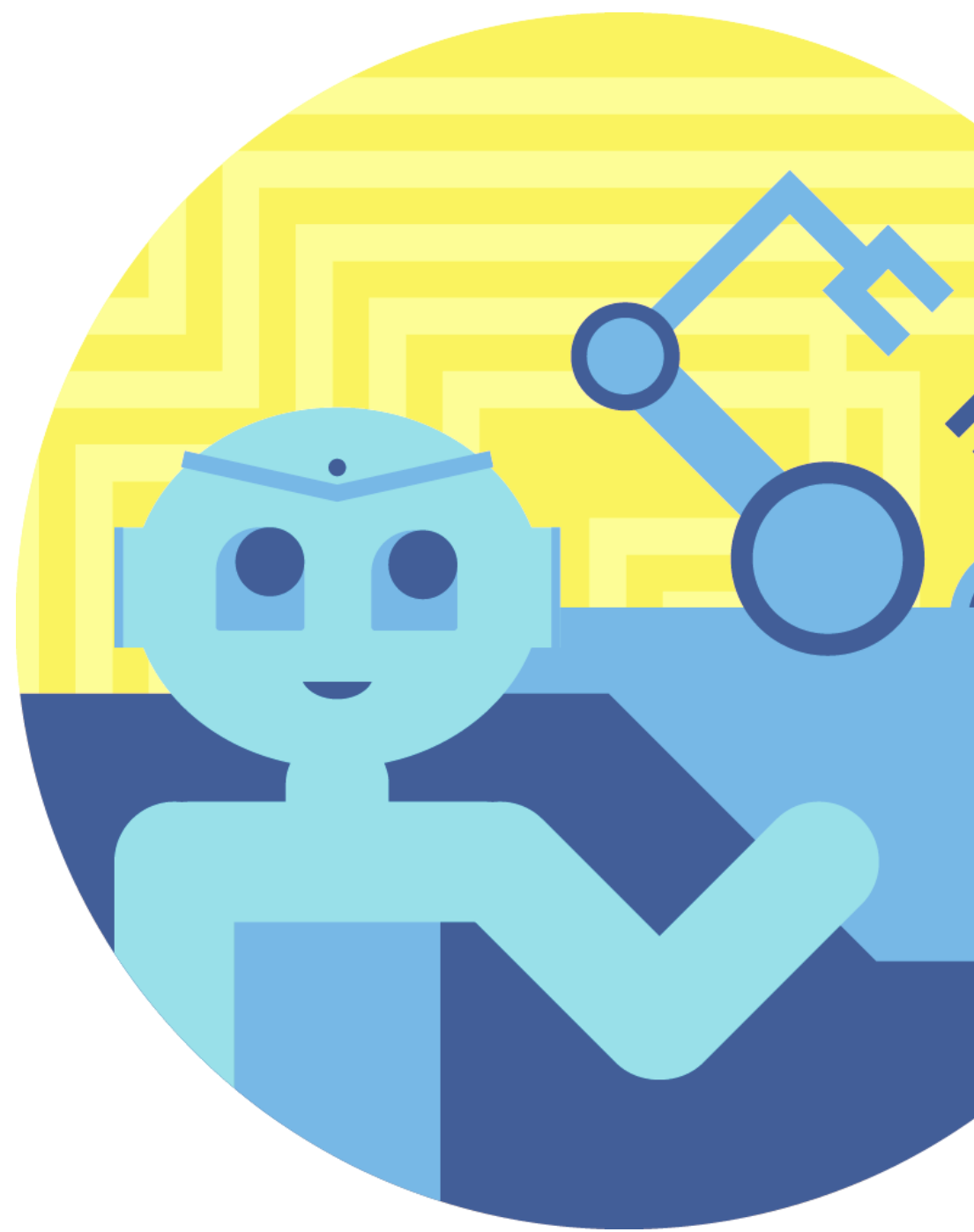


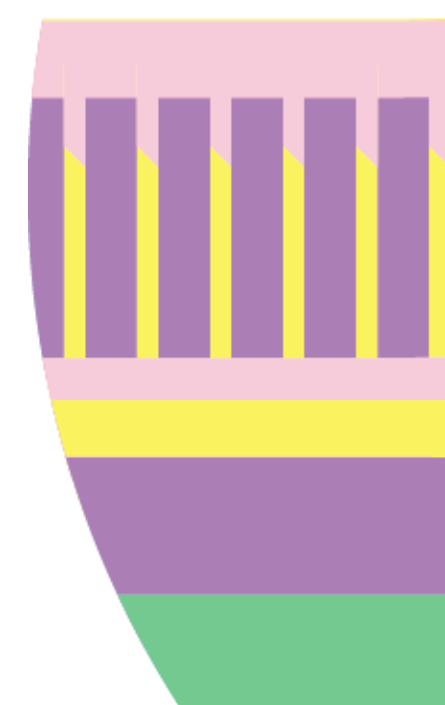
# DETI Engagement Report

Summary of engagement activity in West of England 2020-2021



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***Our vision is for every young person in the West of England to have access to inclusive, engaging and inspiring education experiences to engineer a better future together.***

- **DETI**
- **Inspire**
- Engineering a better future



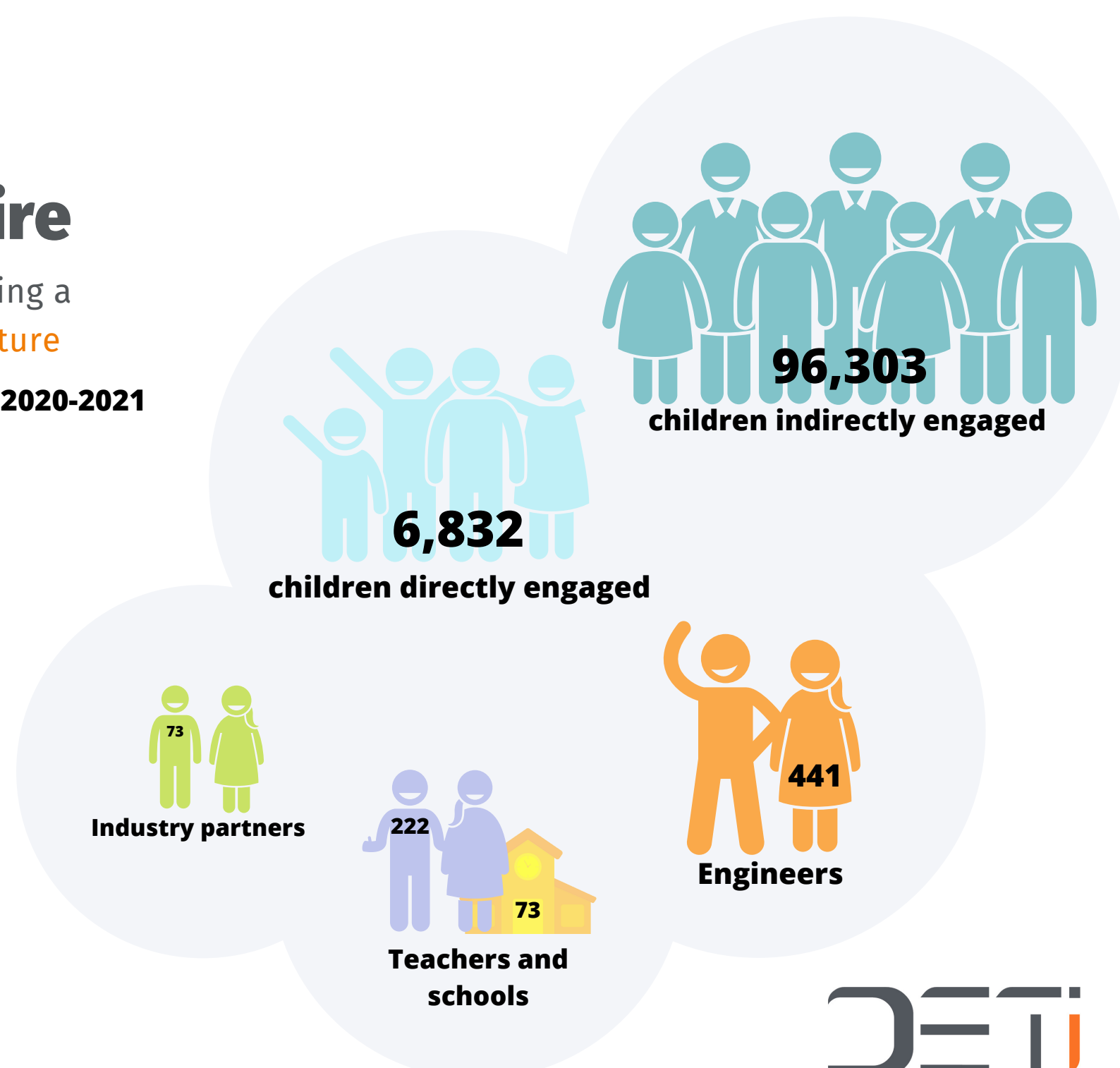
# Executive summary

From January 2020 to December 2021, DETI Inspire has delivered an impressive array of outputs and engagement activities. In that time, the team have **directly engaged 6,832 children and 221 teachers from 73 schools and community groups in the West of England, with an estimated 96,303 children reached altogether through dissemination efforts**. Along the way, children have been able to have conversations with real-life engineers through (online) Q&A sessions, card games and skill shares. **441 engineers** have so far shared their experiences, as well as at least **17 industry partners and three charities**.

42% of total direct engagements (N=2,515) came directly through in-person BoxED sessions, all four developed and launched by DETI Inspire in 2021: The West in Minecraft (N=1,147, 46%), Engineering Curiosity (N=357, 14%), WeCount (N=319, 13%), and We Make Our Future (N=692, 28%). **42% (10) of all the schools engaged in BoxED sessions (total = 24) came from areas within the most deprived 20% of the country, and 17% (4) came from the most deprived 30%.**

The last 20 months has seen the programme: establish a network of 102 engineers from diverse backgrounds (page 12); pair female junior engineers with senior female mentors (page 13); distribute 132 Engineering Curiosity card packs to schools and community groups and launch 40 Tik-Tok videos to accompany them (page 17); host a Sustainable Solutions Summit to 16-18-year-olds (page 27); champion sustainable engineering at COP26 (page 31); reach over 250,000 people through social media (page 37); and beam in engineers to 3,500 children during the height of the pandemic (page 40). For a full list of highlights, and for details of DETI Inspire's engagements, see the summary table on page 5.

 **DETI**  
 **Inspire**  
 Engineering a better future  
**Engagements in 2020-2021**

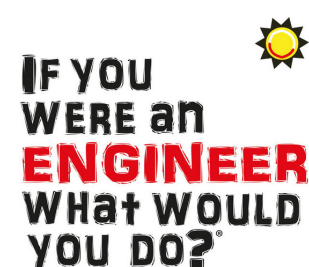
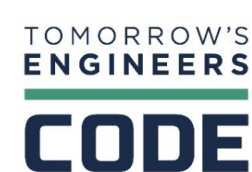




Despite another year of uncertainty, with rules around in-person events frequently changing, the DETI Inspire programme has excelled under the circumstances. Adapting to the changing rules and guidance, the team managed to engage in-person when they could – enriching children and young people’s cultural experiences, limited by the pandemic – and offer well attended online events when they could not. For instance, from two online events alone, DETI Inspire reached 9,000 children and young people.

DETI Inspire will continue to deliver BoxED activities to schools across the West of England Combined Authority (WECA), with a full calendar of bookings right up until June. The programme will also support this year’s Leaders Award (page 44), Great Science Share (page 53), and take part in the long-awaited return of Bristol’s Storytale Festival (page 54), among other activities. DETI Inspire is excelling in promoting engineering for sustainability among children, young people and adults from diverse backgrounds, not only in the West of England Combined Authority, but also nationally and across Europe.

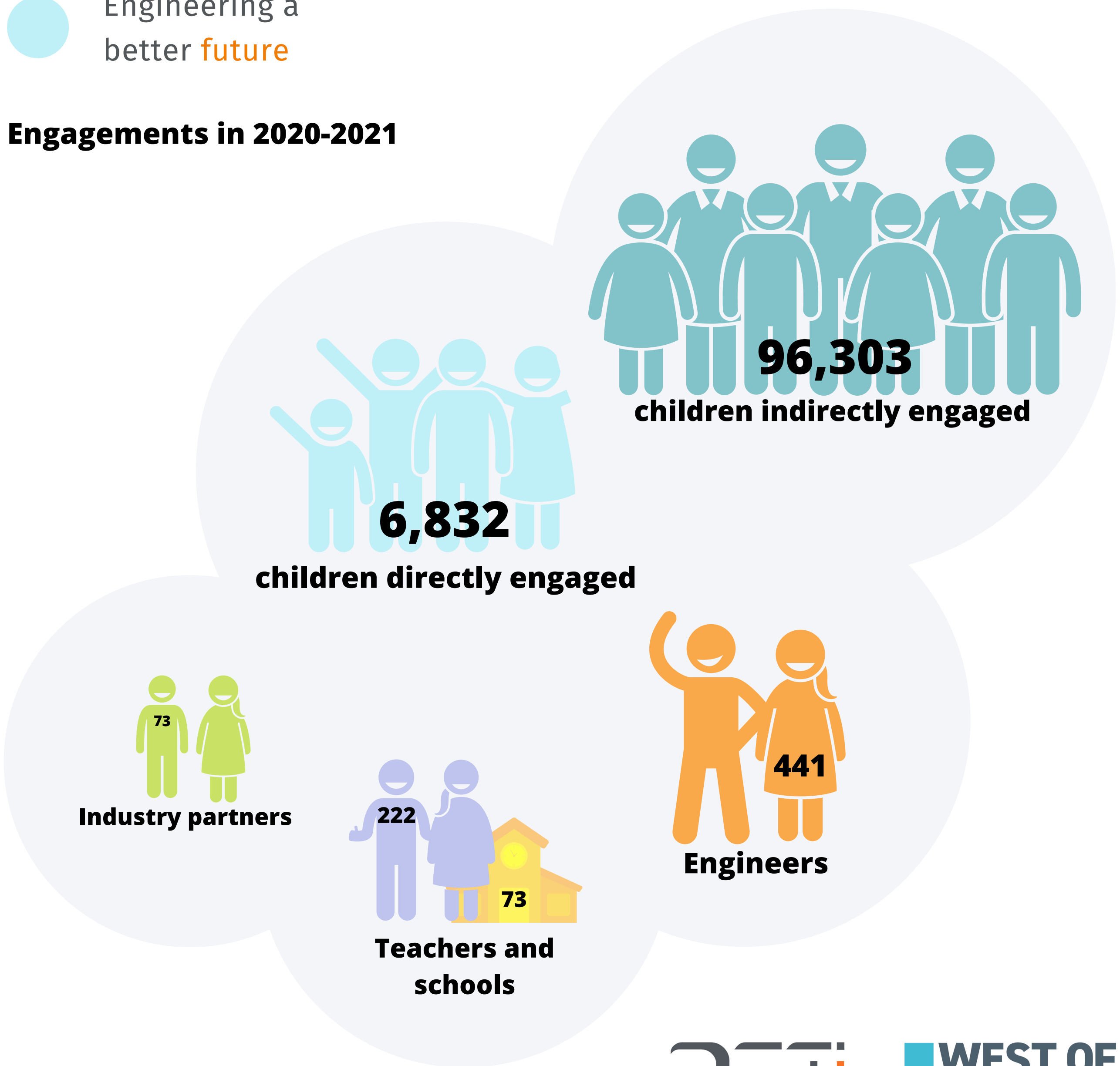
**Associate Professor Dr Laura Fogg-Rogers, DETI Inspire Lead**  
**Research Fellow Sophie Laggan**



**Partners and collaborators in DETI Inspire.**

-  **DETI**
-  **Inspire**
-  Engineering a better **future**

**Engagements in 2020-2021**

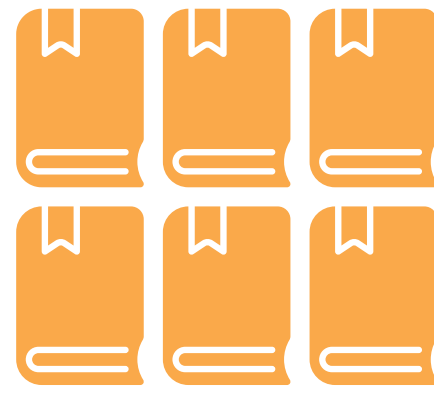
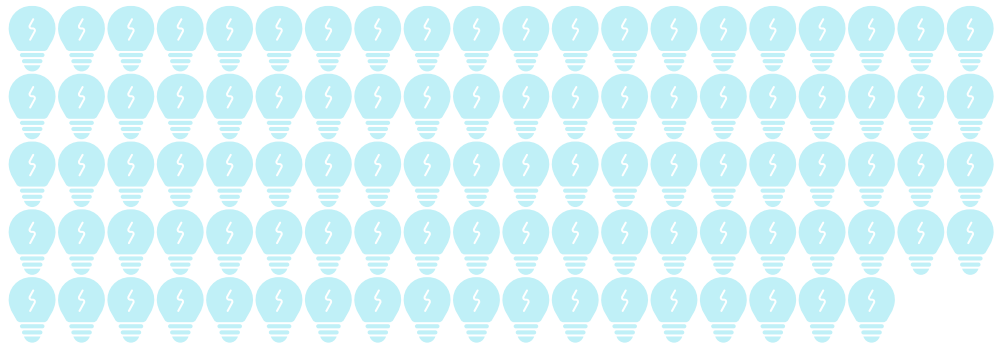




# Outputs 2020-2021

## ENGAGEMENTS AND RESOURCES FOR YOUNG PEOPLE

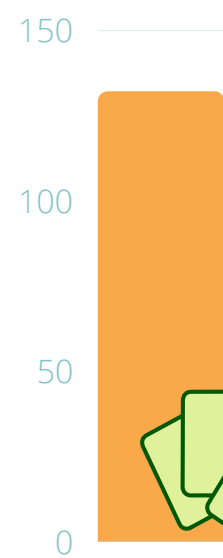
98 school lessons



6 resource packs



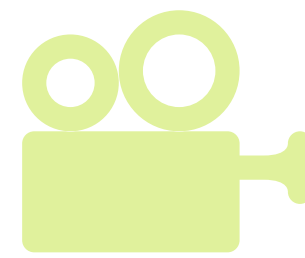
events



132 card sets distributed



1 Sustainable Solutions Summit



1 Planetarium Show

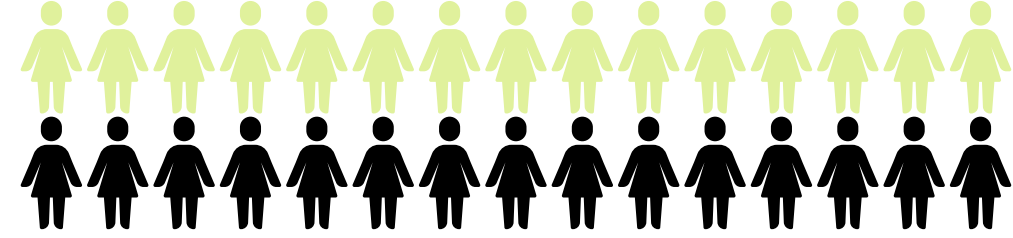


3 STEM Clubs

## KNOWLEDGE EXCHANGE

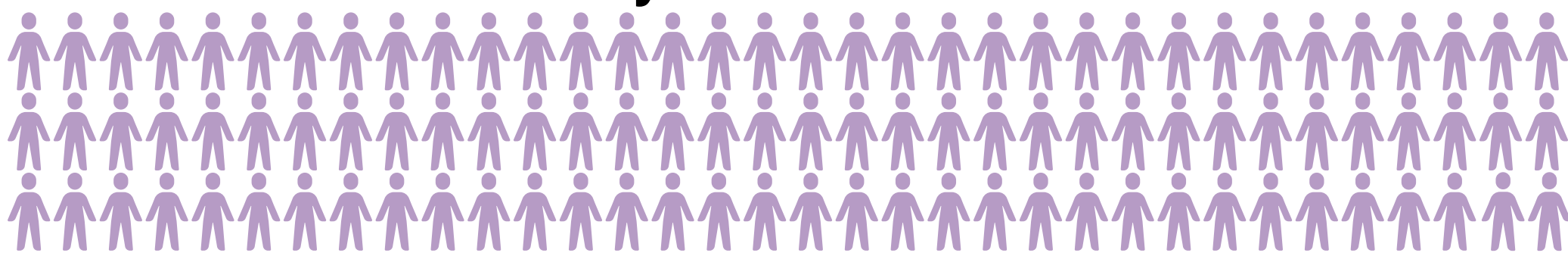


11 Teachers trained

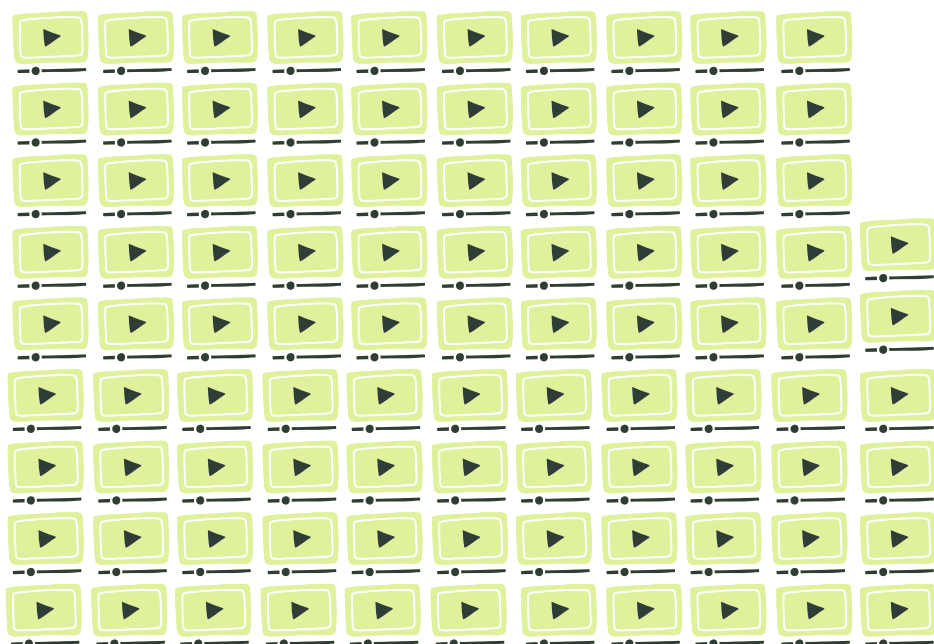


15 Junior Engineers mentored

102 Diversity Demonstrator Members



## DIGITAL PRESENCE



96 YouTube videos



1 app



6 newsletters



2 websites



1 Careers Network Event Platform



40 TikTok videos

## Engagement figures 2020-2021

Engagements	Children engaged directly	Children reached	Schools reached	Teachers engaged	General reach	Engineers involved
Engineering Curiosity	357	2,701	42	60	50	52
The West in Minecraft	1,147	1,147	14	40	NA	NA
WeCount Schools	319	87,000	15,003	14	NA	NA
Sustainability Solutions Summit	51	51	8	8	326	12
We Make Our Future	692	692	7	24	90	NA
Website	NA	NA	NA	NA	5,684	1
Newsletter	NA	NA	NA	NA	300	NA
Social media	NA	NA	NA	NA	262,230	NA
Advisory Panel	NA	NA	2	2	5	10
Digital trailblazers	NA	NA	NA	NA	760	NA
Big Beam In	3,500	3,500	54	54	NA	15
The Leaders Award	52	52	62	NA	NA	8
Teacher CPD	NA	318	10	11	NA	NA
Like To Be	NA	NA	NA	NA	583	14
Community STEM Club	180	180	NA	NA	NA	5
Bristol Robotics Festival	130	130	1	1	683	50
South West STEM Fest	-	5,500	-	-	NA	48
Routes into STEM panel	200	200	-	-	NA	4
Great Science Share	204	204	2	2	NA	NA
Diversity Demonstrator	NA	NA	NA	NA	NA	102
Women Like Me	NA	830	NA	NA	NA	30
Opening of UWE School of Engineering	NA	NA	NA	NA	NA	100
<b>Total</b>	<b>6,832</b>	<b>96,303</b>	<b>15,206</b>	<b>222</b>	<b>270,666</b>	<b>441</b>

# DETI Inspire

DETI Inspire is managed by UWE Bristol's School of Engineering in partnership with the Science Communication Unit, with funding from the initiative for Digital Engineering Technology & Innovation (DETI). The project is run in collaboration with the West of England STEM Ambassador Hub, operated by Graphic Science.

## **Initiative for Digital Engineering Technology & Innovation**

Running from July 2020 as a two-year, research and development (R&D) initiative in the West of England, DETI is collaborating with advanced engineering companies and digital technology pioneers to make digital transformation a reality for companies across the region, and beyond – cementing the UK's place as global leader in digital engineering and low carbon economies.

Digital Engineering Technology & Innovation (DETI) is a strategic programme of the West of England Combined Authority (WECA), delivered by the National Composites Centre (NCC) in partnership with the Centre for Modelling & Simulation (CFMS), Digital Catapult, the University of the West of England (UWE), the University of Bristol, and the University of Bath. DETI is funded by £5m from WECA with co-investment from the High Value Manufacturing Catapult and industry.

## **Engineering a better future**

Encouraging diversity and inclusivity, DETI Inspire engages children in primary and secondary education across the West of England, with a focus on disadvantaged areas. Using curriculum-linked engineering outreach and careers support, we are connecting children with real-life, diverse engineering role models to widen participation and aspirations for STEM careers.

DETI Inspire supports the Women in Science and Engineering Ten Steps, the Women's Engineering Society, the Association for Black and Minority Ethnic Engineers, and the Tomorrow's Engineers Code.

## **Sustainability Solutions**

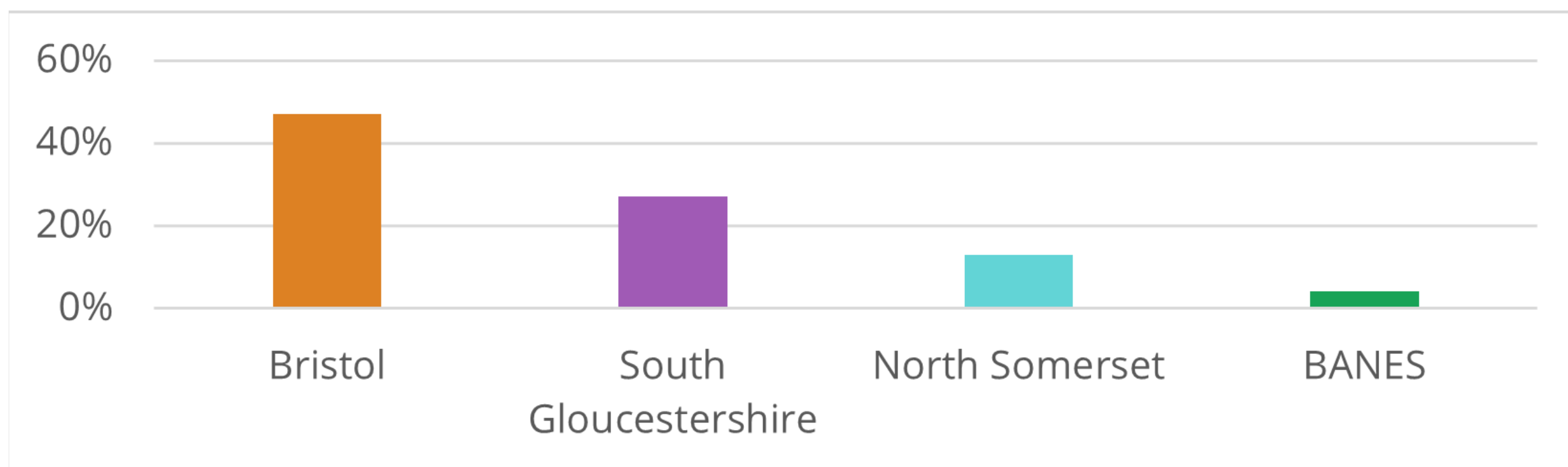
To achieve a zero-carbon global economy, everything we make, transport, and power will need to be completely re-imagined and reengineered. That's where digital engineering can power us to the forefront of this global transition. This new economy and society needs to be in partnership with our diverse communities and education networks.

We need to employ design thinking to understand the problems, empathise with community needs, imagine creative and collaborative solutions, and prototype and test these innovative ideas in partnership with regional industry and education partners. Working together we can achieve a zero-carbon economy for the benefit of all.

# Engagement summary

## Geographic reach

As of 14th January 2022, DETI Inspire has directly engaged with more than 6,832 young people from across the West of England Combined Authority (WECA) region, from ages 4 to 18. This represents 73 schools and community groups (see Table 2). Broken down by region, this corresponds to 34 (47%) in Bristol, 4 (5%) in B&NES, 13 (18%) in North Somerset, and 20 (27%) in South Gloucestershire.



**Schools and community groups engaged, by region.**

### West of England schools and community groups involved in DETI Inspire.

<p><b>Bristol</b></p> <ul style="list-style-type: none"> <li>Ambition Lawrence Weston Community Group</li> <li>Ashton Gate Primary School</li> <li>Ashton Park School</li> <li>Avonmouth Primary</li> <li>Baggator Community Group</li> <li>Bedminster Down School</li> <li>Brentry Primary</li> <li>Bridge Learning Campus</li> <li>Bristol Cathedral Choir School</li> <li>Broomhill Junior School</li> <li>Cathedral Primary School</li> <li>Colston's School</li> <li>Hotwells Primary</li> <li>Filton Avenue Primary</li> <li>Fonthill Primary Academy</li> <li>Fishponds CofE Academy</li> <li>Glenfrome Primary</li> <li>Hanham Abbots Junior</li> <li>Hareclive E-Act Academy</li> <li>Henbury Court Primary Academy</li> <li>Ilminster Avenue E-ACT Academy</li> <li>KnowledGGE Learning Centre</li> <li>Merchants Academy</li> <li>Nova Primary</li> </ul>	<ul style="list-style-type: none"> <li>Oasis Academy Brislington</li> <li>Oasis Academy Bank Leaze</li> <li>Oasis Academy Brightstowe</li> <li>The Old Library, Eastville</li> <li>Parkwall Primary</li> <li>Parson Street Primary</li> <li>School of Christ the King</li> <li>Shirehampton Primary</li> <li>St George CofE Primary</li> <li>St Michael on the Mount Primary</li> <li>Summerhill Infants</li> <li>Woodstock Special School</li> </ul> <p><b>B&amp;NES</b></p> <ul style="list-style-type: none"> <li>Cameley CofE VC Primary School</li> <li>St Marks School</li> <li>Clutton Primary</li> <li>Coombe Down CofE Primary</li> </ul> <p><b>North Somerset</b></p> <ul style="list-style-type: none"> <li>Backwell Junior</li> <li>Baytree School</li> <li>Birdwell School</li> <li>Clevedon School</li> <li>Crockerne Primary</li> <li>Elm Park Primary School</li> <li>Elmfield School for Deaf Children</li> <li>Hannah More Infant</li> </ul>	<ul style="list-style-type: none"> <li>Mendip Green Primary</li> <li>Hans Price Academy</li> <li>Ravenswood School</li> <li>Tickenham Primary</li> <li>Yatton Junior</li> </ul> <p><b>South Gloucestershire</b></p> <ul style="list-style-type: none"> <li>Almondsbury CofE Primary</li> <li>Bailey's Court Primary</li> <li>Christ Church Infant</li> <li>Christ Church Junior</li> <li>Frampton Cotterell Primary</li> <li>Gillingstool Primary</li> <li>Kings Oak Academy</li> <li>Little Stoke Primary</li> <li>New Horizons Learning Centre</li> <li>Olveston Primary</li> <li>Our Lady of Lourdes Catholic</li> <li>Pucklechurch Primary</li> <li>Samuel Whites Infant</li> <li>Shield Road Primary School</li> <li>St Barnabas CofE Primary</li> <li>St Michael's CofE Primary</li> <li>The Manor CofE Primary</li> <li>The Park Primary</li> <li>Tyndale Primary School</li> <li>Watermore Primary School</li> </ul>
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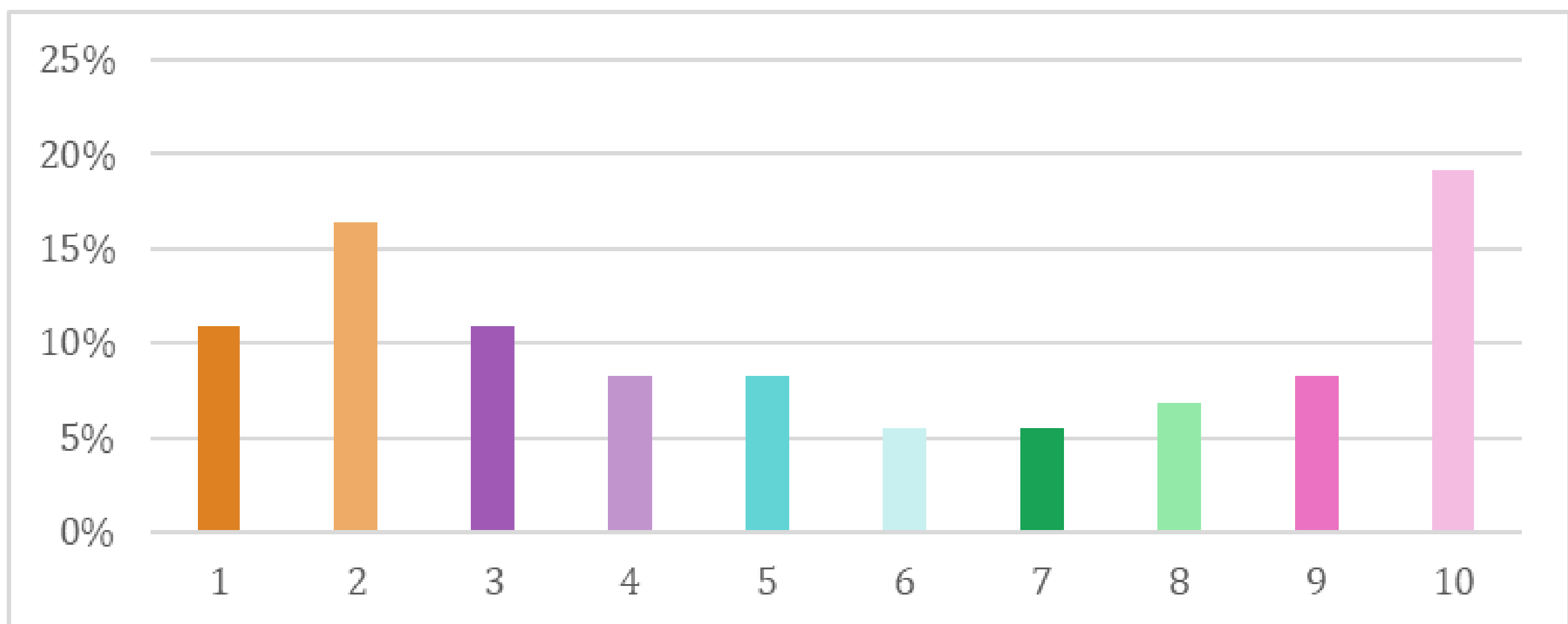




**Locations of the schools and community centres engaged with so far. Note: where some schools have received multiple activities, location colour shows the most recent engagement.**

### Multiple deprivation percentiles

27% of all West of England Combined Authority (WECA) schools and community groups engaged in DETI Inspire came from areas within the most deprived 20% of the country[1]. 37% came from areas in the 3-7th decile of multiple deprivation and 27% came from the lowest 20% deprived areas in the country.



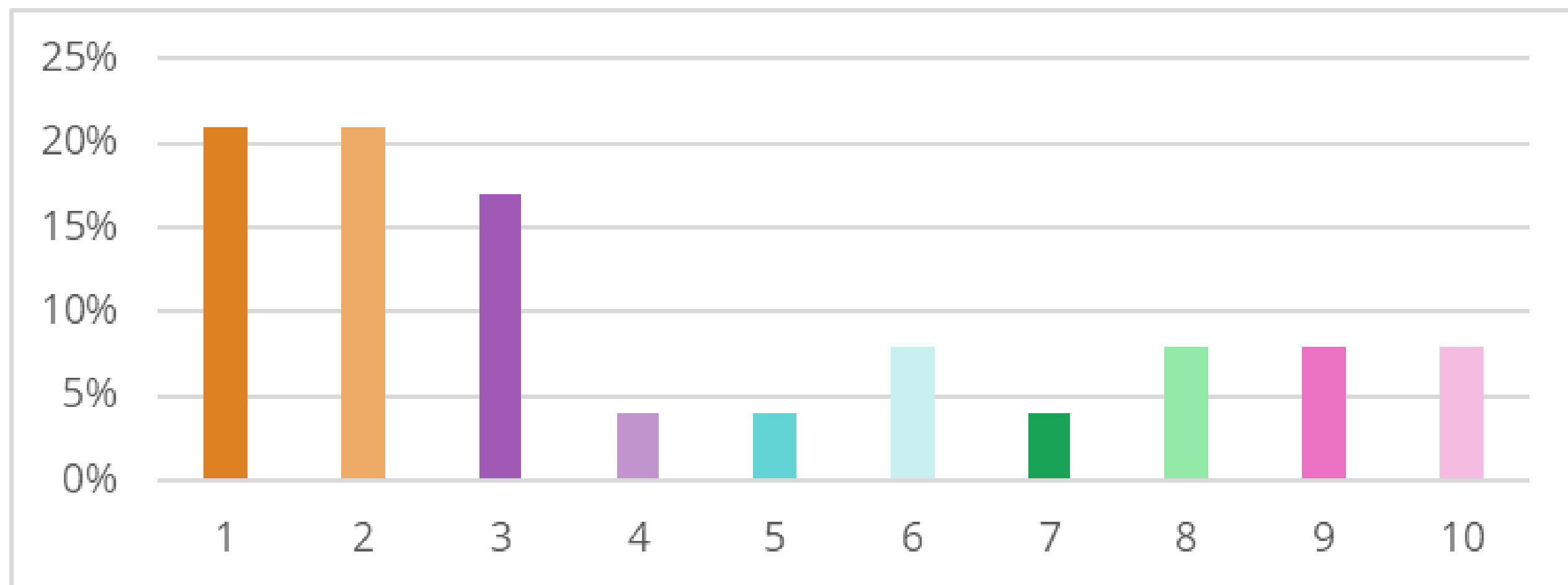
**Percentage of West of England Schools and community groups engaged in DETI Inspire in each IMD decile (1 is highest 10% in the country, and 10 is lowest 10%).**

This picture changes with the DETI Inspire BoxED programme, which targets direct physical delivery with predominantly socially disadvantaged areas. 42% of total direct engagements (N=2,515) came directly through in-person BoxED sessions, all four developed and launched by DETI Inspire in 2021: The West in Minecraft (N=1,147, 46%), Engineering Curiosity (N=357, 14%),

[1] According to the 2019 UK Government Index of Multiple Deprivation (IMD)

WeCount (N=319, 13%), and We Make Our Future (N=692, 28%).

**42% (N=10) of all the schools engaged in BoxED sessions (N=24) came from areas within the most deprived 20% of the country, and a further 17% (N=4) came from the most deprived 30%.**



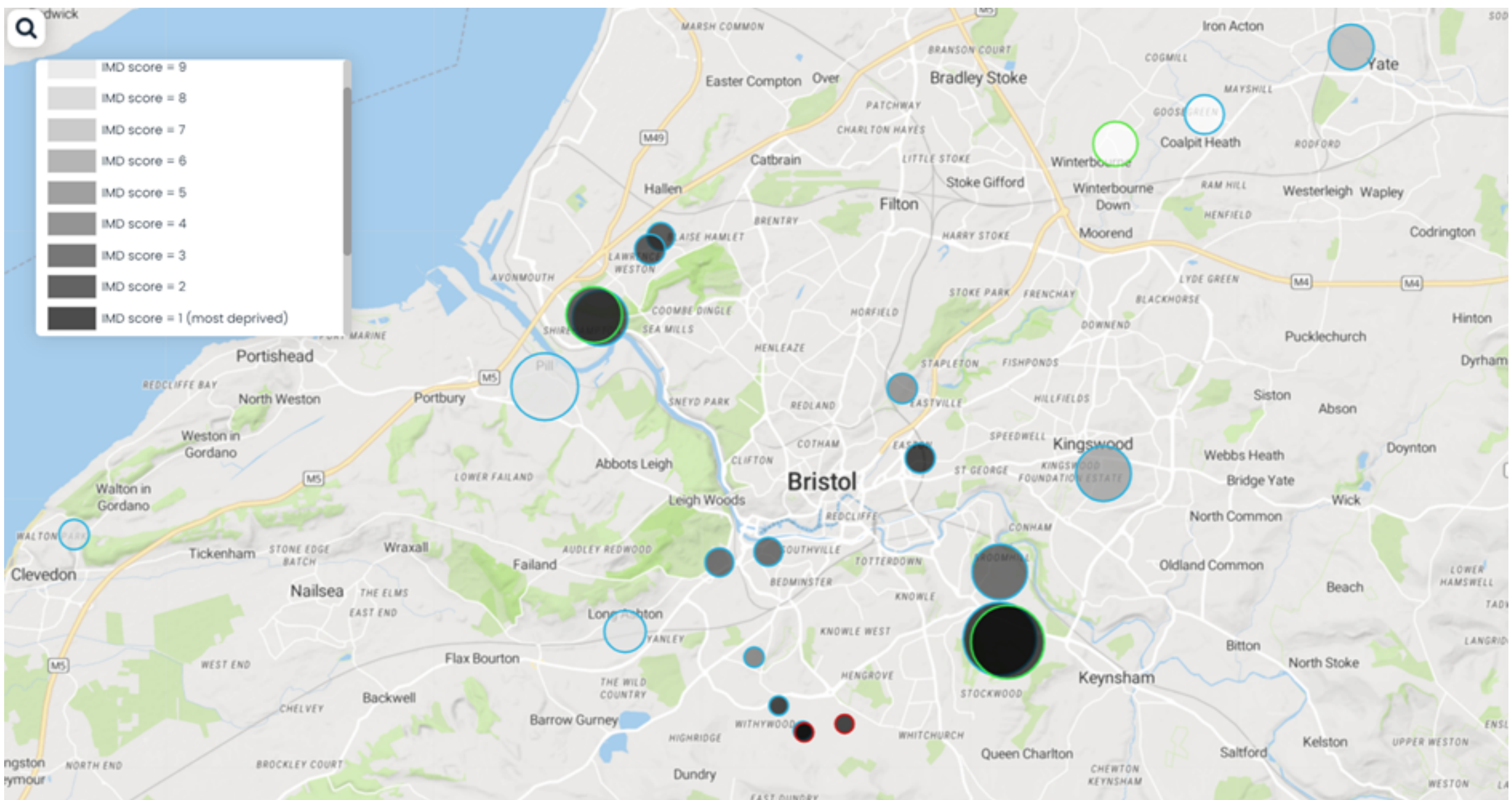
**IMD scores for schools and community groups engaged in BoxED activities.**

**IMD scores for schools and community groups engaged in BoxED activities.**

School or community group involved in a BoxED session	IMD score	Percentage of schools/ community groups in each IMD category
Baggator (community group), Oasis Brislington, Bridge Learning Campus, Harelive Primary, Merchants Academy	1 (lowest 10%)	21%
Ambition Lawrence Weston (community group), Oasis Brightstowe, Oasis Bank Leaze, Summerhill Infants, Filton Avenue Primary	2	21%
Broomhill Primary, Ashton Gate Primary, Ashton Park, Yate Academy	3	17%
Bedminster Down School	4	4%
The Old Library (community group)	5	4%
Our Lady of Lourdes Catholic Primary	6	4%
Tyndale Primary, Broomhill Junior	7	8%
Birdwell Primary	8	4%
Crockerne Primary, Clevedon School	9	8%
Elm Park Primary, Watermore Primary	10 (least 10%)	8%





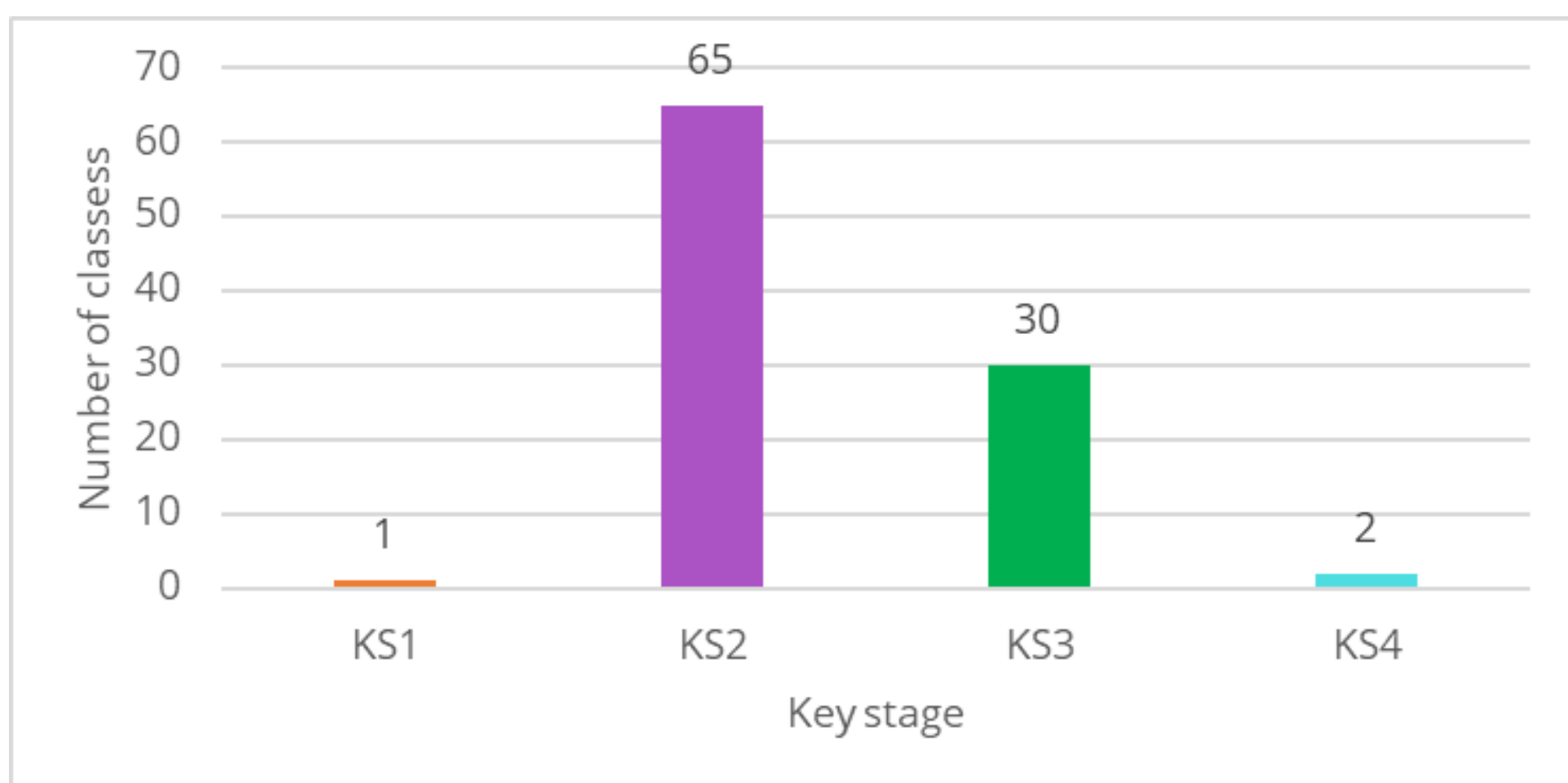


**IMD BoxED scores mapped onto the West of England region. Size of circle corresponds to number of children engaged, if known. [www.scribblemaps.com/maps/view/DETI-Outreach-proportional/VgWvWLI8t](http://www.scribblemaps.com/maps/view/DETI-Outreach-proportional/VgWvWLI8t)**

## Primary and secondary school

The priority for DETI Inspire was to reach out to and engage with children of primary and secondary school age. To do this, the team connected with schools from across the region, contacting via internal and external newsletters, social media and partnership linkages.

Data is incomplete for all activities as it was not always possible to collect ages (e.g., at the STEM clubs which were designed to be informal). The Box ED activities, however, presents a complete picture of the spread of key stages. Of the 98 lessons delivered so far, 66 (67%, KS1 and KS2) were delivered to children of a primary school age and 32 (33%, KS3 and KS4) were delivered to children of a secondary school age. This is not untypical of engagements the project team has made with children in the past.

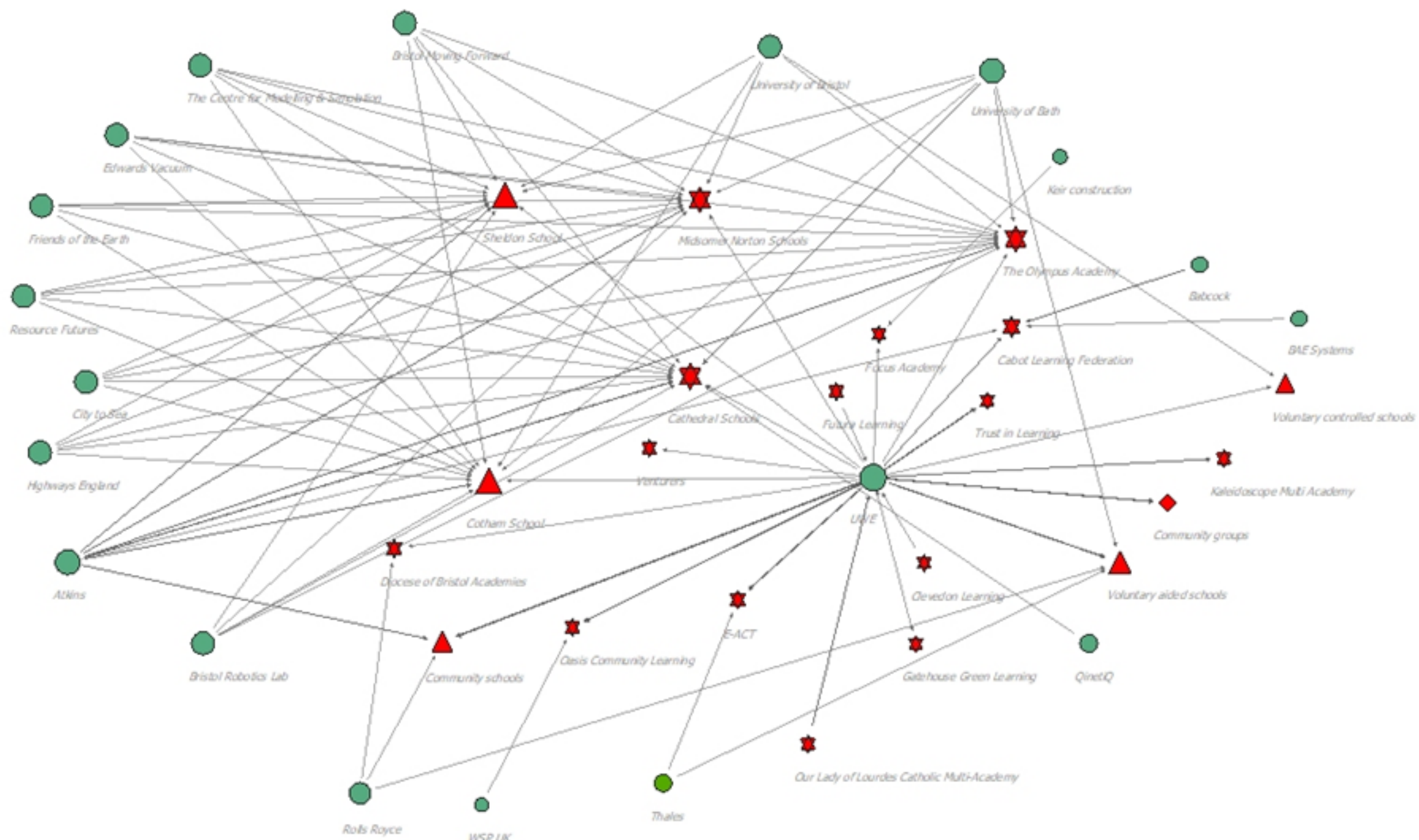


**Number of classes engaged in BoxED activities according to key stage. KS1-2 is primary and KS3-4 is secondary**



## DETI Partnerships

A social network analysis was performed for all the school-industry connections made through DETI Inspire, using a free tool called Social Network Visualiser. The resulting social network displays the strength of connections between groups and organisations and highlights engagement hotspots.



**Network Diagram showing information centrality between industry partners, charities, schools and community groups. Made in Social Network Visualiser.**

To date, **17 industry partners and three charities have engaged with a total of 50 schools or community groups across the West of England region and beyond**, representing 68% of all the schools/groups involved in digital or physical engagements DETI Inspire (N=73). The above image (created on SocNetV 3.0.4) shows the centrality of information flows<sup>[2]</sup> between these industry partners (green circles) and the 21 school Trusts and Partnerships (depicted as red stars) and related organisations (triangles and diamonds) to which these 50 schools/groups belong. The stronger the information flow, the larger the icon.

As can be seen in the diagram, a lot of connections stem from UWE Bristol (in the centre right) and the industry partners that participated in the Big Beam In and the YEES summit (top left). Schools that have only taken part in UWE-led lessons are without wider industry connections (e.g., Clevedon Learning Trust). The thickness of arrows indicates how many times an engagement was made, and the arrowheads (e.g., single or double) represent the flow of information. So, for instance, while Greenhouse Green Learning Trust (GGLT) only connected with UWE, it had a two-way exchange of information as it visited UWE and UWE visited a GGLT school. To put this in perspective, there are more than 80 employers with representation in the STEM Ambassador programme in the West of England region. 15 (19%) of these employers have so far participated in DETI Inspire engagement activities.

<sup>[2]</sup> Degree of information centrality is a way to show how prominent each actor (node) is inside a network in terms of the sharing of information (in this case professionals' and childrens' knowledge). Mapping is a useful way to visualise what is happening within a system and to observe patterns within and connections between the data.



**Employers in the West of England STEM Ambassador programme, grouped according to number of staff enrolled. Employers in bold represent those that have so far participated in DETI Inspire.**

50+ STEM Ambassadors	15+ STEM Ambassadors	5+ STEM Ambassadors	
AECOM Airbus Armed Forces <b>Atkins - SNC Lavalin</b> <b>Babcock</b> <b>BAE Systems</b> DE&S EDF Energy Jacobs MBDA UK Ministry of Defence Renishaw <b>Rolls-Royce</b> <b>University of Bath</b> <b>University of Bristol</b> <b>WSP Group</b>	ARCADIS UK Arup Group Assystems UK AstraZeneca BMT Defence Services BuroHappold Engineering Capita Group Cavendish Nuclear Curtins Consulting <b>Edwards</b> Frazer-Nash Consultancy Hanson UK Hewlett Packard <b>Highways England</b> Just Eat Magnox Mott MacDonald National Composites Centre Schlumberger Schneider Electric Siemens SPTS Technologies Stantec <b>University of the West of England</b>	Alderley Systems Limited Balfour Beatty BASF UK BMT Boeing CFMS Copper Consultancy Crux Product Design Delphi Diesel Systems Etex Building Performance Evona General Electric GKN Hoare Lea Hyder Consulting Hydrock IBM UK Infineon Technologies UK JN Bentley John Wainwright & Co <b>Kier Group</b>	L3 MAPPS Leidos Leonardo MW Network Rail North Bristol NHS Trust Nucleargrads <b>QinetiQ Group</b> Ramboll Royal United Hospital Bath NHS RSK ADAS SCISYS SPP Pumps SUEZ Sweco <b>Thales Aerospace</b> Thatchers Cider Turner and Townsend University Hospitals Bristol NHS Viper Innovations Wales and West Utilities

The STEM Ambassador population in the West of England region is diverse, and well-placed to deliver as role models in the DETI outreach programmes. In the West of England Combined Authority, 73% of STEM Ambassadors are aged 17 - 35 compared to 37% UK population as a whole (**Office for National Statistics**). 40% of STEM Ambassadors are female, compared to 24% of the UK STEM workforce, while 17% of STEM Ambassadors are categorised as from Black, Asian or Minority Ethnic backgrounds compared to 14% UK population as a whole (**Diversity UK**).

## Diversity Demonstrator

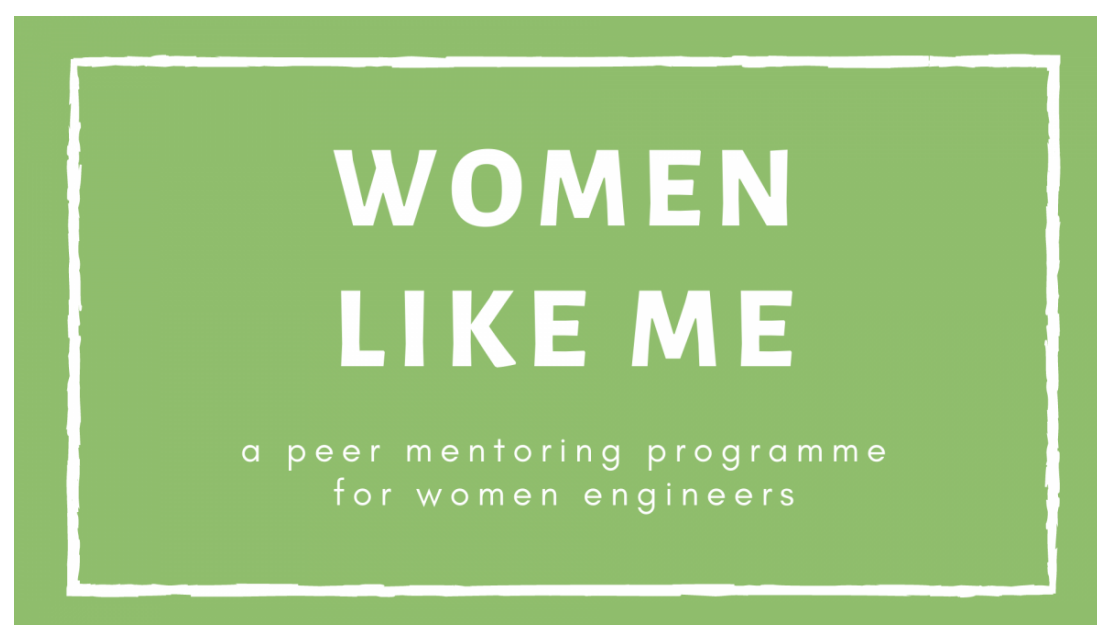
To enhance the network of diverse STEM Ambassadors in the West of England, DETI Inspire launched the Diversity Demonstrator network in September 2020. This network of diverse engineering role models is formed of volunteers from local engineering industry and academia, all of whom can be called upon to champion engineering public engagement and inspire the next generation of digital engineers.

To date, **102 members** have joined the network, with many members actively taking part in Inspire outreach activities with local schools and community groups and participating in linked programmes such as the Women Like Me mentoring project.

## Women Like Me

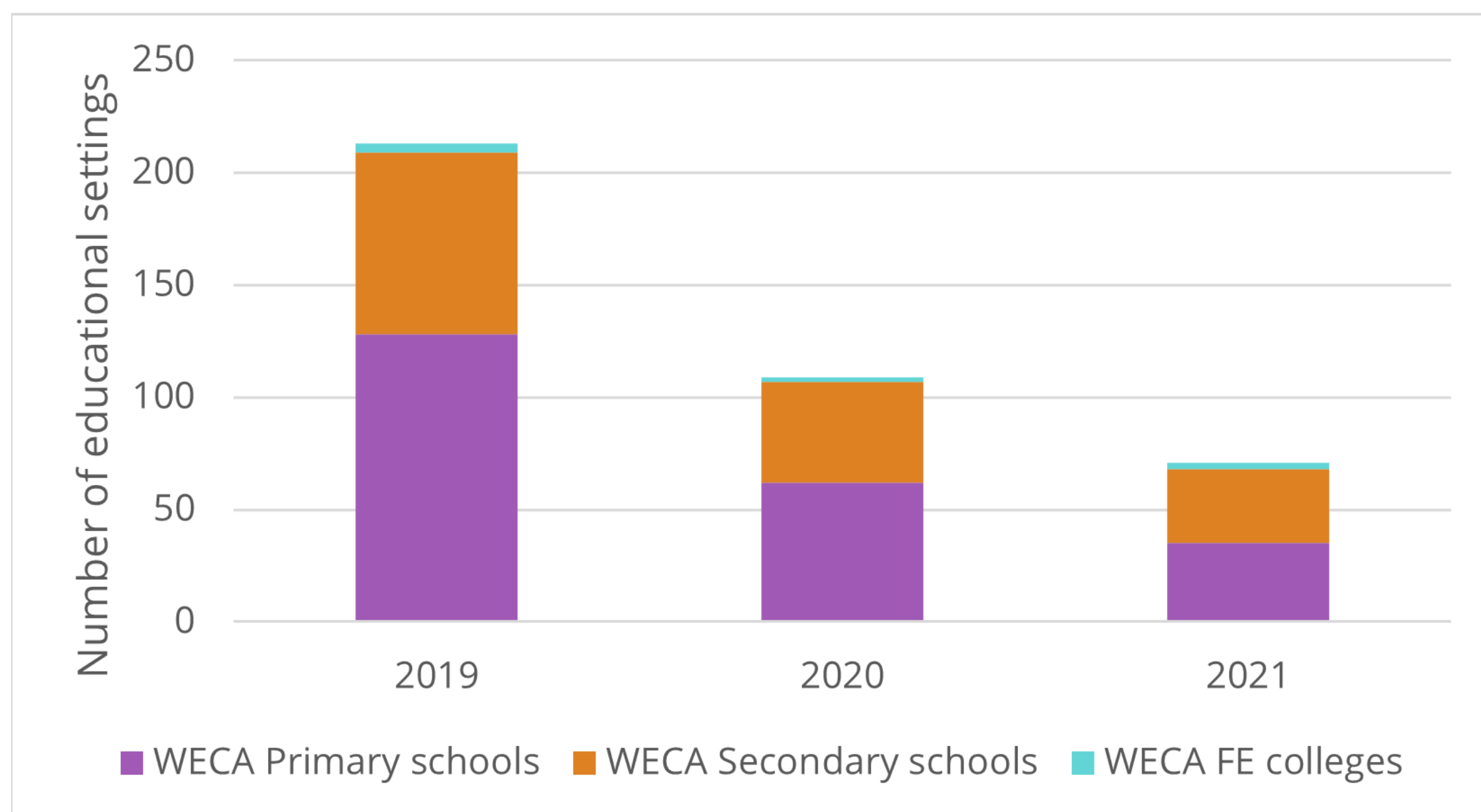
Women Like Me pairs senior (more than five years in industry) female engineers with junior (less than five years in industry) female engineers from across the West of England. The senior engineers provide mentoring to the junior engineers, and the junior engineers undertake outreach activities. Women Like Me has been operational since 2018 and has, to date, engaged around 130 engineers, from over 40 companies and reached around 12,300 children through outreach activities.

In 2020-2021 Women Like Me operated as part of DETI Inspire, and **paired 15 senior engineers with 15 junior engineers, representing 22 companies**. Despite the many challenges to outreach of the COVID-19 pandemic and periods of school closure, **a minimum of 830 children were reached through outreach activities**. All engineers enrolled in the 2020-2021 round also signed up to the Diversity Demonstrator. A new round of the project will launch for 2022, and already has more than ten engineers enrolled by request before official announcement.



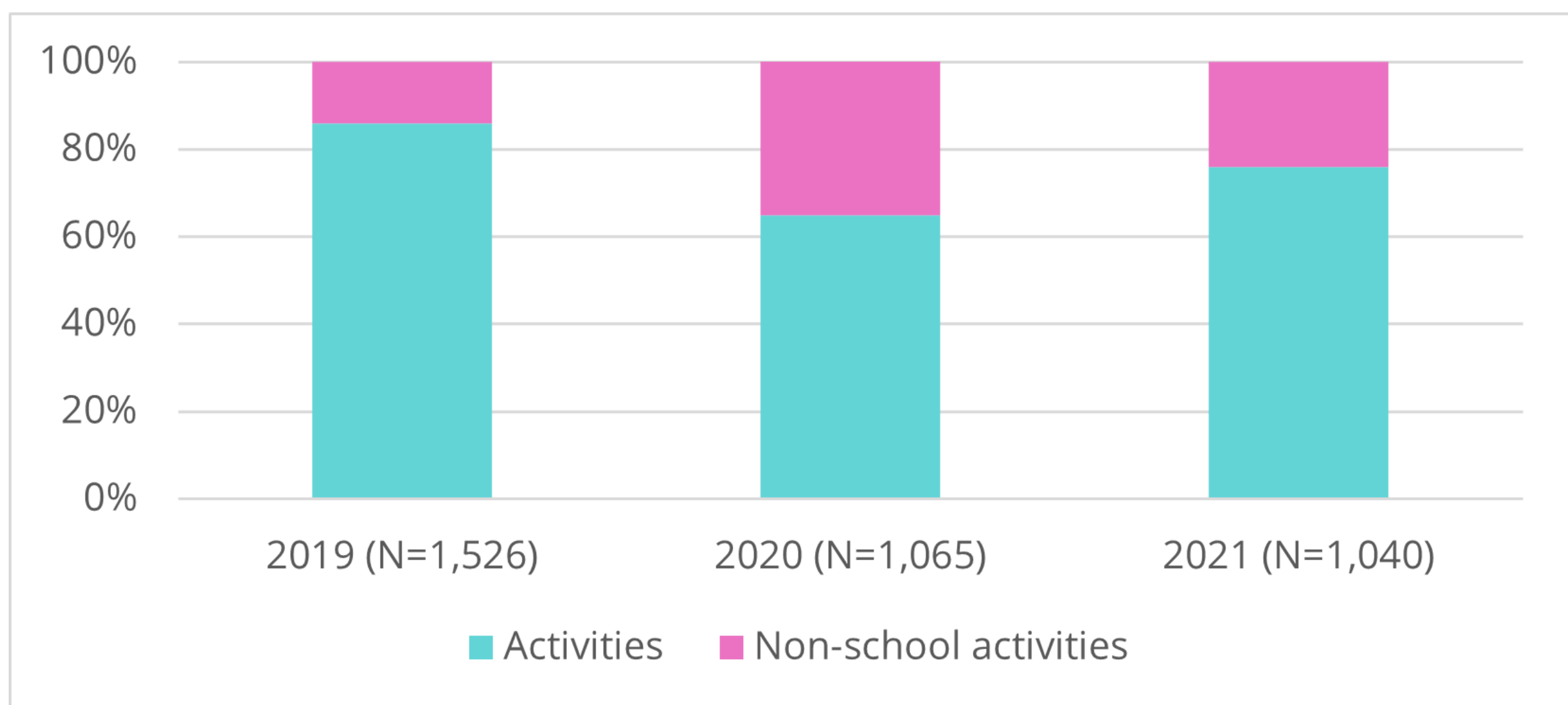
### The impact of COVID-19 on STEM Ambassador outreach activity

**Between 2019 and 2021, the overall number of approved STEM Ambassadors in the West of England Combined Authority (WECA) region increased, from 1,175 in 2019 to 1,607 in 2021, an increase of 37%.** Despite an increase in the approved STEM Ambassador population in the West of England Combined Authority (WECA) region, the number of active STEM Ambassadors, i.e., **the number who have participated in a volunteering activity, has fallen by more than half (from 870 in 2019 to 418 in 2021)**. This is due to a falling level of demand from schools - the number of schools engaged with STEM Ambassadors is much lower now than pre-pandemic.



**WECA educational settings accessing STEM Ambassadors once or more in a year, from 2019-2021.**

**During the year from January - December 2021, over 1,100 STEM Ambassador activities were recorded**, which is about 5% lower than in the year preceding the pandemic and so broadly in line with expectations. However, as illustrated by the chart above, this activity was concentrated in fewer schools / colleges than before the pandemic. By way of compensation, this period has seen an expansion in STEM activity in community settings - the proportion of **STEM Ambassador activity recorded in non-school settings more than doubled in 2020 compared to 2019 (from 14% to 36%), and in 2021 non-school based activity made up approximately 25% of all STEM Ambassador activity across the region.**



**Percentage of STEM Ambassador activities carried out in non-school settings from 2019-2021, compared to total activities**

This data illustrates a mixed environment for STEM outreach, with schools showing a much-reduced capacity for engaging with enrichment activity compared to the situation pre-COVID. While community settings are providing much needed informal educational opportunities, they are not able to fill all the gaps left by reduced school engagement. Together, these two situations have led to lower overall capacity for outreach participation during the ongoing coronavirus pandemic leading to lower overall levels of STEM Ambassador activity.

A global pandemic somewhat perversely provides its own opportunities for scientists and engineers to engage young people in the STEM inherent in the situation, as does the declaration of a climate emergency and a globally significant event like COP26. However, the diversity and high profile of the DETI Inspire activities described in this report are very much a reflection of the effort from the DETI Inspire team to achieve the project goals, during what continues to be a very challenging time for STEM outreach.

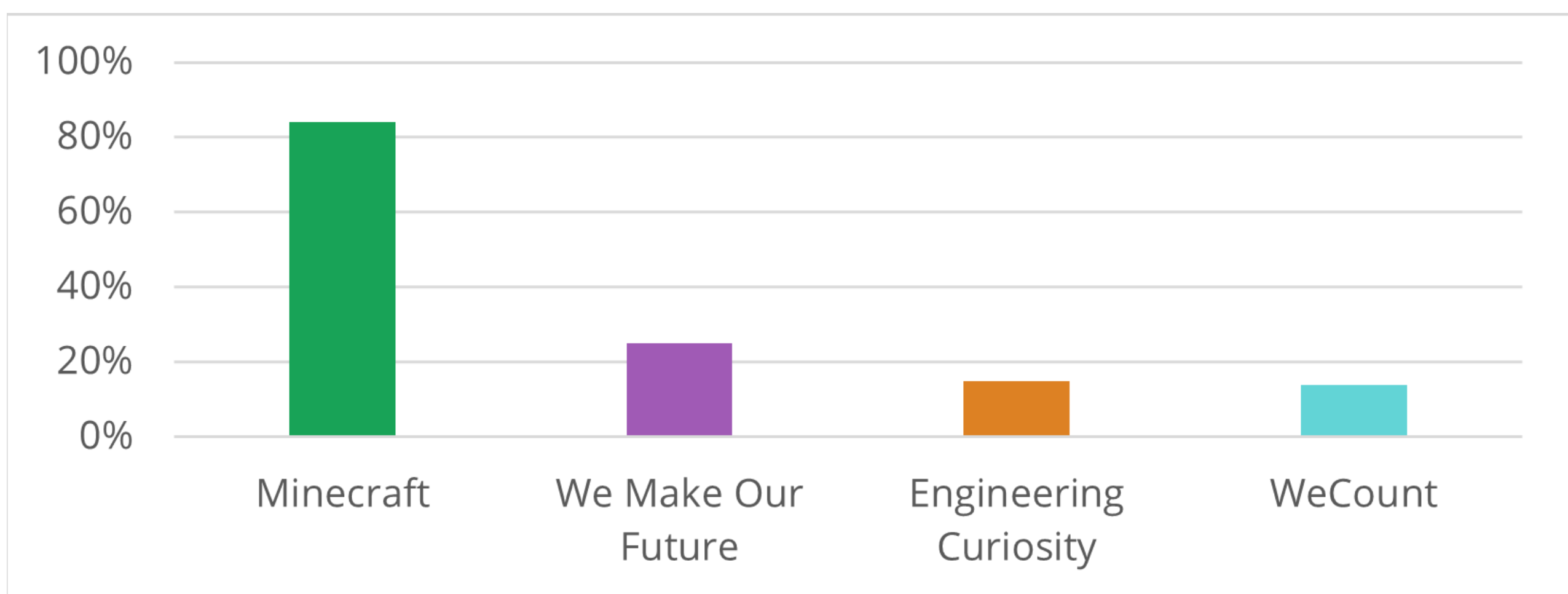




# BoxED outreach activities in 2021

A critical aspect of the DETI Inspire programme has been the development of digital engineering education outreach 'BoxED' activities - a portable programme of activity which can be run in schools and community groups.

**3,415 4-14-year-olds** (42% of total direct engagements) were engaged directly through in-person BoxED sessions developed by DETI Inspire: The West in Minecraft (N=2,047, 84%), Engineering Curiosity (N=357, 15%), WeCount (N=319, 14%), and We Make Our Future (N=692, 25%).



**BoxED engagements, as a percentage of the total.**





# Engineering Curiosity cards



Over half of the Engineering Curiosity cards are made up of women.



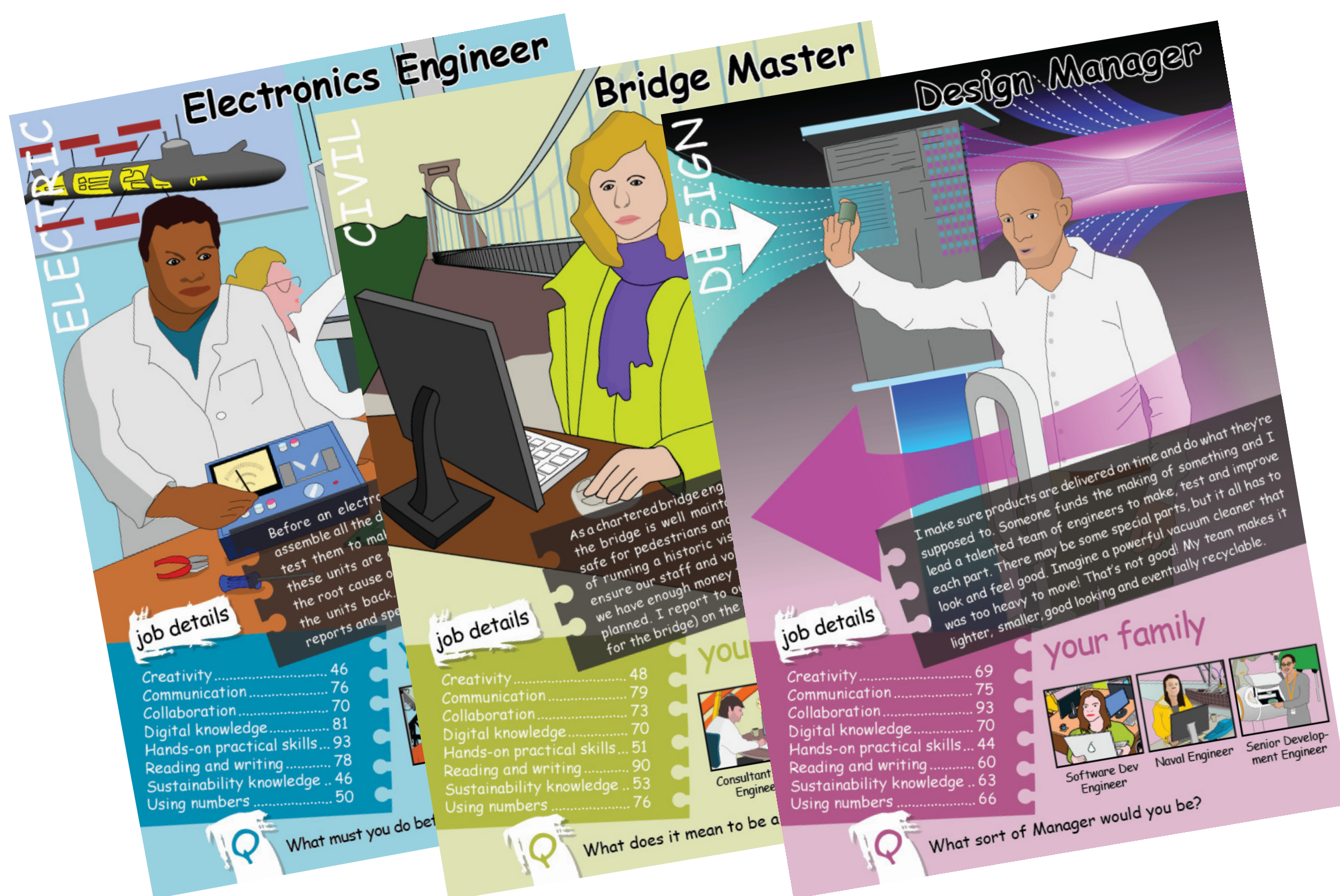


Research indicates that children need to see a wide variety of role models in order to enhance their social capital and identification with people in STEM (Fogg-Rogers & Hobbs, 2019). A critical DETI Inspire resource has therefore been the development of new role modelling career cards for KS2 and KS3 children.

DETI Inspire collaborated with [MyFutureMyChoice](#), an education charity which aims to promote engagement and connection with STEM careers. The collaboration culminated in a card game (in the style of Top Trumps) BoxED showcasing the wealth of different engineering roles and opportunities available. The cards show a great diversity and variety of engineers, with accompanying skills, background context, and colourful illustrations.

The engineers depicted on the cards are based upon real engineers working in the West of England. To describe their job and determine their Top Trump scores, the engineers were interviewed about their route into engineering, as well as their skill set. Conscious effort was made to include more females and people from Black and Asian backgrounds, as they are underrepresented in the field. The diversity of people, careers and workplaces is intended to challenge perceptions of engineers and the jobs available in STEM, and show the children that people like them are part of Engineering.

Each card is also accompanied by a short Tik-Tok style video, made by the engineers themselves, showing them at work or talking about their role. The videos are fun and light-hearted, intending to further cement the conception that engineers are real people and that they come from a wide range of relatable skills and backgrounds. In total, **40 videos were made and have so far been viewed by 1,351 people**. The videos can be accessed through the DETI Inspire [YouTube channel](#).



**Three out of the 52 local engineers featured in the Engineering Curiosity card pack.**



In addition to the card pack, a full set of lesson plans, assembly ideas and activities were developed for use with KS1, KS2 and KS3 classes. The resources are designed to work best with live interaction and support from a STEM ambassador or student engineer, however they also include suggestions on how to deliver online. Depending on time, the activities can be delivered individually, in bite-sized chunks, or integrated into a themed curriculum. The cards, lessons and resources were first used in the Big Beam In event (discussed later in this report) during British Science Week, in March 2021, and are available to freely download from the [Curiosity Connections website](#).

Since the Big Beam In, the Engineering Curiosity cards have been offered for free to every school involved. **72 packs have been sent out to 33 different schools (20 in the West of England Combined Authority (WECA) region) and community groups.** In the case of Easton community STEM club (see page 46), the cards have been used by its sister project Omid, set up to support Afghan refugees over the holidays. The cards proved to be a very popular game during Omid events.

The cards and resources have also been used directly in DETI Inspire outreach. For example, as a quick informal activity using the cards with small groups of children, or as a fully presenter-led session at a school. These engagements equate to **357 children, across 15 classes in years 3-8.**

*Well planned and carefully thought through. Delivery was engaging and exciting. The UWE staff member maintained good energy levels in the room, so all children enjoyed and participated. Great to open up conversations about what an engineer is.*

– Hareclive E-Act Academy teacher.

#### Schools engaged in Engineering Curiosity outreach.

School	Year	Classes	Number engaged
Filton Avenue	Yr5	4	120
Our Lady of Lodes Catholic	Yr5, Yr6	2	31
Hareclive E-ACT	Yr4 (x2), Yr5 (x2)	4	120
Bridge Learning Campus	Yr5	1	24
Cameley CofE	Yr5, Yr6, Yr3	3	38
Clevedon School	Yr8	1	24
<b>Total</b>	Yr3, Y4 (x2), Y5 (x9), Yr6 (x2), Yr8	<b>15</b>	<b>357</b>



# The West in Minecraft

## MINECRAFT



Still from The West in Minecraft world, showing SS Great Britain.

*"I enjoyed reflecting on the learning I had done"*

*- Student252*

*"Best lesson I've ever had! Wouldn't change a thing! Thank you to all the people that made the worlds. PS the Baths are amazingly beautiful."*

*- Student218*

*"One of the greatest lessons I have had! 100% would do it again. Thank you."*

*- Student190*

This BoxED was developed in collaboration with the well-established **Science Hunters** programme, through their engineering strand **Building to Break Barriers**, based in UWE Bristol's Science Communication Unit and funded by the Royal Academy of Engineering Ingenious scheme. It draws upon the programme's evidence that, in combination with their specifically-designed approach, Minecraft is effective in engaging children on scientific issues, particularly with children with additional educational needs. The DETI Inspire team linked to this work to develop new resources, following the programme's successful approach, to teach about digital engineering and the engineering design process, called 'The West in Minecraft'.

The team also worked with engineers from **Atkins** who were able to map Ordnance Survey data into Minecraft, resulting in accurate replicas of Bath and Bristol. This Minecraft 'world' was then brought to life with landmarks in the West of England (Clifton Suspension Bridge, SS Great Britain, Bristol Temple Meads, and the Roman Baths in Bath), created by Science Hunters Minecraft builder Jonathan Kim.

The accompanying educational resources take a digital, play-based approach to support children to develop their own ideas and problem-solving skills, and to engage with engineering as a creative and diverse subject that can impact the world around them. The lessons use the world as the setting for children to explore, build, re-design and re-engineer the city around them.

Piloting for the activity took place during June and July 2021, with several sessions trialled with classes in local schools (Ashton Gate Primary, Broomhill Primary, Birdwell Primary). The purpose of the pilots was to practise and refine the lesson in terms of timings, equipment procedures, and suitability for delivery in a classroom setting, and gather initial reactions to the content. Since its official launch in September 2021 (including the pilots), The West in Minecraft has been **delivered to 1,147 school-aged children, from years 3-10, either in a classroom or community setting**. This equates to 31% (N=360) of primary school age, and 69% (N=787) of secondary school age. The West in Minecraft has reached three out of the four West of England Combined Authority regions so far.

The reaction to the West in Minecraft has been hugely positive. Most children have already heard of or played Minecraft, but never used a world that digitally twins reality in the way that this session allows. Pupils found the session to be fun, exciting and interesting and this was also echoed by teachers' comments (see below).

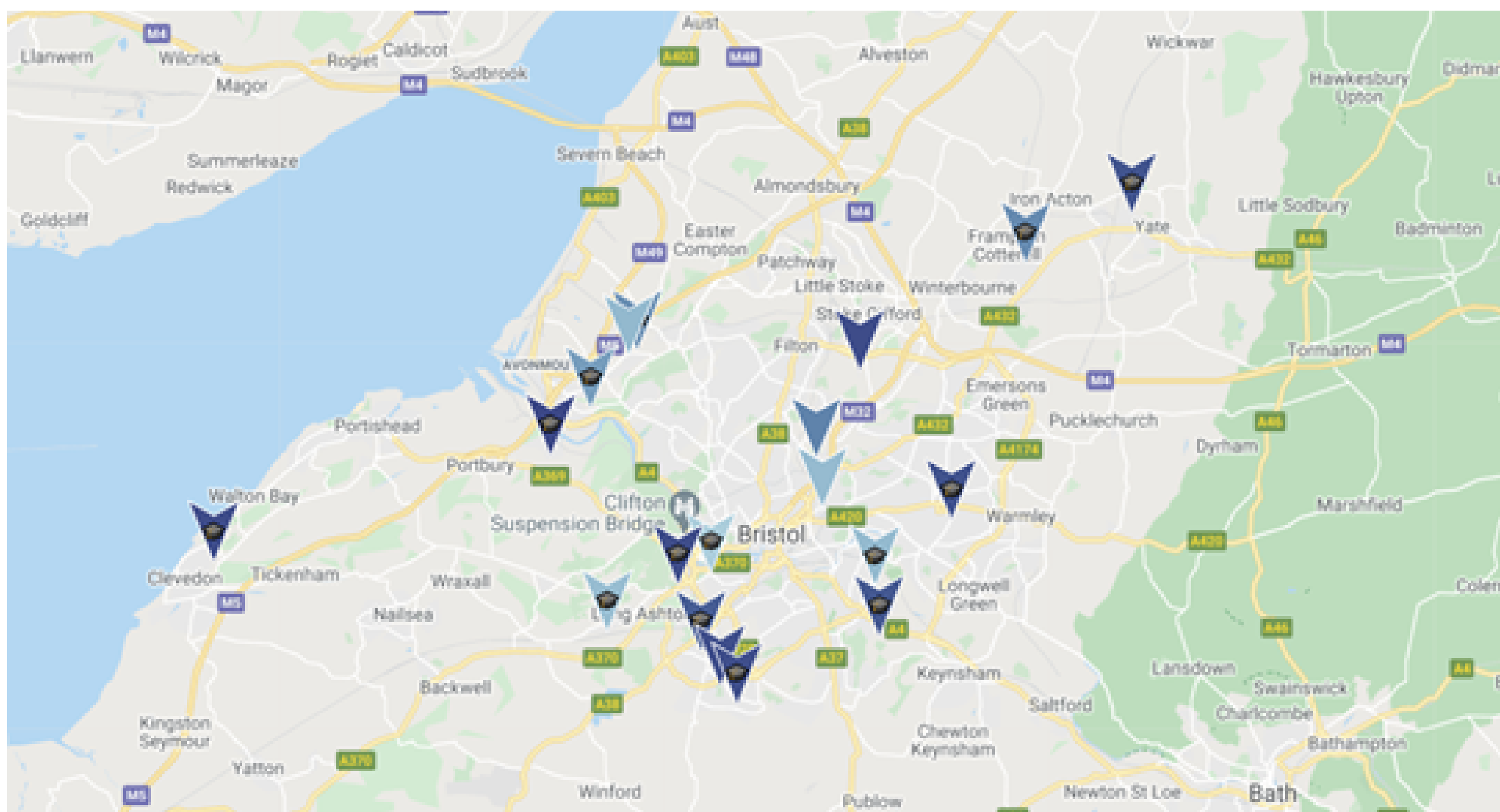
*"The students really enjoyed the session and found it very informative - helping to link engineering and learning through local landmarks which they could relate to and had previously visited... I thought the activities were all very good and very relevant to developing students' understanding of STEM, particularly engineering and sustainability. I would be happy to take part in the same session again."*

*- Teacher at Clevedon School*

**Number of children engaged in the West in Minecraft.**

School	Year	Classes	Number engaged
Ashton Park School	Yr10, Yr9	2	27
Ashton Gate Primary	Yr5	1	27
Bedminster Down School	Yr9	1	15
Birdwell Primary School	Yr6	2	58
Broomhill Junior	Yr3, Yr4, Yr5, Yr6	4	100
Clevedon School	Yr8	1	24
Crockerne Primary	Yr3, Yr4, Yr5, Yr6 (all x2)	8	169
Oasis Academy Brightstowe	Yr7	4	100
Oasis Academy Brislington	Yr7 (x3), Yr9 (x4)	7	179
Oasis Bank Leaze	Yr6	1	25
Our Lady of Lordes Catholic	Yr5, Yr6	2	31
Tyndale Primary	Yr4, Yr5, Yr6	3	67
Watermore Primary School	Yr6	3	60
Yate Academy	Yr10	1	15
<b>Sub-total</b>	-	<b>39 classes</b>	<b>897 (78%)</b>
<b>Community Group</b>			
Ambition Lawrence Weston	KS2	NA	120
Baggator	KS2	NA	10
The Old Library	KS2	NA	120
<b>Sub-total</b>	-	-	<b>250 (22%)</b>
<b>Total</b>	<b>Yrs3-10</b>	<b>40 classes</b>	<b>1,147</b>





**Location of schools and community groups who have so far taken part in The West in Minecraft. The map was generated using the [University of Southampton's Activity Mapper](#).**

**The West in Minecraft engagements according to IMD score, gender and region.**

Engagements according to IMD score									
IMD 1	IMD 2	IMD 3	IMD 4	IMD 5	IMD 6	IMD 7	IMD 8	IMD 9	IMD 10
2	3	4	1	2	1	0	1	2	1
High (N=9, 53%)			Medium (N=4, 23.5%)			Low (N=4, 23.5%)			
Engagements according to gender (of those that gave their gender)									
Female					Male				
266 (42%)					372 (58%)				
Engagements according to region									
B&NES	Bristol			North Somerset			South Gloucestershire		
0 (0%)	13 (76%)			2 (12%)			2 (12%)		

West of England Metro Mayor Dan Norris has also had the opportunity to visit a session at Watermore Primary School in South Gloucestershire and heard from the students about their ideas for sustainably developing their area. This happened as part of the West of England's Climate Emergency Meeting in September 2021.

While the children had space to comment on what they did not enjoy, the majority said they would not change a thing. Some schools had the opportunity to undertake the session in the UWE School of Engineering, which was accompanied by a tour of the building. One teacher suggested an additional activity to enhance children's learning, in the form of seeing a student engineer in action, to really bring the tour to life.



**Pupils of Watermore Primary re-engineering their area in Minecraft, with a special visit from Mayor Dan Norris. Photo courtesy of West of England Combined Authority (WECA).**



**The words used to describe The West in Minecraft, according to 163 8-14-year-olds.**



# WeCount Schools



 **WECOUNT** Schools

Counting traffic for healthier, happier streets

[www.we-count.net](http://www.we-count.net)







### Presenting WeCount to Elm Park Primary.

Working in collaboration with EU citizen science project [WeCount](#), DETI Inspire co-produced a BoxED for KS2, KS3 and KS4, themed around digital technologies (e.g., sensors) for urban mobility. The resources contain all the teacher needs to deliver curriculum-linked lessons, with or without a traffic sensor, covering maths, computing, science, and engineering subjects, alongside humanities subjects as well. The resources sit alongside the other themed packs on the Digital Trailblazers site.

Thanks to the collaboration, the educational resources have reached a European audience, having been shared (and translated where relevant) among schools in Dublin, Ireland and Leuven, Belgium - four of WeCount's case study cities, and advertised on the [WeCount website](#). Together, we estimate this effort has led to **2,000 children reached** across Europe.

So far **three schools** (Oasis Academy Brightstowe, Oasis Academy Brislington and Elm Park Primary) have been directly engaged with these materials, representing **319 children**. Additionally, **10 traffic sensors** have so far been distributed among schools and community groups in the West of England region, including two STEM clubs (Baggator, Easton and The Old Library, Eastville, both in Bristol). Some of these groups will be delivering the lessons on their own, while several have requested DETI Inspire deliver the session(s), Covid permitting.

### Schools engaged in WeCount outreach.

School	Year	Classes	Number engaged
Oasis Academy Brightstowe	Yr7	4	100
Oasis Academy Brislington	Yr7 (x3), Yr9 (x4)	7	179
Elm Park Primary	Yr5 (x2), Yr6 (x1)	3	40
<b>Total</b>	Yr5 (x2), Yr6 (x1), Yr7 (x7), Yr9 (x4)	<b>14</b>	<b>319</b>



Curiosity Connections @BrisPrimarySTEM · 1 Sep 2021

Planning activities in the lead up to #COP26? This new #STEM pack supported by @WecountC and @DigitalDeti explores the topics of traffic and air pollution in your local community, with free lesson plans and curriculum-linked worksheets for KS2!



**Reaction on Twitter to launch of WeCount school pack.**

*"We had to count all the cars, trucks, cyclists and pedestrians and we had to see how many numbers we had, it was really fun. They showed us a machine and it was amazing to see how much intelligence could be in something so small."*

*- Year 6 pupil, Elm Park Primary*

*"The workshops were interesting, engaging and fun. It was great to see the children being inspired about digital engineering and how this can be used to look after our world. Thank you so much again for running the workshops in our school."*

*- Year 6 teacher, Elm Park Primary*

DETI have also developed primary and secondary WeCount-themed lesson plans for the British Science Association, to be featured in their annual resource packs for **British Science Week** (released in January 2022), with **70,000 downloads** for similar packs in 2021.

A similar pack of resources has also been developed for KS3 for **The Scholar's Programme** of The Brilliant Club. The Brilliant Club is a national charity working with PhD students to support pupils who are less advantaged to access the most competitive universities and succeed when they get there. They currently work with **15,000 schools**, covering most of the UK.

# Sustainability Solutions Summit





Over three days, in October 2021, DETI Inspire partnered with **I'm an Engineer** to host an online sustainability and engineering youth summit, ahead of the UN climate change summit **COP26** which took place in Glasgow November 2021.

The Youth Engineering for Environmental Sustainability Summit (**YEESS**) enabled young people (aged 16-18) from the West of England region to connect with local engineers and policymakers, to explore how engineering can help tackle the Climate Emergency and discuss the interconnected solutions needed for future sustainability. Together they discussed potential solutions, using the engineering design process to guide discussion.

The summit focussed on three key themes from the Bristol Climate Action Plan to reach net zero by 2030: Transport, Energy and Waste. Through a series of videos, created by engineers and activists, and live chats, students were encouraged to visualise what future climate solutions might look like, from engineering innovation to societal change, discover what green jobs and career paths are available, and ask questions of our four West of England political leaders, Bristol Mayor Marvin Rees, Councillor Toby Savage of South Gloucestershire Council, Councillor Sarah Warren of Bath and North East Somerset Council, and West of England Mayor Dan Norris.



**Clockwise from top left: Q&A with Bristol Mayor Marvin Rees, Day 1 of the summit; Q&A with South Gloucester Cllr Toby Savage, day 2 of the summit; Mayor Dan Norris joining Yr10 pupils from Orchard School, at We The Curious, for day 3 of the summit, to discuss the West of England Climate Action Plan; and Q&A with Mayor Dan Norris, at We The Curious, also day 3.**

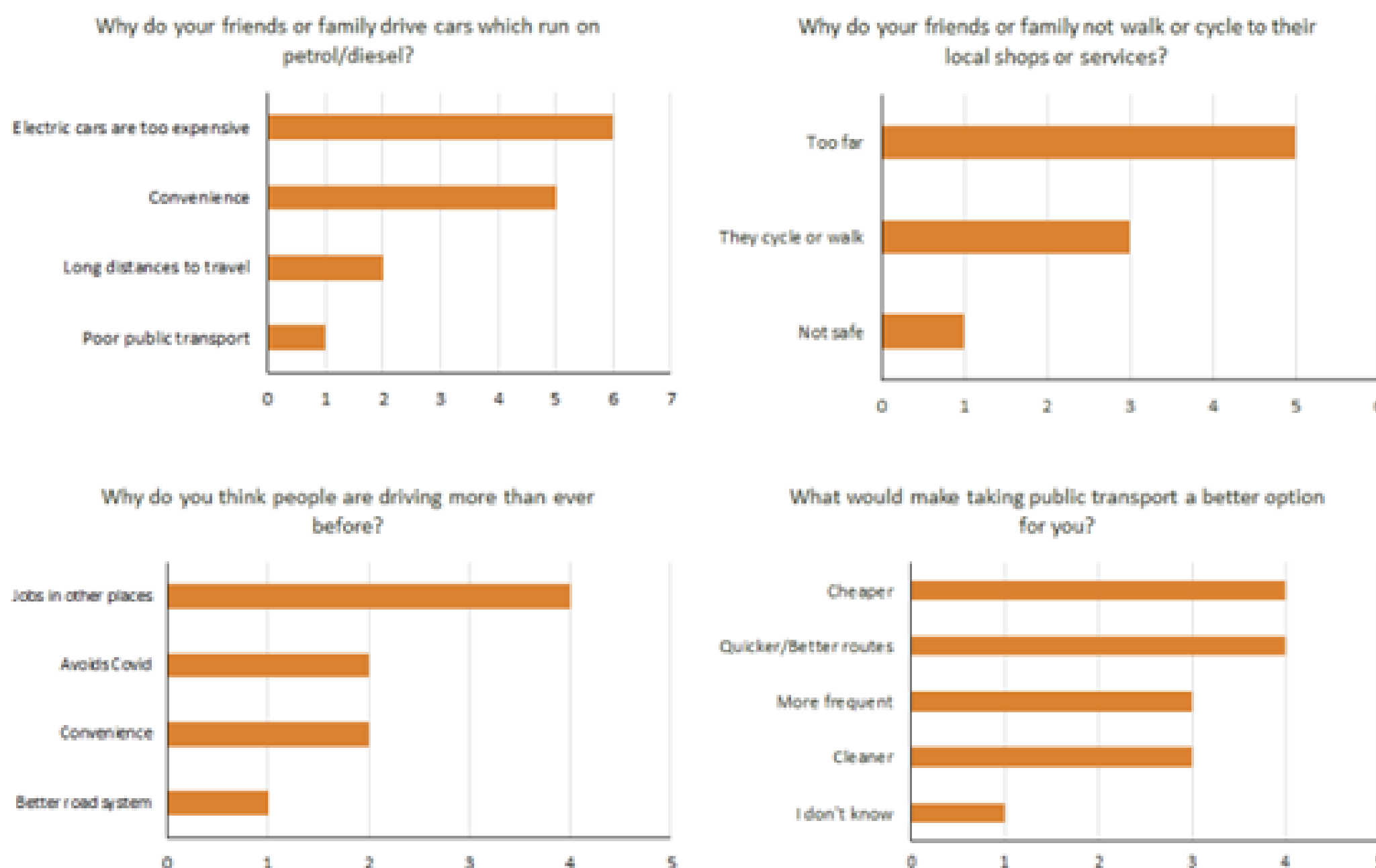


In total, **12 engineers engaged with 51 students from seven schools** across the West of England across the three days of the online summit. 27 students from one school actively took part across the three days of the summit. A further 20 students from Orchard School attended a physical one-day version of the summit, held at We The Curious science centre.

**Schools and colleges that participated in YEES, and regional representation.**

Schools	Region
Bradley Stoke Community School	South Gloucestershire
Bristol Cathedral School	Bristol
Mendip Studio School	Somerset
Orchard School	Bristol
St Katherine's School	Somerset
Sheldon School, Chippenham	Wiltshire
Cotham School	Bristol
Richard Huish College	Somerset

Each day students were asked questions to stimulate debate on the theme for the day. **74 answers were recorded from the 14 questions asked.**



**Answers from participating students following questions on Monday's Transport theme.**







# We Make Our Future & COP26





## **We Make Our Future / COP26**

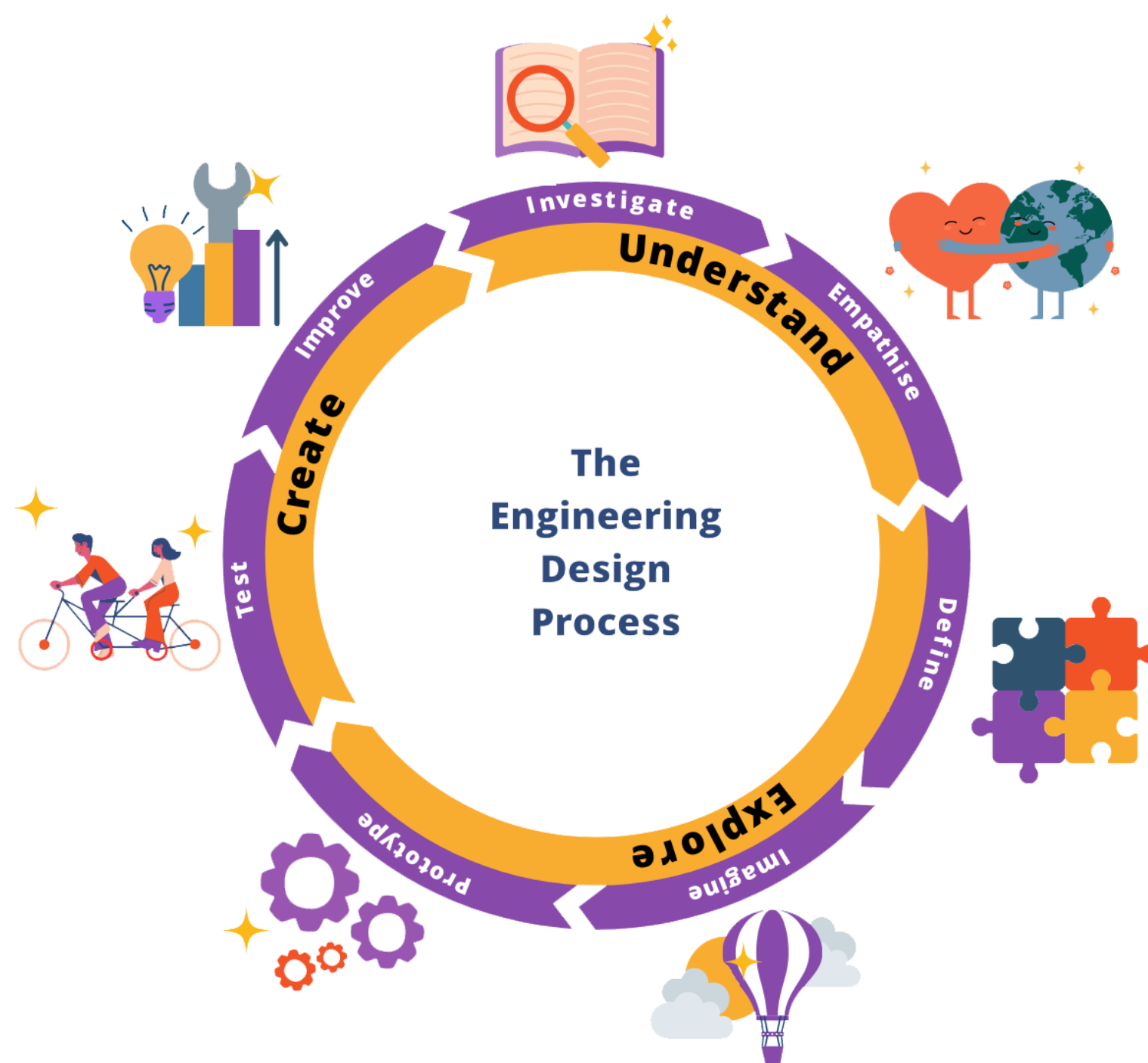
For COP26, the DETI Inspire team, in collaboration with planetarium experts **Explorer Dome**, created a new experience to celebrate the ingenuity of human engineering, address current issues around climate change, and introduce engineering as a relevant and attainable aspiration for all young people.

The new show, called 'We Make Our Future', was showcased in the Green Zone of COP26 Glasgow in November 2021 to **90 adults**. The show is presenter-led, interactive, educational and entertaining, to inspire the next generation of engineers. The experience highlights the urgent need for climate action along with the potential of green technology for economic and social progress.



**Presenting the show in the Glasgow Science Centre Planetarium.**

Inside the mobile Explorer Dome, full-dome digital projections allow audiences to visit engineering marvels from history and explore the pros and cons of technology in modern life. Design thinking offers hope to young children that humanity can solve global problems and bring about real change. Using the engineering design process, children are asked to harness their creativity to implement sustainability solutions.



**Engineering Design Process graphic, created by DETI, for use in the Explorer Dome show.**

Between June 2021 and February 2022, We Make Our Future has been presented to **eight schools** (seven from the West of England Combined Authority region) – three in-person, linked through South Bristol Youth, plus a further four schools via online delivery. This equates to **692 children, from 24 classes, from years 3 through 7**. Four more schools will be booked before July 2022 (with Bridge Learning booked in already), and the show is also available as a paid for service through Explorer Dome. The show is available for free to schools in areas of high multiple deprivation.

**Schools engaged with Explorer Dome show.**

School	Year	Classes	Number engaged
Deerhurst and Appleby Primary	Yr3, Yr4, Yr5, Yr6	4	48
Hambrook Primary	Yr6	1	-
Little Stoke Primary	Yr3, Yr4, Yr5, Yr6	4	80
Ashton Gate Primary	Yr6	3	114
Hareclive E-ACT	Yr4 (x2), Yr5 (x2)	4	90
Merchants Academy	Yr7 (x2), Yr8 (x2)	4	120
Filton Avenue Primary	Yr5	4	120
Bridge Learning Campus	Yr4, Yr5, Yr7, Yr9	4	120
<b>Total</b>	<b>Yr3-Yr9</b>	<b>28</b>	<b>692</b>





**South Gloucester Cllr Toby Savage had an early viewing of the new show at the Zero Carbon Bus Tour in UWE Bristol's School of Engineering building.**

Once again, feedback has been positive, with teachers requesting that the show be repeated.

*"An absolutely brilliant show - pitched perfectly to the age group. Children were motivated to discuss/join in and ask questions... We would love to repeat this experience next academic year with the new year 7 cohort."*

*- Merchant Academy outreach coordinator.*





# DETI Engagement Programme 2021

DETI Inspire brings together connections between existing networks such as Curiosity Connections and Future Quest and has developed these further through the networks available in the wider DETI consortium. This section reviews the wider engagement work which DETI Inspire has coalesced throughout 2021.

## DETI Inspire Advisory Board

DETI Inspire is advised by a well-connected board of regional informal science and STEM learning institutions. Quarterly Advisory Board meetings were held online throughout 2021 in March, July and December. Board members and their organisations are listed below.

### DETI Inspire Advisory Board members

Board member	Organisation
Laura Fogg-Rogers, Louisa Cockbill, Ana Bristol, Josh Warren, Sophie Laggan, Laura Hobbs, Fay Lewis, Lisa Brodie, Ramin Amali, Abdul Farooq, Hannah Tebbutt	UWE Bristol
Liz Lister	Graphic Science/STEM Ambassador Hub West of England
Caroline Higgins, Ellie Cripps, Joel Morley	University of Bristol
Charlotte Thomas	Ashton Gate Primary
Sara McNally, Komilla Datta	Filton Avenue Primary School
Chris Rochester	Primary Engineer
Liz Southwell	The Great Science Share
Tommy Jarvis	Bristol Learning City
Julian Welsh	We The Curious
Jane Hack	Bristol Museums
Amy Seadon	Aerospace Bristol
Rebecca Bound	Renishaw
Emily Merrison	Airbus
Magdalena Grzybek	GKN Aerospace
Mahnoor Nasir, Rob Bates	Ministry of Defence
Karen Woodward	Engineering UK
Claire Arbery	Institute of Technology
Fiona Doughton	West of England Combined Authority (WECA) Careers Hub

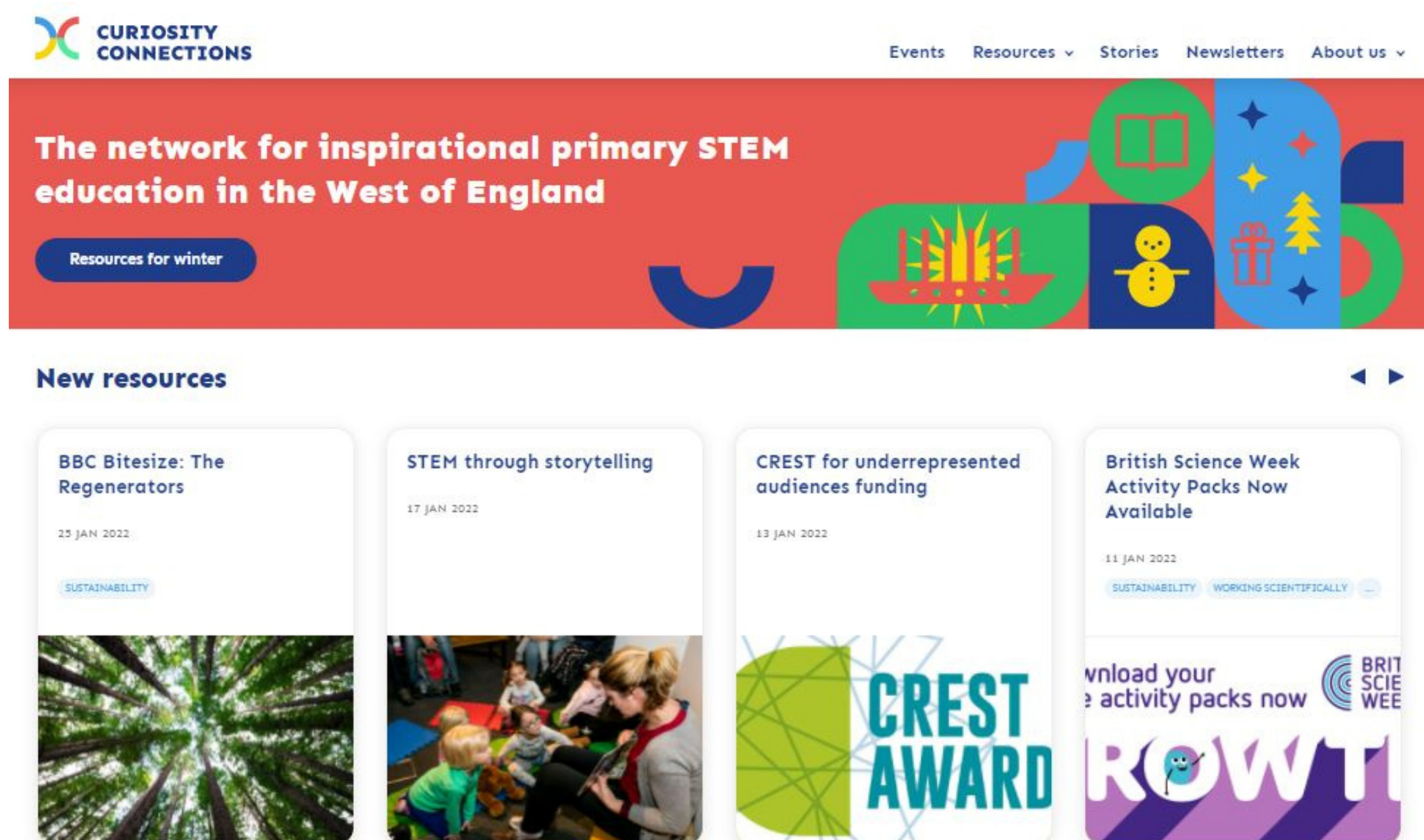


# DETI Inspire Digital Presence

## Curiosity Connections network and website



The Curiosity Connections network is a collaboration between UWE Bristol and Graphic Science, connecting people and organisations wishing to promote, support and deliver inspirational STEM education in primary schools across the West of England region. In January 2021, the [Curiosity Connections website](#) was updated through funding from DETI, via a sub-contract with software company [Line Industries](#). The updated website includes new graphics and easier functionality, allowing users to tailor the experience to suit their needs (i.e., locate information that is most relevant to them).



**The new Curiosity Connections homepage, including a 'resources for Winter' feature, enabling users to quickly access resources themed for the current season.**

The new website signposts to local STEM events, competitions, teaching resources and training opportunities, and serves as a place to share stories from local schools, community groups and organisations. **Newsletters are also mailed out each school half-term (6 per year) to 300 registered members** and are available for download from the website. In 2021, 5 newsletters were mailed out, with **22 new resources added, 6 new stories shared and 20 new events posted on the website.**

**Since the update, the website has received 11,026 visits by 5,684 visitors (compared to 1,108 visitors in 2020).** The most popular page visited was the one displaying the Engineering Curiosity top trump cards, which to date has received 2,352 visits.



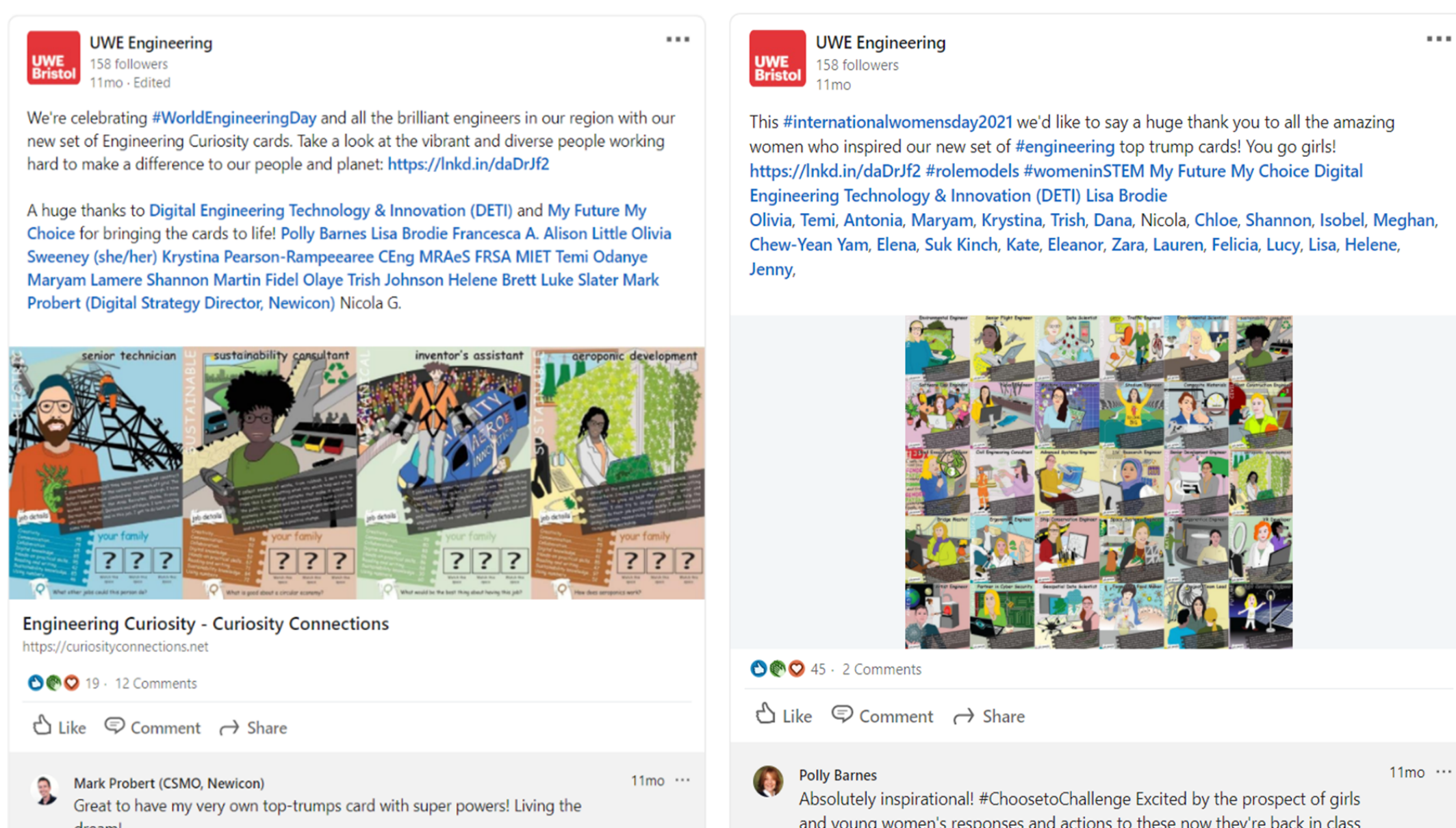
## Social media statistics

In addition to the newsletter, DETI Inspire communicates and promotes its activities on UWE Bristol's Engineering twitter page (Engineering our Future), Curiosity Connections' twitter page and more specifically to industry partners via UWE Engineering on LinkedIn. Combined, these sites have **1,109 followers** (Engineering Our Future, 522; Curiosity Connections, 429; UWE Engineering 158). All posts mentioning @DigitalDETI are then reshared, thereby reaching wider industry audiences.

### Social media statistics from Jan 2021-Dec 2021.

Aspect	Engineering Our Future @EngOurFutureUWE	Curiosity Connections @BrisPrimarySTEM	UWE Engineering LinkedIn
Followers	522	429	158
Total impressions (how many times posts are seen)	187,725	74,505	NA
New followers	112	76	NA

From January to December 2021, **both twitter platforms have gained new followers (total = 188) with posts reaching over 250,000 people (total = 262,230)**. On LinkedIn meanwhile, the Engineering Curiosity cards were among the most popular posts, perhaps in part due to the large number of engineers that have a LinkedIn account. One post, tagged to International Women's Day received 45 likes and 2 comments, while another, tagged to World Engineering Day received 19 likes and 12 comments.



Two popular LinkedIn posts.



Meanwhile, it was the YEESS summit that attracted the most interest on UWE's Engineering Our Future blog, perhaps given that the posts tagged in Bristol Mayor Marvin Rees.



**Popular posts on UWE Engineering Our Future.**

Lastly, as well as receiving high interactivity on their community posts (see STEM in the Community), Curiosity Connections consistently receive double figures in terms of likes and retweets when it comes to announcing the publication of its quarterly newsletter.



**Another successful post about Curiosity Connections' quarterly newsletter.**



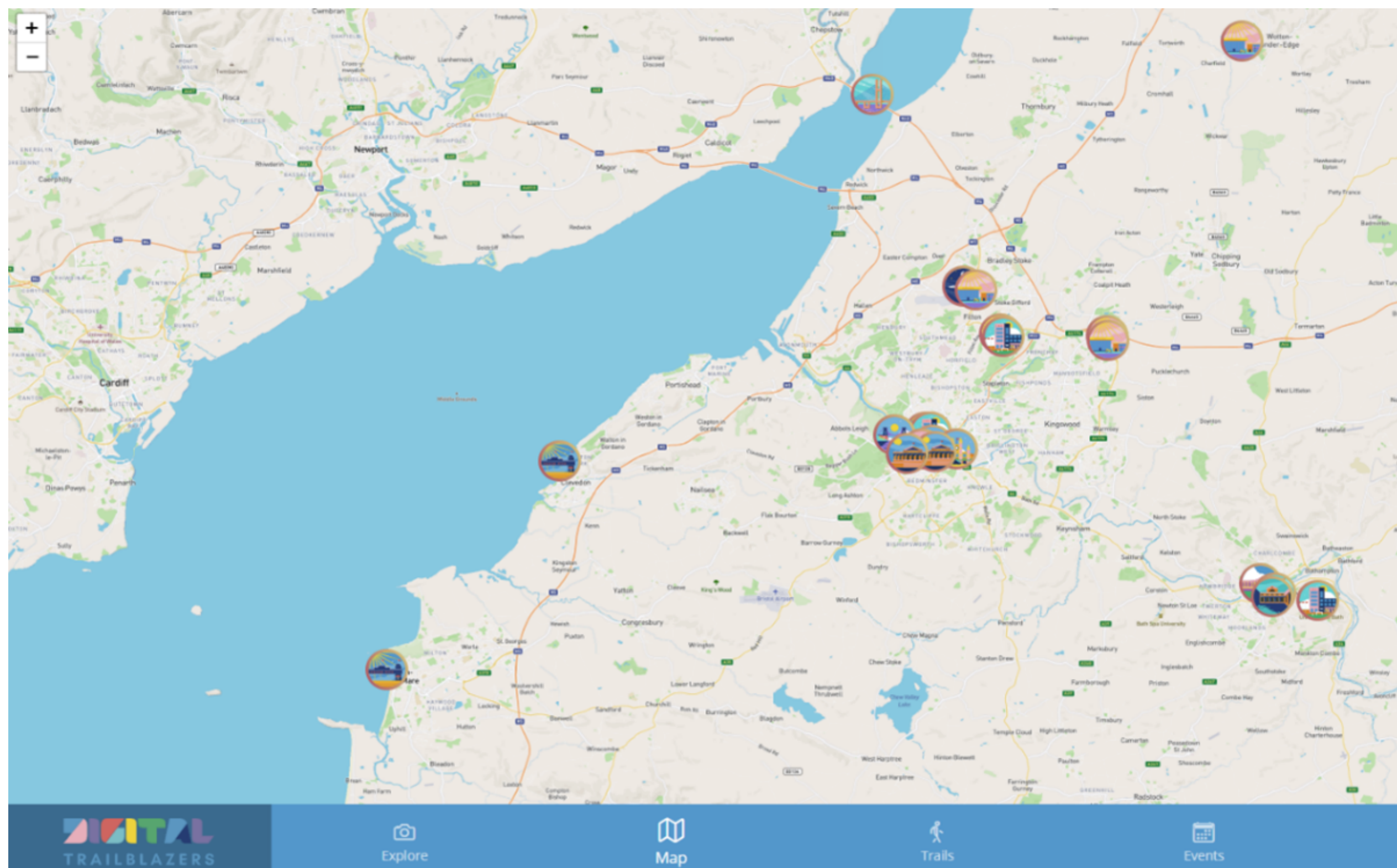
## Digital Trailblazers

Aimed at KS3 and above, **Digital Trailblazers** aims to digitally bring together the engineering community in the West of England, to showcase the past and future of STEM industries and careers. Launched in August 2021, the website features locally relevant resources, including the five **BoxEDs** created by the DETI Inspire team (see Section 5).



**Advertising information for downloading the Digital Trailblazers app.**

The West of England has a rich engineering heritage and is also home to businesses and organisations pioneering the latest in digital technologies. The Digital Trailblazers web app allows audiences to explore this heritage through a series of trails throughout the West of England, featuring famous engineering landmarks, businesses, and institutions. With the aid of the in-built map, users can follow the trail digitally or on foot, clicking on icons to reveal information quickly and easily. The app can also be downloaded for use when on location. To date the mobile app has been downloaded by **45 users** and the website has had approximately **760 page views**. In addition, there have been **38 downloads** from the website resources page.



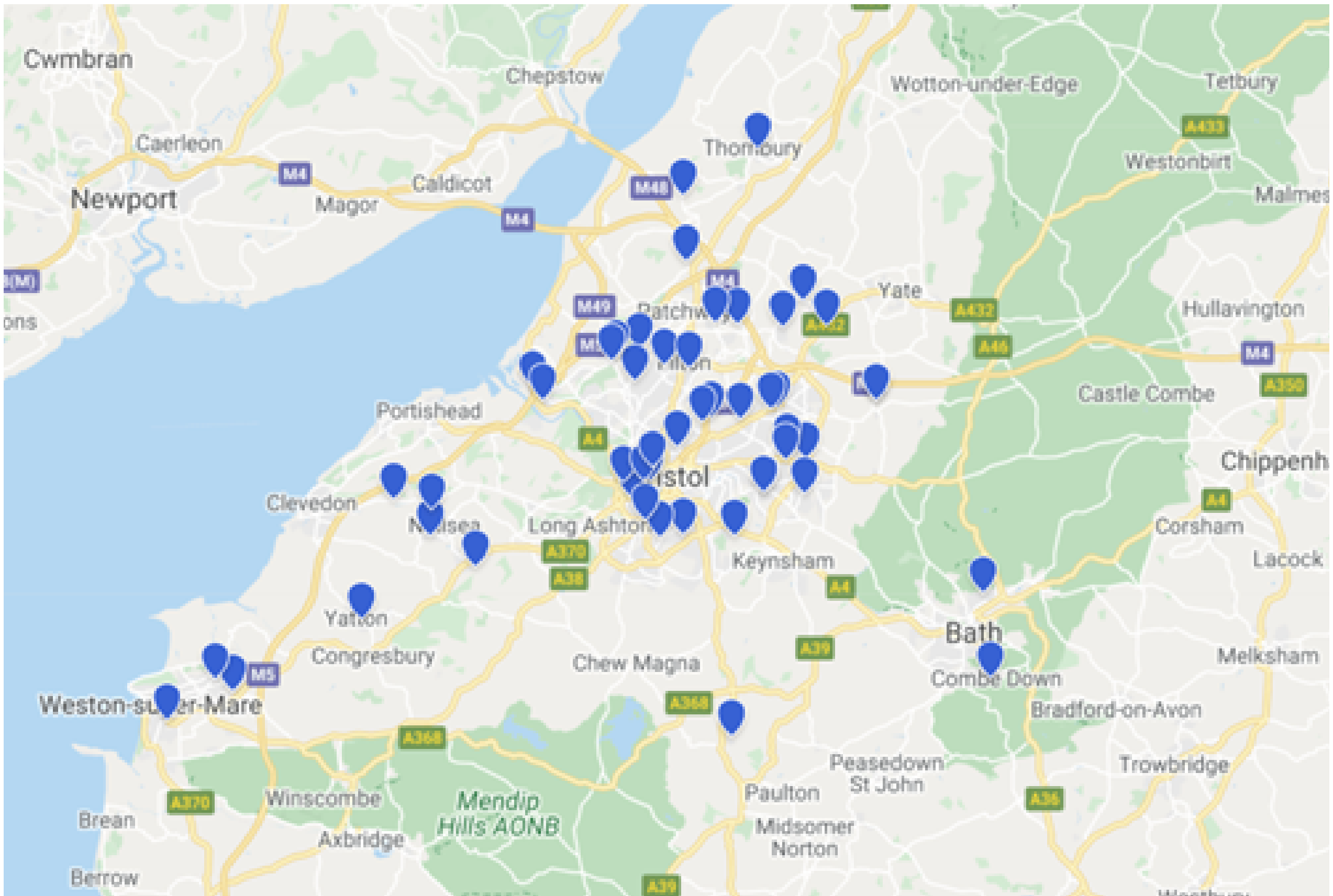
**Digital Trailblazers map of the West of England with engineering landmarks highlighted.**



# DETI Inspire Partner Programmes

## Big Beam In

DETI Inspire hosted a series of online engineering engagement events as part of British Science Week celebrations in March 2021 (5-14th March). Due to Covid19 lockdown restrictions, all activities were conducted online, leading to the idea that the engineers were 'beaming' into the children's classrooms.



**Map showing the locations of schools engaged with the Big Beam In.**

The Big Beam In connected **54 primary and secondary schools** from across the region with **15 local engineering ambassadors**, providing an opportunity to engage over **3,500 pupils** with engineering careers in the West of England. The activities were centred around the lesson plans developed to accompany the Engineering Curiosity cards.

A key theme for the sessions was challenging common stereotypes and myths about engineering, and this was achieved through live interactions with real-life local engineers, a new set of curriculum-linked teaching resources and the Engineering Curiosity card set with accompanying TikTok-style videos.

The event proved popular with teachers and engineers, and feedback suggested the online format worked well during this time of uncertainty.

*"Thank you so much for joining us for our assembly on Friday. The children got a lot out of it. It's been very tricky co-ordinating Science Week this year with us not knowing whether we would be open, but it was good to have had something planned from the outset!"*

*- Yr3 Teacher & Science Lead, Ilminster Avenue E-ACT*

*"Our engineer (James) was excellent. The children were really interested to hear about the projects he has worked on and what his role as an engineer is. They were able to ask him lots of questions and were inspired to design their own inventions after the session!"*

*- Teacher, Cathedral Primary School*

*"I enjoyed taking part. I've done some STEM events before but up until now I've never had the time to present to schools during the day. The virtual format made that possible this time. As much as I dislike lockdown, it does have its silver linings!"*

*- Adam, Acoustic Engineer*



**Future Engineers, inspired by the Engineering Curiosity card set during Big Beam In.**



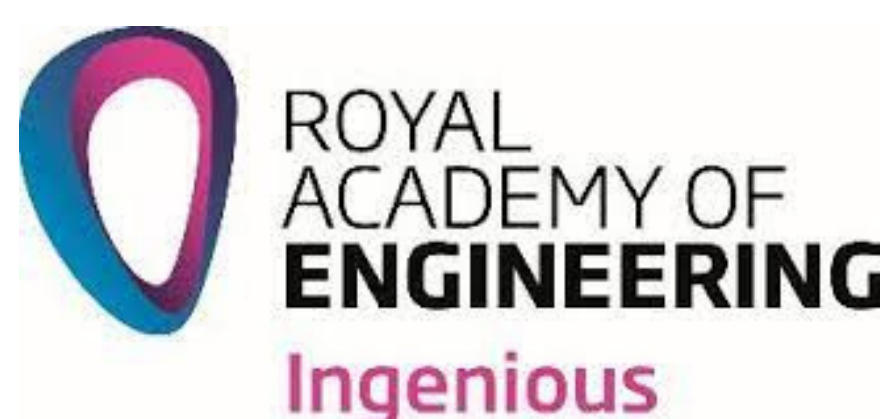
## Building to Break Barriers

Building to Break Barriers is funded by the **Royal Academy of Engineering** through the Ingenious Awards scheme and is part of the **Science Hunters** collaboration between UWE Bristol and Lancaster University. Science Hunters has been using Minecraft to engage children, particularly those who may face barriers to accessing educational opportunities, with STEM since 2014 via various funding streams with highly successful results. **Building to Break Barriers** was initiated in April 2020 to develop Minecraft-based engineering outreach activities for children in under-represented groups, support engineers in developing engagement skills and deliver activities to Minecraft Clubs and schools. In September 2020, the project officially collaborated with DETI Inspire to partner on developing and delivering the West in Minecraft activity specifically, following the successful Science Hunters approach. See The West in Minecraft section for more information.

Outside of this collaboration, Building to Break Barriers is currently developing resources and delivering sessions to Minecraft Clubs for children with Special Educational Needs (see **Hobbs et al. 2020**) and Looked After Children, and community and school sessions for children falling within groups under-represented in engineering, across the UK. The project has encouraged participating engineers in the South West to sign up to the Diversity Demonstrator and supported those also participating in Women Like Me via opportunities to contribute to developing resources, undertake engagement activities and develop outreach experience.



**Suspension Bridge built by Alex Kiyani, Science Hunters participant 2019.**

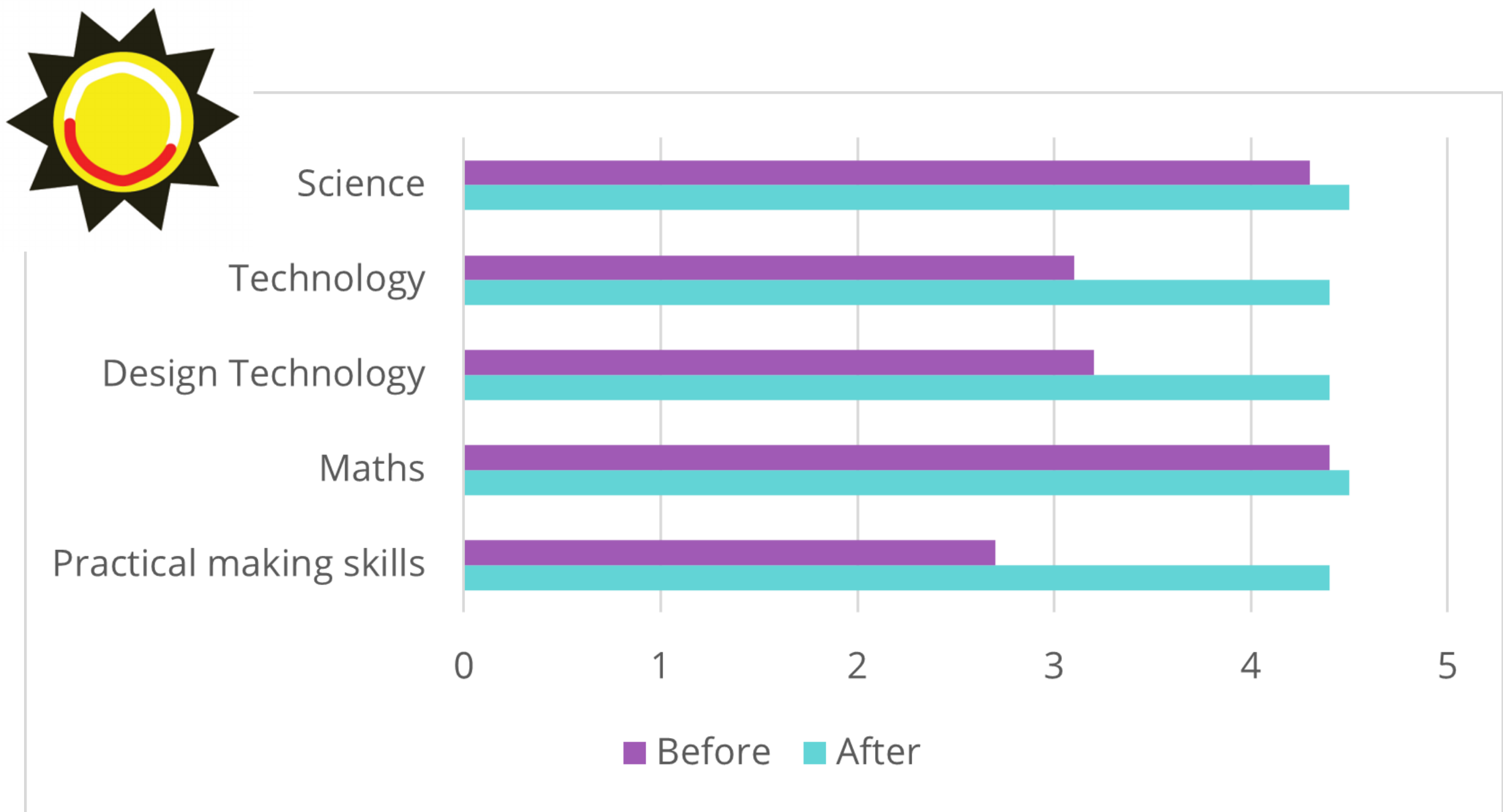


## Primary Engineer

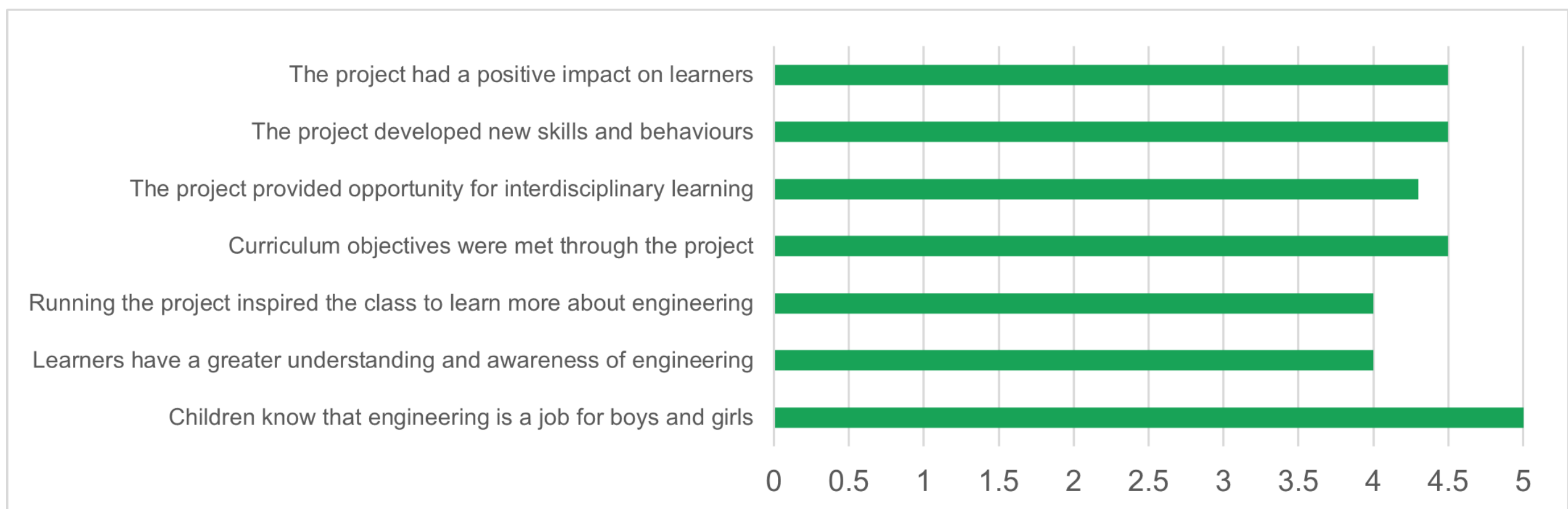
**Primary Engineer** is a national organisation that brings engineering into the classroom, inspiring children, pupils, teachers, parents, and engineers. In the South West, UWE Bristol is the academic supporter of their programmes.

In 2021 DETI Inspire supported online teacher continuing professional development (CPD) training sessions to **11 teachers from the 10 schools** in the West of England region. These one-day online sessions supported teachers to deliver the Electronics Module from Primary Engineer, which enables a whole class to take part in a curriculum-mapped engineering project, in this instance, building an electric car. The sessions took place online, due to Covid19 restrictions.

Feedback was gathered from teachers that participated, to evaluate their before and after confidence in teaching engineering-related subjects, as well as perceived impact of the lesson on their class(es).



**Teachers' confidence in engineering skills before and after training.**



**Perceived impact of Electronics Module on learners, according to teachers.**



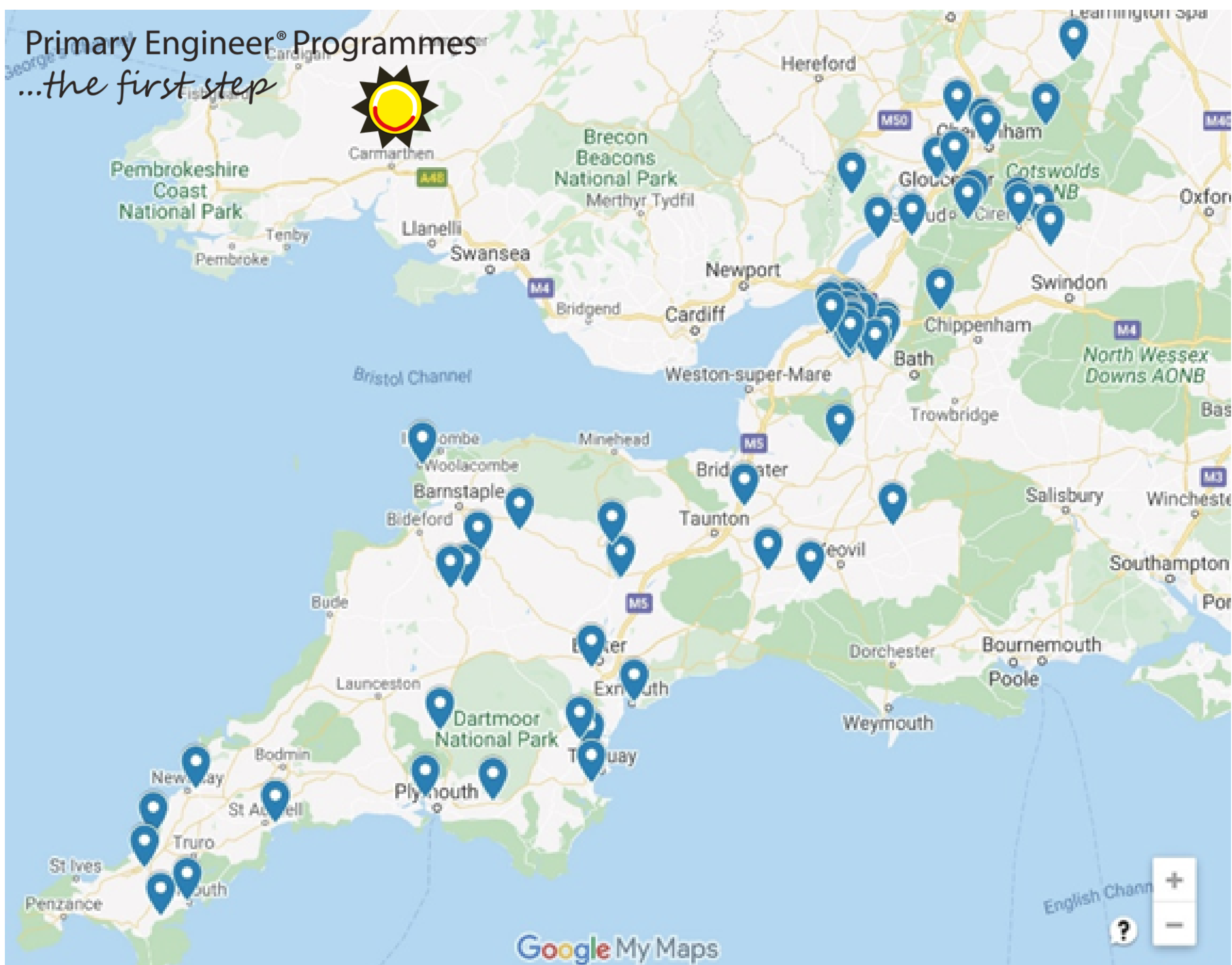
## The Leaders Award Programme

UWE Bristol are the academic supporters of Primary Engineer's **Leaders Award programme**. The programme challenges children, aged 3 to 19, with the question - "If you were an engineer, what would you do?"

Children submit detailed designs for inventions to solve real-world problems, following interactions with engineers from the West of England. This includes, online interviews to inspire children, grading competition entries and finally a team of UWE student engineers pick one of the winning designs to build into a reality.

The competition is promoted to children through the Curiosity Connections network and UWE Bristol hosts the grading days and Exhibition Day - where category winners are displayed, and awards presented to the children by local VIPs. The last live Exhibition Day was held on 14th June 2019, with an online virtual gallery used to showcase children's designs in **2020** and **2021**.

The 2021/22 round of the Leaders Award has seen many children already sign up (as of Jan 2022 - **62 schools** had registered). Head of the Engineering Design and Mathematics department, Professor Lisa Brodie, is due to take part in a live online interview in March 2022 and the grading and judging days will include engineers from UWE Bristol, MOD and GKN.

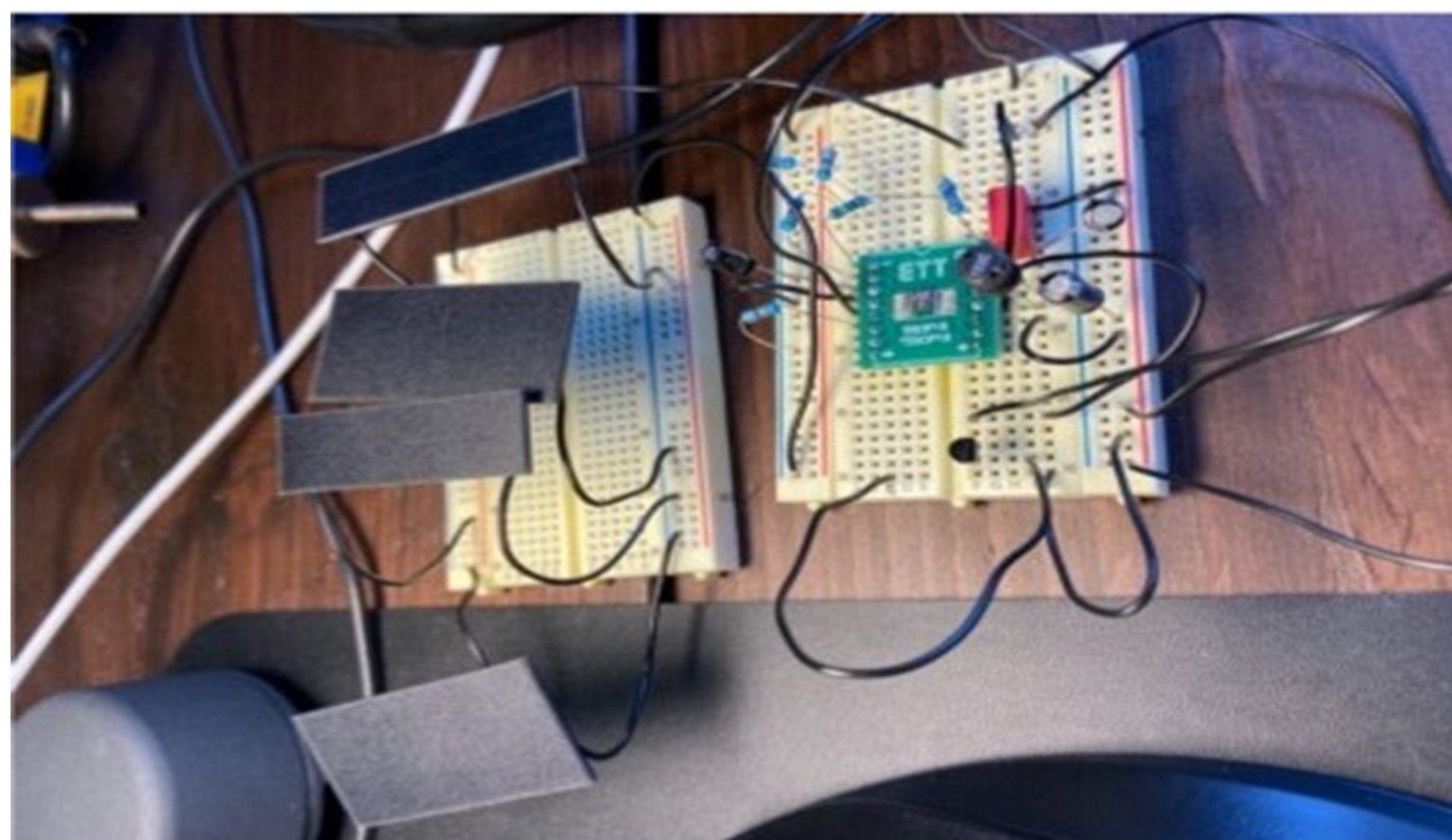
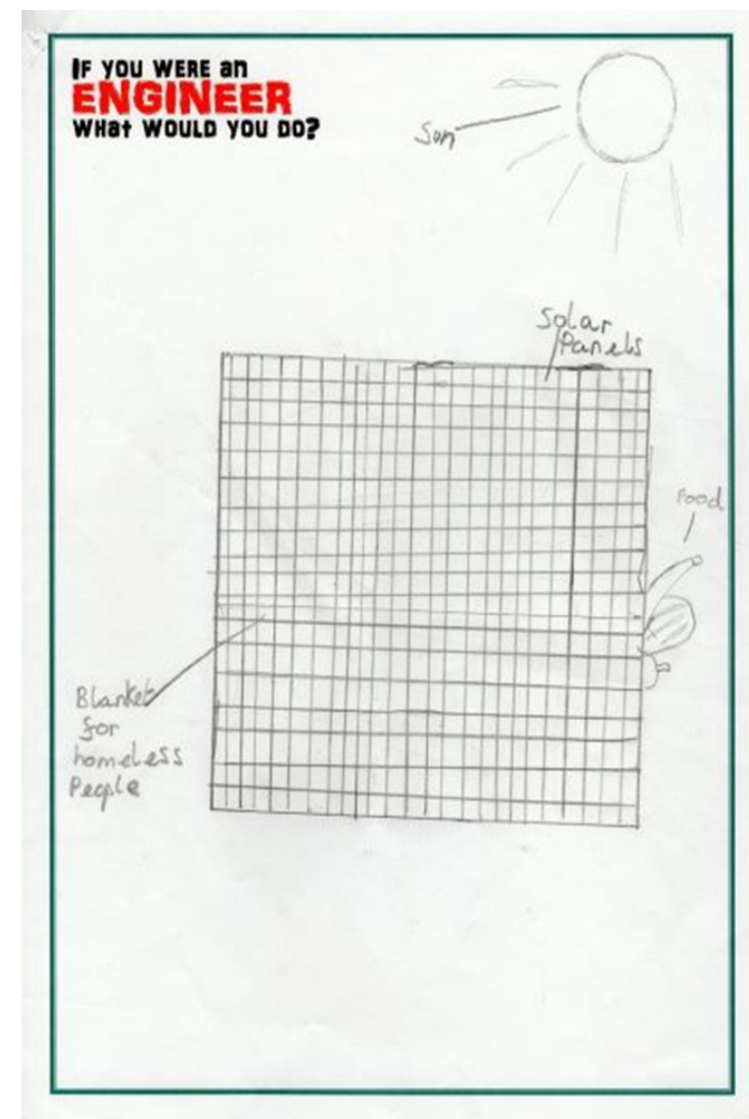


**Map of schools in the South West signed up to the Leaders Award 2021/22.**



In early 2021 a team of student engineers from UWE Bristol (pictured below) selected one of the winning designs from the 19/20 South-West Leaders Award to build. The team selected the solar electric heated blanket idea that Mary, a local Year 5 pupil, designed to provide warmth for the homeless.

The team designed a product that met the needs of the end-user i.e. a durable, portable outdoor blanket that could be produced at low cost and would be easy to maintain, hygienic and able to provide heat for an appropriate length of time. Using electronic simulations, schematic diagrams and 3D models, the students built a model for testing and analysis, which would successfully fulfil these requirements.



**Clockwise from top left: The team of UWE Masters students tasked with building a functional prototype of the blanket include student electronic engineers Oliver Németh, Eimantas Medziunas and Kieran Easdale, and student mechanical engineer Ahmed Nor; Mary's original solar blanket design; the prototype used for testing and analysis.**

**IF YOU  
WERE an  
ENGINEER  
WHAT WOULD  
YOU DO?**





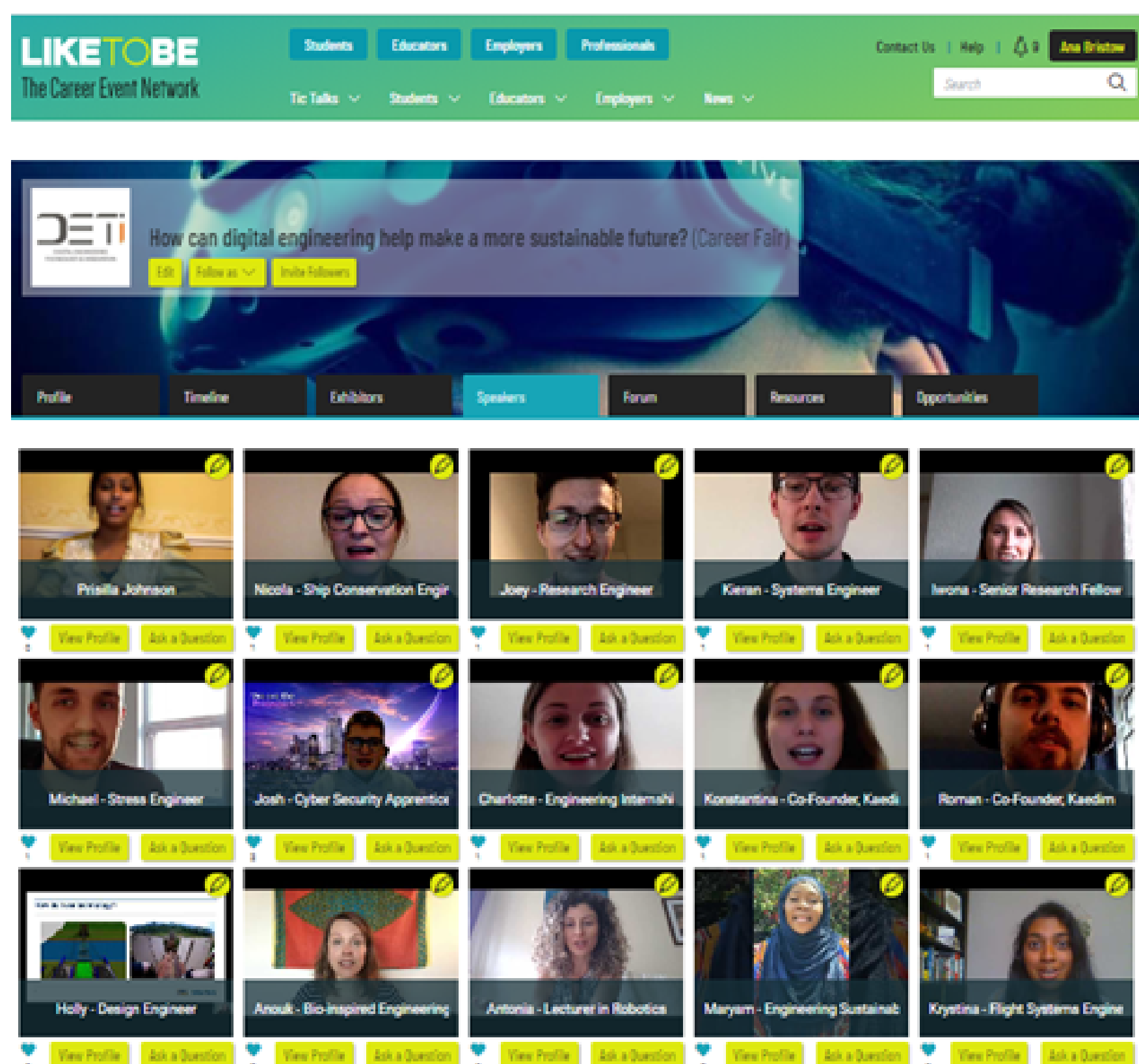
## Like To Be

DETI Inspire collaborated with **Like To Be** to host an online digital engineering careers event during the week of Bristol Technology Festival, from the 9th-15th November 2020. LikeToBe is an online Career Event Network Platform, which helps introduce students to professional online networking and creates regular, employer engagements on the platform. It was designed to connect students in geographically isolated and socially disadvantaged areas with employers and organisations to provide opportunities for all, regardless of their location or background.

The digital engineering careers event enabled young people to hear from inspirational engineers who are designing and creating innovative new solutions to real-world problems. Speakers from a diverse range of engineering fields and specialisms were available to answer questions during the event, with a selection available to answer questions in real-time.

**14 engineers submitted video content**, all of which were 'liked' by the students several times and 9 questions were posted on the engineer's profile pages. The event webpages received **583 views**.

The videos and webpage content remained on the LikeToBe web portal for the whole of the 2020/21 academic year so students could continue to use the free online resource.



LikeToBe web portal.



## STEM in the Community

With the help of a grant from the UWE Community Fund, in 2021 DETI Inspire worked with the STEM Ambassador Hub West England to establish 3 community STEM clubs in 3 different areas of Bristol.

Lawrence Weston Club ran as a 6-week series of STEM activities delivered as part of the after-school drop-in youth provision on Thursday afternoons during May and June 2021, in collaboration with Oasis Community Trust and Ambition Lawrence Weston. This activity attracted up to **20 young people** a week to take part in The West in Minecraft challenges delivered by DETI Inspire team and supported by STEM Ambassadors, with related physical STEM activities taking place alongside.

A club in Easton was set up and run by STEM Ambassadors in collaboration with community group Baggator. It started in May 2021 and has run continuously on a Monday evening (37 weeks to date), transforming into the Easton Data Garden to support community-wide participation in air quality data projects. **A regular crowd of 10 young people** come every week, together with parents, friends and other family, to take part in a mix of physical STEM activities and tech-based activities making use of Minecraft and other digital tools.



**A popular tweet promoting the Easton Data Garden.**

The Eastville club was set up by STEM Ambassadors and since September 2021 has run in partnership with The Old Library and with support from the DETI Inspire team on Thursday afternoons during term time (18 weeks so far). The club regularly attracts up to **50 young people and their parents/carers** to take part in Minecraft activities, robotics and Lego challenges.





**The Old Library Minecraft session.**

Participants at these community STEM clubs tend to be around KS2 age, with fewer, older (KS3 and KS4) young people acting as volunteer helpers and supporters. The ethos of each of these clubs is to expose more young people to STEM and enable them to benefit from the science capital resources the city has to offer which, because of where they live, the young people who attend might not otherwise benefit from. **Five Engineers have so far participated in STEM clubs.**

**Total engagements and possible reach of STEM Clubs.**

Aspect	Lawrence Weston	Easton	Eastville
Total number of engagements	6	37	18
Possible reach	120	10	50





## Bristol Robotics Festival

A collaboration between DETI Inspire, Bristol Robotics Laboratory (BRL) and the University of Bristol's Digimakers, with support from the West of England STEM Ambassador hub developed a new festival to celebrate robotics in the city. **Bristol Robofest** launched in June 2021 as a city-wide initiative to celebrate the UK Festival of Robotics and raise the profile of STEM in our local communities.

During the festival, robots popped up in five locations throughout the city, with **over 130 children and family members** taking part in a variety of robot themed activities in person, with many more accessing online activities (numbers unknown). UWE Bristol featured the event on its Engineering blog. An additional **638 people** signed up to the BRL's conference, tuning into talks from **50 engineers**.

### In-person and online events during Bristol Robotics Festival.

In-person events	Online activities
<b>Family fun day</b> , at the Old Library, Eastville	<b>We Make Our Future</b> , science show with Explorer Dome Bristol
<b>Open City Lab</b> , at We The Curious	<b>Robot treasure hunt</b> , game created by FARSCOPE students
<b>Robotics activities</b> , at STEM@Baggator Community STEM Club	<b>Mosaix with swarm robot tiles</b> , remote control of swarm robots to create a communal art piece
<b>Robotics activities</b> , at Lawrence Weston Community STEM Club	<b>Pepper the Robot Goes to School with Autistic Children</b> , A talk by Severin Lemere and researchers from UWE Bristol
<b>University of Bristol's Digimakers robotics and coding workshops</b> , at Barton Hill Settlement	<b>Bristol Robotics Lab (BRL) Conference</b> : various talks delivered by staff and MSc students from the BRL



**Pepper the robot joined in the fun at the Old Library robot family day.**





## South West STEM Fest

South West STEM Fest (SWSF) was a virtual STEM Festival, held between 7th- 25th June 2021. It was a collaboration between the STEM Ambassador Hubs West England and South West Peninsula. It consisted of a programme of online talks, demos and tours suitable for primary, secondary, FE and home educators that showcased the best of STEM in SW England. The corporate sponsors were Babcock, Software Solved, and Weston College.

Over the course of the 3 weeks, SWSF delivered **59 live and pre-recorded events** and **reached over 5,500 children and young people across all sectors**. Events involved **73 different companies** and were fronted by a mix of professional presenters alongside 68 STEM Ambassadors in everything from Archaeology to Aerospace. **Approximately 48 (66%) of the Ambassadors came from an Engineering profession.**



Selection of headers from South West STEM Fest.



## Industry Engagement

This year, the DETI Inspire team has also had the opportunity to showcase the sessions and resources developed to various industry partners. One such event was the launch of **GKN Aerospace's Global Technology Centre** in October 2021. The DETI Inspire team were invited to talk about the sessions and outreach developed, with stakeholders and aerospace industry partners. UWE EDM Head of Department Dr Lisa Brodie was also part of a Q&A panel at the event, fielding questions from the attendees about the importance of developing the skills of employees and the role the university and the DETI Inspire team has in engaging with future engineers.

A second opportunity for the DETI Inspire team to showcase resources and developments came at **the opening event** of the School of Engineering building on the UWE Frenchay Campus on 18th November 2021. **The event was attended by nearly 100 representatives of the local engineering industry**, as well as many of the collaborators, STEM Ambassadors and engineers that the team has directly worked with. Invited to speak at the event was Dawn Bonfield MBE, founder of Towards Vision and Magnificent Women, and Deputy Chair of the Women in Engineering Committee, among other accolades. The DETI team spoke with her about our resources, outreach, and joint visions. Dawn has since received **50 sets of Engineering Curiosity cards** that she will use as part of her own talks and engagements to demonstrate an excellent example of STEM outreach



**UWE's new School of Engineering building.**





## Routes Into STEM Panel

In February 2021, DETI Inspire was invited to host an online webinar, in collaboration with the Engineering Development Trust (EDT)'s **Routes into STEM programme**. The webinar took the form of a live question and answer session between Year 9 and 10 students and a panel of engineers, all of whom featured on the Engineering Curiosity cards. The panel took live questions from the audience of students, talking about their roles, their routes into the position, and advice for those wishing to take engineering forward.

Forming the panel was:

- Temi Odanye - Mechanical Design Engineer, LettUs Grow
- Richard Moorcraft - Technical Design Engineer, Smurfitt Kappa
- Olivia Sweeney - Sustainable Waste Consultant, Resource Futures
- Laura Star - Naval Architect, BMT

The **webinar** was attended by **over 200 Year 9 and 10 pupils from across the country**, and over 100 questions were sent into the live chat during the session. Two subsequent webinars were also held in collaboration with EDT Routes into STEM, focussing on Higher Education routes and choices for engineering. The UWE School of Engineering was represented by Dr Pritesh Narayan, Deputy Head for the Department of Engineering Design and Mathematics (EDM).



**The panel of speakers during the Routes into STEM event.**



## Great Science Share

The Great Science Share (GSS) is an annual campaign to inspire 5-14-year-olds to share their scientific questions with new audiences, culminating in a celebration event in June each year. Historically, UWE Bristol's School of Engineering would host a celebration event for schools in the region, bringing teachers and pupils together to share their scientific discoveries. In 2019, nine local schools and home education groups visited Frenchay Campus for such an event.

Due to Covid restrictions it was not possible to host physical events in 2020 or 2021, but an online event was organised by the DETI Inspire team in June 2021 for local schools who had participated in the GSS during the pandemic. **204 pupils from 2 local schools** joined the team for their first ever online viewing of the new sustainability solutions science show, We Make Our Future, delivered by Explorer Dome via Zoom. DETI Inspire hope to take part in the GSS in 2022.



**Our advice would be to start where you feel most comfortable!**

**Start with your class or across your school, see what works and then look outwards for opportunities to collaborate and share with other schools, and organisations.**



**Kate Redhead is Regional Mentor for the Primary Science Teaching Trust  
Paul Tyler is Science Leader at Kirkhill Primary School, PSTT Fellow**

**#GSSfs2022**

**It's time to encourage your pupils to ask - investigate - share!**

**Social media promotion of Great Science Share 2022.**





## Curious Stories for Curious Children

'Curious Stories for Curious Children' first launched in 2019 as part of **Bristol's Storytale Festival** with STEM Ambassadors deployed to libraries and historically-scientific relevant locations across Bristol, to read short, stereotype-busting children's stories. The 11 events took place in October half-term 2019 with nearly 300 children and adults attending. In preparation for the original events, a **Stereotype challenging booklist** - to change perceptions of what science is and who scientists are, was collated. A library of these books has been expanded at UWE Bristol in 2021.

The Covid pandemic has prevented a repetition of such events but by collaborating with the West of England STEM Ambassador Hub, DETI Inspire plan to deploy Curious Stories for Curious Children in schools in 2022. STEM Ambassadors will undergo training with UWE Bristol's Associate Professor Jane Carter, who specialises in promoting reading with young children, before going into schools in the South West to read stories supplied by UWE's STEM stereotype-busting library.

The DETI Inspire project will continue delivering outreach to schools and community groups in 2022, with a focus on schools from socially disadvantaged areas in the West of England. All five of DETI Inspire's BoxED activities are showcased visually below and are available to download for free from DETI's website.

All sessions are being evaluated, with feedback from the programme conducted according to the DETI Inspire Evaluation Framework. Throughout 2022, the programme will also continue to support national engagement programmes such as the Leaders Award, Great Science Share, British Science Week, and Tomorrow's Engineers Week.



**STEM Ambassador reads to children at Wick Road Library in October 2019.**

# Outreach Plans for 2022

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## DETI Inspire Workshops

All our free workshops are run by trained outreach coordinators and feature real-life STEM Ambassadors and students. We can deliver in your school in the West of England or you can visit our purpose-built classroom at UWE Bristol's School of Engineering.

### ENGINEERING CURIOSITY 1 or 2 hours; KS2; KS3

Engineering Curiosity explores engineering careers and opportunities in the West of England. The resource features a set of top-trump style cards, each one inspired by a real-life engineer from the region, with curriculum-linked worksheets to help connect your classroom learning to the skills needed in the working world.

### WE MAKE OUR FUTURE 50 minutes; KS2; KS3

We Make Our Future is a new interactive, educational & entertaining science show which celebrates the ingenuity of human engineering, addresses current issues around climate change and introduces digital engineering as a relevant and attainable aspiration for all young people. This is a presenter-led experience delivered inside Explorer Dome's inflatable planetarium.

### THE WEST IN MINECRAFT 1 or 2 hours; KS2; KS3

The West in Minecraft educational resources take a digital, play-based approach to engineering using the popular game Minecraft. We support children to develop their own ideas and problem-solving skills, and engage with engineering as a creative and diverse subject that can impact the world around us.

### WECOUNT SCHOOLS 1 or 2 hours; KS2; KS4

WeCount Schools uses Raspberry Pi sensors and coding to support young people to learn about the grand challenges' cities face in relation to urban travel, air pollution and the steps we can take collectively to make their school streets, and cities, safer, healthier and happier.

### SUSTAINABILITY SOLUTIONS DEBATE KIT 2 hours; KS4; KS5

How might we reach net zero by 2030? Get your students thinking like an engineer and discussing potential solutions to the climate and ecological emergency with their peers using this debate kit developed using the West of England Climate Action Plan.



