yesc

Young Engineers and Science Clubs Scotland

Partnership Report
Academic Year 2021-22

scdi Scottish Council for Development and Industry

Contents

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1. Our Partnership

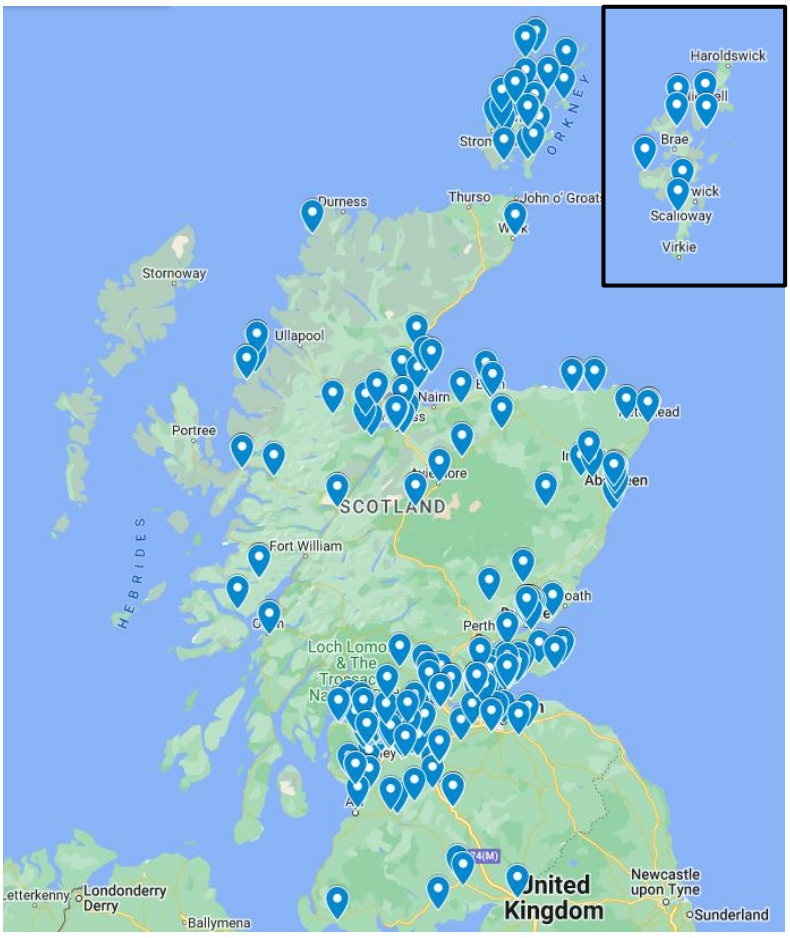
With Scottish Government and industry support the Young Engineers and Science Clubs (YESC) team have been working with schools in Scotland since 1987 and currently work with over 1,650 schools and STEM clubs across the country, with coverage in all 32 local authorities.

This invaluable support over many years has been vital to closing the STEM skill gap and inspiring the next generation. It has increased YESC's impact in relation to delivery of the Scottish Government's STEM and Digital Learning and Teaching strategies.

Support from the Scottish Government and our industry Lead Partners BP, EngineeringUK, Shell U.K. Limited and Wood enables us to enthuse young people by opening their eyes to the exciting opportunities within these sectors and helping them make informed decisions to pursue STEM subjects at school and beyond; ultimately delivering the future talent pipeline for Scotland's economy. Further support from a wide range of partners enables us to deliver a comprehensive programme of events and free school resources.

Despite the continued challenges the pandemic still presented in 2021/22, we were able to:

- Delivered 326 resource kits to schools, 45 school workshops, 38 CPD's and 15 STEM events.
- Secured two new project partners for our 2020/21 pilot digital coding competition Code vs Climate and rolled out 127 kits to 40 schools
- Delivered our Future Voice project which complemented the launch of SCDI's 2030 Blueprint report, with shortlisted schools joining the Forum virtually to share their vision for Scotland's future
- Celebrated with five face-to-face Celebration of STEM events in Aberdeen, Dundee, Inverness Shetland and Orkney with support from 8 event partners
- The map below shows our reach across Scotland of schools receiving a resource, workshop or those that came to an event.



2. 2021-22 School Year Highlights

• **326** STEM kits and resources provided to schools free of charge (a 71% increase on last year)

• **1** exciting new STEM competition launched in conjunction with SCDI's 2030 Blueprint Report – Future Voice

• **37** teacher CPD sessions delivered

• National delivery of Energy Quest programme running **33** to secondary schools across Scotland

• Delivery of national robotics competition to 33 schools, with 7 teams reaching UK finals

• **37** new schools welcomed to our network of around 1650 clubs (Appendix 1)

• **5** Celebration of STEM events in Aberdeen, Dundee, Inverness, Kirkwall and Lerwick with 50 schools in attendance.

• 66.6% (146) of schools were in the top 25% BME, FSM, 25% most deprived by SIMD or UR5/6. This is a 4.1% increase on last year. 84.5% (185) in the top 50% SIMD or UR 5/6 with above average BME and FSM.

"YESC plays an essential role within our technology ecosystem in sparking the curiosity and interest of young people in engineering and science. It moves children from classroom theory to real-world application and gives them a taste of what it feels like to work in such an exciting industry. The YESC team has created very exciting projects that engage young people in the search for solutions to the problems that we face as a society. What could be more valuable than that?

Mark Logan, Professor of Computer Science, University of Glasgow"

"Running the STEM club has been a key success for me in last 5 years. The SCDI competitions have provided the focus and challenge for the students to aim for. The events we then attended have always been excellent and the students are held up with acclaim on their return to school afterward.

Teacher, Charleston Academy"

3. Teacher Feedback

> Resources are probably the biggest barrier. By having everything we needed in one kit, we were able to fully immerse ourselves in this project and all pupils engaged fully - even pupils that sometimes disengage during literacy or numeracy lessons.
> **Shortlees Primary, East Ayrshire.**

> Many of our STEM Ambassadors have been selected due to their lack of engagement in the classroom. During STEM sessions, they are very much engaged and enjoy the hands-on and skills based approach to learning. Before the Code vs Climate project, the learners had very little knowledge or experience of coding. The project and competition peaked their interest in coding and they found makecode very accessible and user-friendly - particularly the blocks version.
> **Uphall Primary, West Lothian**

> It was such a great experience for the children, and they were proud to show off their hard work. The STEM activities were so much fun too. From the initial 'Climate Smarter' CPD through to the showcase event yesterday, it has personally been the most enjoyable project that I have been involved in. It was so well organised/resourced throughout, and I felt yesterday ran so well with a great mix of experiences
> **Lumphinnans Primary School, Fife**

> At staff level the networking has broadened and strengthened links. Parents have been involved. Pupils have continued to explore the micro:bit tutorials in their own time and stretched their capacity with this type of tech. Our pupils are a bit code-crazy at the moment they can't get enough of it!
> **Canmore Primary, Fife**

Our children are within a Scottish Attainment Challenge school due to the SIMD banding within their local area. There are barriers to learning for our children related to poverty and additional needs. This project was inclusive of all our learners - the materials made available, the task being open ended for interpretation. We are a small village without great transport links so the opportunities to engage with wider community groups is limited - this type of experience isn't offered elsewhere and was so valuable.
St Thomas' Primary School, West Lothian

4. Ongoing challenges presented by Covid-19

Ongoing support from Scottish Government and our industry partners (Appendix 2) enabled us to deliver an inspiring programme of events and competitions through the 2021-21 school year, despite the impact of COVID-19. Experience gained throughout the 2020-21 year enabled us to continue with an engaging virtual programme throughout the start of the academic year as schools went back into a national lockdown. We saw a gradual return to hybrid and face to face delivery which was slightly slowed by the Omicron outbreak but by April 2022, were delivering multi-school face to face events. While we have learned a lot and delivered many projects and workshops digitally, being able to engage pupils and teachers face to face has been such a welcome return.

- **STEM resource kits**

  Our free project kits continue to be posted directly to schools. Kits were adapted to contain more sets of materials to limit resource sharing as much as possible and the teacher notes were updated to include cleaning guidance. With schools focused on catch-up, we emphasised the cross curricular nature of projects and highlighted the literacy, health & wellbeing and outside learning elements. Schools used our resource kits in a full flexible way. This year our resources were primarily used within whole class settings with extra-curricular clubs still being restricted for most of the year. We supported teachers to deliver our projects and activities within the classes in the most appropriate way.

- **Teacher training**

  Teacher continuing professional development (CPD) training was delivered online, using Microsoft teams and recording the sessions so they could be accessed again at any time. This format proved very popular with teachers able to join after school without travel complications. Online training will never be able to recreate the impact of peer-to-peer learning and networking that goes on at a face-to-face event however feedback has been hugely positive and we were able to engage with higher numbers of practitioners. We have returned to delivering CPD sessions face-to-face wherever possible, although still offer recordings of sessions to more remote schools.

- **New hybrid format for events**

  YESC returned to multi-school, face-to-face events as of April 2022. The school and industry appetite for these was significant, and the buzz and excitement to be returning to events like these was palpable. The impacts of covid were still felt this year, for example across our celebration events. while we had 50 schools attending the events, a further 14 cancelled at short notice with the main reasons being short staffing due to covid related absence. This also affected our industry partners with a few of them having to pull out last minute due to staff illness.

  To help parents and guardians share in the events we recorded pupil presentations and shared with schools. We also delivered national projects virtually to allow pupils from all over Scotland to learn and showcase together.

5. Summary of Progress

Target 1:

To provide an inspiring programme of resources, hybrid competitions and events for schools across all 32 local authority areas in Scotland, utilising new technology and event formats to deliver high impact projects.

This academic year we welcomed 37 new local authority schools to our network (36 primary schools and 1 secondary school). This brings the total number of schools in our network to 1,662. This is made up of 1,635 local authority schools and 27 independent, home-school or other category of clubs. Most of these schools received a free resource or grant to assist them to get started and many also attended online teacher CPD courses and our online Celebration of STEM events.

School Sector	Number of LA Schools in Scotland*	Number Registered with YESC	
Primary	1,979	1,305	**68%**
Primary; Secondary	26	22	**85%**
Secondary	332	308	**93%**
Grand Total	**2,337**	**1,635**	**70%**

*Dataset from Scottish Government downloadable document school contact details

	Kits Distributed	Schools involved	Workshops	CPD Delivered	Events
Code vs Climate	127	40		4	**1**
Climate Smarter	85	85		6	**2**
Little Lighthouse	21	18		1	**1**
Construct a Crane	18	14			**2**
EEP Robotics		33		5	**3**
Energy Quest		27	33		
Future Voice		10			**1**
Barefoot		56		12	
Celebration Events		50			**5**
Lighting Up	45	45		4	
Fife Stem Festival	19	19	2		
Orkney Science Festival	11	11	11		
One off workshops				6	
TOTAL	**326**	**408**	**46**	**38**	**15**

Target 2:

To develop and deliver topical, high-quality cross-curricular resources for teachers and pupils with a focus on digital skills, the energy transition, and careers. We set an ambitious target of delivering 300 resource kits to schools in 2020-21.

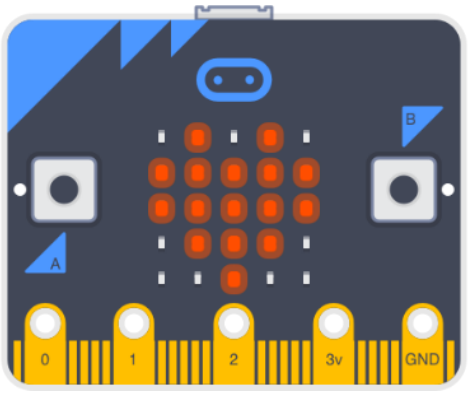
AND

Target 3:

To expand 3 projects across Scotland (Little Lighthouse, Climate Smarter and Code vs Climate) with sustainability and digital skills at their core.

We have provided details on the reach and expansion of all our projects including Little Lighthouse, Climate Smarter and Code VS Climate specifically below. As per the table on page 7 we distributed 326 STEM kits to schools free of charge over the 21-22 academic year.

{CODE} VS CLIMATE

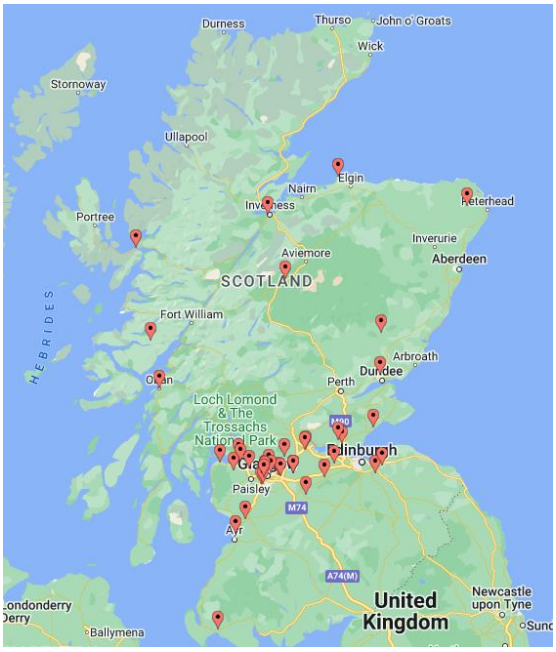


digitalXtra fund

micro:bit

SCOTTISHPOWER

THE UNIVERSITY of EDINBURGH



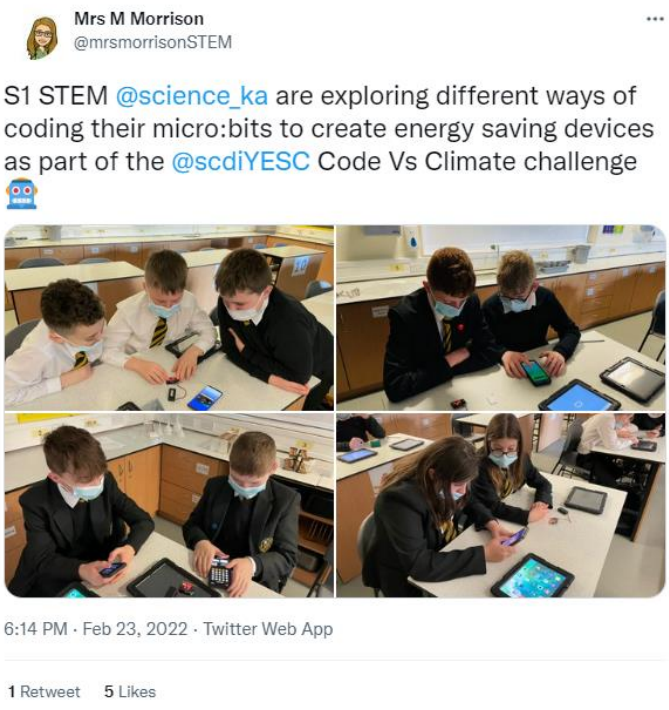
Code vs Climate which was launched for the 20/21 academic year thanks to support from ScottishPower and it was rolled out further in 2021/22. Thanks again to support for ScottishPower and new partners DigitalXtra Fund, Micro:bit Educational Foundation and the University of Edinburgh a total of 127 kits were distributed to 40 schools across Scotland. Of these kits, 87.5% went to schools with above-average percentages of black and minority ethnic (BME) students and free school meals (FSM) recipients or those within the top 50% most deprived communities or those classed as remote/rural. 60% of our resources went to schools with the top 25% highest number of BME students, FSM recipients, or the top 25% most deprived communities or those classed as remote/rural.

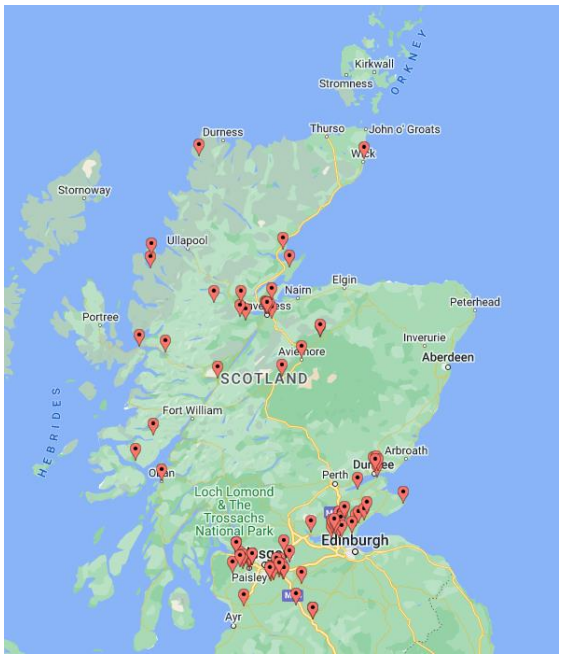
The project challenges pupils to investigate energy use in their school and by using the micro:bit computer they are asked to adapt their knowledge to develop a programme that can be incorporated into an energy-saving application or device to save energy, save money and help tackle climate change.

The project culminated in a virtual Code vs Climate Celebration which showcased school entries. The winning Primary was Kingcase Primary, South Ayrshire who audited their school and found many devices that were being left on when not needed and decided to raise awareness within their school. They then designed a device that detected when lights are on, and every hour played a very loud sound reminding people to switch them off if no longer needed. They turned their design into reality by using the micro bit light sensor and connecting their micro bit to a loudspeaker giving a deafening warning sound.

The pupils provided a detailed explanation of what each line in their code which showed a very good understanding of programming.

The Secondary winner was Carluke High School, South Lanarkshire who audited their classroom and surveyed teachers in their school on energy use. The found a specific problem they could solve; projectors being left on when not in use. As well as energy cost, this results in expensive bulbs burning out faster. They came up with an innovative design to detect that the projector had been on for a long time by measuring its temperature rise. The simulated circuit designs and came up with an effective circuit to warn teachers when their projector has been on for a long time.

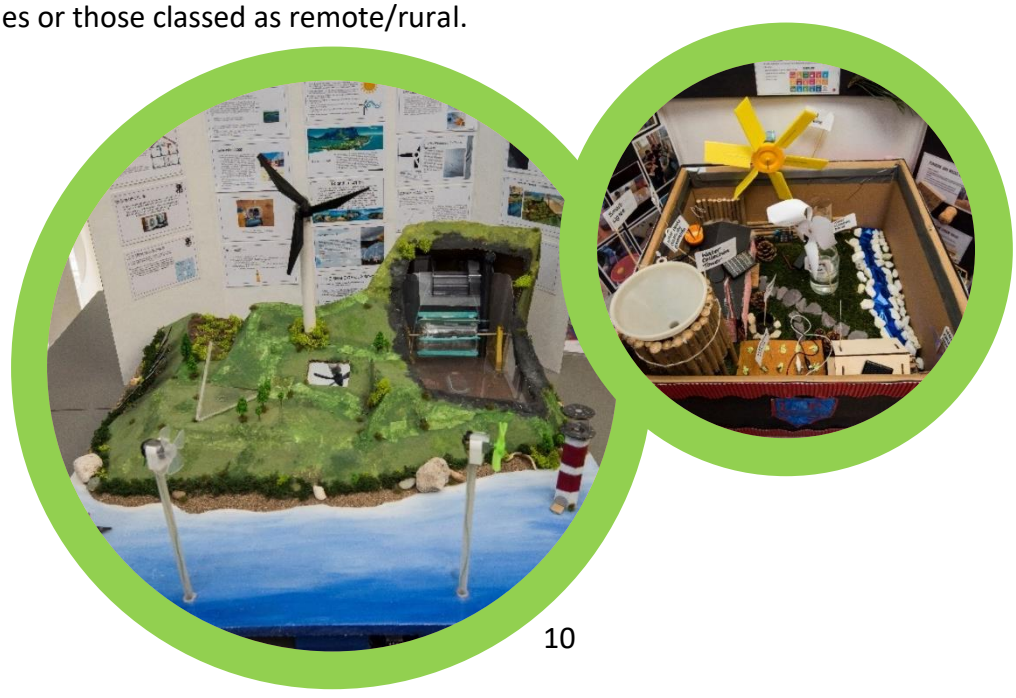




Climate Smarter launched in 2019 giving schools the resources to investigate how energy is produced, used, and how this is affecting the world around us. Teachers are trained and equipped to run hands-on experiments in class, culminating in the schools designing and building a model of their future smart eco-school. This project also incorporates significant digital elements, making use of the BBC micro:bit as a sensor and smart controller. This year we were delighted to partner with Confor and Scottish Forestry Trust. The project was expanded with input from timber sector industries to include a section on sustainable materials and carbon literacy.

With support from our partners this project was delivered to a further 85 schools from Fife, South Lanarkshire, Dundee, Highland and Renfrewshire reaching an estimated 1500 pupils.

Of these kits, 90.6% went to schools with above-average percentages of BME student and FSM or those within the top 50% most deprived communities or those classed as remote/rural. 77.6% of our resources went to schools with the top 25% highest % BME students, FSM recipients, or the top 25% most deprived communities or those classed as remote/rural.



Little Lighthouse

Little Lighthouse is an interdisciplinary school project for young engineers using lighthouses as a context to introduce various STEM topics including electricity and circuits, weather, sustainability, and digital coding.

Schools are provided with a kit of materials to lead them through scientific investigations, engineering challenges and learning to programme a microcomputer – all with the aim of constructing a functioning model lighthouse. Over 300 schools across Scotland have taken part in the project to date.

This year YESC partnered with RAiSE and Orkney Council to offer this resource to every school across the local authority. The YESC team travelled to Kirkwall in 2021 and delivered training to 35 teachers from 19 schools. Schools then worked on the project and showcased their fantastic constructions at our regional celebration event held in June 2022.

Of the 57 kits distributed this year, 94.4% of kits went to schools with above-average percentages of BME student and FSM recipients or those within the top 50% most deprived communities or those classed as remote/rural.

88.9% of our resources went to schools with the top 25% highest % of BME students, FSM recipients, or the top 25% most deprived communities or those classed as remote/rural.

As expected for the project on Orkney, the primary criteria was 16 of 18 schools being from UR 5/6 given the extreme remoteness of some of the communities involved.

Construct a Crane

Construct a crane has historically been one of our most popular projects. Schools are given a small set of parts, and then source the rest of the materials themselves. They are challenged with moving as much weight as possible within a tight timescale. While a relatively simple concept, designs can range from very simple basic functioning models through to complex mechanical constructions. This allows a wide range of young people to engage with the project.

This year we distributed 18 kits to 14 schools in Moray, Aberdeenshire, Aberdeen City and Shetlands. Schools brough their models to competitions held at our North-East and Shetland celebration of STEM events.

Lighting Up the Curriculum

IOP | Institute of Physics In Scotland

Lighting Up the CfE interests' pupils in electronics and physics through the magic of enabling them to create colourful flashing lights to light up their own artwork and projects.
Since 2010 around 320 electronic starter kits have been distributed to schools, delivered around 35 soldering training workshops for teachers in areas across Scotland and distributed over 30000 LED-based circuits.
The kits contain a soldering iron and all necessary tools and safety equipment, as well forty pre-packed circuit kits. A half-day CPD training session is provided for every school, ensuring teacher comfort with the basics of soldering, the operation of our circuits, and simple fault-finding and fixing.

This year with support from the Institute of Physics Scotland, 45 starter kits or top up kits have been distributed to schools across Scotland.

EEP Robotics Challenge is an exciting programming competition for pupils aged 11-14. The regional competitions are the culmination of a ten-week extra-curricular or in-school programme that will see students learning how to design and control their robots.

During the 21-22 academic year the Robotics Challenge was delivered as face-to-face competitions. Refresher training and support throughout the year was delivered online. Schools were all provided with a series of planned lessons, tutorials and activities on how to use the hardware and software.

In total 33 schools took part in the programme this year. 17 schools (132 pupils, 34 teachers) attended a physical event with a further 6 schools unfortunately having to cancel last minute. 3 Scottish regional finals were held at Forth Valley College, Falkirk; University of the West of Scotland (UWS), Paisley campus and at Leuchars Station (Army).

7 Scottish teams then went on to represent Scotland at the UK finals, held in Birmingham as part of the Big Bang Fair in June 2022.

Funded by Shell, over the last six years EngineeringUK has developed Energy Quest into a well-received programme, reaching 215,000 young people through 3,150 sessions in 1,460 UK schools. YESC are the Scottish national delivery partner for this programme and have just completed delivery of year 2 of 3. Over the next year EngineeringUK will be working with partners and funders to develop, test and evaluate different content and ways of delivery to maximise the programme's impact on young people, particularly girls and other groups that are under-represented in the engineering profession.

Energy Quest is targeted at students aged 11 to 14 and is designed to unlock their inner engineer as they explore sustainable energy sources. The programme is designed to be inclusive and to make the workshop content accessible and young people played a key role in developing the content of the workshop.

For the 2021-22 academic year, the Energy Quest programme was delivered in an online / hybrid format with kit being sent to schools and our team joining remotely to lead the session. On the day, the YESC team delivered the sessions guiding pupils through a series of hands-on engineering challenges and careers information. Towards the end of the year, we returned to delivering face-to-face sessions in schools.

In total 33 sessions were delivered to 847 pupils. A further 36 sessions are planned for 2022/23.

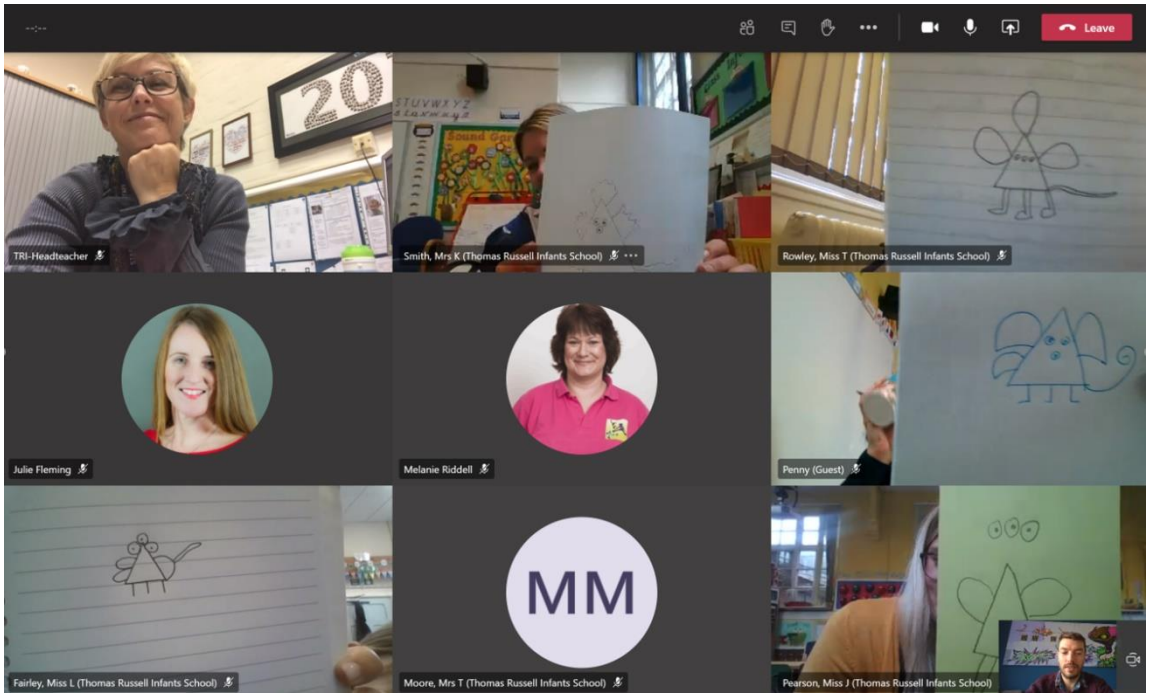
Barefoot

These workshops instantly bring the Barefoot resources to life in an interactive session. These sessions give teachers the confidence and knowledge to embed digital skills and activities across the curriculum.

Barefoot has recently launched a new programming CPD in addition to its computational thinking workshops which are accessible to primary teachers. They provide the perfect introduction to Barefoot, offering teachers the opportunity to explore a selection of resources designed for the classroom.

YESC organised monthly CPD sessions for Scottish teachers through the Education Scotland Digital teams. These proved very popular and received overwhelmingly positive feedback.

In total the YESC team delivered 12 CPD sessions to 166 teachers from over 65 schools.

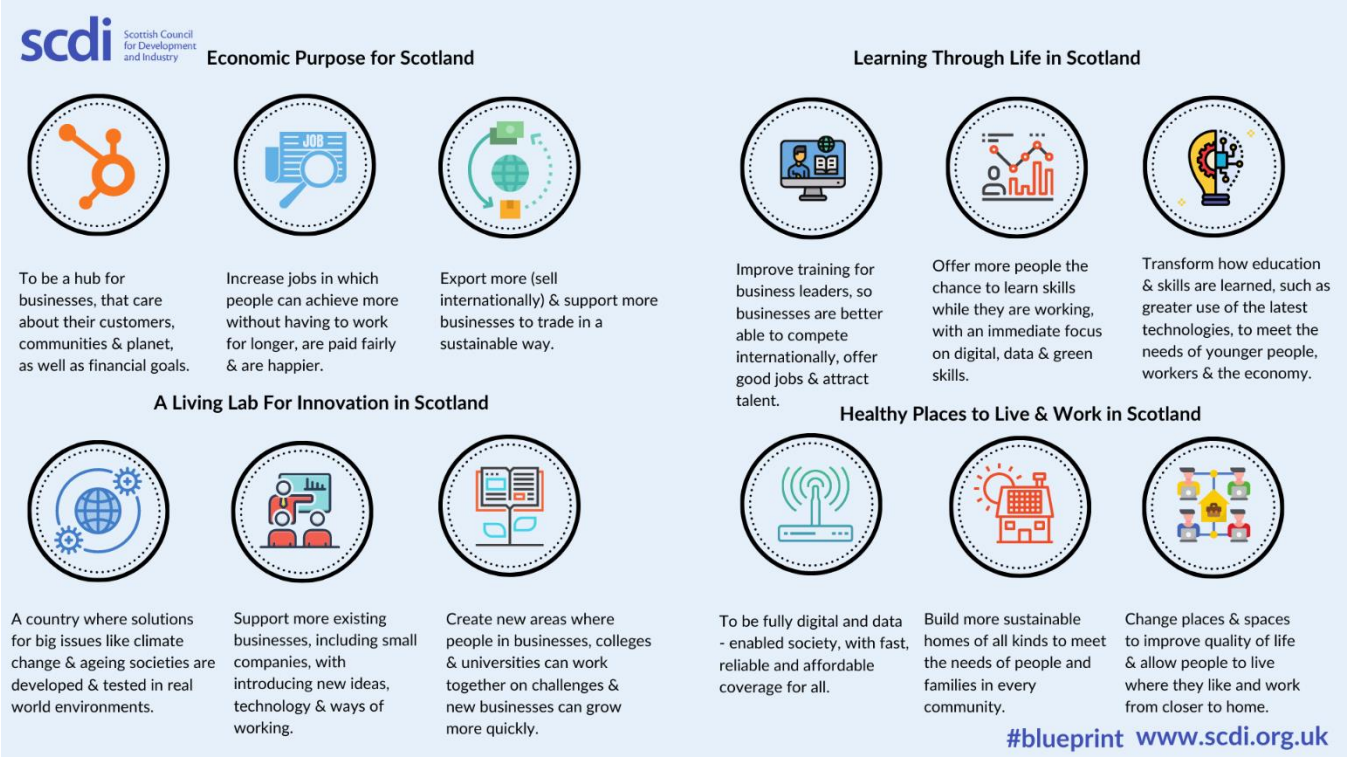


Blueprint 2030 - Future Voice

SHEPHERD+ WEDDERBURN

Thanks to support from Shepherd and Wedderburn, the YESC team worked with the policy team at SCDI to develop a new competition 'Future Voice' for the 21/22 academic year. This was different style of project for the programme which brought together young people from schools across the country in an important and valuable discussion about the vision for Scotland's future set out in the SCDI's 2030 Blueprint report. YESC invited young people to share their vision for Scotland's future, with schools joining SCDI's Annual Forum to share their ideas with the business world.

In total 226 pupils from 26 different schools shared their ideas and vision for Scotland's future.



Upcoming Project – Carbon Capture and storage

In the 2022/23 academic year thanks to support from Shell UK Ltd the YESC team will redevelop and revive our Carbon Capture and Storage project. This project was first delivered in 2014/15 but national focus has meant this technology is back in development.

This project will help young people to understand the technologies involved in low carbon energy as well as carbon capture, storage and transport. The project will also explore hydrogen fuel cell technology.

Teachers will receive training, resources and ongoing support to deliver a series of STEM activities in the classroom. Pupils will be invited to share and showcase their work at end of year celebration events.

This project will initially be rolled out to 50 schools across Aberdeenshire, Aberdeen City and Fife. We will also work with partners including Aberdeen Science Centre, TechFEST and Acorn to train and provide them with resources to deliver the project activities in their own settings.

Significant project expansion - HCI City region deal

YESC were delighted to be awarded funding as part of the HCI Skills gateway strategy.

The HCI Skills Gateway is part of the Edinburgh & Southeast Scotland City Region Deal and is funded by the UK and Scottish Governments. It is based at Edinburgh Napier University. Their ambition is to deliver clear, integrated and inclusive progression routes into construction careers.

This encompasses all skill levels, from introducing basic skills in schools across South-East Scotland, through to advanced postgraduate training for people under-represented in senior construction roles.

Funding for YESC will enable us to expand our Climate Smarter project to 30 schools across Fife, Edinburgh, West Lothian, East Lothian, Midlothian and Scottish Borders. We will work with both primary and secondary schools throughout the duration of the funding. A key focus of this project will be to develop meaningful partnerships and relationships between local STEM industries and participating schools. To enable this, YESC are recruiting for a member of staff to lead on this exciting expansion.

Crucially, this funding is secured for a 3-year period, which allows us to invest in the project and the new member of staff and deliver significantly more impact through prolonged engagement with the project stakeholders.

STEM Support network

In addition to delivering these key projects and linked events, the YESC team are on hand throughout the year to provide support and guidance to teachers across Scotland. Our team has countless small conversations with teachers to offer suggestions for activities and resources, to point them towards partner activities and to troubleshoot technology and equipment. One silver lining of the pandemic is that teachers are very confident arranging video calls to discuss technical questions and share live footage of issues – a vast improvement on doing the same via email or phone calls

In addition to our own events and activities the YESC team have supported or delivered:

- Workshops to 335 pupils as part of the Orkney Science Festival
- Livestream and in-person workshops to Orkney schools
- Micro:bit CPD for Falkirk Inclusion and Wellbeing service
- Workshops delivered in partnership with Edinburgh DYW to special school
- Organisation of and presentation at meetings of Scottish Physics teachers
- Delivery of workshops as part of the Fife STEM Connect-ability workshop
- Micro:bit CPD courses in partnership with RAiSE / Education Scotland

YOUNG STEM leader

The YESC team also worked closely with the Young STEM Leader team at SSERC to align our Climate Smarter project with the YSL programme. Now schools/pupils that complete the project can submit a portfolio of evidence and receive a YSL Level 2 certificate. Several hundred pupils have already been awarded their certificate as part of the project. Our ambition is to align all major future projects with the YSL programme and grow the partnership to help them reach every school in Scotland.

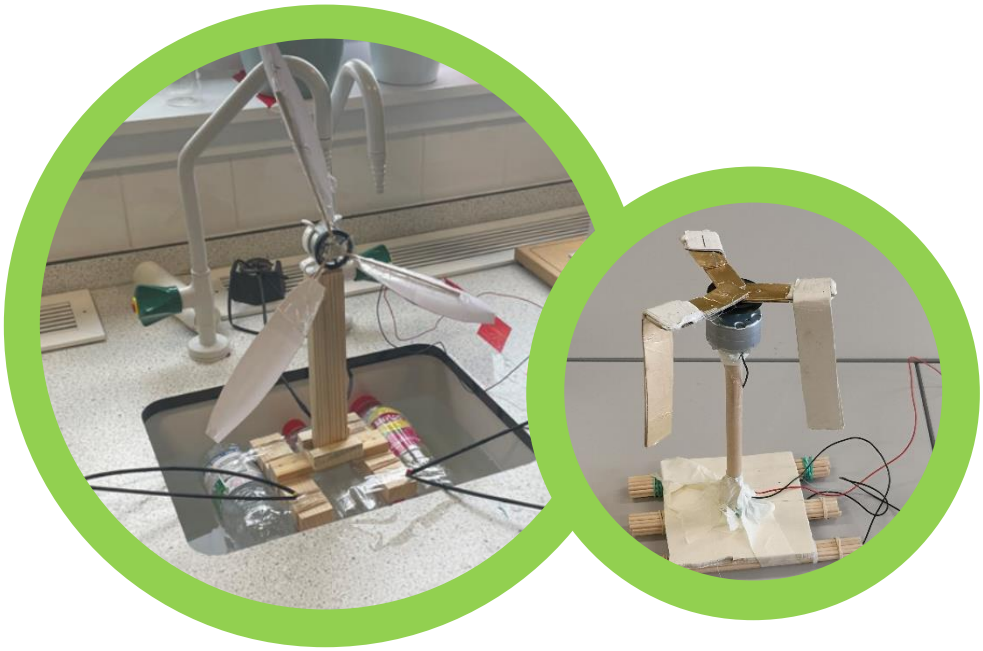
Pupils from Tulliallan Primary School and Nursery with their YSL Certificates

Retired project

This year we retired out Knots to Watts project and merged key parts of the challenge into our expanded Climate Smarter project. To date this project has been delivered in 103 schools across Scotland.

This offshore wind turbine project 'Knots to Watts' challenges 6-person teams (Primary or Secondary) to produce a research portfolio on technologies being used for offshore wind and then design, build and test a floating wind turbine. YESC provided a kit of parts and a quick start guide and then it was up to the groups to design, build and test their turbines.

Our ambition is to refresh and scale up this project and offer it nationwide but to do this requires significant partnership income. An initial plan is to target companies that were successful in the recent ScotWind programme.



Target 4:

To deliver a series of 5 celebration events across the north and north-east of Scotland giving young people extra-curricular experiences and opportunities to showcase their STEM work.

Support from BP, Confor, Crown Estate Scotland, Royal Academy of Engineering Ingenious Award, Repsol Sinopec, Shell UK Ltd, The Scottish Forestry Trust and Total Energies provided the funding required to deliver a series of in-person events.

Celebration of STEM events bringing together schools, families and engineers from local industry; took place in the following five locations: Aberdeen, Dundee, Inverness Shetland and Orkney.

At these events, the young people showcased their STEM project work, competed in STEM challenges set by the engineers, listened to inspiring talks, and took part in behind-the-scenes tours to discover more about career opportunities.

The following companies supported our events and brought STEM to life young people and teachers:

ASCO	**European Marine Energy Centre**	**Repsol Sinopec Resources**
Balfour Beatty	**Falck Renewables**	**SaxaVord Spaceport**
BP	**Heriot-Watt University**	**Shell UK Ltd**
Bristow Group	**Highlands and Islands Airport Ltd**	**Skills Development Scotland**
BSW Timber	**Jacobs**	**SSEN Transmission**
DYW Shetland	**Kaefer**	**Tilhill**
Digital Xtra Fund	**NatureScot**	**TotalEnergies**
Dundee and Angus College	**Orbital Marine Power Ltd**	**Vysus Group**
Dundee Science Centre	**ORE Catapult**	**Wood**
Engineering & Nautical, UHI	**ReFLEX Orkney**	

Over the 5 events, 56 school teams attended, receiving STEM resources and had their travel and overnight accommodation costs covered. Covid still caused challenges for both schools and companies attending with a further 14 schools cancelled last minute due to the omicron outbreak.

76 teachers and 309 young people met with 101 STEM professionals over the five events. To enable families to be a part of the day we videoed the Celebrations for the schools to share with family networks.

The island events reached remote and rural schools with very small pupil numbers, over the five events, 10 of the 56 school teams have a roll less than 25 pupils and 9 have a roll between 26-50 pupils. Reaching schools from the outermost islands meant that we had to be very mindful of travel restrictions, careful timetabling and preparing activities that could engage a varied age range.

The table below shows the statistics from school teams in attendance at these events.

Date	Event	School	Postcode	Pupil Roll	8-fold urban/rural classification	SIMD 2020 quintile	Percentage FSM
21-Apr	Aberdeen	Aberdeen Grammar School - Team 1	AB10 1HT	1163	Large urban areas	3	7.8
21-Apr	Aberdeen	Aberdeen Grammar School - Team 2	AB10 1HT	1163	Large urban areas	3	7.8
21-Apr	Aberdeen	Clerkhill Primary - Team 1	AB42 2AX	438	Other urban areas	2	13.8
21-Apr	Aberdeen	Clerkhill Primary - Team 2	AB42 2AX	438	Other urban areas	2	13.8
21-Apr	Aberdeen	Danestone Primary	AB22 8ZN	226	Large urban areas	5	12.6
21-Apr	Aberdeen	Elgin High School	IV30 6UD	796	Other urban areas	4	15.6
21-Apr	Aberdeen	Lochside Academy	AB12 3JG	1092	Large urban areas	4	23.5
21-Apr	Aberdeen	Peterhead Academy	AB42 1SY	1212	Other urban areas	3	16.4
21-Apr	Aberdeen	Riverbank Primary - Team 1	AB24 2XL	335	Large urban areas	2	42.2
21-Apr	Aberdeen	Riverbank Primary - Team 2	AB24 2XL	335	Large urban areas	2	42.2
28-Apr	Dundee	Bellyeoman Primary	KY12 0XP	231	Other urban areas	4	26
28-Apr	Dundee	Blackness Primary	DD1 5RT	350	Large urban areas	3	7.7
28-Apr	Dundee	Canmore Primary	KY11 8RF	320	Other urban areas	5	6.1
28-Apr	Dundee	Carnoustie High School - Team 1	DD7 7SS	846	Other urban areas	4	11.8
28-Apr	Dundee	Carnoustie High School - Team 2	DD7 7SS	846	Other urban areas	4	11.8
28-Apr	Dundee	Crail Primary	KY10 3UW	77	Accessible rural areas	4	c
28-Apr	Dundee	Dunbog Primary	KY14 6JF	43	Accessible rural areas	4	c
28-Apr	Dundee	Fintry Primary	DD4 9EL	395	Large urban areas	2	41.5
28-Apr	Dundee	Kinross High School - Team 1	KY13 8FQ	953	Accessible small towns	5	4.4
28-Apr	Dundee	Kinross High School - Team 2	KY13 8FQ	953	Accessible small towns	5	4.4
28-Apr	Dundee	Lumphinnans Primary	KY4 9HG	122	Other urban areas	2	44.8
28-Apr	Dundee	St Joseph's RC Primary	DD2 2AB	334	Large urban areas	2	21.4
28-Apr	Dundee	St Paul's Academy - Team 1	DD3 0EH	934	Large urban areas	1	34.9
28-Apr	Dundee	St Paul's Academy - Team 2	DD3 0EH	934	Large urban areas	1	34.9
28-Apr	Dundee	St. Margaret's Primary	KY11 4BB	349	Other urban areas	5	12.1
01-Jun	Orkney	Eday Community School	KW17 2AA	10	Very remote rural	3	c
01-Jun	Orkney	Papa Westray Community School	KW17 2BU	2	Very remote rural	3	0
01-Jun	Orkney	Papdale Primary School	KW15 1PJ	439	Very remote small towns	4	8.8
01-Jun	Orkney	Sanday Junior High School - Primary	KW17 2AY	28	Very remote rural	2	c
01-Jun	Orkney	Sanday Junior High School - Secondary	KW17 2AY	31	Very remote rural	2	c
01-Jun	Orkney	Shapinsay Community School	KW17 2DY	13	Very remote rural	2	c
01-Jun	Orkney	Shapinsay Community School	KW17 2DY	13	Very remote rural	2	c
01-Jun	Orkney	Stronsay Junior High School - Secondary	KW17 2AE	12	Very remote rural	2	0
01-Jun	Orkney	Westray Junior High School - Primary	KW17 2DH	31	Very remote rural	3	c
01-Jun	Orkney	Westray Junior High School - Secondary	KW17 2DH	48	Very remote rural	3	c
08-Jun	Shetland	Burravoe Primary	ZE2 9AY	10	Very remote rural	3	c
08-Jun	Shetland	Hamnavoe Primary	ZE2 9LA	86	Very remote rural	4	c
08-Jun	Shetland	Mid Yell Junior High School - Team 1	ZE2 9BN	49	Very remote rural	3	0
08-Jun	Shetland	Mid Yell Junior High School - Team 2	ZE2 9BN	49	Very remote rural	3	0
08-Jun	Shetland	North Roe School	ZE2 9XG	14	Very remote rural	3	0
08-Jun	Shetland	Ollaberry School	ZE2 9RT	22	Very remote rural	3	c
08-Jun	Shetland	Sandness Primary	ZE2 9PL	18	Very remote rural	3	c
08-Jun	Shetland	Whiteness Primary - Team 1	ZE2 9GJ	67	Very remote rural	4	0
08-Jun	Shetland	Whiteness Primary - Team 2	ZE2 9GJ	67	Very remote rural	4	0
16-Jun	Inverness	Avoch Primary - Team 1	IV9 8PS	292	Accessible rural areas	3	9.7
16-Jun	Inverness	Avoch Primary - Team 2	IV9 8PS	292	Accessible rural areas	3	9.7
16-Jun	Inverness	Charleston Academy	IV3 8ET	738	Other urban areas	1	13.3
16-Jun	Inverness	Culloden Academy	IV2 7JZ	1081	Other urban areas	5	10.2
16-Jun	Inverness	Elgin High School - Team 1	IV30 6UD	796	Other urban areas	4	15.6
16-Jun	Inverness	Elgin High School - Team 2	As above	796	Other urban areas	4	15.6
16-Jun	Inverness	Forres Academy	IV36 1FG	835	Other urban areas	5	13.4
16-Jun	Inverness	Kyleakin Primary	IV41 8PH	23	Very remote rural	3	c
16-Jun	Inverness	Millburn Academy	IV2 3QR	1237	Other urban areas	3	9.7
16-Jun	Inverness	Muirtown Primary	IV3 8LU	200	Other urban areas	4	11.3
16-Jun	Inverness	Newmore Primary - Team 1	IV18 0PG	34	Remote rural areas	3	c
16-Jun	Inverness	Newmore Primary - Team 2	IV18 0PG	34	Remote rural areas	3	c

The industry partners reported that they valued the opportunity to engage with their local communities and that the events provided a platform to meet with their future workforce while developing their public speaking specifically with a younger audience.

"It is fantastic to see Shetland primary schools explore science through these projects. Working in partnership with Young Engineers and Science Clubs helps strengthen the important message that studying STEM subjects can be a rewarding, exciting and fun part of the school curriculum. As an international energy company operating in Shetland, we are committed to supporting the local community with a focus on providing new learning opportunities for school children whose ideas and innovations will drive our industry and our world forward in the future."

Alison Pitts Site Field Engineer, TotalEnergies E&P UK Limited

"Confor is proud to support the Young Engineers and Science Clubs as our ever-changing world calls for more young people to take an interest in STEM subjects. It was fantastic to attend the event at the Scottish School of Forestry and see what the primary and secondary pupils have been working on. The attention to real world problems and creativity in finding solutions was very impressive. All the participating schools should be very proud, and we look forward to seeing more from them in the future."

Eleanor O'Neill, Communication Manager, Confor

"This successful event provided local school pupils a simple insight into the generation of hydrogen from electricity and how to use this cleaner energy source to power a small hydrogen car. Representatives from Repsol Sinopec's Aberdeen Office and Flotta Terminal were on hand to support each group as they completed the experiment and test each car's performance. Flotta Terminal Manager Ian Tulloch also spoke to the pupils about working at Flotta and the terminal's future plans, including the Flotta Hydrogen Hub, a proposed green hydrogen production and export facility on the island. We look forward to welcoming the winning schools on the visit to the terminal."

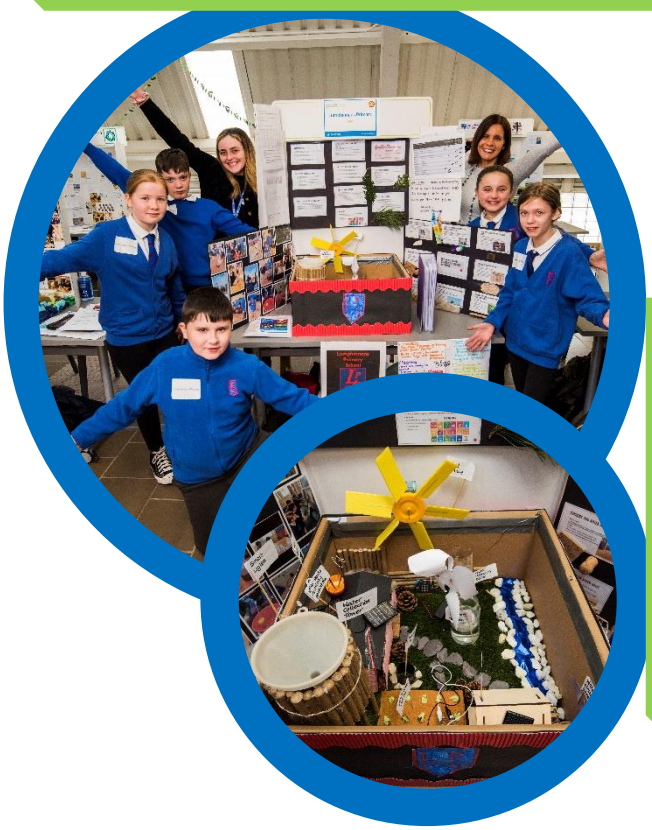
Doug Mackay, Project Manager at Repsol Sinopec Resources UK Limited

Schools were particularly keen to return to in person events allowing their young people to network and develop their presenting and team working skills, while seeing STEM in a hands-on context.

> The children had such a great day, and I was so proud of them and their confidence and teamwork when completing the challenges and presenting their model.
> **St Joseph's RC Primary, Fife**

> It allows us to be aspirational and gives context to our young people. It helps us further develop our STEM capital.
> **Culloden Academy, Highland**

> It is an engaging event with rich experiences and opportunities to explore STEM with real life applications that are relevant to our future.
> **Papdale Primary, Orkney**



> It was such a great experience for the children, and they were proud to show off their hard work. The STEM activities were so much fun too. From the initial 'Climate Smarter' CPD through to the showcase event yesterday, it has personally been the most enjoyable project that I have been involved in. It was so well organised/resourced throughout, and I felt yesterday ran so well with a great mix of experiences. Thank you!
> **Lumphinnans Primary, Fife**

We also used the opportunity of in-person events to create a new promotional video for YESC, which can be viewed on our website: https:// www.scdi.org.uk/yesc/

Targets 5, 6 & 7:

To work with partners to ensure YESC is an inclusive STEM learning programme, recording demographics where possible and using as a baseline for reporting.

- **At least 40% of schools reached to be in the top 25% of the Scottish Index of Multiple Deprivation [SIMD]; and**
- **At least 40% of schools to be graded 5-6 on the 6-fold Urban/Rural classification.**

YESC continues to strive to achieve its targets of engaging with groups from the most deprived and remote areas and have had significant success in achieving this over the academic year.

We continue to target our projects towards these under-represented groups, and this will remain a key focus of our work in 2022/23 and beyond. In 2021/22 we distributed a total 326 kits and worked with 219 schools throughout Scotland. 66.6% (146) of these schools were in the top 25% BME, FSM, 25% most deprived by SIMD or UR5/6 with 185 (84.5%) being in the top 50% SIMD or UR 5/6 with above average BME and FSM.

All Schools Engaged across YESC programme			
Total Schools		**219**	
BME	**Above Average**	**63**	**28.8%**
	Significantly above	**30**	**13.7%**
FSM	**Above Average**	**85**	**38.8%**
	Significantly above	**36**	**16.4%**
SIMD	**Top 50% most deprived**	**97**	**44.3%**
	Top 25% most deprived	**40**	**18.3%**
URC	**Remote / Rural**	**79**	**36.1%**
Above average BME, FSM, top 50% SIMD or UR 5/6		**185**	**84.5%**
Top 25% BME, FSM , SIMD or UR 5/6		**146**	**66.7%**

Data on Free School Meals (FSM) pupil percentages, black and minority ethnic (BME) pupil percentages, Social Index of Multiple Deprivation 2020 and Urban/Rural classification (UR) were sourced from: https://www.gov.scot/publications/school-level-summary-statistics/

Target 8
To continue to work with partners to provide young people and teachers with insights into the world of work.

Over the past academic year, we have deepened industry partnerships and seen a far higher engagement between schools/young people and industry than in previous years. There are 3 suspected reasons for this:

1. Demand from schools has been significantly higher than normal, perhaps due to a year of minimal industry engagement due to nationwide lockdown for much of the 20/21 year.
2. Desire from, and expectation on industry to 'do more' and engage more. Greater focus on business purpose and social responsibility in face of climate crisis and events like COP-26.
3. Easier forms of engagement such as joining a school session remotely via platforms like Zoom.

We have facilitated hundreds of industry-school engagements, reaching thousands of pupils. Examples of the work done on this area include:

- 101 industry volunteers from 36 companies attending our celebration events and meeting pupils from 50 schools
- Industry site tours as part of our celebration events. For example, at our Robotics event in Leuchars pupils toured the engineering / maintenance hangers. At our Highland celebration, pupils went on a forest tour and visited an active sawmill.
- 39% of Energy Quest school workshops having an industry volunteer present
- Development of a Forestry ambassador database and the introduction of over 100 teachers to industry volunteers, arranging site visits, talks and in school support.
- Provision of case studies and videos from volunteers which were included in our project briefs and shared with schools.
- Links to DYW information on careers throughout our programmes.
- Sharing of industry material, competitions and education initiatives across our network.
- Site tour of Bristow helicopters base, with a chance to meet engineers and pilots as well as a chance to experience the flight simulator was organised as prize at our North-East celebration event.
- Similarly, a site tour of the Flotta Terminal visit was offered to our Orkney celebration winners
- 17 volunteers supported our robotics events with pupils learning more about their careers

20/21 has been a hugely successful year in terms of providing an insight into the world of work and plans are already in place to grow and expand this over the coming year.

> Great opportunity for the pupils to showcase STEM learning in schools. Fantastic opportunity for pupils to speak to real life STEM engineers and apply their learning into real life situations/activities

Pupil, Danestone Primary

> I had a lot of conversations that have inspired me to keep going with engineering.

Pupil, Elgin High

Appendix 1 - Registered Schools by Local Authority

Local Authorities	Number of Schools*	Active YESC Schools	% Active
Aberdeen City Council	59	46	78%
Aberdeenshire Council	167	108	65%
Angus Council	59	42	71%
Argyll and Bute Council	85	28	33%
City of Edinburgh Council	112	59	53%
Clackmannanshire Council	19	14	74%
Comhairle nan Eilean Siar	23	18	78%
Dumfries and Galloway Council	111	85	77%
Dundee City Council	41	30	73%
East Ayrshire Council	47	46	98%
East Dunbartonshire Council	42	26	62%
East Lothian Council	39	25	64%
East Renfrewshire Council	31	25	81%
Falkirk Council	57	35	61%
Fife Council	151	95	63%
Glasgow City Council	171	118	69%
Inverclyde Council	26	25	96%
Midlothian Council	37	28	76%
Moray Council	53	50	94%
North Ayrshire Council	57	57	100%
North Lanarkshire Council	142	68	48%
Orkney Islands Council	21	21	100%
Perth & Kinross Council	77	63	82%
Renfrewshire Council	61	44	72%
Scottish Borders Council	68	38	56%
Shetland Islands Council	29	29	100%
South Ayrshire Council	49	49	100%
South Lanarkshire Council	142	120	85%
Stirling Council	45	36	80%
The Highland Council	199	139	70%
West Dunbartonshire Council	37	22	59%
West Lothian Council	80	46	58%
Grand Total	2337	1635	70%

*Primary, Primary/Secondary, Secondary schools both local authority and independent

Appendix 2 - YESC Partners 2021-22

Lead Partners

Event / Project Partners

Venue Partners

YESC would like to thank the following organisations for providing venue spaces for our STEM celebration and robotics event.

In-kind support

YESC would also like to thank the companies below who provided in-kind support and volunteers for our Celebration of STEM events this year