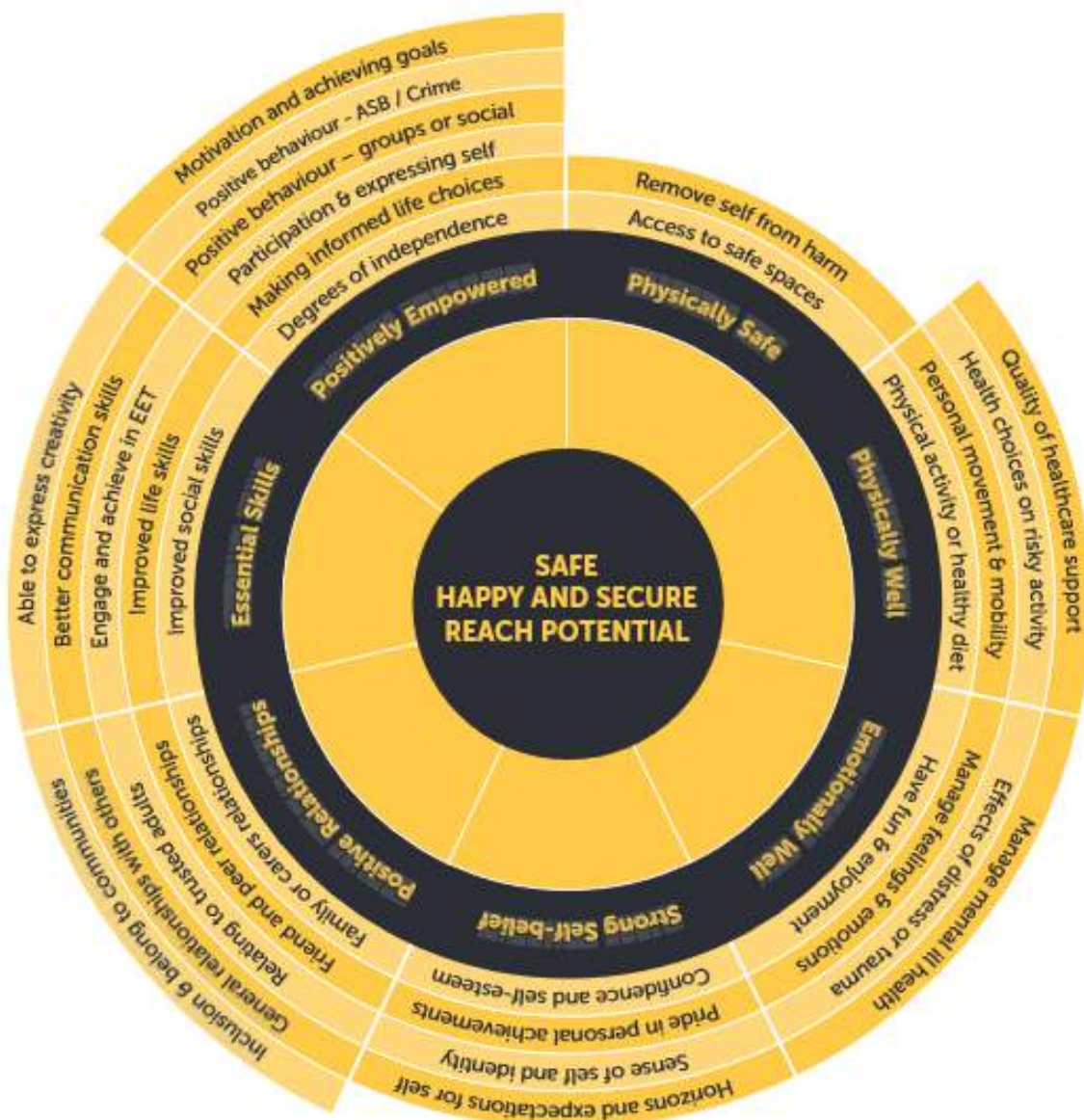
2.2   Analysing Curiosity project differences

We had access to the projects' difference data from their initial applications, updated 'Your Difference' forms[5], and end of project reports, including:

★   each difference in the grantee's own words
★   each difference coded to the BBC Children in Need Difference Framework
★   the number of children and young people they intended to support in achieving each difference
★   the number of children making no progress, starting progress and making significant progress against each difference

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[5] Forms submitted by each funded organisation after attendance at a Curiosity impact event, when they had refined the differences they intended to make with their Curiosity project.

★ narrative descriptions of how the differences were evidenced
★ case studies of how the project had made a difference in individual children's and young people's lives.

Our analysis combined quantitative analysis of differences using the reporting data, synthesised with qualitative data from our fieldwork and qualitative data supplied in the project reports.

All differences were initially analysed at individual difference level and then at building block level. We did not identify any meaningful trends in the data at individual difference level, most likely due to the small number of projects in Round 1, and we therefore decided to present findings at building block level.

As already described, every project defined three differences that they aimed to make for young people. Figure 9 shows the frequency of each difference across the Round 1 portfolio.

Figure 9   Most projects aimed to enhance young people's self-belief.
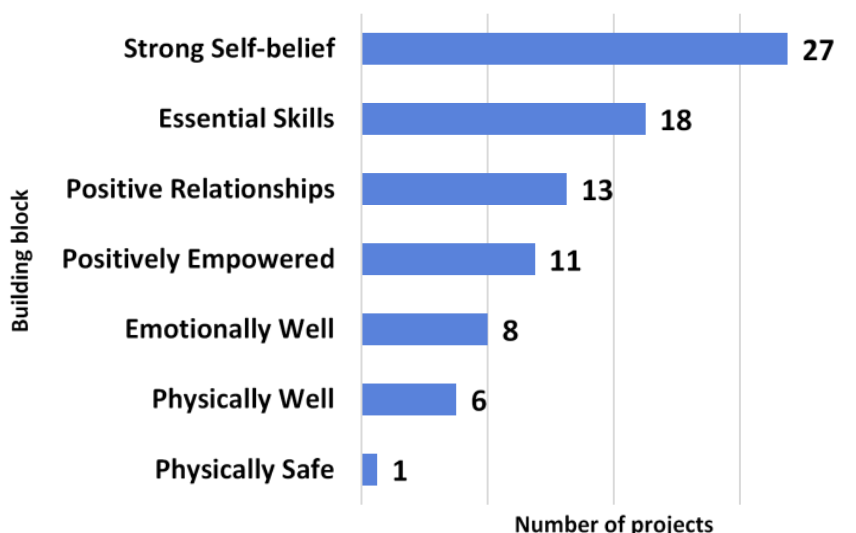
Based on 32 projects

The following chart summarises the progress made against each difference, and the subsequent sections provide a narrative on each of the differences and include examples of the differences being achieved.

Figure 10   Most young people made some progress against each of their building blocks and in most of the building blocks, at least half of young people made significant progress.
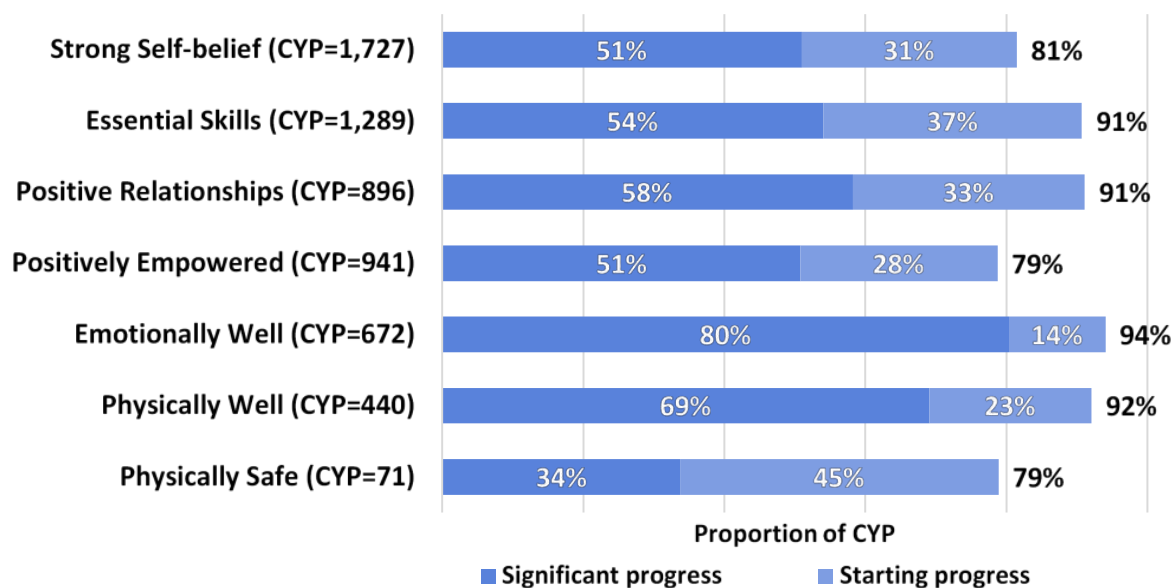
Based on data from 31 projects.

2.3   Strong self-belief

Strong self-belief *encompasses confidence and self-esteem, pride in personal achievement, sense of self and identity, and horizons and expectations for self. Most of the differences the projects aimed to make in this area related to young people being able to learn and do new things that they could have ownership of, and to achieve an end result together that they could have pride in.*

Oarsome Chance is a coastal rowing charity, and their project worked with a group of young people struggling to engage in their last year at primary school. The project gave them the opportunity to build a rowing boat and their own oar, while also developing their fitness to row and learning about the coastal environment they would be rowing in. Each young person made their own oar, deciding themselves about the design they thought would be best, based on what they were learning about hydrodynamics. The finished oars were completed to a high quality and were the children's to keep at the end of the project. The process of making, testing and using such a high-quality item was something none of the children had experienced before. The indoor training and physiology sessions involved helping the young people understand the impact of training and lifestyle choices on their bodies and fitness. They also had fun tournaments on the indoor rowers to test their abilities and chart the changes as they trained. With three discrete science topics explored through the project, and many different ways to participate, every child in the group found their niche. Some found they were problem-solvers and conceptual thinkers, others found they loved the physical exertion of rowing and were motivated to get better through training, and yet others discovered they were naturals in the carpentry workshop. Many surprised themselves with what they could do and, as the project progressed, they all became more confident in their behaviours and interactions. As one girl put it, "I didn't think I'd be as good as the boys at this, but it turns out I'm just as good. Maybe even better!"

Red Balloon of the Air is an online alternative education provider for traumatised children and young people who are unable to leave their homes. Typically, the young people in the project group would not share their work with others in the group and would be reluctant to share work even with their teacher, due to fear of failure and criticism. Their project involved building and coding computers to collect local weather data, using Raspberry Pi hardware. Originally, they were only going to collect the data, with their teacher building the computers for them to do so. But one of the young people expressed a desire to build the computer himself with guidance and was successful, so the teacher offered the others the same option and all but one jumped at it. It wasn't necessarily straight forward, and some ran into difficulties, but with support they solved the problems themselves, ultimately succeeding in building the computers. As a result of this success, they have begun engaging more in online sessions (both for the project and in teaching sessions) – sharing work with each other, engaging with the teacher more, and being more confident in participating in class.

YMCA Paisley delivers youth projects using a wide range of digital resources. Their Curiosity project was focused on girls, offering opportunities to meet female role models from locally based technology companies such as Hewlett Packard and Lenovo and taster sessions to get them interested in computer science. This was followed by girls-only coding clubs to enable those more interested to develop their skills. This project was partly about long term goals to address gender imbalance in this area of science, but on a more pragmatic level was in response to girls not flourishing or feeling welcome in what are normally quite male dominated clubs. The girls we saw at the coding club were enthusiastic about technology and clearly quite knowledgeable already. Two girls said they would not have enjoyed it as much if boys were there as they take over and are noisy. The youth worker said one of them had tried a mixed club but had found it overwhelming. In a girls-only environment they were all able to be themselves. One girl said that at school she found it difficult to fit in because, "I'm a Muslim, a girl and I'm bright". In the coding club she was able to feel good about being herself.

The **WESC Foundation** is a residential school for young people with visual impairment. Some also have other disabilities. The outdoors can be a very scary place for people with limited or no sight, so a lot of time is spent indoors in safe spaces. Some of the young people are also tactile-defensive, meaning that they find being touched extremely uncomfortable. WESC's project was to develop a wildlife garden, with young people designing the garden to create habitats for different creatures and to create different sensory experiences. As the garden progressed, young people spent increasing amounts of time outdoors in the garden and grew in confidence and curiosity to the extent that they were willing to touch insects and let them crawl on their skin, and to touch different textures of plants. The young people are now confident enough with being outdoors that they ask to spend time in the garden outside of session times, and those who are able to visit without assistance do so frequently.

Abraham Moss Warriors is a football club that provides a range of after school support and activities for young people in their local community. Their Curiosity project involved a mix of weekly session delivery in their own premises, trips out, and a more intensive week long intervention delivered at Manchester Metropolitan University. At the start of the project, the project lead brought all the young people in the club together and asked them who liked science and who didn't. All those who said they didn't like science were selected to participate in the Curiosity project. All the

young people who participated in the university part of the project participated in a formal graduation ceremony with their families in attendance. During the ceremony the young people delivered a presentation where they spoke about their achievements, what they had learned and what difference it had made. Since the end of the funding period this project has been shortlisted for a STEM Excellence award and a group of the young people visited the House of Lords to speak about their project with MPs, members of the House of Lords and a variety of other attendees.

One young boy attending the **People Know How** project demonstrated very low confidence and in the early stages of the project was so anxious about making a contribution in the group that he cried. The boy continued to attend over the following weeks and delivery staff provided him with lots of support and encouragement. Gradually, he started contributing to the group through asking questions, which then progressed to him sharing thoughts and ideas, and being confident enough to speak openly and ask questions about things he didn't understand. By the end of the project, he presented his favourite experiment to everyone in the group.

2.4   Essential skills

This building block includes ability to express creativity, better communication skills, engage and achieve in employment, education and training, improved life skills, and improved social skills. The majority of the projects making a difference in this area were focusing on life skills, communication and social skills, and there was a strong connection between developing strong self-belief and the knock-on effect on essential skills. For example, as a result of building their confidence and self-belief through the project many young people also developed improved teamworking and communication skills.

WAC Arts is a performance arts organisation in North London and their Curiosity project worked with young people with mild to moderate learning disabilities to explore the science of the senses. This project involved several different activities, including developing an immersive journey through the body and creating a 'sensory rave' for other WAC students to attend, including those with more severe disabilities. The variety of activities in the sensory rave meant that the group had to work together to design and create all the different experiences (multi-sensory chill room, dance room, etc), considering the varying needs of the people who would be attending. Everyone had different roles to play on the day: from dancer to doorperson to VJ to bartender to singer, every young person had lots of opportunities to express their creativity and they worked together to make something happen for other people to enjoy.

Fife Young Carers is an organisation that provides a range of support for young people with caring responsibilities. A core part of the respite support they offer is through their respite group sessions, which give young people the chance to have a break from their caring role with other young people in a similar situation. Key to maximising the reach and sustainability of this project was to work more intensively with a cohort of older young carers to equip them to visit groups of younger carers to deliver science-based sessions. This resulted in the older young carers developing planning and communication skills, while also enhancing their confidence. Further, the older young carers reported a real sense of achievement in being able to provide fun sessions for the younger groups and pass on their science knowledge.

Station House Media Unit provides opportunities for residents in seven regeneration areas of Aberdeen, to gain skills in film, radio and the production of publications. This project used all these

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media, not only to enhance the media skills and science knowledge of those involved but to reach further into their communities to bring science to a wider audience. Through the project they produced three science-themed films, three radio shows and articles for their youth magazine. The young people interviewed scientists and staff at an oil and gas company and carried out research into different science topics. The young people reported that the project made them more confident and knowledgeable about science, while also helping to develop skills such as teamwork, editing, creative writing and communication. The young people felt a sense of pride and achievement in what they produced, and how widely it has been shared.

Petworth Youth Association have used Curiosity funding to get involved with the Green Power challenge, to build and race an electric car. Working in teams each young person was able to find the thing that they were good at; driving, understanding how the engine works or making sense of the performance data produced. As a result of the project one young person has gone on to study mechanics at college. Another has bought a 3D printer and is now using it to make all manner of things. Alongside the technical skills, the young people also developed skills such as managing a budget, letter-writing and logistics as they had to raise sponsorship from local companies and organise their own travel and accommodation to attend the grand finals.

2.5   Positive relationships

Positive relationships *encompasses inclusion and belonging to communities, general relationships with others, relating to trusted adults, friend and peer relationships, family or carers relationships. Most projects making a difference in this area focused on providing activities and opportunities for young people to meet new people, work together in teams and to develop new social networks. The projects often involved young people that were generally isolated through a range of different factors. Further, projects encouraged the young people to involve their carers/families in what they had been doing at the project to encourage positive communication and interaction.*

The Enterprise Centre is based on a nature reserve and aims to provide opportunities to disadvantaged young people that develops essential life skills and increase aspirations, using ecology and nature as a vehicle. In recruiting to their project they took referrals from agencies and organisations such as troubled families units, social work, pupil referral units and the Children's Trust. Many of those participating in the project came with challenging and disruptive behaviour. At the heart of this project was using the science of nature to help young people understand cause and effect, relating this back to their own actions and behaviours. Over the course of the project, delivery staff observed improved behaviour and young people being more accepting of rules and giving greater thought before acting. Staff began to see young people starting to work better in teams, communicate in a more positive way and as a result develop new friendships.

YMCA Swansea provides a variety of youth clubs for young people with different needs, including a young carers group and an LGBTQ+ group, as well as an open access youth club. Their project involved building a food computer and using it to experiment with different growing conditions and crops. The team visited each of the specialist youth groups as well as the open access group to consult on the project, and to recruit young people to participate. The food computer project took place during the open access youth club, and young people from the LGBTQ+ and young carers groups also came along thus mixing with new peers.

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Scarborough and Ryedale Carers Resource provides support to people of all ages with caring responsibilities. Their work with young carers is predominantly delivered on a one-to-one basis in the school setting, so their Curiosity project provided the opportunity to support young carers in a new and different way: they worked with an outdoor activities organisation, Hidden Horizons, to explore the outdoors and spend time with other young people, given that they can rarely do this and be very socially isolated. All the activities were group-based, giving the young people a chance to see that there are other young people just like them, in the same situation, and providing the opportunity to develop new social networks. Delivery staff observed new friendships developing as the young people's confidence increased, and as they helped and supported each other through the different activities.

Groundwork NI used a 'Grow Bus' to take their project about food and science out to communities that were unable to access their existing community garden. They focused on hostels for refugee families where, despite living under the same roof, families and children rarely mix. The excitement and buzz caused by the bus being on site brought all the families out and got them doing science activities together. Resources were left behind so that the community could continue to work together. This has been particularly important for one hostel where, due to pressures for accommodation, communal areas were being converted into family living space, further reducing opportunities to meet and mix with each other.

Getting Better Together is an organisation that aims to advance education and promote health in the local community in North Lanarkshire. Their Youth Worker planned to deliver science sessions that delivered the core principles of the scientific approach and enable young people to pick a project to do their own scientific research. One boy that had been getting into trouble, as he had a tendency to be confrontational and had poor social skills, started coming to the sessions. Clearly quite knowledgeable, he had been able to demonstrate this knowledge and as he talked was able to connect with other young people. He took a supportive role within the project with his peers and now participates in other after school club activities.

2.6   Positively empowered

Positively empowered *comprises motivation and achieving goals, positive behaviour in relation to anti-social behaviour and crime, positive behaviour in groups and social settings, participation and expressing self, making informed life choices, and degrees of independence. A number of projects were aiming to make a difference in this area, as one of their three main differences, but our findings also indicate that the vast majority of the Curiosity projects achieved this as an additional benefit, related to the style of delivery to which the science activities lent themselves (see 2.10.2).*

Those that focused on making a difference in this building block tended to aim to help young people to see what they can do for themselves, to take responsibility and ownership for what they do and the influence this has, and celebrating what they achieve. There was also a focus on encouraging young people to be confident in sharing ideas, opinions and being actively involved.

Murray Hall Community Trust worked in Partnership with FabLab to deliver a technology/engineering-based science project that gave young people the chance to experience a range of activities including 3D printing, design, robotics and coding. One of their groups included a young boy that had been referred by his school for low confidence and because he was socially isolated at school. At the beginning of the project he was very shy and didn't communicate at all

with others in the group. He started speaking to other members in the group as the project progressed and as his confidence grew the staff observed him offering help and support to others in the group when they were stuck with something. One of the project's final activities was to build a robot and write a programme that would make the robot carry out actions. This turned out to really capture the boy's interest and was an area he really grasped. He enjoyed sharing his ideas and working with other people in the group to complete the task.

Transplant Sport UK are a national charity, supporting organ transplant recipients to lead active and healthy lives, through sport and social events. Their project worked with young organ transplant recipients to educate them on how their bodies responded to an organ transplant and how their medication worked inside the body, to encourage adherence to their treatment regime. Ultimately, they set out to equip and empower these young people to make positive choices, understand the responsibility they had for their own health and wellbeing, and to also to be more confident in being able to talk about their transplant. The feedback from the young people was positive with the majority reporting having improved their knowledge of transplants, being more confident about talking about their transplant, and that they would focus more on their medication regime.

Eczema Outreach have used science to help explain to children and young people how their condition is caused, and what they can do to alleviate the symptoms and improve their skin. Children and parents often battle over the application of creams, as the children don't understand why they have to go through all this and can feel uncomfortable among their peers because of their condition. Following his attendance at an event in Edinburgh, which used science-based activities to help children understand their condition, one young boy said he had a better understanding of his eczema and the importance of using creams. A week after the event his mum posted on Facebook that he was now applying his own cream. This was seen as important first step for him being able to self-manage and becoming more independent.

Access Community Trust partnered with Cefas to deliver science sessions to disadvantaged and educationally disengaged young people. One young person was not very engaged and quite quiet. He eventually revealed that he was being home-schooled as he had been bullied, and he preferred the company of adults. Clearly having had a difficult experience with people his own age, he had looked elsewhere for company. However, as the project progressed, he slowly began to take ownership of the group and he became the natural leader. One of the days about the fishing industry included a trip on a boat. Having never been on a boat before, he described this as the best day he'd ever had.

WAC Arts did not have this building block in their three main differences, but they noted that their immersive journey through the body had an unexpected empowerment outcome. The young people devised the journey during workshop sessions, working out how, if a shrunken person entered the body through the ear, they could journey through the body and exit through the bottom[6]. They then dramatized the journey using performance and multi-sensory stimuli and invited their parents to experience it. For this, the parent was placed in a wheeled office chair, blindfolded and pushed by their child through the journey. The young people involved are normally reliant on their parents for guidance and support, but in this case the parents had to trust their child

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[6] Because bottoms are, of course, very funny!

completely and be guided and supported by them on the journey. This level of trust was not something WAC staff had seen these parents show their children before, and parents fed back afterwards what a powerful experience it was for them to see their child so empowered.

2.7   Emotionally well

Emotionally well *comprises managing mental ill health, effects of distress or trauma, managing feelings and emotions, and having fun and enjoyment. While some projects explicitly aimed to achieve differences in this building block, it's important to note that all projects also enabled their young people to experience fun and enjoyment. Every project visited as part of the Deep Dive provided compelling visual evidence of this, in the form of smiles and lots of laughter.*

A number of the projects aiming to make a difference in this building block worked with young people with specific mental health and emotional issues, or those at risk of developing mental health issues.

Red Balloon of the Air also ran a project with their learners who attend the Red Balloon Centre in Cambridge. They are able to leave home to attend the Centre, but rarely go elsewhere because of the effects of the trauma they experienced. The project aimed to encourage the young people to visit new places with a science theme as a group. Visits began with short trips to local places but culminated in the planning of a trip to London to visit the Science Museum and the IMAX cinema. This would involve using public transport and being in spaces the young people would feel little control over. The trip to London was challenging for a number of the young people: fear of the Underground, multi-sensory stimulus in the IMAX, crowds, noise, lots of new experiences. With the support of their peers, they all completed the trip, and those who would often struggle in these situations managed their emotions and were able to enjoy the whole day. One girl decided to take the Underground with her friends despite having planned and budgeted to take taxis, because of her growing confidence and the support of her friends. Overcoming these challenges together has had a positive impact on their individual confidence but also in how they communicate together at the Centre.

St Paul's Community Development Trust delivered their project over the Easter and summer holidays and covered a wide range of science activities, including nature, electronics, energy, geology and engineering. It involved trips out, conducting experiments, building, planting, foraging and much more. Key to it all was making things practical, hands on and, most importantly, fun. Such was the interest in the project it was oversubscribed during the summer months as word of mouth spread. Delivery staff highlighted that this project included and brought together young people with and without additional needs. This mixed group environment helped all young people to feel the same as everyone else. Consequently, some young people felt emotionally better, calmer and more relaxed and showed behavioural improvements. This has continued outside of the project with positive feedback from parents and teachers.

While **Abraham Moss Warriors** did not have Emotionally Well as one of their main differences, one of their project activities had a profound effect on the emotional wellbeing of a boy diagnosed with ADHD. During a trip to a national park they were trekking up a hill, accompanied by a park ranger and exploring the natural environment. Half way up, the group stopped for a rest and a member of project staff observed this boy just sitting in silence taking in his surroundings. When it was time to get moving again the young boy asked the member of staff if he could sit there for a bit

longer, saying it was the calmest he had ever felt. This was fed back to his parents who now take him there at weekends as a way to help him relax.

Fife Young Carers' Curiosity project has enabled them to provide something new and different for the young people they work with. They emphasised the importance of providing engaging and fun respite opportunities, while building confidence and self-esteem, as a way of supporting the mental and emotional wellbeing of young carers.

2.8 Physically well

Physically well comprises quality of healthcare support, health choices on risky activity, personal movement and mobility, physical activity or healthy diet. The majority of the projects working on this building block focused on lifestyle choices (diet and physical activity), however one of the projects was focused on a specific condition.

As described, one of the objectives of **Transplant Sport UK**'s project was to encourage young people to adhere to their treatment regimes. Research has shown that there is a drop-in adherence as young people transition into adulthood, and there is a need for information to be less adult-focused and more youth-friendly for this group. Transplant Sport UK worked with Science Made Simple to develop fun activities and games as way of educating young people about their transplant and medication. One participant, a 16-year old who had received a kidney transplant, reported that his understanding of his immune system and the importance of medication developed significantly. He also reported that he was more confident speaking openly about his transplant to friends, and that he was committed to always taking his medication.

One of the aims of **St Paul's Community Development Trust** was to improve young people's physical activity levels and to encourage them to eat more, and different, fruit and vegetables. By providing young people with pedometers, they generated an element of competition – with each other and with themselves – through trying to beat each day's number of steps. By the end, all young people showed a consistent increase in their number of daily steps and reported enjoying the physical nature of other activities. It wasn't sports or games: they were experiencing other ways of being active. To encourage them to try different fruit and vegetables, the young people planted their own at the start of the project and tended them over the course of the project. They also took part in foraging and fruit-picking activities. This gave them the opportunity to cook with their own vegetables, make smoothies, and experience new foods and different ways of preparing food. This has led to young people being more open and willing to try new foods, while understanding more about nutrition and healthy eating.

Rathfern Community Regeneration Group wanted to get their young people more active through hill-walking and other outdoor activities, by giving them skills and equipment to be able to venture out onto the local hill. Soon the group were doing regular walks, even in bad weather. This included one young person with asthma, and another with hypermobility syndrome who thought that being out on the hill was beyond his reach. The group now goes out at least once a week, and even goes out at night to add interest and challenge. The group are very supportive of each other and keep each other going when finding it hard. The project is also planning to redevelop part of the garden to start growing vegetables.

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Groundwork NI used a bus to bring communities together and learn about food and science. They leave seeds behind to encourage communities to establish gardens and grow their own produce. The Grow Bus also gives young people the chance to try experiments involving food to spark interest and get them engaged with food science.

YMCA Swansea wasn't actively working towards this building block, but the use of hydroponics for the food computer project led to lots of conversations with the young people about marijuana use[7], which enabled the youth workers to explore risky behaviours with the group and individuals they identified as particularly at risk.

2.9   Physically safe

Physically safe *comprises removing self from harm and access to safe spaces.*

Only one project, **Lyng Community Association**, identified this as one of their three main differences. Their focus was on providing a safe space for young people to make mistakes without fear of punishment. At the outset the project lead recognised that science provided an ideal vehicle to change the way failure was viewed among young people, and that it didn't have to be associated with negative consequences. The project was seen as an opportunity to give young people a place where they can feel safe to try things that might not work out as intended. The project focused on using this as a learning opportunity, exploring why things hadn't worked, what could be done differently and what could be learned through the 'failure'. Delivery staff reported that their own lack of prior knowledge and experience of many of the topics they were covering really helped this exploratory focus: the young people saw the adults making mistakes too or not having the answers straight away. Delivery staff reported that young people now demonstrate reduced anxiety about failing, and focus on what they can learn when things don't go right or to plan.

2.10 Unexpected outcomes

Organisations identified a number of outcomes that they hadn't expected their projects to generate.

2.10.1   Peer support and strengthening of peer relationships

Numerous project leads spoke about the way in which the Curiosity projects encouraged young people to work together and support each other during the activities. This was partly a result of the project leaders standing back more and letting the young people get on with things themselves, and partly a result of those young people with a natural leaning towards scientific thinking being able to share those skills and insights with their peers. Further, those young people who had this natural leaning often tended to be the ones who were not as integrated into their peer group, sometimes through shyness, sometimes through not having a good rapport with peers. When their skills and abilities were seen in the light of the project, and shared with their peers, they became more integrated into the group. This effect lasted beyond the life of the activity; the young people had found a way to connect.

> "He started off as one of the shyest lads, loved books, loved reading and after the club he went home and was reading all about the science behind what we had been doing. Because of that, he was coming back full of ideas and questions, and before long he was one of the leaders in the group"

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[7] Hydroponics and indoor farming equipment can be used to grow marijuana.

Project staff member

2.10.2 Problem solving

A number of organisations noted that the science-based activities and exploratory nature of the projects enabled young people to develop their problem-solving skills, and to become more comfortable with trial and error and learning from mistakes.

2.10.3 Career aspiration

Several organisations reported examples where participation in their projects has impacted on young people's education and career aspirations. They reported this to be a result of young people being exposed to the breadth of science and having the opportunity to experience it as something fun, interesting, engaging and something open and relevant to them.

Young people from **Abraham Moss Warriors** that participated in the week-long programme of events at Manchester Metropolitan University reported that their perceptions of university had changed. Before, they did not see it as an option for them and/or something that interested them, but they now had ambitions to study hard so that they could go to University after school. Further, during the presentations that the young people delivered at the graduation event, some spoke of their desire to have a career in science when they were older.

One of the young boys that attended the **Murray Hall Community Trust** project, who has autistic spectrum disorder, did not see science as a career option. However, during the project he developed an interest in coding and felt it was something he could take further as a potential career.

One of the participants in the **Fife Young Carers** project had just found out she had been not been accepted to medical school and instead would have to do biomedical science, which she was unsure about. During a trip to the museum as part of the project, she met several people who knew about the course and talked to her about the many career options she would have with a degree in Biomedical Sciences. As a result of the visit she is now very excited to study the course and to learn more about the science involved.

2.10.4 Willingness and ability to deal with more challenge

A number of project staff have reported that the young people have been much more willing and able to deal with challenge than they had anticipated. For example, asking for more challenging activities and pushing themselves to go into situations that scared them. The project activities and predicted outcomes were sufficiently appealing and exciting for the young people that they overcame their fears.

> "We tend to be overprotective and wrap them in cotton wool. They've shown us that we can push them more than we realised they could handle."

Project staff member

Others also reported that the empowering delivery style led young people to achieve more than staff had thought they would. By staff simply standing back and letting them get on with it, young people had the opportunity to develop and show skills that the staff did not expect.

> "They surprised me every time."

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2.10.5 Enabling other youth work

The projects have enabled conversations between youth workers and young people that youth workers do not believe would have happened otherwise. In some cases, young people who have not been very engaged with other provision have really opened up during the science activities because it sparked their interest. This allowed the youth worker to build a relationship that enabled other youth work to take place and to support other needs that the young person had not discussed before.

In other cases, the project content or activities has sparked side conversations about topics such as risky behaviours, which has enabled youth workers to address those issues.

Scarborough and Ryedale Carers' Resource's project allowed them to work with young people in a new environment, participating in things together. They reported that this opened up different conversations with the young people. In some instances, it revealed issues that the project staff did not think would have been raised otherwise and can now take action to ensure the required support is provided.

Youth workers at **Petworth Youth Association** identified that one of their young people had mental health issues. This had not been picked up elsewhere in her life, but her disruptive behaviour in the project alerted youth workers to the issue. Using their contacts they got the young person referred to Children and Adolescent Mental Health Services and she is now getting much-needed support. She has really turned a corner and is now making friends. Her parents are not sure this issue would have been picked up without the intervention of the project.

2.10.6 Environmental awareness and local stewardship

A number of projects focused on the local environment and, as a result, the young people have become more aware of and caring about their local environment.

The Enterprise Centre had a strong focus on nature, the environment and ecology, and delivered a lot of education around conservation. Through their experience of the project, what they learned, and their new-found curiosity of the natural world, several of the young people are now volunteering on the nature reserve where the centre is based.

Access Community Trust's project activities were focused around coastal sciences. While talks about oil pollution lacked relatability and were a little lost on the young people, a beach litter-pick was a success and a much better way to land the messages about caring for the environment.

Rathfern Community Regeneration Trust's project focused specifically on developing young people to take on the stewardship of an area of traditionally misused and abused land. By giving the young people the skills to be outdoors safely and teaching them about the environment through a range of activities and talks, the group are gradually taking 'ownership' of the land. The current group will be the leaders for future groups to hopefully leave a lasting legacy.

2.10.7 Engagement with parents

In several projects, there have been examples of young people doing things with their parents as a result of the project activity. For example, introducing their parents to some of the same activities,

and doing new things together. In addition, several have hosted activities to celebrate their project's achievements, which have engaged parents in what the young people were doing.

Abraham Moss Warriors have encouraged their project participants to share what they are doing and their learning with their families. This has led to young people discussing the activities at home, taking home examples of what they have been doing, and getting their parents and/or siblings involved in experiments at home. Parents have started approaching project staff to ask if they can get their other children involved and volunteering to support sessions and trips out. Project staff reported that they have never had this level of interest or involvement in any of the other projects and activities they have delivered in the past.

The **Rathfern Community Regeneration Trust** project has drawn on the skills of some parents to support the project; for example, one parent delivered a talk about bees. Parents have been encouraged to join the younger children on walks, which are becoming real family events. The project has also generated wider interest in the community centre and resulted in parents volunteering for other activities.

2.11 Ripple effects

There have been instances where a project's impact and reach has extended beyond those that were engaged directly, or has encouraged others to try/do new things.

For example, by **Abraham Moss Warriors** encouraging participants to discuss and share learning and activities at home, siblings developed an appetite to get involved with the project because it sparked their interest. Similarly, there is the example of the family that now take their son back to the Peak District because of the calming affect it had on him. This is quite a commitment given that they rely on public transport and it takes over an hour each way to travel.

The project delivered by **Station House Media Unit** also extends out into the community. Through the films they have produced and the science-focused radio shows they made, they have been able to reach a wider audience. Likewise, around 1,000 copies of the youth magazine that featured science articles were distributed to schools, libraries and other community groups and venues.

Haldane Youth Services aims to broaden children's horizons and raise their aspirations through providing a range of services in West Dunbartonshire. They delivered science-based 'funshops' as part of their after-school club offering, and some trips to local museums and places of interest. They reported parents getting involved in supporting the projects by helping out on trips and some of the young people took family members to some of the places they had been.

Rathfern Community Regeneration Trust are now planning an intergenerational project involving their young Hill Wardens and an Older Men's group, to combine both art and history of the area.

2.12 Science's unique contribution

In addition to testing the hypothesis that science can be a vehicle for supporting disadvantaged young people (similar to other activities such as sports and the arts, for example), the Curiosity programme seeks to explore whether science offers anything different and unique to the field of youth development. The learning approach used in Round 1 did not examine this in depth but has identified a number of emerging themes for further exploration in Round 2.

2.12.1 New ways of thinking

Delivery staff have described that working with science has encouraged new ways of thinking – both for themselves and for the young people they work with. Core to science activities are the concepts of cause and effect, and the value of experimentation. The science activities have also encouraged young people to ask questions, find answers and explore concepts, rather than expecting the delivery staff to have all the answers. This has all added up to new ways of thinking and doing, that are now spilling into the way staff work on other projects and the way the young people interact with them outside of the original Curiosity projects.

> "It's really challenged and changed the way I work with the young people. I'm much more inclined to pose questions and then encourage them to take the lead. I'm much less slavish to a learning plan now – if the young people get the learning, then it doesn't really matter so much which route we take. And I think they learn more when they're in the lead."
>
> Project staff member

> "It doesn't need to be a science project to incorporate the ideas of exploration and experimentation. And because science is about the world, there's always a bit of science in whatever we do. I actually think it would be remiss of us not to think about science in every project now."
>
> Project staff member

2.12.2 An empowering delivery style

Even youth workers who were already very facilitative in approach have found that the experimental and exploratory nature of science has led them to stand back more and encourage young people to do the thinking and doing themselves, and to find their own way to solutions. This gave young people a greater sense of ownership of the project and created the conditions for young people to support each other. The nature of scientific exploration also encourages mistakes and 'failure' to be used as positive learning and a stepping stone to progress; delivery staff found this extremely helpful in supporting young people's resilience.

> "Our young people can be really scared of making mistakes. This project has helped them see that it's just part of the learning process. Now they're up for more challenging things, and are less worried about always getting it 'right'"
>
> Project staff member

> "I stepped out of the room for a few minutes and left them with the components and instructions. When I came back in, they'd pretty much built it."
>
> Project staff member

> "We've learned that sometimes we've underestimated the young people – what they can do and what they're up for trying. We've wrapped them in cotton wool a bit. Curiosity has taught us they're able and keen to do much more than we perhaps gave them credit for."

Project staff member

2.12.3 A different stimulus to engage young people

Project staff reported that not only does science provide a different vehicle to provide new experiences and opportunities to develop life skills, it also enables these organisations to reach young people that may not engage with their provision otherwise. It gives them an offering that can appeal to those young people that perhaps aren't as interested in sports, arts and their other offerings. But, this isn't at the expense of excluding young people with those interests; it can enhance or change the emphasis of other provision.

Projects have found that science provides a space where all different skills and preferences are valued and it enables a range of strengths and qualities to be showcased and valued among peers.

2.13 Changing young people's attitudes to and relationship with science

Due to the small number of young people we were able to engage directly, our fieldwork gathered limited evidence of the influence the projects had on how young people's perceptions of science. Nonetheless, there were still some examples that provide insight.

Abraham Moss Warriors made a conscious decision to work with young people that expressed a dislike for science. They were asked to attend a single session, give it a try, and if they didn't like it they didn't have to attend any more. All of the young people were given the freedom to contribute ideas about themes they would like to explore. These were all put up on the wall and the young people could add their name to whichever ones they were interested in. Every young person chose to return after the first session, and over time the list of names for each of the themes and activities continued to grow as the young people wanted to continue attending. By the end of the project every single young person reported that they now liked and enjoyed science and there is a real appetite in the club to have it as a regular feature.

Happy 'n' Healthy were delivering environmental science projects but without being explicit about the science, just encouraging young people to be curious. They felt that some young people, even though apparently engaged in science, lacked curiosity and were often unable to connect science to their lives. By encouraging curiosity and exploration, they hoped to embed that approach in their minds and that it would stick with them in later life. They found that stimulating curiosity enabled young people to, "come out of the boxes they had been put in. The project was liberating in ways I haven't seen before in any other project".

Feedback from a number of organisations also indicated that, to varying extents and particularly where the science was explicit, the young people in their projects had changed their perceptions and enjoyment of science. Projects put this down to four main factors:

★ doing activities and experiences that exploded the myths and stereotypes that young people often brought with them about what science was and who it was for
★ seeing the breadth of science, and showing the variety that it encompasses
★ making it different from science at school, not chalk and talk, not learning from a book – making it practical, hands-on and fun

★ being able to relate it to the young people's different interests and personal strengths and making it recognisable/relevant to them and their world.

2.14 Impact of different approaches on outcomes

Figure 11 illustrates a number of variables that we identified in delivery approach at the application stage and subsequently explored as part of our evaluation with projects.

Figure 11   Different projects' approaches to delivery.

Narrow and deep ⟺	Wide and shallow
Short and sharp ⟺	Long and intensive
Topic-focused ⟺	Exploratory
Science as a process ⟺	Science content/presentation
Science explicitly framed ⟺	Science by stealth
Science added to existing activities with established audience ⟺	Brand new intervention and audience
Local focus ⟺	Global/generic focus
Scattergun 'stuff' ⟺	Coherent programme
Gender specific ⟺	Open to all

We have attempted to identify whether any of these variables have an impact on the differences achieved for young people or the quality of their experience. From the data available (the combination of projects' self-evaluation reports and the findings of our fieldwork with them), we identified **intensity** and **exploration** as the two variables that appear to influence outcomes and experience. We discuss these below, along with a discussion about gender bias, which was highlighted as a possible concern during the grant-making process.

2.14.1 Intensity

The projects that worked with a young person for a longer period of time tended to lead to more young people making progress towards the desired outcomes, and the outcomes themselves tended to be richer than could be achieved in a short-lived intervention. Longer-lasting interventions also offered more learning for the Curiosity programme, by virtue of having more time to explore concepts and approaches in depth.

2.14.2 Exploration

Where science was presented as a body of knowledge to young people, this had a negative effect on young people's engagement, especially if the delivery style was particularly didactic. Empowering and facilitating young people to take an exploratory approach to learning about the world around or inside of them, asking questions, and using scientific process to answer those questions, was a unifying factor in all projects. Whether they intended it from the outset or learned it through experience, this approach was key to young people's engagement.

2.14.3 Gender bias

During the approval process, a number of projects were identified with either explicit or potential implicit gender bias:

Explicit gender bias

★   M13 Youth Project – different groups for different genders
★   YMCA Paisley – girls coding club

The rationale for gender-specific provision at **M13 Youth Project** was to align with their existing approaches to community work, which involves running separate girls and boys drop in sessions and groups. Each group chose different topics to explore: the male group selected sports science, physiology and aerodynamics, while the female group chose food and sustainable production, and astronomy.

The rationale for the girls coding club in **YMCA Paisley** was to address inequalities of access to tech subjects and encourage more girls to experience coding. The project initially struggled to find female youth workers to deliver the club and act as role models, and staff were concerned about the message this would send to the girls. After continued efforts, they were eventually able to recruit and train female workers to deliver the club. Two of the girls that attended the club said they preferred it without boys and another was reported as being overwhelmed in mixed clubs.

Implicit gender bias

★   Abraham Moss Warriors – a football club, which therefore might attract more boys than girls
★   Petworth Youth Association – a green powered vehicle project, which might attract more boys than girls

Abraham Moss Warriors, while having their roots in football, are known locally as a community resource which provides a range of sport participation opportunities for all genders and ages as well as a range of other after school activities. The project offered the opportunity to participate to all members of the club and the wider community and achieved a good mix of male and female participation.

Petworth Youth Association didn't do anything to try and encourage girls specifically and ended up with roughly a third girls. There was no perceived inequality in the roles played by boys and girls.

3 LEARNING FROM DELIVERY

3.1 Framing and integration of science

3.1.1 Framing

Most projects were explicit that the activity was science-related. However, this may have been introduced gradually rather than badging this as 'come along to a science project' during the recruitment phase.

Figure 12   The majority of projects clearly presented their activities as science

N=32
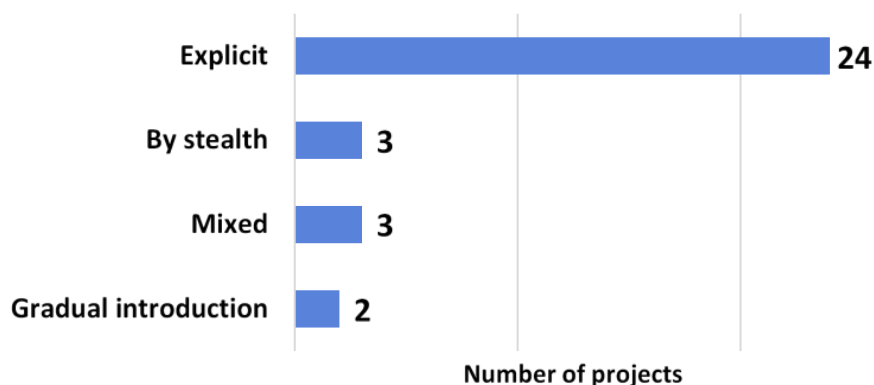
All projects tended to promote the activity by focusing on the topic and aspects that they expected the young people to be interested in; for example, building a food computer, becoming a coastal rowing crew, exploring our senses, creating a wildlife garden, etc. Once the young people began the project, most projects were clear in explaining that it was about science. Others waited for the opportunity to arise to explain that it was science.

A small number were less explicit in how they've framed the science. This tended to relate to the capacities and developmental stage of the young people rather than a desire to avoid or hide the term 'science'.

Many projects have used the term 'curiosity' in promoting and describing the project, and continued to do so during delivery. They've found this word really helpful in explaining the purpose of the project to young people and parents, and as a call to action throughout their delivery. They found that young people and adults reacted very positively to this theme as it is an inherently appealing attribute that also provides lots of freedom to explore.

3.1.2 Integration into delivery

In most cases, while the science content has been new, the project staff have retained much of their normal delivery style. They've used tools and approaches that they already know work for their client groups and that are familiar to them but deployed them to explore science topics and content instead of their usual content. In summary, they've treated science as a vehicle and a stimulus rather than trying to teach science. Science has encouraged many project staff to take their usual youth-led approach to another level by standing back and empowering the young people to take a much stronger lead.

> "At the beginning I thought I'd need to use a different approach because it was science. Boy, was that a mistake?! I got really excited because it's my kind of thing, did loads of research, prepared tons of slides… and after ten minutes I'd lost the young people. There I was, thinking I needed to teach science the way it's always taught, but it really didn't work. So, I regrouped and figured I needed to go back to how I normally work with the young people – lots of practical, hands-on activities, lots of variety. As soon as I did that, it worked."

Project staff member

One of the projects was run by an arts organisation, and the activities were still arts-based but underpinned by a very clear science focus. This led to a different way of thinking about the design of the arts activities, and enriched delivery.

> "We design lots of generic arts and performance projects for young people, but science provided a totally new stimulus. Some of the activities, like superheroes and potions, were topics we'd covered before, but really just from the angle of having fun and being expressive. With science as the framework, we could help the young people think about what kind of superpowers would be useful and why, rather than just imitating the latest Marvel characters. And with potions, the young people had to justify their ingredient choices based on what they knew or had researched about their nutritional values. Believe me, a chocolate, garlic and beetroot smoothie does NOT taste good but, fair play, the young person explained and debated their rationale with the others, based on proper nutritional information."

Project staff member

Another project was delivered by a community media organisation. While the specific activities were media-based, such as film, radio and publication production, it was underpinned by a science focus and content. This has helped them to rethink how they approach future work with young people.

> "The experience has definitely made us think differently about how we can work with young people in terms of theming project work and bringing a focus to what they are doing. We've found that taking this approach has actually allowed us to give them more ownership of what they are doing. It's added value to what we already do and gives us something to consider when planning future projects."

Project staff member

3.2 Engaging children and young people in science

3.2.1 Critical factors in engaging young people

Organisations told us that engaging disadvantaged children and young people in science activities didn't really differ from how they would engage them in other activities and topics. Our fieldwork reveals a number of critical factors:

- ★ youth-led and co-created (see section 3.3)
- ★ practical, hands-on, doing
- ★ fun
- ★ lots of variety
- ★ let them come to you – let their natural curiosity come out
- ★ don't squash or park questions, respond there and then
  - follow whatever path it takes, rather than sticking to the script
  - if you don't know the answer, don't panic – just work with the young people to find out the answer together
- ★ adapt the science content to fit with facilitative youth work practice, rather than the other way around
- ★ remove barriers:
  - use known, accessible, unintimidating spaces – or at least begin with those familiar spaces, and then stretch out into new spaces
  - make sure the necessary equipment (including clothing, where necessary) is available without cost.

3.2.2 Barriers to engagement

We also explored what had acted as barriers to engagement or led to young people being 'turned off' by the Curiosity projects. None of the projects received feedback that the idea of a science project put anyone off or led to young people not signing up. Some young people didn't engage due to reluctance to try something new, but project staff reported that this was not unusual in their experience. Rooting project activities in known spaces with known staff and incorporating familiar types of activities alongside the new activities helped with this.

Referral routes didn't always work as planned which affected numbers in some projects. For example, **Murray Hall Community Trust** invested time with local schools, to raise awareness and gain commitment to identifying and referring pupils that they felt could benefit from such an opportunity. Though the response they received from schools was enthusiastic and positive, this did not translate into referrals; when it did, it did not always result in attendance. Taking this learning on board for future sessions, they changed their approach and widened their referral routes which proved more successful.

All projects reported high retention rates once the projects had begun. Some also got more participants as time went on, as existing participants encouraged friends and siblings to join in. Young people were reported as having a very low tolerance for anything that was not hands-on and, if this occurred, they quickly turned off from 'chalk and talk' and classroom-style delivery. As soon as hands-on delivery was reinstated, they readily re-engaged.

Contextual factors affected some young people's engagement:

★ chaotic lives – some young people had unpredictable home lives and/or chaotic lifestyles of their own, and this prevented them attending consistently

★ other commitments – with much of the provision taking place over the holiday periods, some young people missed project activities due to family holidays and day trips; some also missed activities due to family events

★ an unseasonably warm summer – in summer 2018 the UK enjoyed exceptionally warm and settled weather for several weeks, which led to some young people choosing to spend time with friends outdoors rather than coming to project activities, especially where the activities were indoors; in addition some families took unplanned day trips and holidays to make the most of the weather.

There were other very specific contextual factors that could not have been predicted, but that affected attendance. For example, a hate campaign on Twitter targeting people of Pakistani origin led to some young people being scared to go out to attend projects or their families insisting they stay at home for their own safety.

3.2.3   Making science relevant to young people

All organisations reported that the project had enabled them to make science feel relevant to young people, by making it a part of their everyday lives regardless of their disadvantage. The hands-on nature of the science, and the degree to which young people directed the activity, made science seem like something for them rather than a remote concept.

> "We've been doing things that you don't need money to do, the stuff you need is all outside. It didn't even feel like science, I didn't know it was science, thinking about angles and what makes the structures strong, even staring and thinking about what's going on up there [pointing to space]"
>
> Project participant

> "I like being outside in nature, it's fun and I like that we are able to help the animals and each other"
>
> Project participant

In some projects, the content tackled directly relevant science concepts or brought scientific thinking to a personal level.

Two projects (**Eczema Outreach** and **Transplant Sport UK**) worked with young people with specific health conditions, to help them understand their conditions better and thereby be better able to self-manage and live well with their conditions. Young people improved their understanding of the purpose and effect of their treatments, leading to better treatment compliance and health outcomes. Further, each project also brought the young people together into a supportive peer group to address the sense of isolation that their conditions can bring.

In other cases, the projects focused on science within the local environment. Several projects (**Oarsome Chance**, **Scarborough and Ryedale Carers' Resource**, **Access Community Trust**) looked at the local coastal environment and the factors affecting it. Despite living very close to the

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coast, many of the young people had not experienced spending time in the coastal environment, nor understood how it interacts with human and land-based activity. Others spent time exploring urban environments and how humans affect them, or local rural landscapes that young people had not accessed before, despite them being on the doorstep.

3.3 Engaging young people in design and delivery

3.3.1 Involvement in design and direction

Young people have been very involved in the design and shaping of the projects. In some cases, youth panels and previous groups' feedback shaped the initial idea. But even where the initial project idea was developed by delivery staff, young people have directed the work once it began. This appears to have been crucial to their continued engagement.

At the outset of their project **Abraham Moss Warriors** held a community open day. As part of that they brought the young people together to explore their perceptions of science, and what they thought a scientist was. Their partner from Manchester Metropolitan University spoke about the different types of sciences, and then opened it up to young people to come up with different things they would like to explore. This resulted in a wide range of topics from how magnets work and what energy drinks do, through to gravity, electricity and bacteria. The project staff at Abraham Moss then worked with their science partner to come up with fun and practical ways to explore those topics. And it didn't stop there. Project staff found that as the young people were learning more about science, they were coming up with more ideas and topics that they wanted to find out more about. This led to additional sessions, trips and activities being developed to ensure they were responding to what the young people wanted.

WAC Arts originally planned their entire project as focused on hearing and acoustics, but young people then started asking questions about how the rest of the senses worked and the ideas for the rest of the project were developed to explore all the senses and beyond. Through addressing young people's interests, it evolved into a multi-sensory project to enable young people with learning disabilities to experience all the different aspects of a festival or rave in a way that they could cope with the varied and heightened stimuli of such a setting.

The **WESC Foundation's** project originally focused on a controlled experiment looking at two patches in a wildlife garden: one with a designed planting scheme to attract certain wildlife and one left fallow. The plan was to compare the wildlife in the two patches by surveying and filming. However, the young people became more interested in the learning about and experiencing the plants and insects themselves rather than the experimental aspect, so the focus shifted to that. As already discussed, unusual or unexpected touch and sounds can be very distressing for WESC's student group due to visual impairment and tactile-defensiveness, but through the project the group spent time touching different plants and engaging with different insects and other wildlife and learning about their habitats and care needs.

Station House Media Unit recognised that, for the young people to truly own it, they had to lead the project, with staff there to guide when necessary. After introducing the project and emphasising that the theme was science, the gave the young people the control to decide the topics they wanted to cover, the methods they wanted to use, and the media they wanted to produce. They facilitated meetings between the young people and their science partners at Aberdeen University so that young people could tap into the expertise they needed, but also to access the links and

contacts the University had, such as an oil and gas company. This has resulted in three films being produced, a 'science special' radio show, and articles being produced in a youth magazine.

Fife Young Carers decided to give their young people some exposure to science, and get them enthused about it, prior to consulting them on what they wanted from the project. The first thing they did was take a group of their young carers to the National Museum of Scotland during science week, where they took part in activities and explored different exhibits. At the end of the trip they asked the young people what interested them and what they wanted to find out more about. As a core part of the project was to equip older young carers to deliver sessions at young carer groups, they then worked with the older young carers to design and plan the sessions.

3.3.2 Informal involvement in delivery

As delivery has progressed, some projects have seen peer support emerge naturally as part of delivery.

The **Red Balloon** group involved in science visits have supported each other on trips and interacted together in ways they hadn't done in the past due to their vulnerability and difficulty trusting others. The Red Balloon of the Air group involved in the online computer-building and weather station project have shared their work online with each other, where they didn't before, again due to their vulnerability and fear of criticism. In addition, one young person became especially interested in the coding aspect of the project and volunteered to build the data analysis website for the weather station measurements, for all the students to use.

Petworth Youth Association built and raced two cars as they had done previously but this year, similar to in Formula One, they worked as a single team across both cars. The project lead reported that the older ones took time out to help and explain things to the younger ones rather than focussing on themselves. Removing the competitiveness enabled the older ones to take on a more supportive role.

Quotes from a number of other projects also illustrate this informal involvement in delivery:

> "You could see them start to work better as a team as the week went on, the support and encouragement they gave to each other was so nice to see."
>
> Project staff member

> "They would find the thing they were good, start seeing their strengths, and would start helping others. And when they weren't as good at some of the things there would be others that were and then they would get the help and support."
>
> Project staff member

> "He was the shyest kid of the lot, but by then end all the others were kind of looking up to him, he was always full of ideas and questions. He even had me stumped some of the time."
>
> Project staff member

3.3.3 Formal involvement in delivery

Some projects have formally involved young people in delivery as the project has progressed. Others are planning to so as they move forward with future projects.

Transplant Sport UK's initial idea was to run two residential trips away for young people. However, following the first residential, their plans changed and they decided to run workshops at the Transplant Games. One of the young people that attended the residential expressed an interest in doing more to raise awareness and support others, so project staff saw the opportunity to involve him in their work at the Games. The young person was glad to get involved and helped to deliver the workshops, which drew on the activities covered during the initial residential.

Four of the older young carers from the **Fife Young Carers** project have been supported to plan and deliver sessions to other young carers groups. They've now delivered sessions to all but two of the groups across the whole of Fife.

Renewal Trust worked with Ignite to deliver science sessions to a range of different groups. A young person that had been along to a session for older children had heard about sessions for Tiny Tots. She was keen to get involved so went along as a volunteer to support the session for the little ones.

3.4 Delivery teams

3.4.1 Who has been delivering?

About half of the projects did not have an expert partner supporting their delivery but had access to experts, who they used infrequently. In a small number of these cases, the organisation had staff with science expertise involved in the project, but in others the team were learning as they went.

The other half of organisations had varying depths of partnership with an expert provider. Some of these were ISL providers, while others were local partners with relevant subject matter expertise, such as local hill rangers, The Wildlife Trust, museum, nutritionist, environmental officer, outdoor education specialist. Two organisations worked with their local university. A couple of projects involved university students in supporting delivery. They reported that this worked very well in terms of the young people's engagement and the provision of role models, but only when delivery didn't coincide with the students' summer holidays and exam periods.

3.4.2 Role of partnership with experts

Our fieldwork indicates that projects that have tackled more technical science topics (for example, robotics, virtual reality, coding, engineering, DNA, 3D printing), have been able to do so because of access to experts and in some cases their equipment and facilities. By having relationships with these experts they've been able to provide experiences that the delivery organisation could not have delivered alone. This expertise does not necessarily need to come from an ISL provider. The most important factor is that a partner or expert adviser brings the relevant expertise to support the project and has an engaging, hands-on delivery approach in line with the critical engagement factors discussed earlier.

Projects delivered by an organisation's own staff have tended to be less technical in nature, but we see no difference in quality of outcomes, experience and engagement between them and the more technical projects, simply a difference in the types of topic covered.

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3.4.3   Essential skills and qualities

The critical factors for engaging young people, and the essential skills and qualities needed by staff delivering science activities to disadvantaged children and young people reflect the critical factors and what we would expect to see from any high quality youth work. We also saw young people respond most positively to staff who embodied a genuine curiosity of their own, with:

★   highly developed facilitation skills
★   flexibility
  •   responding to questions and young people's interest in the moment
  •   seizing opportunities to explore other topics
★   highly developed youth work skills (and play skills in younger groups)
★   an enabling, youth-led approach
★   curiosity, and passion for learning and exploring.

3.5   Impact on delivery organisations

3.5.1   Youth sector organisations

All youth sector organisations reported that being part of Curiosity had broadened their horizons and challenged their thinking about <u>what</u> types of activities they can deliver and what their young people will respond to. For many it has also influenced their thinking about <u>how</u> they deliver, showing them that young people respond very positively to an exploratory and empowering approach where they can take the lead and achieve.

Some reported that the new subject area had been really energising and motivating for staff, as it's easy to get into a rut with delivering the same things and in similar ways. Many staff reported having to learn about science themselves in order to be able to deliver confidently, and that this was stimulating. In some cases, staff had bad experienced of science in school and being involved in Curiosity also changed their own attitudes towards science.

Many reported that they intended to embed scientific thinking and content into future projects regardless of the type of activity, as science enriches other activities and helps them to engage a broader range of young people.

Some also said that using science as a new focus brought rigour to how they designed their activities.

> "You can bring science into anything, but you need to work at it and be rigorous with yourself about standing back and letting young people take the lead in asking and answering questions."

<div align="right">Project staff member</div>

3.5.2   Science organisations

Some of the science organisations involved in Curiosity partnerships had long experience of working with young people, including those from disadvantaged communities, but not necessarily in a youth work setting or with the age groups they worked with in Curiosity. Some of them reported that the experience changed how they think about connecting with young people, and what engages them. One also reported having learned about how to work with younger age groups.

"Our core market is 16-18-year olds, and while we have done workshops for younger people during holidays, it's tended to be one-offs rather than over the course of a full week. It's needed us to constantly gauge how they are responding, really observe what they are interested in, how they are acting and behaving, so that we can respond to it, tailor the delivery and keep it exciting for them. We've learned a lot from this partnership, it's the first time we've done something like this"

<div align="right">ISL partner</div>

"With the young people we tend to work with, the interest in science is already there. Our work with them is usually linked to the curriculum and plays to our strength, which is bio-medical expertise. Our delivery is more planned and structured. With Curiosity we've had to be much more reactive, provide more breadth. It's given me a real confidence in working with this type of format"

<div align="right">ISL partner</div>

3.6   Wellcome and BBC Children in Need's added value

Leadership: Most projects now say that bringing together science and youth development to support disadvantaged young people seems obvious, but they report that they don't believe it would have happened without Wellcome and BBC Children in Need coming together and providing both funding and leadership.

A mark of quality: Organisations reported that receiving funding from such prestigious funders provided families and potential partners with additional assurance about the quality of the project. In most cases, BBC Children in Need was the funder that was well-known to them.

Clinical credibility: Wellcome's involvement added specific value to the **Eczema Outreach** project. As an organisation they are keen to explore the causes and triggers of eczema with health professionals. A specific area of interest is psycho-dermatology, a relatively new discipline that studies the links between the mind and skin, for example the impact of stress. They planned an event in London to explore the topic with health professionals and to share their Curiosity plans. Having Wellcome as a funder gave their project a level of credibility that attracted key experts and practitioners in this field. They do not believe they would have got the level of response and interest without Wellcome's involvement and the opportunity has opened important doors for them as an organisation.

Supporting learning: Many projects have reported how valuable they found the impact events and self-evaluation support as a means to strengthen their approach to measuring and demonstrating their impact, and an opportunity to reflect on progress periodically. They reported that this is not something they normally receive support for, and really appreciated the genuine learning focus. Many reported valuing the final learning event as well, as an opportunity to share experiences and practice, and to feel part of a peer group doing something new and exciting.

Leveraging other support: A number of organisations have secured other funding and attributed this success to having already been funded by Curiosity. This relates to the quality and reputation

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of the funders involved and the fact that their decision to fund the project gave confidence to other funders that the organisation could deliver a quality project. In addition, the project having a solid funding base enabled other funders to feel confident 'topping up' the funding to provide enhancements. Further, a number of projects have received in-kind contributions from local partners (e.g., tradespeople) when they explained the purpose of the project; others have received free equipment and entry to science attractions for the same reason.

Supportive presence: Organisations reported welcoming the supportive but relatively light-touch presence offered by both funders. They knew support was available if they needed it but were pleased to be left to get on with delivery unless they needed support. They also welcomed the thoughtful approach to monitoring and reporting, which was not cumbersome, allowed flexibility of delivery and encouraged learning and adaptation.

Let's not forget the name: On a final note, many projects reported that the choice of Curiosity as the programme name was a master stroke. It made them realise that science was something they could engage with and provided a powerful word for inspiring young people and making science accessible.

4 CONCLUSIONS AND KEY LEARNING FOR ROUND 2

The key learning questions for Round 1 were:

★   What does it take to set up the programme and deliver the first round of projects?
★   What differences are achieved?
★   What is working and why, at project and programme levels, that lead to positive outcomes (and the lessons about what does not work in making a difference)?

Learning Report 1 explored what it took to set up the programme. The previous chapters of this report describe in detail what it's taken for organisations to deliver their Curiosity projects, the differences made for young people, and provide examples of what works and what doesn't in terms of engagement and delivery. Here, we summarised the key learning that has emerged from Round 1 including some emergent themes that will need more exploration in Round 2.

4.1   Science can be a vehicle for supporting disadvantaged young people

One of Curiosity's working hypotheses is that science can be used as a vehicle for supporting disadvantaged young people. The findings from Round 1 show that science projects can indeed make positive differences to this group, provided they are delivered within the framework shown in section 4.2.

4.1.1   Science also appears to make a unique contribution

A second hypothesis was that in addition to being as suitable as other activities for supporting disadvantaged young people, science might also offer something different and unique in supporting these young people. This needs much further exploration in the evaluation of Round 2 but our findings indicate some promise in three areas:

★   the opportunity to engage young people who are not so excited by other activities
★   encouraging young people to develop their problem-solving skills in ways that other activities don't
★   enriching other non-science activities such as the arts and sport, by incorporating a scientific element.

4.2 How to engage disadvantaged young people in science

The approaches and skills required are not dissimilar to those required to engage disadvantaged young people in any developmental activity. Figure 13 summarises the core critical success factors.

Figure 13 The critical success factors for engaging young people and successfully delivering Curiosity projects.

We have deliberately placed facilitation at the centre of the circle, as it underpins everything else. Whoever delivers, they need highly-developed facilitation skills to enable the approaches described in the outer circle. This enables them to seize the moment and explore with the young people, adapting delivery in real-time to respond to emerging questions and the dynamic of the group.

4.3 Who can deliver science activities for disadvantaged young people?

The original idea for Curiosity involved partnerships between youth organisations and ISL providers to share practice and experience, so that both could learn from the other about delivering informal science learning to disadvantaged children and young people. Around half of the grantee organisations did not form partnerships at all or formed lighter-touch arrangements with expert advisers. Where partnerships were formed, some were with ISL providers or other science organisations, but others partnered with organisations that wouldn't necessarily be considered ISL or science organisations.

Partnerships and relationships with expert advisers have influenced some of the science and facilities that were available to those projects, but the data we have shown no notable differences in the outcomes and experience of the young people, regardless of whether a science organisation was involved.

The organisations that decided to deliver without a partner have not been hamstrung by that decision, because the principles of youth work are inherently exploratory and facilitative, so staff have delivered activities where they and the young people have explored and learned together. Indeed, the organisations that worked with ISL partners also took this approach and we heard reports from the ISL partners that they had learned new ways to work with young people as a result.

Partnerships have been valued by those delivering within them, and some learning has taken place especially on the part of the ISL providers. However, we conclude that they are by no means critical to successful engagement of disadvantaged young people in informal science experiences. Rather, the approaches used (and described above) are the critical factors.

4.4   Real youth leadership of science activities is multi-faceted and continuous

One of the critical success factors depicted in section 4.2 is youth leadership. By this we mean that young people participating in the project were in the driving seat in terms of design and delivery. Some organisations did consultation before submitting their Curiosity grant applications and early assessment of interest and demand is certainly valuable. However, the projects where youth leadership has been most evident have facilitated young people to continue to design and shape activity throughout the project's lifetime; for example:

★   asking young people to choose the topics they want to cover and enabling them to continue to put forward ideas and preferences as the project progressed and they learned more about what interested them
★   changing content and future plans according to the questions and ideas that emerge over time
★   in the moment, reacting to questions and emerging interests and following those threads rather than sticking to the plan for the session.

As well as the direction of the project activity, further youth leadership and ownership has also emerged from the delivery style adopted. A number of delivery staff talked about science encouraging them to stand back more and leave the young people to do more of the activity themselves, stepping in to support only if essential. This meant that the project activity was literally in the hands of the young people, and the staff role was about empowering them to take the lead in exploring, learning and achieving.

4.5   Youth work practice has brought something new to ISL

Our findings are from only 32 projects and limited fieldwork. But we have consistently found that a youth work-led approach to delivering informal science experiences has been successful. Many grantee organisations now feel equipped to continue delivering elements of ISL as part of their work to support young people (and are convinced of its benefits). The ISL providers who partnered with youth organisations also confirmed that they learned from the youth work approach about how to engage more effectively with young people and to work more flexibly with them.

We have discussed this at programme board on more than one occasion and continue to be excited by the learning Curiosity can continue to generate about this particular subject. The evaluation of Round 2 should be designed to explore this further.

4.5.1 Science has brought something new to youth work practice

It was very early days to understand whether science offered something new and unique to youth work practice, but again our findings offer promising themes for further exploration. It would appear that science not only offers a new stimulus for thinking about and designing youth activities, but it has also begun to influence youth work practice among some delivery staff: facilitating an even more youth-led approach by encouraging staff to stand back more and leave young people to get on with the activities themselves, with less hands-on support than usual.

APPENDICES

APPENDIX 1 – LEARNING AND EVALUATION QUESTIONS

Assumptions underpinning our evaluation questions

★ engaging, hands-on science activities (informal science experiences (ISE)) can be a vehicle for helping disadvantaged children and young people achieve personal and social development outcomes

★ the intentional use of ISE is not already happening at scale in organisations supporting disadvantaged children and young people

★ the reason it's not already happening is a lack of knowledge, confidence and experience (disadvantaged children and young people providers about science, ISE provider about disadvantaged children and young people)

★ it will continue to not happen without an intervention to persuade providers of the value of ISE for disadvantaged children and young people and to equip them to deliver

★ ISE projects are well-suited to providers doing youth work (approx 24% of BBC Children in Need grantees)

★ we need a variety of projects in order to learn about what works, in what circumstances and for whom

★ we expect that socio-economic disadvantage will be the most common disadvantage addressed by projects, but that multiple disadvantages will also be common; we want to understand more about the types of disadvantage that ISE can address

Evaluation questions
Framing/profiling questions

★ Characteristics of organisations that applied (and of those that were successful):
  • Location
  • Scale
  • Remit
  • Type of disadvantage they tackle
  • Partnership with other provider(s)
★ Characteristics of children and young people they targeted:
  • Age
  • Type of disadvantage
  • Gender
  • Engagement with school
  • Interest/engagement in science
  • Ethnicity
  • Location
  • Existing client group or new
★ What kinds of science were included in applications (all and successful) and how was the science framed?
★ What was the organisation's motivation to apply?
  • Survival/new funding stream
  • Interest

- Always wanted to do it
- Doing it already

★ Do we need to reach a more diverse set of applicants? (why?)
★ How can we reach those that didn't apply?

What does it take?

★ What support do providers need, to develop good applications? (including information, help with framing/understanding science, the role of the open space events)
★ How do providers integrate the 'science bit' into their provision?

Supplementary lines of enquiry relating to the above:

★ How are any partnerships between DCYP[8] and ISE providers structured?
★ What brings the sectors together? And what other ideas might there be for doing so?
★ What unique added value arose from Wellcome's and BBC CiN's involvement?
★ How did Wellcome and BBC Children in Need both help and hinder the process?
★

Practicalities:

★ When's the best time to run a grant scheme for DCYP providers?
★ How did the application form work for applicants and assessors?
★ How well did the delivery timings fit for DCYP providers?
★ How much evidence do we need to allow us to get to the next stage?

What works?

★ To what extent were DCYP engaged in the design, delivery and evaluation of projects?
- What difference did that make?
★ What was the nature of the partnerships between DCYP and ISE providers?
- Could either have delivered without the other?
- Who needs to own and lead the project and its different elements for it to be successful?
★ How visible is science in the project?
★ What is the nature of the science involved:
- Frequency
- Level of exposure
- Variety
★ How relevant is the science to CYP and/or their disadvantage?
★ How do you engage DCYP in science?
★ How does this differ across different age groups, gender, other characteristics?
★ What stops DCYP engaging with projects in the first instance and/or causes them to become disengaged?
★ What's different and what's the same as:
- Engaging non-disadvantaged?
- Engaging in non-science?

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[8] Disadvantaged children and young people

- ★ What physical resources are required to deliver the projects?
- ★ What are the personal characteristics/attributes of the people delivering the project?
  - • How does this influence effectiveness?
- ★ How does it fit with the rest of the provider's portfolio?
  - • Is it new or displacement?
  - • Does that matter?

What difference does it make?

Shorter term:

- ★ Do science projects improve personal and social development outcomes for DCYP?
- ★ Do science projects improve DCYP attitudes to and relationship with science?

Longer term:

- ★ What is the interaction and interdependency between these two?
- ★ What impact does Curiosity have on the funding sector?
- ★ What impact does Curiosity have on providers (DCYP and ISE)?
- ★ What have been the unintended/unplanned outcomes?

What have been the ripple effects e.g., into families and communities?

APPENDIX 2 – PROJECT SUMMARIES

Abraham Moss Warriors Junior Football Club				Access Community Trust			
Delivering in partnership with Manchester University, with a range of topics being provided based on their consultation with young people, from engineering through to animals and habitats. The young people will work in mixed age groups with activities tailored to suit, and a mixture of session times and lengths is being used.				Partnering with Cefas, a world leader in marine science and technology, Access are delivering coastal/marine-based science activities to disadvantaged and disengaged young people. Themes will be decided with the young people involved.			
Location	No of CYP[9]	Ages	Dose[10]	Location	No of CYP	Ages	Dose
Manchester - NW	169	7-15	66	Lowestoft - ME	48	10-18	44
Ashton Community Trust				**Eczema Outreach (Scotland)**			
An urban science club delivered at FabLab, a digital fabrication laboratory. The young people will be able to access a range of technology to develop and execute their own experiments.				A range of activities and workshops, from light touch mass events to 1-2-1 support for children and young people to raise awareness about eczema, its causes and how to manage the condition.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Belfast - NI	20*	10-15	12	Linlithgow - SC	95	5-18	Variable
Epic ELM CIC				**Fersands & Fountain Playscheme**			
In partnership with Aeroscene, young people will build balloons from plastic bags. Combining creativity with science the project aims to engage both those interested in science and those not, including young girls at risk of serious violence. Themes will include solar power, pollution and plastic.				A variety of interactive hands on workshops being delivered in partnership with Aberdeen Science Centre. An outline of potential activities has been developed based on the Science Centre's knowledge of what engages and excites young people, but the early sessions will give the young people an opportunity to choose what they want the topics to be.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
London - SE	163	5-15	12	Aberdeen – SC	44	5-12	12
Fife Young Carers				**Getting Better Together Ltd**			
This project aims to give young carers exposure to science and encourage a lasting interest in science. Beginning with a visit to Edinburgh International Science Festival to catalyse ideas for future sessions. Older young carers will be equipped to deliver to other young carers and groups in future, to develop a science toolkit that can be used to ensure sustainability of science activity for the organisation. Delivered in partnership with the National Museum of Scotland.				Fun science clubs delivered to young people in a deprived urban location with poor engagement in schools with science. Five sessions building to young people developing their own projects to get them 'hooked' on science.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Lochgelly - SC	100*	8-18		Shotts – SC	78	10-15	50

[9] Based on actual numbers delivered, except where marked with *, where numbers are based on estimates at the application stage
[10] Calculated from application forms

Groundwork Northern Ireland				Haldane Youth Services			
Gardening on a bus, targeting young people from families that are homeless, refugees or otherwise isolated. Taking gardening and science to young people who will participate in experiments on the bus and will be encouraged to start gardens where they live.				Building on an existing programme of after school activities, science workshops will be delivered by project staff. Drawing on some local expertise and a partnership with the National Museum of Scotland, culminating in a visit to the museum.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Belfast - NI	312	0-18	3	Balloch - SC	75	8-11	30
Healthy n Happy				**Jig-So Children's Centre**			
A range of activities from large scale family events to workshops, alongside the development of a small number of Youth Activists. Focused on environmental issues, such as recycling, and making use of community assets to get young people curious about science while developing confidence.				Science clubs for children aged 0-3, 3-8 and 8-12 in areas of deep rural poverty and isolation, to explore a variety of science topics using hands-on activities. Community recycling projects with children and families in four rural communities, in partnership with local steel works.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Rutherglen - SC	173	5-15	Variable	Cardigan - WA	216	0-15	
Lyng Community Association				**M13 Youth Project**			
A multi-topic project with a mix of all-age and age-specific activities, with older young people becoming mentors to their younger peers. Using local assets such as the education centre in the local sewage works and the space centre for a mix of weekly local sessions and trips during the summer holiday.				A project that will deliver 2 sets of 6 sessions 2 hourly sessions as part of their summer club, with groups of 6-11 year olds. Furthermore 14 sessions will be delivered for their existing 'peer groups', with separate sessions for different age groups and genders. Initial ideas for activities include sport science the environment, rocket building and crystal growing, however this will be finalised in consultation with the young people to ensure it is aligned to their interests. Once the topics are finalised they will seek to engage relevant lecturers from Manchester University to support delivery.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
West Bromwich - ME	71	0-14		Manchester - NW	95	5-18	4 to 17
Murray Hall Community Trust				**Oarsome Chance Foundation**			
Robot-building project for young people with low confidence using virtual reality, 3D printing and CAD. Robots will then be used in the young people's schools. Delivered in partnership with FabLab.				Coastal Rowing project for young people disengaged from school, focusing on the physics of boat design and building, the physiology of rowing and improving performance, and the science of the local coastal environment (marine ecology, weather, tides).			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Tipton - ME	39	9-12	22.5	Milborne Port - SW	31	10-15	67.5

People Know How				Petworth Youth Association			
Delivered in partnership with Leith Labs, and drawing on additional expertise from Edinburgh University. Three groups of young people (one from a secondary school, another from a primary school and a third from a local community centre) will design of the programme and topics to be covered, and showcase their learning in their local community				Engineering project based in an isolated rural community, to design and build green powered racing cars and race them against other teams in competition, maintaining and improving the cars as they progress.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Edinburgh - SC	31	10-15		Petworth - SW	22	11-16	100
Project Buzz				**Rathfern Community Regeneration Group**			
Introducing young people at risk from drugs and gang culture to science through workshops delivered in weekly programmes and away days. Students from Sheffield University science societies will be supporting the project team to deliver the activities.				Developing Junior Hill Wardens, who will learn outdoor skills and about the environment to enable them to take young leaders' roles and cascade their learning to other young people. Supported by local agencies such as Woodland Trust and Belfast Hills.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Sheffield - NE	66	10-15	141	Ulster - NI	21	5-16	18
Red Balloon Learner Centre Group				**Renewal Trust**			
Science Club for students who are not in mainstream school due to severe trauma from bullying, to construct and operate a network of weather monitors, conduct biodiversity studies and participate in large scale citizen science astronomy projects.				Working in partnership with Ignite Futures to deliver science activities in communities. Shaped by young people a phase of introductory sessions to stimulate curiosity build into a period of 6 sessions working alongside scientists to conduct experiments and investigations. Findings will be presented at the Nottingham Festival of Science.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Cambridge - ME	17	12-15	22.5	Nottingham - ME	170	0-18	
Scarborough & Ryedale Carers Resource				**Spiral**			
Working in partnership with Hidden Horizons, an outdoor activity specialist, practical hands-on activities to expose young people to the science in the nature around them, including torch-making, fossil-hunting and rock-pooling. A family event at the end of the project will enable young people to share what they've learned.				Working with young people likely to end up NEET, workshops introducing careers in tech combined with coding. Drawing in industry experts such as Microsoft, to deliver careers master classes and Turing Lab to support coding activities.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Snainton - NE	21	8-18	10.5	London - SE	20	16-18	35
St Pauls Community Development Trust				**Station House Media Unit**			
Multi-topic playscheme during Easter and summer holidays, with different themes each week, including the environment, go-kart building, electricity and electrical components, and health. Delivered in partnership with the local science museum and with the in-house farm manager and maintenance worker.				In partnership with Aberdeen University, developing and producing radio programmes to raise science awareness. Producing videos based on different science topics and including interviews with scientists, to be shown at Mayfest.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Birmingham - ME	94	5-11	27	Aberdeen - SC	21	12-18	

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Swansea YMCA				The Enterprise Centre Limited			
Urban farming project for young people experiencing poverty and deprivation, researching and creating an urban farm using hydroponics and LED lighting, and conducting experiments to identify optimal growing conditions for various edible crops.				Activities focused on water life and conservation, to learn about underwater life, ecology identification, cause action and consequence. Designing their own pond based on what they have learned.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Swansea - WA	46	10-18	Variable	Tottington - NW	84	9-16	18
Transplant Sport UK (Transplant Sport)				Wac Arts			
Working in partnership with Science made simple to provide weekend residentials for young people who have undergone organ transplants, exploring how the body responds to transplants and how the medication they take works.				After school sessions and holiday club for young people with learning difficulties and/or on the autism spectrum, to explore the science of sound, hearing and the other senses using virtual reality, experimental multi-sensory workshops and creative arts.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Nottingham - UK wide	23	14-18		London - SE	64	10-15	36
WESC Foundation				YMCA Paisley			
Wildlife garden development project for young people with visual impairments (and often other learning difficulties and physical disabilities), including experiments to stimulate biodiversity and compare the effects on biodiversity in cultivated and 'wild' sections of the garden.				Coding activities and talks from female industry role models, targeting girls with low digital literacy from disadvantaged areas. The girls will then be encouraged to join a coding club to build their confidence and digital skills.			
Location	No of CYP	Ages	Dose	Location	No of CYP	Ages	Dose
Exeter - SW	26	10-18	33	Paisley - SC	141	10-18	3-80

March 2019

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