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early years & primary STEM bulletin

Ideas and inspiration for primary teachers and early years staff

In this edition:

And other articles by external partners & organisations

Debugging your way to success!

If there is one constant you can be assured of when stepping into the world of Computing Science (CS) and coding, it is that you will inevitably make mistakes along the way.

CS is awesome; whether you and your learners are delving into unplugged lessons, engaging with micro:bits, or fortunate enough to own robots you can program to drive, sing, tell stories and even dance!

From experience, one of the guaranteed benefits of engaging with CS and programming is the enthusiasm and willingness displayed by learners. However, another guarantee is that mistakes will be made, and the skill of debugging will be essential!

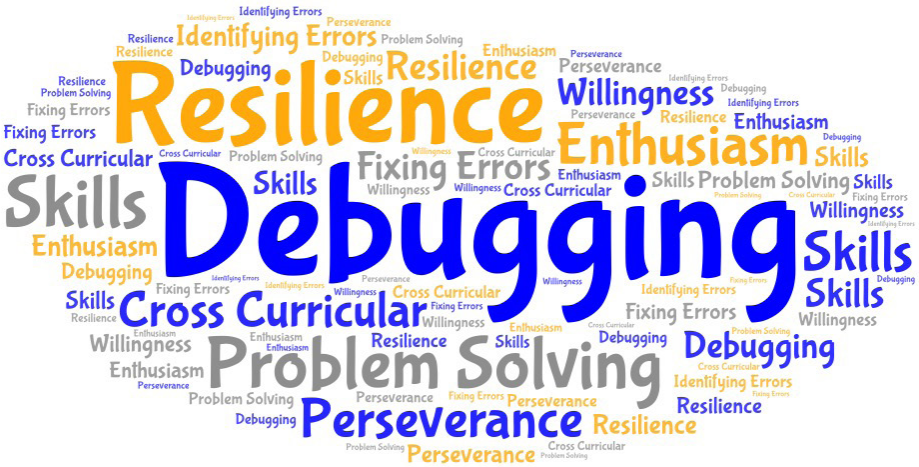
What is debugging, and why is it so significant?

Debugging is the process of identifying and resolving errors in code. Although this may seem straightforward, it requires learners to develop specialised skills. While debugging is closely tied to CS and programming, it not only aids in coding but also enhances crucial problem-solving abilities.

Debugging, or at least the bugs themselves, can sometimes carry negative connotations. Throughout all of the training we run via SSERC Digital, we discuss barriers to engaging with CS. One of the most common difficulties cited by teachers is a lack of confidence and uncertainty in overcoming issues when programming. The fear of not knowing how to support learners when their code encounters problems is a real concern and can contribute to disengagement.

Despite the challenges, Computing Science offers a unique opportunity to enhance problem-solving skills, foster collaboration, and develop life skills. While some learners may struggle with debugging or problem-solving, the potential benefits of embracing Computing Science far outweigh these challenges.

Enthusiasm and willingness are vital to enhancing learning. From years of delegate feedback, as well as personal experience working with primary-aged learners, it is evident that CS is a powerful motivator for learners. Learners often strive to succeed with CS, demonstrating resilience and perseverance in the face of difficulties, allowing them opportunities to develop vital problem-solving skills that are transferable across the curriculum. In many of our showcase sessions, we have heard from educators commenting that learners who usually disengage from learning and are frustrated by mistakes were willing to try again and again in CS sessions, ultimately experiencing success.



Introducing debugging

When teaching CS, educators need to make a conscious effort to introduce specific concepts. This is one potential pitfall to be aware of when using resources such as Marty, Sphero Indi, VEX GO, and micro: bit, to name a few. Engaging with these resources alone does not lead to learners developing an understanding of algorithms, repetition, and selection; these concepts need to be taught alongside using the devices.

Debugging, on the other hand, will present itself more naturally, as it is an essential skill for progressing and succeeding with any CS resource or task. Engaging with CS inevitably >>

leads to mistakes. Therefore, it is essential to discuss debugging and how we need to be able to locate and fix bugs in our code to ensure our programs work correctly.

If you are introducing a CS resource to learners, the very first input is an excellent opportunity to make an error and discuss bugs with them. It's even better if the educator makes the mistake! Learners often enjoy fixing mistakes made by others, and debugging is an excellent way for them to engage with CS without being overwhelmed by the task of creating their own code from scratch. Instead, they get to explore pre-existing code and try to identify where it has gone wrong.

If you are looking for a few ideas of where to get started with your debugging journey, click on the picture below and work through some examples using BBC, Barefoot, micro:bit and others:

Not just the what, but the how!

No matter where you are on your CS journey, whether introducing your pupils to CS for the first time or you are well along your journey, debugging must be an essential part of every lesson.

It is vital to teach your learners how to debug and problem-solve rather than simply explaining what debugging is. We hear a lot of feedback about the lack of problem-solving skills our learners possess, but are we taking the time to teach the skill? As discussed, teaching coding is an ideal opportunity to do this.

Below are some examples of methods to use when developing debugging skills (Figure 1).

Across the curriculum

Having introduced the concept of debugging, it can be useful and fun to start using the terminology across the curriculum, taking the learners' enthusiasm for coding into other areas. Instead of learners being asked to correct their work in maths, they can debug it. Learners can be debugging their writing to check for any errors in their spelling, grammar and punctuation. This helps to soften the finality of getting something 'wrong', flipping that mindset to a search for a bug that first needs to be identified and then fixed. In our showcase sessions, we hear a lot of examples of how effective this is and how a change in pedagogical approach and use of terminology can have profound results.

Debug your way to success

It is often true that debugging a piece of code can take more time than writing the actual code. Even now, after using many CS resources for years, we find that debugging is still essential to any coding success. It is also true that the more complex your code, the more necessary it is for you to use your debugging skills. However, these skills can be developed from the very first engagements with CS, such as unplugged experiences using a codable robot to navigate a maze, and maintain their importance as you continue through to block coding and beyond. If you want your learners to be successful in their coding, then teaching, developing, and enhancing their debugging skills is essential, and it is made easier due to the enthusiasm, perseverance, and resilience when approaching and delivering your CS lessons. As an added bonus, the overall impact on learners' problem-solving skills will ultimately help them with their work across all learning. <<

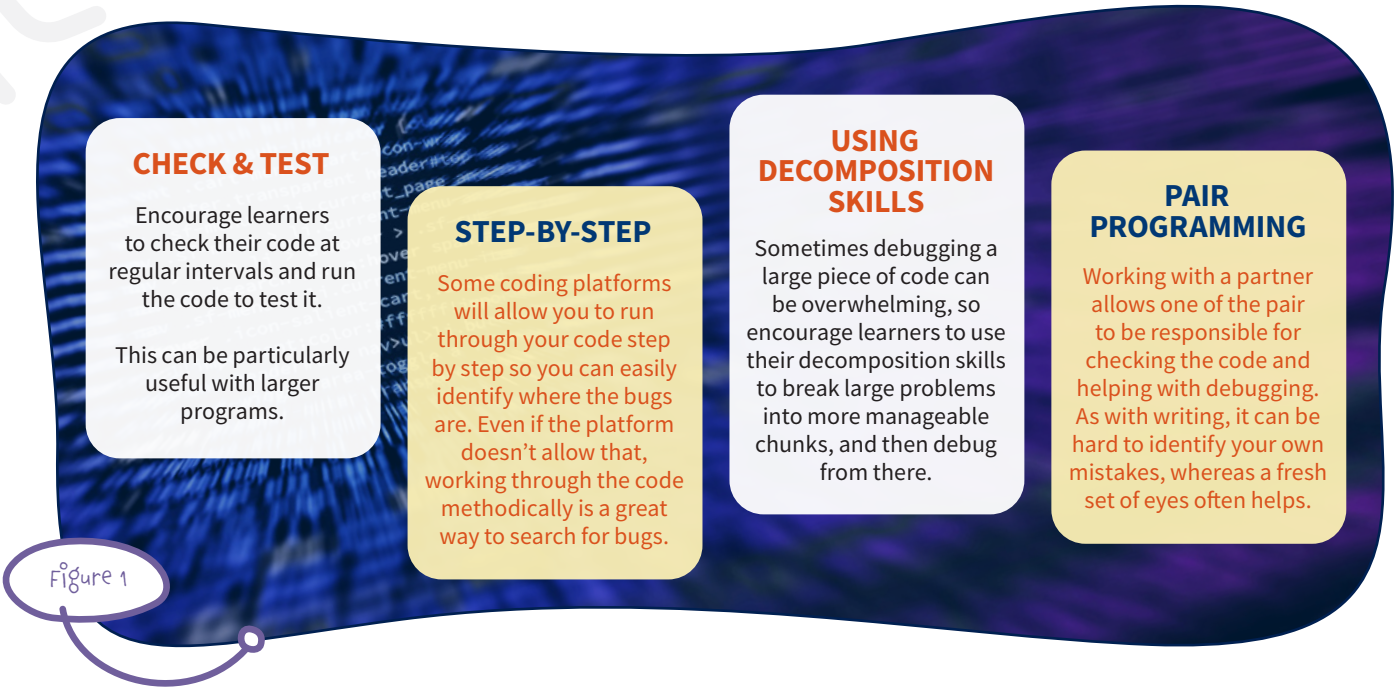
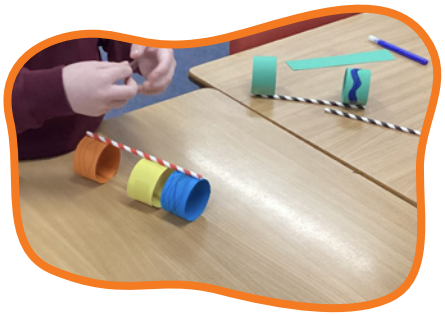


Figure 1

A STEM journey

Graeme Robertson is a teacher at Dens Road Primary School, Dundee. In this article, he tells us about his experiences of attending professional learning at SSERC.

As a teacher delivering digital learning and STEM for upper primary and leading these areas for the whole school, the professional learning available through SSERC has been invaluable for my own development and for supporting colleagues in our school. Over the past couple of years, I've participated in various SSERC programmes – face-to-face training days and online sessions – and in 2022-2023, I was involved in the Primary Cluster Programme.



What makes SSERC's professional learning so effective is that you receive not only experiential training but also physical resources to implement the learning immediately with your learners.

"Using Marty, Indi and Bolt lets me learn more about coding and I am able to create much better codes to complete lots of tasks."

Primary 6 learner

The comprehensive materials – presentations, planning documents and lesson resources – further support putting the training into practice. Access to the professional learning community via Teams means you're never alone in your implementation efforts.

"There are lots of STEM skills which I can use in other areas of my learning and in my life."

Primary 7 learner

These opportunities are open to all educators, regardless of role or prior experience. I've benefited from sessions where I felt like I was going into the unknown and others where I felt I could contribute more of my expertise and skills. The value lies in the diverse perspectives shared.

While resources are provided, scaling up for classroom or wider school use requires securing additional materials, considering factors like procurement, approved suppliers, network capabilities, storage and upkeep. It can be challenging, but giving yourself time and leveraging contacts within your district can help overcome barriers. SSERC is also available to assist with persistent issues.

"Science is so much fun and it makes we want to be a scientist."

Primary 4 learner

Introducing new devices and approaches from SSERC training has created a real buzz in our school around digital learning and STEM. However, the real sense of achievement and fulfilment comes from building true impact. This requires commitment from yourself as the participant, leadership, staff buy-in, and time to foster a supportive ethos. Despite the challenges, the professional growth has been invaluable, and I would eagerly participate again, inspired by the potential for an even greater impact.

Our school's STEM journey began with articulating a new vision in 2021, involving and listening to the staff, learners, and wider school community, which led us to SSERC's enriching opportunities. If you are interested in STEM, I highly recommend exploring SSERC's offerings. Understand your goals, anticipated next steps, and approach the learning with an open mind. The journey is fulfilling, rewarding and exciting! <<

Sphero Mini: tiny tech, endless STEM learning

Get started learning STEM in the classroom with the Sphero Mini Education Pack. Sphero Mini packs tons of fun and learning into a tiny, app-enabled robotic ball. At an entry-level price point, this tabletop bot is perfect for all students and learning spaces.

The Sphero Mini Education Pack has everything you need to get rolling and learning! This pack includes 16 clear Sphero Mini app-enabled robotic balls, bumper covers, mini traffic cones, bowling pins, construction sets, and activity cards that help expand playtime and imagination in STEM learning.

KEY FEATURES AND BENEFITS

Teeny tiny tech

Packed with teeny tiny tech, Sphero Mini has a little gyroscope, accelerometer, and LED lights. With almost an hour of playtime, your students will have the room to stretch their imagination—all while having fun learning!

Step-by-step learning

Learn the fundamentals of STEM and coding with mini traffic cones, bowling pins, construction sets, and step-by-step activity cards with STEM-inspired challenges and games.

Program three ways

Using the Sphero Edu app, program your Mini using draw and drive commands, Scratch blocks, or even JavaScript text programming.

Free lesson plans

The Sphero EDU app offers thousands of free lesson plans, so you can get rolling quickly. <<

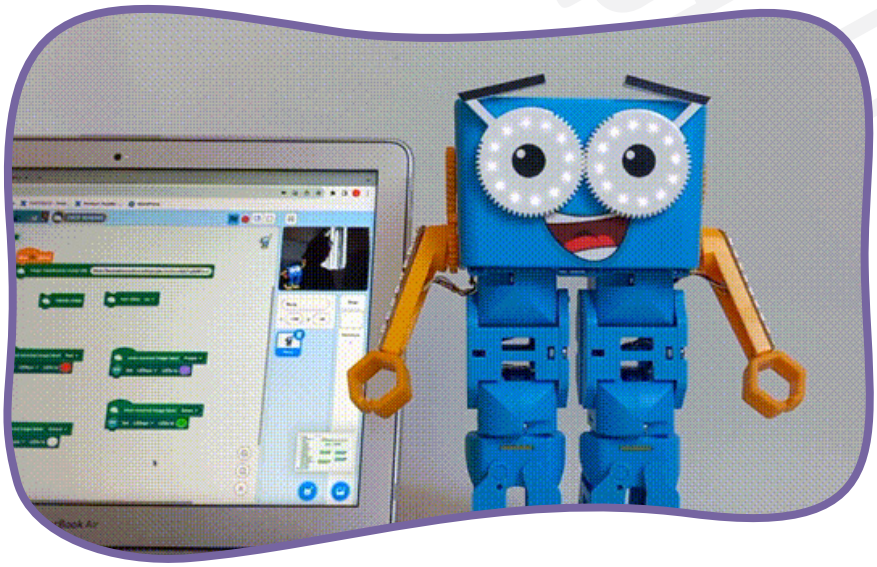
Find out more about Marty

Python translator

Marty the Robot was designed to provide immediate fun and engagement for children and to serve as an approachable solution for teaching coding and programming. A key element in making computational thinking accessible is the introduction of block-based coding, which is particularly suitable for learners just starting on their coding journey due to its emphasis on visual learning and an easy learning curve.

MartyBlocks, based on Scratch 3.0, is Robotical's block-based visual programming language tailored for children and young learners. With MartyBlocks, users can program routines, reactions to sensors, and other actions for Marty, fostering creative thinking, computational reasoning, and collaborative work (Figure 1).

We've introduced a new "show code" function to facilitate the transition from block-based to text-based coding. This feature serves as a block-to-Python translator, allowing students to seamlessly shift from visual programming to text-based coding and progressively enhance their coding skills.



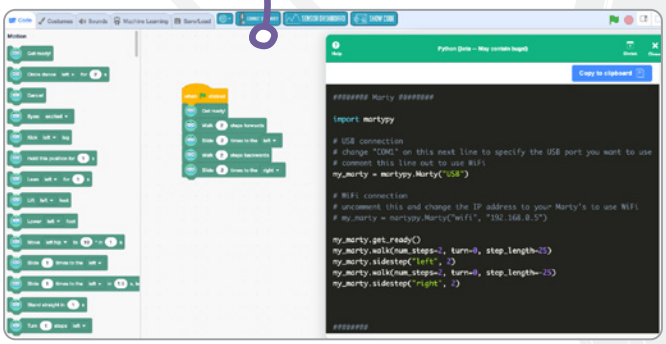
Using Marty to teach AI and Machine Learning!

In an increasingly technology-driven world, it's crucial for children to feel included in discussions about the technology they engage with. Inclusion helps dispel any potential concerns or misconceptions they might develop regarding AI or Machine Learning and encourages young students to innovate and create using the technologies around them (Figure 2).

Marty the Robot was designed with interactivity in mind, and our new machine learning extension allows students to interact with Marty like never before. Students can teach Marty to react to sounds or images and control the outcome. Marty can dance to a specific song, whistle when shown a particular image, or say hello and wave when they see a student; the options are endless!

Our user guides provide simple step-by-step instructions for training images or sound models. Here's an example of a project in which Marty has been trained to change his eye colour in response to different-coloured cards. >>

Figure 1



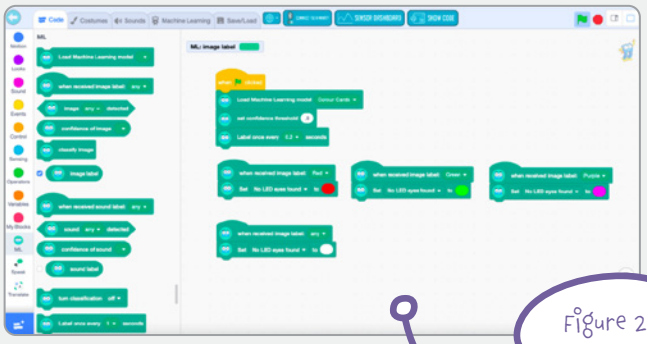


Figure 2

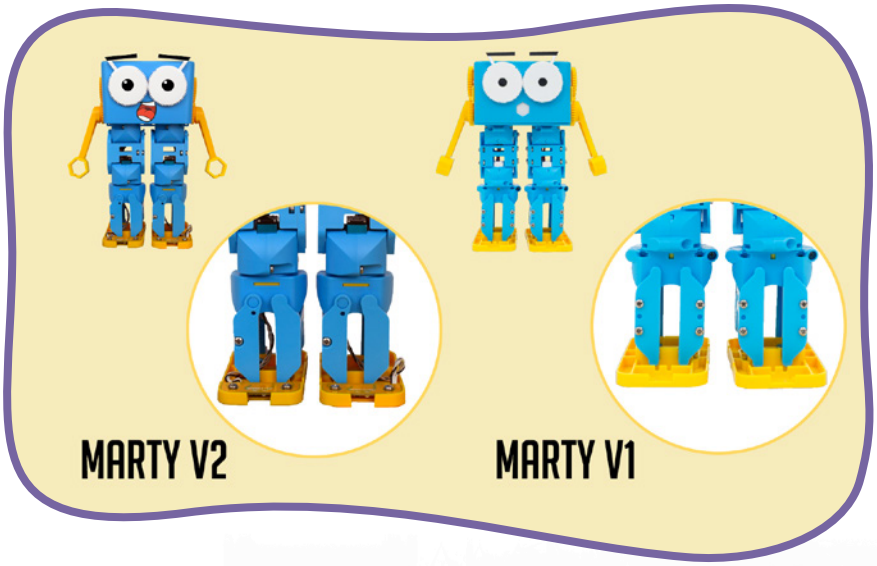
If you're unsure which version of Marty you have, the quickest way to find out is to check the legs. Marty V1 has four screws on the front of each leg, while Marty V2 only has one.

If you're interested in donating your Marty V1, please get in touch with us at hello@robotical.io. We'll arrange everything, from the collection to donation and even throw in a 25% discount on Marty V2 robots or class packs.

Time for a new Marty?

Since Marty V1 was first made and sent to schools worldwide in 2017, much has changed! While Marty V1 was great for making STEM learning engaging and fun for teachers and students, a few tweaks needed to be made. Marty V2 has kept all the best bits from V1 (the dancing, kicking, eyebrow-wiggling, and personality are all here to stay!) but is easier to use, stronger, and has great features, including sound and voice, add-ons, expansions, and Bluetooth.

If you no longer use your Marty V1, we can collect your robot, refurbish it, and donate it. We are delighted to support organizations like The Turing Trust and Perfecto Labs, who work tirelessly to transform education.



Create a buzz around bees!

Create a buzz in your setting by supporting native bees of all kinds. You can encourage learners to take an active part in improving local habitats and biodiversity with a range of easy-to-implement actions - all designed to make life a bit easier for these very important insects.

Bees are very popular invertebrates, and they can be easy to spot with their distinctive markings. Learners are often aware of their importance, but many species of bee are in serious decline and need our help.

How many kinds of bee are there?

While learners may be familiar with bumblebees and honeybees, they might not realize the staggering diversity of bees in the British Isles. There are over 250 distinct species, with only the native honeybee (Apis melifera) and the 24 species of UK bumblebees forming colonies. This rich variety underscores the importance of our efforts to protect and support these crucial pollinators.

Colonies of social bees have a single female queen (she lays all the eggs), many worker bees (all female but unable to reproduce), and male drones (only produced at certain times of the year to mate with queen bees). The worker bees have various roles within the colony, including caring for the queen and the larvae, guarding the colony, and foraging for nectar and pollen.

Why are bees so important?

The foraging behaviour of bees is the key to their importance as pollinators. When collecting nectar and pollen for food, bees often brush against the reproductive structures of flowers; as bees move between flowers, they transfer pollen from the anthers of one flower to the stigma of another (see photos below). If the pollen is transferred to a flower of the same species, pollination can occur – potentially leading to fertilisation and the formation of seeds, often within fruits. These seeds contain genetic information from both parent plants. Over time, fruits and seeds have become an important food source for humans and other animals.

Many plants rely upon bees for pollination; without bees, there would be fewer food crops available to us. Examples of economically important crops that rely on insect pollination include raspberries, apples, pears, beans, tomatoes and almonds.

What are the reasons for declining numbers of bees?

Possible reasons include:

- Loss of food sources - such as flower meadows – often due to changes in agriculture.
- Lack of suitable places to make a nest.
- A rise in parasites - including mites.
- Climate change – flowers may not be available when food is needed most.
- Use of pesticides.

What can we do to help?

Learners can get involved in practical activities to encourage pollinators of all kinds – including bees.

Grow plants for pollinators

Pollinating insects prefer simple, open flowers, allowing easy access to pollen and nectar. Aim to grow a variety of plants that will be in flower throughout the year - with various flower shapes, sizes and colours. >>

Ivy forms a valuable food source, as do dandelions and many other garden "weeds" – so try to resist cutting back plants until after they have flowered. "No Mow May" is a campaign to encourage lawn owners not to cut their grass during the month of May - to benefit wildlife. For a list of plants for pollinators, visit: Plants for Pollinators advice and downloadable lists/RHS Gardening Gardens and planted areas provide a vital habitat for pollinators: How gardeners can help our declining bees and other pollinators/RHS Gardening.

Try making seed balls

These are dried balls of soil or shredded paper containing wildflower seeds. When the ball of seeds reaches suitable growing conditions, the seeds will germinate, the plants will grow, and flowers should follow. You can watch a SSERC film showing you how to make simple seed balls here: Bee Bomb.mp4 (sharepoint.com)

Do not introduce the seed balls into wild places - keep them restricted to gardens and cultivated areas. Always wash your hands after handling soil and compost.

Provide places for bees to nest

Cavity-nesting bees like the Common Masked Bee and the Wool Carder Bee nest in holes in wood and hollow plant stems. You can increase the number of potential nest sites by bundling together hollow sticks and stems. Tuck the bundles into sheltered places around the outside areas in your setting. Learners can make elaborate "hotels" for solitary bees by placing hollow sticks and stems into containers such as paper cups or pots. Look out for evidence of these habitats being used. SSERC and the Young STEM Leaders from Linlithgow Primary School produced a "live lesson" about ways to make simple bug hotels part of the Great Science Share for Schools. Watch the film here.

Take a look at SSERC's Room for Wildlife guide here.

See one of SSERC's STEM by the Book resources here.

Bee spotting

Once learners have made the environment a better place for bees, they might like to go bee spotting to find out which bees have been attracted by the changes they have made. How many different kinds of bee visit your outdoor areas? A field guide is really useful when it comes to identifying bees - British Bees Identification Guide | FSC Bee Guide for Great Britain & N.I (field-studies-council.org).

Get involved in a citizen science project

You might like to participate in the UK Pollinator Monitoring Scheme (UKPoMS) – spending 15 minutes counting pollinators. The count runs from April – September each year and there is full guidance at FIT Counts: help us monitor pollinators | PoMS (ukpoms.org.uk). <<

Find out more...

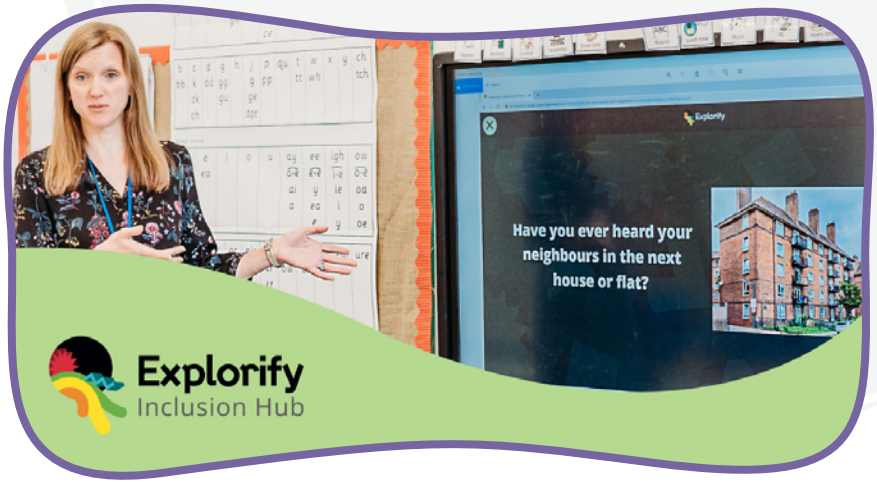
Other on-line resources to support you with further ideas:

- How to help bees | Conservation | Scottish Wildlife Trust
- Curriculum resources for schools - Bumblebee Conservation Trust
- Plants for Primary Pupils Booklets - Overview - Science & Plants for Schools (saps.org.uk)
- Bee Friendly Schools | British Beekeepers Association (bbka.org.uk)
- Bees need food up to a month earlier than provided by recommended pollinator plants - Royal Entomological Society (royensoc.co.uk)

Explorify for inclusion

How can Explorify's new Inclusion Hub help you create a collaborative learning environment in science lessons and unleash the power of dialogue for all your pupils?

Inclusive classrooms are those that make sure that every child feels that they belong and can actively engage in the learning. Explorify activities focus on valuing children's ideas rather than looking for one correct answer. This helps to create a safe, fun space for science discussions. Teachers who use Explorify regularly know that it can increase children's confidence in speaking and listening and their engagement in discussions.



"Explorify brings that curiosity, asking questions, wondering, thinking about what possibly could be going on. It's not about being right or wrong. You don't have to be a super-nerdy boffin to be a scientist: science is just about asking questions."

The **Explorify for Inclusion** project provides teachers with a range of strategies and resources to complement and adapt existing Explorify activities. Developed and tested by teacher-researchers from various settings, the resources can be accessed from the **Inclusion Hub** in the **Teacher Support** section of Explorify.

Caroline, one of our teacher-researchers

You will find:

- Ten 2-minute videos where the teacher-researchers summarise their projects.
- Detailed case studies that explain the teachers' setting, their identified needs, their approach, and the key outcomes for children, followed by their reflections.
- Top tips organised into four areas: choosing which Explorify Activity to use; establishing calm and focusing attention; improving the quality of thinking and talking; and recording children's responses.

Although every child, class and school are different, these ideas and 'snapshots' of what works for other teachers can be adapted to suit individual contexts.

Caroline, one of our teacher-researchers, used visual instructions and thinking time to keep children calm and focused.

Another teacher-researcher, Wendy, knew that some of the Year 1 children within her provision base were cognitively ready to tackle Odd One Out activities but needed support with building their language and confidence. In her 2-minute video, she describes her scaffolded approach, starting with concrete objects to teach children the concept behind Odd One Outs. Her pupils were soon finding three classroom objects that could be sorted in different ways themselves. They now enthusiastically participate in Odd One Outs following the age-appropriate science curriculum. >>

"The language that has been developed through using these resources has been absolutely amazing."

Wendy (teacher-researcher)

"Children could communicate with their peers and became more independent."

Meanwhile, teacher-researcher Jenni wanted to remove writing as a barrier and explored ways that all her children could develop their thinking skills and share their ideas in their preferred way. Strategies she explored included learning stem sentences, using an Explorify big book, active learning, drawing and scribing. If increasing children's confidence and independence is a priority in your school, you could read Jenni's case study (number 9), which goes into greater depth than the summary video.

Greg's first project applied 'frames' to Odd One Out activities. He says, *"Using a frame makes the Explorify activity more accessible. I found that children knew what was expected of them and could repeat what they had to do. This lowered their anxiety and focused their attention."* There are sample frames created by Greg in the 'Downloads' area, along with a blank frame which teachers can combine with Odd One Outs of their choice. All these materials are free to download. Other valuable resources include thinking sheets to support children in formulating sentences, same/different cards to get children listening to each other, and a template to help teachers create localised Have You Ever? activities.

"We can identify strong science learners despite special educational needs and disabilities."

There is a wealth of evidence on the long-term benefits of children's communication skills. The Explorify for Inclusion resources are made by teachers for teachers, to help them support every child in finding their voice in science. We would love to hear your feedback about these resources, so do get in touch: Rebecca.ellis@pstt.org.uk.

Become an Explorify Champion

Are you a fan of Explorify and regularly share the word with other teachers? Then why not become an Explorify Champion!

Explorify Champions Deliver CPD about Explorify to teachers and networks beyond their own school. We will provide you with up-to-date training materials that you can use to deliver CPD. You will get dedicated support from an Explorify Engagement Leader and get regular update emails from the Explorify team. All we ask is that you keep in touch regularly with the team and help to promote Explorify.

If you want to become an Explorify Champion, please email Stacey Reid at stacey.reid@pstt.org.uk. <<

"The key strength of Explorify for all learners is that it builds links between everyday experiences and scientific thinking. The concrete examples help learners to understand the relevance of the science concepts in their everyday lives, whilst stretching them to provide logical explanations. This particularly supports those who learn in an atypical way whilst benefiting all those whose development is more typical for age. In other words, it is the ideal tool for creating an inclusive science lesson."

Dr Jane Essex (University of Strathclyde)

STEM Engagement round-up

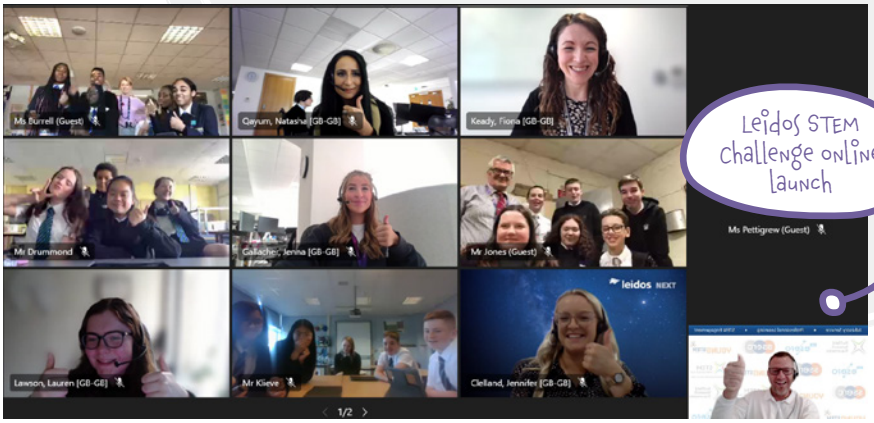
SSERC offers a wide range of STEM engagement and enrichment programmes to further increase access to, and participation in STEM, well beyond the traditional classroom setting. The STEM engagement portfolio offers educators, young people, and partners in industry the opportunity to collaborate and create learning activities and opportunities in STEM for children, young people and adults in Scotland.

With so much STEM Engagement activity going on at SSERC, the team has taken the opportunity to give a comprehensive round-up of all their programmes in recent months and also look ahead to what is coming. STEM Engagement offers are continually accessible and there are often new opportunities and activities being created so there's always the chance to get involved.

SSERC Education Industry Partnerships (EIPs) bring partners in industry together with education settings, enabling groups of early years, primary/secondary schools and colleges to improve young people's engagement in STEM.

Education sserc Industry

PARTNERSHIPS



Leidos and SSERC STEM Challenge

Year 3 of the EIP with Leidos is well underway with 8 schools taking part across Glasgow and the West, including primary, secondary and ASN centres. Each of the school teams are being mentored by a STEM Ambassador from Leidos to solve a real-life STEM Challenge. A combination of workplace and school visits are taking place with careers-based learning for both learners and educators. The Showcase event will be held in Leidos HQ in Glasgow in June 2024.

leidos

Looking ahead, Leidos has now confirmed it wishes to continue their hugely successful EIP with SSERC and plans are already underway for Year 4! If your school is interested then contact SSERC on partnerships@sserc.scot »

Enthuse Partnerships

ENTHUSE Partnerships empower schools, colleges and employers to share practice and work collaboratively aiming to help young people achieve increased attainment, interest and understanding in STEM.

The professional learning event to launch the Spectris Tayside partnership.

Spectris Tayside

Year 1 of this partnership is now complete with partner schools and their learners completing a series of professional learning and activities on digital technologies using Sphero robotics kits. Year 2 is now underway with a focus on engineering and construction via SSERC's popular STEM Challenges for First and Second Level Course..

The celebration showcase led by learners.

Aramco Northeast

Year 1 of this EP is now complete with partner primary schools and their learners respectively completing a series of professional learning and activities with our Early Years and Primary Team on engineering and construction themes via SSERC's popular STEM Challenges for First and Second Level Course. Year 2 is now underway with a focus on enhancing STEM learning in the classroom using digital technologies and robotics.

Professional learning taking place in a series of primary workshops at Aberdeen Science Centre.

BP Super Enthuse

A practical-packed two-day PL event for early years and primary educators took place at Aberdeen Science Centre back in September 2023. Twenty delegates took part in workshops covering forces, energy, electricity, renewables and other key STEM themes. This practical work is now being delivered to learners in primary schools across the northeast. An impact update took place in February 2024 with guests from bp joining us to hear about the work we are doing. As we progress to year two of the partnership, we will concentrate on new areas such as engineering and construction and biology.

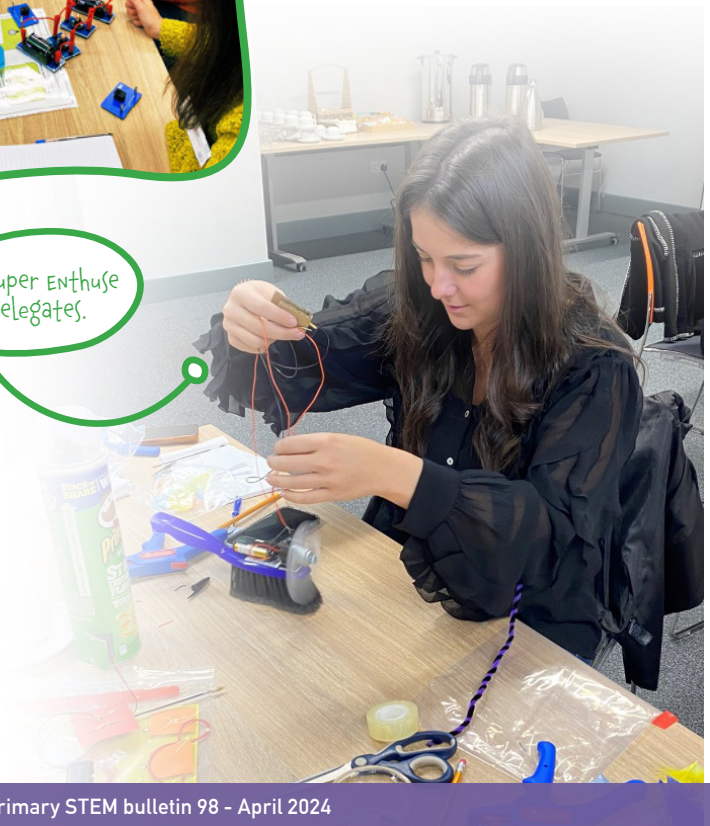
BP Super Enthuse, a two-day PL event at Aberdeen.

BP Super Enthuse delegates.

Now launched!

UK SPACE AGENCY

Twenty-two primary schools from all over Scotland have joined the SSERC Early Years and Primary Team and the STEM Engagement Team for a year-long professional learning journey linked to the Space Experiences and Outcomes from Early to Second Level.



ESERO

Do you teach Space? Don't forget that there is a wealth of free teaching resources on the ESA and ESERO websites.

Also, STEM Ambassadors with an interest in Space can provide inspirational talks and activities to schools and help deliver ESERO's resources such as Mission X: train like an astronaut, Climate Detectives and Astro Pi Challenge.

Request a visit from a Space Inspirations STEM Ambassador on the STEM Ambassador portal. <<

STEM AMBASSADORS Partner

Scotland

Great Science Share for Schools - sustainable science new resources launched

'Sustainable Science' is the theme for this year's Great Science Share for Schools, the annual award-winning campaign which inspires 5-14-year-olds to ask questions that matter to them, investigate and share their science with new audiences.

New Great Guided Enquiries, consisting of teacher notes and pupil activities, enable you to participate with ease. Uncover the links between sustainability and fashion in the Great Fashion Share.

Why not capitalise on the Paris 2024 Olympic Games by joining in the Great Sports Share.

Consider the impact of technology on the environment in the Great Computing Share.

Enter the world of quantum physics with a captivating new book – Izzy Jones's Quantum World, written by the award-winning author Jules Pottle for the Great Quantum World.

For 2024, Great Science Share for Schools brings you enrichment activities.

The Great Science Poetry Share provides a creative outlet for your pupils to share their science.

The Great My Science Club resource allows you to extend your GSSfS into an extra-curricular club.

Give your pupils the chance to voice their thoughts on science through the Great Science Shout Out – can they help reach the 200 letters to Parliament target?

Encourage higher-order thinking skills around sustainability issues that matter to your pupils by using the Great Question Ponder.

Sign up to the GSSfS website to access the Toolkit, a one-stop destination for a suite of resources to enable your pupils to work scientifically.

Do you need some support or want some CPD?
Take a look at the webinars hosted by the GSSfS team – open to any teacher regardless of specialism. <<

Email
greatscishare@manchester.ac.uk

Website
www.greatscienceshare.org

Sign up or login here!

New Programme Manager for the Young STEM Leader Programme

At the end of 2023, SSERC was delighted to appoint a new Programme Manager for The Young STEM Leader Programme (YSLP). This programme continues to grow from strength to strength, with over 1000 centres and 20000 young people having engaged with the programme since its inception. Below, we find out a bit more about Dr Sharon Macnab and the opportunities that participating in the Young STEM Leader Programme offers – focussing, of course, on the levels of the programme most relevant to Early Years and Primary.

Dr Sharon MacNab.

Having recently taken up the post of Programme Manager for YSLP, I've been fully immersed in supporting the rollout and development of this fantastic programme.

Having recently taken up the post of Programme Manager for YSLP, I've been fully immersed in supporting the rollout and development of this fantastic programme.

I have been truly inspired by the transformative impact of this programme on learners, their teachers, and other Tutor Assessors.

It's a sight to behold, seeing young people inspire, lead, and mentor their peers, families, and communities through the creation and delivery of STEM activities, events, and interactions. This experience not only enhances their confidence, communication, and teamwork skills, but it also instils a deep-rooted passion for STEM.

One of the strengths of the programme is that it is very much a learner-centred approach, with the young people having ownership over the direction of their activities.

Not only do they research and dispel stereotypes in STEM, but they themselves become STEM role models for others, building STEM capital. The programme is delivered in many ways, and whilst the following is not an exhaustive list, it highlights some of the amazing work undertaken in our schools across the country. We have secondary school pupils leading STEM clubs with P7 pupils, supporting transition activities and the move to high school. Science Fairs have been delivered full of parents, carers and other visitors but developed and hosted by young people. Young STEM Leaders have produced creative science podcasts, run homework clubs or supported study sessions.

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Young STEM Leaders in Glasgow presenting their work at Leidos HQ in Skypark.

Young STEM Leaders from Mosshead Primary presenting skills at Strathclyde University.

The key thread of YSLP is that it is for young people by young people and supporting your learners to complete a Young STEM Leader Award is an excellent way to engage your whole learning community with STEM, and it's free for any school, youth centre or community organisation in Scotland.

YOUNG STEM LEADER

THERE ARE TWO VERSIONS OF THE PROGRAMME:

Non-formal

The non-formal version of the programme is offered at Curriculum for Excellence Second, Third and Fourth Levels (known as YSL2, YSL3 and YSL4 (non-formal)). Each of these awards comprises four badges (Discover, Create, Inspire and Lead) and the completion of all four, leads to an award certificate for the YSLs. These awards are delivered typically, but not only in primary schools and the Broad General Education phase in Secondary schools with learners at these curricular levels.

Formal

Starting the programme at primary schools allows young people to progress on a journey through Formal Awards. The formal version of the programme comprises four awards at Scottish Credit and Qualifications Framework (SCQF) Levels 4, 5 and 6 (known as YSL4 (formal), YSL5 and YSL6). Level 7 (STEM Leader 7) will launch in August 2024. Formal levels are typically delivered in the senior phase of secondary schools, in further education settings and within apprenticeship programmes. With these accredited awards, learners achieve SCQF Credit Points upon completion. Insight tariff points for relevant centres are also available, and YSL6 and SL7 are also featured on the UCAS system.

How to get involved

It's easy to start delivering the Young STEM Leader Programme by becoming a Tutor Assessor (TA). Training takes two hours and is delivered as an online twilight session by SSERC staff. If you have a group or cluster of teachers, we can come along for a face-to-face training session.

The training covers the award details, delivery approaches, assessment and verification. Our bespoke online platform for marking and reviewing evidence is also part of the training process.

All Young STEM Leader Awards are supported by a host of resources and support notes, including logbooks for the young people to track and record their STEM Leadership journey and activities and lesson plans for teachers. These are all available through an online portal, which also enables young people to upload videos, photos, etc.; however, paper copies are also available.

Training events run monthly throughout the year and you can book a session at www.youngstemleader.scot/events.

Post training you'll join a professional network of almost 3000 Tutor Assessors and have access to support from the SSERC Team and further opportunities for training, sharing and meet sessions.

There's lots more information on our website, so please take a few minutes to find out more at and join the Young STEM Leader Community.

If you need any more information at all, please email us at youngstemleader@sserc.scot. <<

Young STEM Leaders showcasing their skills as part of SSERC's Pneumatics & Hydraulics course that their teachers participated in.

Storytelling sessions with The3engineers

STEM Ambassadors in Scotland are collaborating with The3engineers to bring Scout's adventures into your classroom!

The3engineers are STEM Ambassadors who have written books about Scout and aim to inspire young people in STEM. During the sessions, they read the books, talk about their experiences and answer questions. These sessions are ideal for P1 to P4. This is all done via Teams Live, sign up for the sessions on the right.

STEM Ambassador in Scotland Week 2024

The STEM Ambassadors Team at SSERC recently held their annual 'STEM Ambassadors in Scotland Week' to celebrate the accomplishments of Scottish STEM Ambassadors and give them tools to volunteer successfully in the coming year.

There was an incredible response from STEM Ambassadors across social media, many highlighting successful activities and their desire to volunteer. Search **#SAISWeek2024** to find out more about Scottish STEM Ambassador, and it could inspire your next STEM activity in your classroom.

The3engineers Storytelling Sessions

- **World Bee Day**, 20 May 2024, 9.15-9.45am: The Adventures of Scout, The Missing Bees, sign up here.
- **National Upcycling Day**, 24 June 2024, 9.15-9.45am: The Adventures of Scout, Animal Rescue, sign-up here.

Online information sessions

Over 100 Scottish STEM Ambassadors attended online info-sessions with a wide variety of local partners, including MCR Pathways, Tech She Can, Maths Week Scotland, Research Experiences and Placements, Daydream Believers, Institution of Civil Engineers, Institute of Physics, ScotlandIS Digital Critical Friends, and I'm a Scientist, Get me out of here!

To request a STEM Ambassador for an activity with your class, register via STEM Learning as an educator. You can then browse pre-existing offers from STEM Ambassadors or create a new activity post to advertise directly to ambassadors. For more information, please visit the STEM Learning website here: Request a STEM Ambassador. <<

SAIS WEEK 2024
5 - 9 February 2024

STEM AMBASSADORS Partner
Scotland

Leading the way in STEM

The delegates of cohort 2 on our Leadership in STEM Education course continue to make excellent progress as they work towards the completion of their professional enquiry.

Leadership in STEM Education

To date, the group of twenty-one aspiring/existing school leaders have completed professional learning on:

- ✓ The Scottish educational landscape
- ✓ Key policies and drivers in education
- ✓ Internal STEM school audits
- ✓ Self-evaluation of their own leadership skills and qualities
- ✓ 2-day residential course at SSERC HQ
- ✓ Developing leadership skills, handling conflict, coaching and leading teams
- ✓ Designing their own critical collaborative professional enquiry

The six-unit course is a blend of online, face-to-face and independent research and study. Spanning around 160 hours, the course covers a broad range of professional learning topics. Aligned to the GTCS standards for career-long professional learning and middle leadership means the content and learning is so relevant to the ongoing professional learning for primary and secondary educators in Scotland. Our delegates will also gain the GTCS Professional Recognition Accreditation on completion of this course to acknowledge the "*enhanced, significant, sustained and reflective enquiry a teacher has undertaken and the development of their professional learning in a particular area*".

The delivery team at SSERC doesn't just support our delegates, each of them has the commitment from their Headteacher and In-school Coach to ensure they are given the time and opportunity to complete a range of research and leadership tasks back at their centre. Furthermore, the course is designed to bring as many external partners and agencies together as possible, all working together with SSERC to put the practitioner at the centre, encouraging them to see themself as the learner, with input from:

- GTCS
- Education Scotland
- Skills Development Scotland
- Strathclyde and Stirling Universities
- Experts and consultants in leadership and management strategies
- Organisations that support STEM education

What our delegates say

Jayne Mays from Fintry Primary School in Dundee completed the Leadership in STEM Education course as part of Cohort 1. Whilst the course has seen some changes in the academic year that followed her success, she has certainly gained valuable professional learning from her journey with us. Below, she details the impact of the course.

"The SSERC Leadership in STEM course was a fantastic opportunity to develop my leadership skills. As a primary teacher, who was still class committed, it was my role to lead and drive STEM forward within my setting without being in a leadership position, which at times could be >>

delegate Jane Mays.

a daunting experience. The course provided by SSERC not only enabled, but supported, a deep dive into my leadership style - the good, the bad and the ugly - by completing a 360 with colleagues which allowed me to gain alternative perspectives on myself as a leader and the areas that I should focus on for development. I found this whole process extremely insightful on both a professional and personal level. It is important throughout the course that you have to maintain your authenticity, have an open mind, be willing to tackle those challenging moments in the process and lean on those around you for support.

Throughout the entire exploration of my own leadership styles and journey that I then went on, I couldn't have done it without the support of the other primary colleagues on the course, and SSERC staff. I left the course at the end of the 12-month period, having learned a lot about myself on both a professional and personal level, feeling revitalised as a leader, confident and ready to lead my school on the next part of our journey.

The CCPE course that is required to be done is an insightful process and allows you as a leader to embark on a small project to measure something within your practice, reflect on its impact and identify both the benefits for all of the stakeholders involved and the next steps. In the sharing sessions of these projects between both primary and secondary colleagues, you gain an insight into both types of settings, learn from each other and most importantly grow your network.

I actively encourage anyone that I know in a similar position of leading STEM in their school to participate in this course as the benefits that I have felt from doing this course have been unbelievable".

Next steps

In June this year, our delegates will present the findings of their critical collaborate professional enquiry. This will see them complete the course and gain their final SSERC and GTCS certification.

Below an example of some of the enquiries that have been investigated this year.

Interested?

If you would like to know more about our Leadership in STEM Education course or are considering applying for a place for 2024/2025, please visit our website. <<

How can AI be used as an adaptive teaching strategy in a STEM classroom to build pupil autonomy and metacognition?

How/in what way does inter-disciplinary learning within STEM subjects impact the pupils' knowledge of STEM careers and pathways within the primary setting?

How does the delivery of a renewable energy-based STEM workshop change perceptions of STEM careers and green jobs?

Promote scientific and artistic skills throughout your school with Sketchbook Science

Sketchbook Science is a set of eight lessons that combine learning in both science and art. Lessons cover concepts relating to the biological, chemical and physical sciences.

Primary Science Teaching Trust

All lessons offer opportunities to develop disciplinary knowledge while applying skills of science enquiry. Children are also introduced to new art skills with each lesson culminating a piece of work. Sketchbook Science allows children to apply and communicate their new learning and skills in both science and art.

Each Sketchbook Science lesson contains:

- Expected learning outcomes for children's conceptual development.
- Key artistic and scientific vocabulary.
- Resource lists.
- A step-by-step list of suggestions about what to do in the learning activities for art and for science investigations.
- Ideas for recording and presenting results from the science investigations.
- Examples of artwork.
- Information about the artists that inspired the learning activity ideas.
- Further resources related to the activities.
- Background science explanations to support teachers.
- Links to related Explorify activities.

Start combining science and art throughout your school. Curriculum coverage document and all eight Sketchbook Science lessons can be accessed here.

Seashore Science is a must this summer for coastal trips

Outdoor learning offers numerous benefits for children's physical health and mental well-being. A sensory-rich outdoor environment can stimulate cognitive development and foster creativity, as well as encourage curiosity and develop problem-solving skills.

Get outdoors this summer with Seashore Science – a 'pick up and go' set of 15 lessons to carry out at the beach, all with minimal requirements for equipment and preparation. Lessons are highly adaptable so they can be used with any primary age, and in a variety of coastal types of shorelines.

Each Seashore Science lesson contains:

- Expected learning outcomes for children's conceptual development as well as skills of working scientifically that the children might learn and apply.
- Key vocabulary.
- Pre-visit checklist – what to do before you go to the beach.
- At the beach – a step-by-step list of suggestions about what to do.
- Key questions to support children's thinking and explaining.
- Ideas for extending learning back in the classroom.
- Suggestions for further resources related to the lesson.
- Background science explanations to support teachers.
- Links to UK science curricula.

Enjoy all the benefits of outdoor learning as well as specific environmental learning opportunities shared in Seashore Science. Access your free book here. For specific health and safety enquiries relating to Early Years and Primary STEM activities in Scotland - including visits to the coast - please contact primary@sserc.scot. <<

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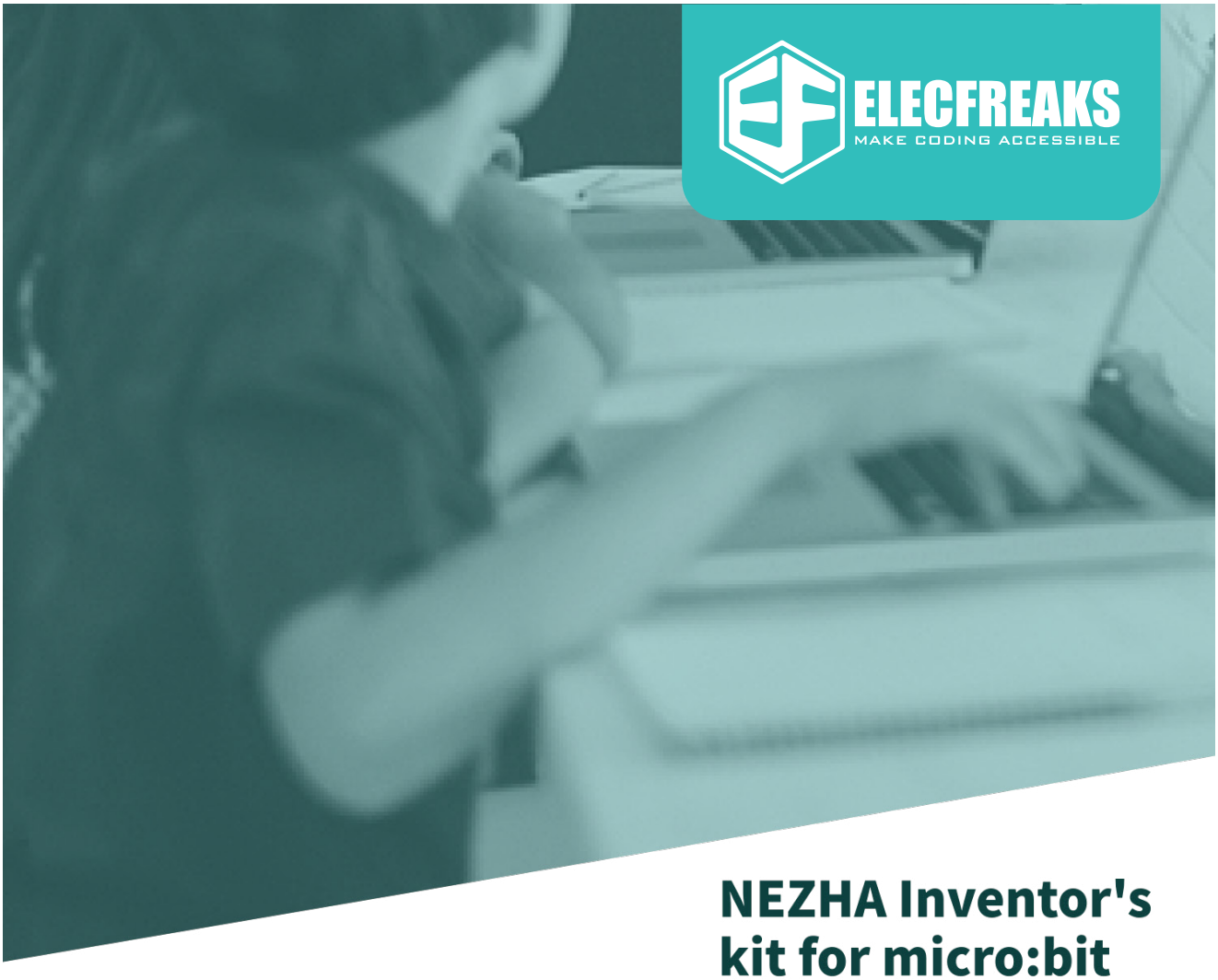
ELECFREAKS

Established in the year 2011 and located in Shenzhen, China, ELECFREAKS is a company focusing on the micro:bit developed kits and accessories with full services of researching, manufacturing, and selling.
Now, ELECFREAKS focuses on the development and sales of micro:bit related accessories. At present, tens of thousands of schools and educational institutions in more than 100 countries and regions worldwide use ELECFREAKS products, courses, and services.



micro:bit Wonder Building Kit

It focuses on the bricks expansions with 48 projects available in our WIKI, and it gives you more chances to create more projects.

NEZHA Inventor's kit for micro:bit

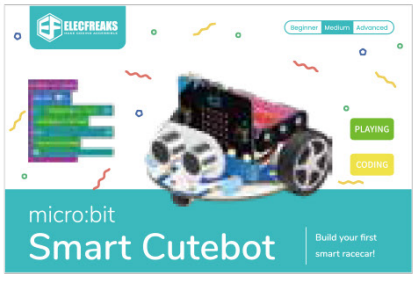
Based on PlanetX sensors, it contains LED, trimpot, soil moisture, ultrasonic sound, crash, line-tracking and over 400 pieces of bricks.

TPBot Smart Car Kit

It can be regarded as a toy for its preset functions that does not need a micro:bit; it can also be used as a teaching aid at the same time, you can code it via the micro:bit or make extensions with the other modules.

micro:bit Smart Cutebot

It is a rear-drive smart car driven by dual high speed motors. There are many on-board equipment including ultrasonic sound and distance sensor, the LED headlights and clearance lamps, two line-tracking probes and an active buzzer.

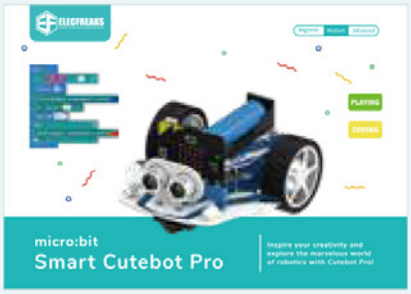


micro:bit Retro Arcade

It is a color screen joystick expansion board for micro:bit V2. It could be used with micro:bit V2 to program games online and play offline on the Microsoft Arcade programming platform.

micro:bit Smart Cutebot Pro

It is a programming robot for STEAM education, it equips with the 4-way infrared line-following sensor, the encoder motor, the LED rainbow light, the ultrasonic sensor and the other devices.



micro:bit Smart Science IoT Kit

It is developed based on IoT:bit with sensors such as the ultrasonic sound, dust, light, RTC and WIFI module. You can gather and send data to the cloud for data analysis.

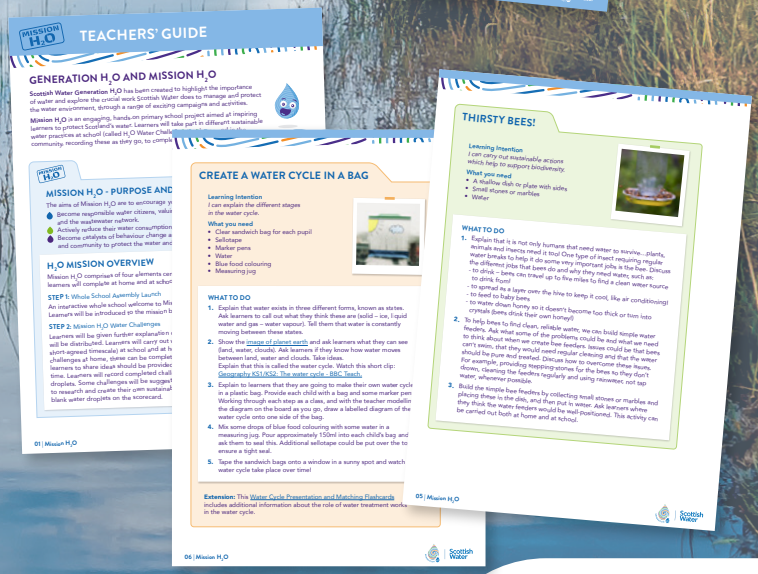
ELECFREAKS
MAKE CODING ACCESSIBLE

External partners and organisations have submitted the articles that follow. These are not SSERC-devised activities; however, they offer examples of practical STEM-based activities that could be delivered in the classroom.

INSPIRE LEARNERS AGED 5-11 TO PROTECT SCOTLAND'S WATER

Scottish Water

MISSION H2O



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