

Impact Report 2019/20



lightyear
foundation



"At Lightyear Foundation we passionately believe that diversity can be used as a tool for innovation and growth. Better innovation comes from more diverse groups and to overcome the big global challenges, our scientists and engineers of the future need to come from all walks of life."

Katie Sparkes - CEO



Introduction

Lightyear has been full steam ahead this year, building each of our four projects to increase the type and scale of our impact.

We have reached more children through our Active Learning Workshops than ever before, added seven new Role Models, delivered three SEN (Special Educational Needs) in STEMM (Science, Technology, Engineering, Maths and Medicine) roundtables and launched our new Work Inspiration Trips – designed to get more disabled people pursuing a career in STEMM. Our work has featured in national newspapers as well as industry titles, and we've spoken at events like the UK Space Conference, showcasing our techniques to others.

Lightyear has developed internal structures including updating our branding and website. We have welcomed five new trustees and recruited a project manager, in charge of our SEN for STEMM directive.

Lightyear has secured considerable new funding including two larger funders over three years, allowing us to be a sustainable organisation with a strong platform for growth.

Here's to an exciting 2020!





The Problem

Throughout the life of many disabled people there is a severe lack in volume and quality of STEMM education, careers advice and guidance, and employment prospects. However many 'disabilities' are in fact advantageous in certain areas of the STEMM industries e.g. the skill of having fine attention to detail and comfort in repetition, common to those with autism, are key skills of a successful coder.



There is a growing realisation that a homogenous workforce tends to come up with narrow-focused solutions. To overcome the big global challenges, our scientists and engineers of the future need to come from all walks of life.

A recent study, 'Jobs of the Future', has revealed that science, research, engineering and technology jobs will grow at double the rate of other occupations, creating 142,000 extra jobs between now and 2023. With disabled people still currently remaining significantly underrepresented in the STEMM workforce, we need to mobilise this untapped pool of talent and give employers the confidence, information and motivation to make their workplaces accessible.

Recent years have seen some headway made in tackling science education's inclusivity and diversity issues, but, it's fair to say, this is still very much work in progress. And one significant subsection of society – that makes up 7% of UK children and 18% of working-age adults – remains largely ignored: disabled people.

Our Solution

Lightyear Foundation opens up the exciting world of science for all children and young people regardless of ability or social background. This year we have progressed our four project streams to further break down the barriers to disabled people participating in STEMM.

Active Learning Workshops

We fuse movement with STEMM in our unique, creative workshops currently being delivered in partnership with Flamingo Chicks (an inclusive dance organisation). With a different theme each term and sessions packed with sensory equipment and tailored communication aids, they are ideal for all kinds of children including those with Down's syndrome, autism, profound and multiple learning disabilities (PMLD) as well as those with other conditions such as cancer

SEN in STEMM

Lightyear founded SEN in STEMM, a roundtable-style platform for bringing the sector together to break down barriers to inclusion, in June 2018. We now have 53 members including leading Science Institutions such as The Royal Society, Membership Organisations such as The Royal Astronomical Society, Science Centres including the Association for Science & Discovery Centres, charities like WECIL, government bodies such as the Ministry of Defence and corporates like Airbus. Members come together to collectively share best practice, raise awareness of the issue, provide training and techniques. Together, the network works to empower the SEN in STEMM community and get more disabled people interacting with STEMM.

Role Models

It's especially important for young disabled people to see other disabled people succeeding in STEMM, so we have begun a Role Model programme highlighting amazing disabled scientists. It's vital for disabled children to see that their disability need not be a barrier to success. When young people are inspired and engaged by our Sensory Science workshops, we can offer support and encourage these budding disabled scientists to look at the STEMM industries as a viable and welcoming career option.

Work Inspiration Trips

We want to encourage young scientists to look at the STEMM industries as a future career prospect. Therefore, we run a Work Inspiration Day programme. From visits to the Science Museum in London to Aerospace in Bristol we love inspiring young scientists by showing them STEMM in action. Here they get to meet people working in STEMM, in a variety of different job roles, ask questions and see first-hand what they do. In return they complete an accessibility audit, helping make places and spaces more accessible for disabled visitors.



"I didn't think
science was for me,
now I'm thinking
differently."





Active Learning Workshops

Key facts

817 children in regular sessions

956 children in outreach sessions (including the Big Bang Festival)

52 locations from Yorkshire to London

Settings included special schools, children's hospitals, hospices, festivals and events

SEN

Participating children had a variety of complex needs including Asperger's and Autism, PMLD, Down's syndrome, cerebral palsy, visual impairment and illnesses such as cancer along with a range of communication needs (such as being hearing impaired or non-verbal) plus physical disabilities.

817
children

956
outreach
sessions

Bristol

Cardiff

London

Yorkshire



Active Learning Workshops: Alien Worlds

With space
expertise from the Royal
Astronomical Society and
Astrophysics Lecturer
Dr Josie Rawes, from
University of York

Our Alien Worlds theme developed curricular links across maths, physics and chemistry by exploring out of this world scenes through dance. From fun with forces to discovering the InSight and ExoMars Missions we were able to explore topics including planetary science, time and states of matter.

This exploratory theme further allowed children to develop important life skills such as dealing with unexpected outcomes and choice making. The children created their own aliens and considered what faraway worlds would look, sound and feel like! We buddied up mainstream and SEN schools to explore active learning together. The Hazelbeck School choreographed their own wonders of the universe routine. To inspire children and reinforce learning, we partnered with Explorer Dome to use pop-up planetariums in class creating a real wow in several of our Bristol and London groups.

Lesson Plan examples:

Motion of the Moon

Exploring pirouettes and turning in relation to how the moon moves through space, with a focus on revolution and rotation. The children enjoyed using ribbons, scarves, and inflatable planets to explore how to move around each other and create their own revolving dances.

My Alien

We used our imaginations to create our own aliens, focusing on creativity, communication and celebrating differences. Children created their own alien masks, which they then brought to class each week. They also created their own 'signature dance' for their aliens, which they performed as solos or small groups.

Molecules

Exploring chemistry in space with a focus on learning about molecules. We played games that focused on 'molecule building' where the children would 'stick' to each other to create different tableaux. Some children also explored the choreographic tasks of 'accumulation' - adding and repeating separate movements to create a longer 'string' of ideas.





"I think I could be an astronaut! You have to be really really brave. It's so cool to think about travelling up high and away and meeting aliens! There could be life on Mars. I want something exciting to happen and for us to find aliens soon! I think they would have humongous eyes, green hair and 20 antennas!"

"I liked learning about Alien Worlds. It was a bit scary at first so I was proud of myself for trying new things. Aliens would need different life resources to Earth. Like different air, food and water."





"We explored a variety of themes from camouflage (colour matching, disruptive colouration and countershading) to the Finch Response of Galapagos Tortoises. The tortoises stretch up on their legs and extend their necks fully and almost go into a trance-like state. This gives the Darwin finches the opportunity to peck at any dead skin and parasites on the tortoises therefore cleaning them as well as giving themselves a nice feed at the same time! We have been exploring this with movement - some children moving slowly or on all fours as the tortoises, then stopping and slowly rising up into a trance. Others have been the finches who fly around, hovering and pecking!"

Sam McCormick, Teacher

Active Learning Workshops: Carnival of the Animals

With Zoological expertise from the Zoological Society of London and University of Cambridge Marine Biologist, Dr Sam Matchette

This term saw us look at the animal kingdom from fossils to the big five! Inspired by Christopher Wheeldon's famous ballet 'Carnival of the Animals' we developed an ecology and zoology linked series of experiences and dance sessions.

Children learnt about how organisms live together in different environments. We used the different movements of these animals to develop dance routines. Students from The Chellow Heights School created deep blue sea and African safari inspired routines. To bring this theme to life, we organised special experiences such as a visit from Zoologist Dr Sam Matchette and a visit to Bristol Zoo. A highlight of our partnership with Flamingo Chicks was showcasing the 'Carnival of the Animals' and 'Across the Universe' routines, performed by a total of 32 children. We even staged some performances at the Northern Ballet in Leeds! The performances were a great spectacle complete with beautiful costumes hand-made by volunteers.

John Lyons - Funding for Active Learning Workshops in London

Lightyear was pleased to receive a three-year grant from John Lyon's Charity for the development and delivery of new weekly classes in London (three in year one, four in year two, then five classes in year three). The aim is to carefully track the impact of teaching STEM via active learning against three key objectives which are:

1. **80%** of children will have increased physical mobility, helping to reduce pain or discomfort or enhance overall physical wellbeing
2. **100%** of children will have increased confidence and awareness of others
3. **70%** of children will be able to recognise key elements of each STEM subject.

Masters students from City University London, specialising in Clinical, Social and Cognitive Neuroscience, are working with us to evaluate the project.

Parents/Carers

Parents and carers were given 'note home cards' which included a snapshot of what their child did and enjoyed most during the term. The reverse featured an experiment they could try at home to continue learning! Each child was also given a certificate of achievement to proudly take home.



Teacher Training

Thanks to funding from The Ogden Trust, we up-skilled 13 dance teachers from Flamingo Chicks on physics and STEMM to be able to deliver new active learning themes.

These included Alien Worlds (2019) as well as Inventing and Flight (2020). We also introduced the United Nations Sustainable Development Goals with a view of aligning our work with them. We were lucky that Lady Catherine Ogden and Alison Rivett from The Ogden Trust also attended to observe.

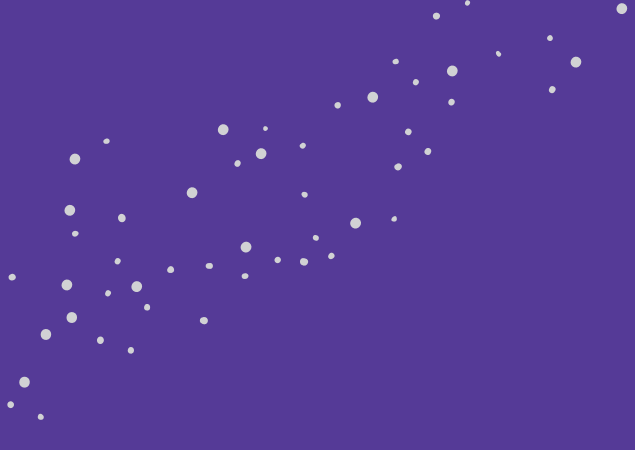
Teachers fed back a 40% shift in confidence in science delivery

"Active learning and blending the two different interests is a great way to look outside the box. It engages many people in different ways and allows a different avenue of your creativity to flourish. I took away the mindset that nothing is impossible."

"Adding science into classes has forced me to become more creative with my lesson plans, which has been very much for the positive! It allows for students to be curious and has helped harder to reach students engage."

"I really enjoyed sharing teaching ideas with other teachers. I will definitely try to add more vocabulary into my lessons plans and be braver with the level of science that is being introduced."





"I've recently started working with an early years group in Leeds who have complex Autism. They have really loved the theme of Alien Worlds especially when we get to describe the new world - recently they chose to have a red sky, pink sea and orange sand, so we used some sparkly red fabric and went for a journey under the sea: we saw fish, sharks and an octopus. After a long swim and learning to say hello to the fish with a port de bras, we took a rest on the seabed looking up at the fish. We floated the sparkly material up and down over the children as they lay on the floor. Within a couple of minutes everyone had settled under the material and the room was calm - something that is often a challenge for this group. We then enjoyed a goodbye circle, where we said thank you and goodbye, with Makaton too. This was the first time that the group was able to explore an atmosphere of calm and relaxation, alongside expressing their energy and enthusiasm. At the end of the session each child said thank you and goodbye to me too, which was another first, so all in all an awesome break through!"

Matt Lackford – Teacher, Yorkshire



Outcomes



75%

of children that took part
ended term thinking science is
fun and exciting.



89%

ended the term feeling
happy/confident in class. This
is a 23% increase in feeling
happy/confident from before
term began.

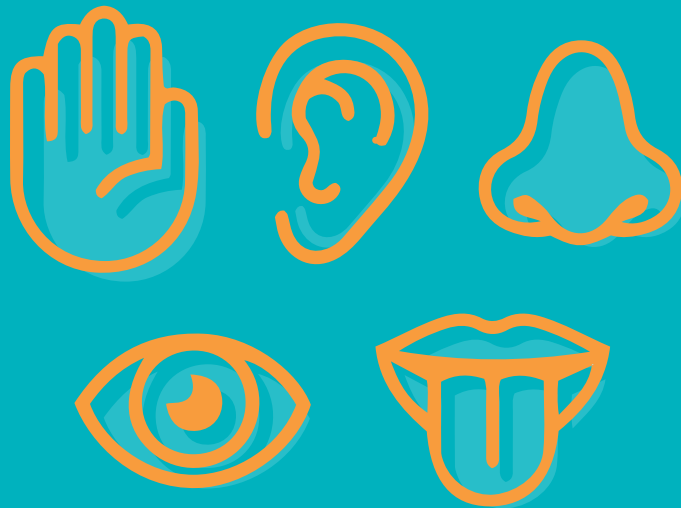


25%

children/adults showed an improvement
in STEMM object recognition after the
course. 47% got it correct originally and
correct again after!

66%

now want to do
more physical exercise
(outside of class).



"Lightyear Foundation offers a wealth of reliable information, advice and practical steps on improving our engagement with a wider scope of society. Their help has been crucial in giving both myself and my organisation the confidence to move forward in this field and broaden our educational offer and create impact within SEN communities."

Joe Burton, Education & Public Engagement Manager,
The Linnean Society of London

SEN in STEMM

As well as sparking interest in science at a grassroots level, we're also creating change from the top down, making it easier for the movers and shakers in the STEMM industries to engage with disabled people.

Key facts

53 members

3 roundtables delivered

New project manager appointed

9 cases of supporting organisations directly to improve accessibility

Following an overwhelming response to our CEO's speech at the Royal Society's Diversity conference in 2017, we founded SEN in STEMM network. We kicked off the network with a roundtable bringing together members together across leading science associations, including The Royal Society, UK Association for Science & Discovery Centres, London Zoological Society, Sense About Science and Employment Autism. This event clearly showed that there was a real need for an established network with a central connector to break down barriers to SEN in STEMM inclusion.

Lightyear continues to lead this network to share best practice, raise awareness, train and inform so that together the network empowers the SEN in STEMM community. Between roundtables we manage the network and deploy triage support to members needing help with questions on inclusion and accessibility. This could be sharing what we have learnt during our Active Learning Workshops, identifying best practice or linking up members who could provide advice based on their own experience with a similar issue.

Thanks to funding from The Funding Network, we've appointed a new SEN in STEMM Project Manager, Emma Zeale.

Our most recent roundtable was held on 20 February at the Home Office with twenty-eight attendees from across science institutions, funding bodies and corporates. The aim of the meeting was to improve attendees' disability confidence by focusing on communication and disability language. Following the event, 78% of respondents to our post-event questionnaire felt more disability confident.

"You'll be pleased to hear that we are making some progress with your recommendations. We have introduced a warning about the tesla coil in Wonderlab and are having large print books produced for in there too. We are looking at creating sensory calming kits like the Torquay ones for all our museums and will be talking to our Early Birds and Sensory Astronights families about what would be of most use to them to be inside. We've also, just yesterday, trialled a mobiloo shared with our neighbours at the Natural History Museum!"

Susan Raikes - Director of Learning, Science Museum Group



Role Model Programme

Our role models programme highlights the inspiring careers of disabled people. We have recently added profiles for Andrea Chapman, a successful scientist working within radiotherapy who has dominant optic atrophy, and Lara Aryis an inspiring business leader who is autistic and has Irlen Syndrome.

Key facts

7 new role models profiled this year

We are promoting the programme through our website, social media channels and through speaking/event opportunities. Our Role Models give brilliant tips and advice to the next generation of disabled STEMM stars, which has a great impact on those coming through our active learning workshops. We also invite our Role Models to join us on Work Inspiration Trips, so the young people we work with can see themselves reflected in the STEMM workforce. Lived disability experience is not replicable and so our Role Models play a big part in helping young aspiring scientists realise their potential.

"There are some case studies in the media where individuals with Special Educational Needs are celebrated for having a successful career in STEMM. However prospects for the majority of SEN students are not as optimistic. Most students with learning difficulties depending on the severity of their condition will spend most of their adult career in a care home, recreational day centre or in supported employment in retail or hospitality. Why? How many successful STEM ambassadors have learning difficulties? Or are born with a physical, visual or auditory disability? Are there any SEN STEM role models who visit schools to inspire our youngsters? No, of course not.

Students with learning difficulties have many gifts and qualities that are ideal for the functional side of STEM. Pupils on the Autism Spectrum who base their daily life on structure and routine would make amazing laboratory technicians where following procedures are second nature. I have taught students with SLD who have completed work experience for the RSPB, Aquariums and Nature Reserves and were more productive than their peers. All these work experience placements involved science. After teaching SEN students for over 15 years, I have witnessed that the pupils I have taught make more progress in science compared to other core subjects. However, they will hardly have the opportunity to pursue a career in the subject they love the most. We desire a future for our pupils with SEN, to enable them to pursue their love of science and structure. To give them the opportunities they desire. We need to educate our STEM industries. They need to understand that they are missing out on employing a very special workforce but more importantly we need to find and produce the aspirational SEN STEM role models our future SEN students dream to be."

Julie Neil - PSTT fellow, ASE National Committee, PSQM Gold Award Winner

"Hearing from a staff member with autism talking so honestly about how much she loves her job and how the MoD have put in adjustments to help her thrive was emotive and hugely inspiring. As one of the students said, 'she's someone like me' – it really helped us all raise expectations of what can be possible."

Charlotte Sibanda, KS5 Lead, New Fosseway School



Work Inspiration Trips

Key facts

7 Work Inspiration Trips Delivered (in 2019)

93 students and young adults participated

STEMM workplaces including Facebook HQ in London and Boardman Performance Centre in Evesham

Work experience meets accessibility audit...

How it works

1. Lightyear Foundation conducts a visit to a science centre or science business.
2. The group meets key staff members and in small groups, has the opportunity to ask questions, try out activities and learn more about job roles.
3. There's time to explore the setting including behind the scenes.
4. The group may also complete an accessibility audit – sharing their thoughts on how to make the setting more accessible to disabled guests. This enables the group to feel they have made a worthwhile contribution and help improve the experience for future disabled visitors or staff.


Work experience can have a number of benefits for people with disability. It can help them show a potential employer what tasks they are capable of doing; and it allows them to build skills and display a positive attitude and eagerness to work. Work experience also helps people with disability improve their résumés and see if certain jobs are to their liking.

At the same time, work experience helps employers assess how a person with disability might match to different jobs. It also allows them to observe changes that could be made in the workplace to help people with disability do a better job. However, we have found that traditional work experience placements for young people with learning disability are hard to set up with

employers, especially on an on-going a basis. The unique style of work placement we are proposing therefore offers students a more tailored opportunity for vocational learning and personal development – showcasing routes into STEMM and transferable skills of STEMM. For students with disabilities and/or learning difficulties this opportunity can be a key to the world of work from which they might otherwise be excluded.

"Fifteen percent of our school leavers will be accessing social care packages and 85% of our leavers have applied to college provision where courses will continue to develop both life skills and employability skills as their journey into adulthood continues. Lightyear's work inspiration days are a brilliant way for a large number of SEN students to get a taste of a range of job roles and by working as a group. Experiences such as these play a big role and are shared during college interviews. It's a great way to boost confidence and inspire our young people."

Joanne Payne, Transitions Coordinator,
New Fosseway School, Bristol



STEMM workplaces
including Facebook
HQ in London and
Boardman Performance
Centre in Evesham

Case Studies

Boardman Performance Centre

We visited this world-class sports science venue in Evesham and learned how its incredible wind tunnel works, as well as positional biomechanics and aerodynamics. Participants were from a local group, the Freedom Centre, and at the start of the visit 25% said science wasn't for them but afterwards 100% were interested in finding out more about STEMM.

M Shed

Our group from New Fosseway School got a behind the scenes tour of their most treasured collection. We were given the tour by John, a volunteer, who really engaged the group with his passion and wonderfully extensive knowledge. Our harbourside learnings sparked curiosity into STEMM jobs, such as becoming a shipwright or working in a museum, and 62% of the group wanted to pursue work experience in these areas.

After the trip, the number of students that thought science was for them had trebled! One hundred per cent of the group could see science in the everyday aspect of our water systems and boats, compared to only 23% before the trip. Ninety-two per cent of the group enjoyed the day and two young men in particular were really interested and we are going to keep in touch and follow their development with the school.

Aerospace

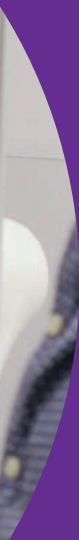
the home of Concorde! Students from New Fosseway Post 16 took over the setting for a whole day assuming roles including Visitor Services, Marketing, Social Media, Archive and Collections, Fundraising and working in the shop as well as giving their feedback on the museum's accessibility and recording Makaton videos to help make the centre more accessible for future visitors.




Inspiration days work well for employers too...

"Aerospace Bristol really enjoyed having the Lightyear Foundation visit us. The staff were so supportive with the group and the approach toward the whole day was inclusive and inspiring. The group asked lots of fantastic questions and gave us a really helpful insight into how we can improve our centre to be more accessible to those with disabilities. We would love to have them visit again!"

Katherine Martin, The Learning Team,
Aerospace Bristol



A large, light-colored wooden barrel is mounted on a heavy-duty metal frame. The barrel is positioned horizontally and is supported by a complex system of metal beams and cross-braces. The setting is a large industrial warehouse with a high ceiling and concrete floor. A person is partially visible on the right side of the frame, crouching down. A teal circular graphic is overlaid on the left side of the image, containing text.

At the start of the
visit 25% said science
wasn't for them but
afterwards 100% were
interested in finding
out more about
STEMM



CAUTION
flying
debris

Our Team

We have a small but impactful operations team, and we're growing! We are delighted to have Emma Zeale join us as our new SEN in STEMM project manager. In addition, we are also supported by an array of STEMM volunteers who support across all our work such as Ben and Lucinda...

Ben Booker has been supporting our work as a medical student and now as a Doctor. He provides great advice and practical help regarding evaluation methods and data collection, as well as input into our Human Body workshops and plans.

Lucinda Offer is Education and Outreach Officer at the Royal Astronomical Society as well as the Executive Director of the Mars Society. Lucinda has been so supportive and active in our work this year, giving a talk at our Teacher's Development Day, which really inspired our team. She has also contributed to our class plans for Alien Worlds term and is always on hand with her advice and help.

We've appointed five new Trustees this year - as an organisation committed to breaking down barriers to inclusion, we follow the Charity Governance Code and all Trustees undergo Child Protection training.

Our philosophy

We consider volunteering to be a learning and development opportunity. Just as our volunteers give something back to the young people we support, we hope we give them something back too. We provide opportunities for our volunteers that will enable them to develop new skills while supporting us.

As part of this, we provide robust training and ongoing support to ensure the quality of our work and a positive volunteering experience. For example, we released a volunteer training video for those participating in our sessions. We also filmed and released a series of videos sharing basic Makaton signs to aid better communication in our sessions and the community. As well as being used by our volunteers, these are currently being used in places such as the Centre for Life in Newcastle and have been viewed 62,443 times (to March 2020)!

Fundraising

We fundraise tirelessly to ensure we can keep breaking down the barriers that prevent disabled young people from accessing science education. Our fundraising ranges from organising events such as '50 Moonlit Miles', to seeking grants and engaging our community to raise money for our cause.

MyRace, a 'virtual race' platform that enables participants to complete races in their own time – ran a 5km Lightyear Space Race which raised £750! Participants got a space-themed medal with a lid that revealed a mirror, so they could see themselves as an astronaut.

Logico Toys donated 5% of every sale purchase to us during their holiday promotion. We've been reviewing their toys with two children with SEN, written up in a blog

A big thank you everyone who has supported us this year including:

- Souter Foundation
- The Paypal giving fund
- Facebook Giving
- John Lyon's Charity
- Quartet Community Foundation
- Baily Thomas Charitable Fund
- The Ogden Trust
- Woodward Charitable Trust
- The Funding Network
- The Big Bang Fair/Engineering UK
- Newington Community Primary School
- Ashton Gate Primary School





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