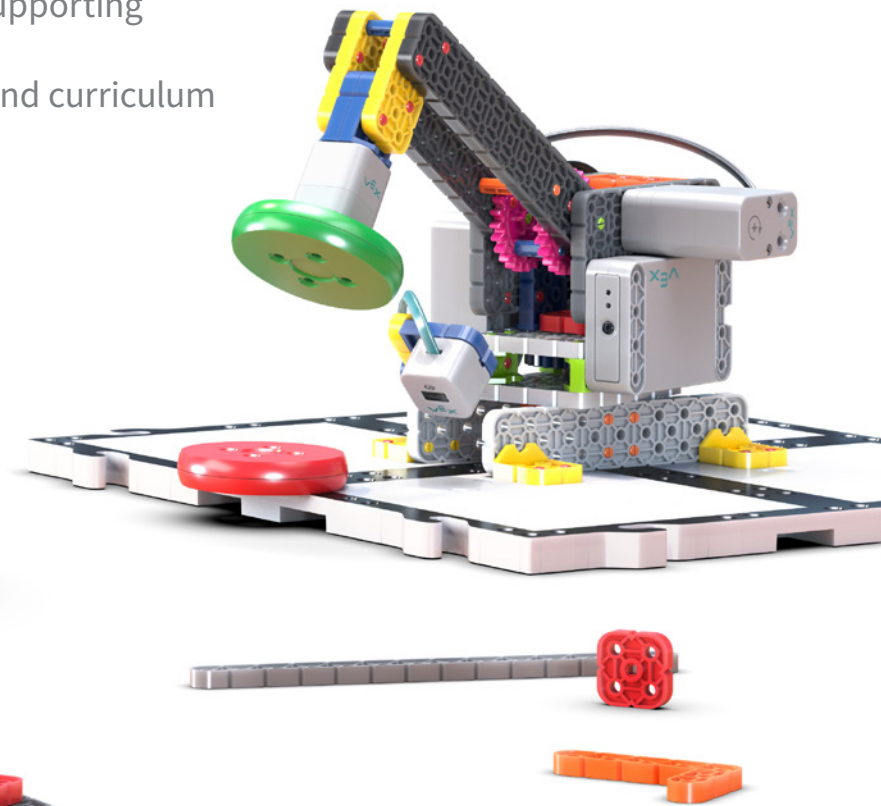


early years & primary STEM bulletin

Ideas and inspiration
for primary teachers
and early years
practitioners

- > Let's get started... with Computing Science
- > Marty the Robot
- > 5 Digital activities for Young STEM Leaders in the primary classroom
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- > VEXcode VR free virtual robotics and curriculum



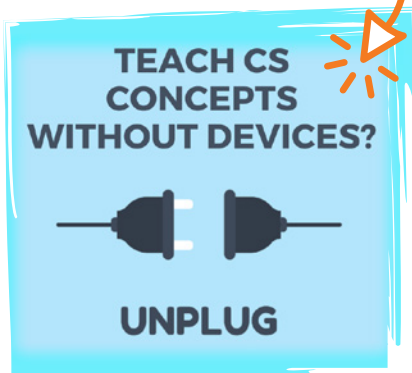
Let's get started... with Computing Science (CS)

Computing Science has been highlighted as a subject in crisis, yet it has never been more relevant or important for our young people and future work force. So, to start with, let's ask the important question.

Why Computing Science?

Unplugged CS: The foundation of understanding

Unplugged CS is a great way to engage learners and teach them the concepts of CS without having to use any devices. If you want to find out more about how this unique approach develops the foundations of computational thinking then [click this image](#).



Unplugged to plugged

While Computing Science should not be taught entirely through unplugged activities, what it does help to provide is the foundations of learner understanding, which can then be enhanced through other methods.

After introducing a concept via unplugged activities, going on to use concrete resources such as Bee-Bots, Colby the Robot Mouse, Indi, Sphero,

VEX GO, Botley 2.0, Marty etc. would build further on previous learning. It then may be advantageous to engage in some 'plugged' activities on devices such as iPads, laptops or ChromeBooks to cement the concepts via more abstract methods such as online coding platforms.

Click on the image below to see how this might look when covering the CS concept of repetition over a series of sessions. >>



RESOURCES TO SUPPORT UNPLUGGED CS

Barefoot

Barefoot Computing is an organisation that has produced a plethora of fantastic unplugged CS lessons. They have managed to create a whole range of lessons that can be easily delivered, adapted and differentiated, focusing on core Computing Science concepts, whilst engaging learners in fun and meaningful learning experiences.

All of these resources are free to access, and simply require a Barefoot account to download and get started. You can find out more via this Thinglink.



Hello Ruby

This website provides a huge variety of fantastic unplugged resources for your Early/First level setting, which are available in the 'Play' section. There is no need for an account or any sign up, and the activities are very engaging and unique, mimicking the quirky nature of the 'Hello Ruby' world. The activities cover lots of aspects of computational thinking like algorithms, decomposition, selection, problem solving, logic and many more, but also look closer at the internet and components that make up computers.

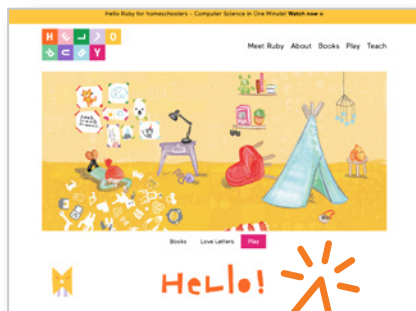
There is also a fantastic 'Teach' area which allows you and your learners to work through a pre-constructed programme to help embed the concepts of Computing Science into your classroom.

CS Unplugged

CS Unplugged provides a collection of free teaching resources that teach Computing Science through engaging games and puzzles, using common classroom materials and lots of running around.

Code.org – CS fundamentals unplugged

Code.org have provided a host of fantastic lesson plans, videos, games and activities in a well set out and structured list, guiding practitioners and their learners to work through a variety of courses. >>>



Hello Ruby



CS unplugged



code.org

Let's Play @ Computing Science

Here are some of the unplugged resources we use as part of our 'Let's Play @ Computing Science' course, which focusses on the Early/First level and using these resources in a play based environment.

Let's Go Code

Let's Go Code is a resource designed to 'encourage critical thinking, sorting information, mapping routes between points, and helping children break down large problems into smaller mini-puzzles that they can work through logically.'

Typically this game can be played in pairs or groups. There is usually one learner/group who will program the algorithms and the other/s will be the learner-bots who are directed around the maze.



Mouse Mania

Mouse Mania is a fun and educational board game used to introduce basic Computing Science concepts through play. This game can help develop skills in using algorithms, sequencing, debugging and selection, as well as directional language which learners can find difficult.

Taking it further

If you would like to explore unplugged Computing Science further, look out for our self-study course coming soon.

If you are interested, then please click the image below and we'll let you know as soon as the course is published and ready to access.

Conclusion

In conclusion, Computing Science is a fantastic subject which can help to teach your learners a multitude of essential skills, creates enthusiasm, engages learners, and does not have to be complex or complicated to teach.

Unplugged Computing Science is a great place to begin your journey, with learners gaining an understanding of computational thinking and Computing Science concepts as they go. <<

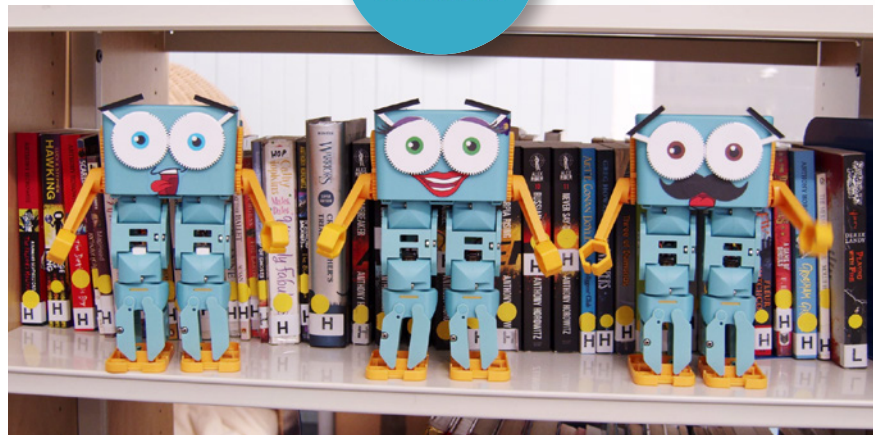


Marty the Robot

Robotical is on a mission to bring learning alive, and have designed and manufactured Marty the Robot - a walking, dancing, football-playing robot that's full of character and helps introduce children to the world of coding and robotics in a fun, imaginative and engaging way.

From screen-free coding to block-based programming, and right through to text-based real-world programming language Python, Marty is a flexible learning tool that grows with learners. As the most affordable humanoid robot used in education today, Marty's design and functionality appeals to children as young as five. So Marty can be used from pre-school and kindergarten all the way through to secondary education.

The physical product is supported with extensive teaching resources that align to the Curriculum for Excellence, require minimal preparation and helps build confidence for teachers who may be new to teaching coding and STEM.

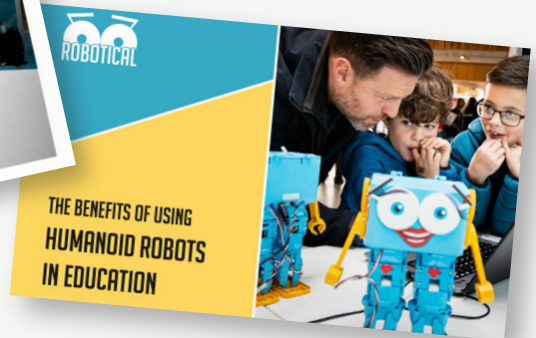
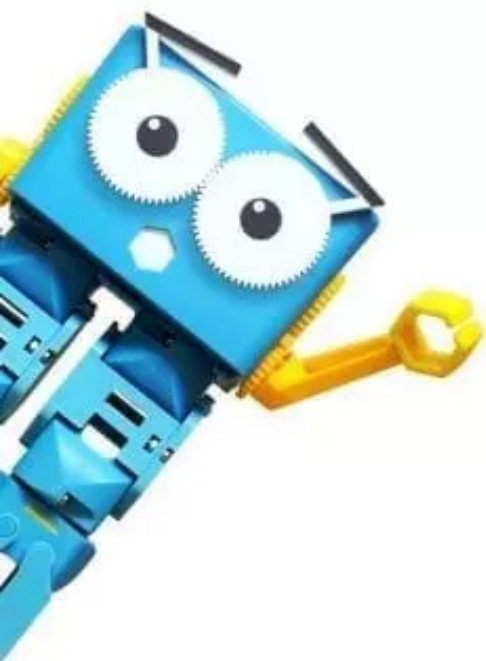


Free trial offer

Robotical is loaning Marty the Robot for free, no obligation, two-week school trials and will even cover the shipping and return costs! As part of the trial, you will receive 1:1 training and CPD via video call. Roboticals in-house experts will suggest the best teaching resources to achieve your goals in the classroom. Sign up to your free trial [here](#).

The Robotical team have recently collated a whitepaper around the benefits of using humanoid robots in the classroom and have also written an article about the topic. <<

Click the pictures to access the paper and the article.



5 Digital activities for Young STEM Leaders in the primary classroom

by *Jayne Mays*

Digital Technology is everywhere! With our children and young people being ‘Digital Natives’ who love what technology does; it is important for them to understand how it works and how it can be used to allow them to be creative.

Below are some activities that have been planned and delivered by both myself and some of my Young STEM Leaders. There are also links to the resources which have been found on well-known websites.



1) Animation

Animations can be used to retell a story, create a new story or to share some learning. This activity works great in pairs and can make use of Lego, Play-Doh, and drawings to create the content for animations. Not only does it explain how animations are made, the importance of frames and the ways in which the number of frames affect duration, it also highlights the importance of communication and teamwork.

This activity should last between 2 and 3 hours.

- First explore the basics of animation, frame, and frame rates. A great resource to develop an understanding of these is [Pivot Animator](#).
- Next, plan the animation – What material will be used? Are models or drawings needed? What is the story that the animation will tell? Stories should have a beginning, middle and end.

- Finally, it is time to create the animation. I would recommend the [Stop Motion Studio App](#) to do this.

Top Tip!

Only move your model/drawing a small amount to create the most effective animation.

2) Escape Room

Escape Rooms are a great way to bring some excitement, and a competitive edge into the classroom. An Escape Room can be made using Microsoft OneNote, where new pages are locked with a password and questions can vary from everyday topics to recapping previous learning. [Tutorials](#) on how to do this can be easily found online.

3) Hour of Code

Computer Programming embeds skills from across the curriculum whilst encouraging problem solving skills. Computer programming

encourages learners to develop prediction skills and debugging/ abstraction skills to fix and remove unnecessary code. If your learners are not confident in using Scratch or Python programming languages, the [Hour of Code website](#) is a great place to start exploring the various languages at a level suited to their needs. You can choose a specific game for the learners to focus on or allow them to explore/develop a particular language further. Dance Mat is a firm favourite of my learners!

4) Micro:bit

With Micro:bits the possibilities are endless and one way my Young STEM Leaders love to use these is to program the LEDs to show a picture or a message to decorate our STEM room Christmas tree! Micro: bits can be plugged in via a USB or using Bluetooth to transfer over code. If you don't have access to physical Micro:bits, there is a simulator on the [Micro:bit website](#). If your learners are confident at coding >>

with Micro:bits you can challenge them by programming one Micro:bit to send a radio signal to another telling it to display the LEDs in a particular way or have them programming the lights to go through a sequence.

5) Bee-Bots

Bee-Bots are a fantastic way to explore algorithms as well as reinforce many aspects of learning including position and movement. This activity can make use of Bee-Bots or Blue-Bots if you have access to them or can be completely 'unplugged' and the skills developed are the same! STEM Leaders can have the children create their own mat for the Bee-Bot, linked to a theme such as a fairy tale or their favourite toys. Once the mat has been created, the pieces can be stuck together



Jayne Mays is an Associate Regional Trainer and Verifier (ARTAV) for the Young STEM Leader Programme based at Fintry Primary School in Dundee, supporting centres across the Tayside Regional Improvement Collaborative. To contact Jayne email: Jayne.Mays@sserc.scot

and the Bee-Bots (physical device or paper Bee-Bots that the children have designed themselves) can now explore the mat. The Young STEM Leaders should encourage

the learners to use commands such as Start/Go, Left, Right, Forward, Backwards and Stop to plan the code, perhaps writing this on paper or on a whiteboard, and then follow the instructions.

I hope this gives you, your Young STEM Leaders and learners some ideas to get started and spark a love of learning in STEM. <<

Find out more...

To learn more about the Young STEM Leader programme and start delivering it in your school community or youth group, visit www.youngstemleader.scot, email us youngstemleader@sserc.scot or check out our [@YoungSTEMLeader](https://twitter.com/YoungSTEMLeader).

Fasten your seatbelt and watch 'indi' go!

The Sphero indi has now launched and the reaction has surpassed expectations. Put simply, it's a wonderful introduction to Sphero for younger learners.

indi inspires imaginative play-based learning by empowering learners to design and build their own mazes while teaching critical problem-solving and computational thinking skills. With its on-board colour sensor and colour cards, indi provides endless opportunities to rev learners' creativity with or without the need of an app.

Build custom mazes, solve puzzles, and take control of the wheel to drive. Teach coding concepts to

beginners and kick programming into high gear with even more options to spark interest in computing science in the free Sphero Edu Jr app.

The simplicity of indi is really resonating with both learners and educators due to its simplicity and very thoughtful execution.

Don't just take our word for it. Check out the UK indi case Study Video. <<

sphero
indi



watch indi go!

digitalXtra fund enabling digital creativity across Scotland

Digital Xtra Fund opens its seventh round of grant awards for initiatives that inspire young people to engage in tech.

Funding applications are now open for this year's grants programme from Digital Xtra Fund to increase the number and diversity of young people learning key digital skills.

Digital Xtra Fund was launched in 2016 with the purpose of boosting young people's interest in computing and technology through extracurricular activities. Shortly thereafter, the Fund became a Scottish Charitable Incorporated Organisation (SCIO) enabling it to collaborate with a wide range of industry partners and stakeholders. Since then, the charity has been backed by businesses, government, and individuals with a common will to help young people succeed in a digital world. The Fund's goal is for every young person in Scotland to have access to inspiring and meaningful digital tech activities regardless of their gender, background, or where they live.

The Fund's aims are to:

- Enable high-quality, exciting digital skills activities for young people across Scotland
- Inspire the next generation to understand, create, and innovate with technology
- Give industry experts and young people an opportunity to connect in informal and creative settings

Since its inception, the Fund has awarded £725,000 to over 100 tech initiatives which have engaged nearly 36,000 young people with skills such as computational thinking, coding, robotics, cyber skills, and data science while also highlighting the future career opportunities these skills provide. Only by inspiring



young people through exciting and relevant activities can Scotland inspire a generation of developers, designers, and digital leaders who will understand and create with technology, rather than simply use it.

The Fund's model is straightforward – using an application process, they identify, finance, and assist extracurricular tech initiatives across the country. Current partners include AWS, Baillie Gifford, CGI, Chroma Ventures (4J Studios), JP Morgan, Scottish Government, and Skills Development Scotland (SDS) as well as Accenture, BT, Cirrus Logic, Fujitsu, Incremental Group, Micro:bit Educational Foundation, ScotlandIS, and Skyscanner.

How and when to apply

Applications for the next round of grant awards (Round VII) are now open. Applications are welcome from UK-registered companies, charities, chartered bodies, local authorities, schools, colleges, or >>



universities actively involved in the provision of computing education or digital technology related activities, especially for audiences from excluded groups or backgrounds (such as learners from areas of high deprivation and/or rural isolation, girls and young women and/or minority groups).

Supported activities must be completed between **1 July 2022** and **30 June 2023** and delivered entirely in Scotland. Activities must also focus on engaging young people aged 16 and under. Eligible organisations can apply for grants from a minimum of **£500** to a maximum of **£5,000**.

Whether you are just starting out with a new micro:bit coding club or participating in a global competition such as FIRST® LEGO® League, Digital Xtra Fund is keen to support any exciting and stimulating

extracurricular activities that appeal to young people. This year, applicants will be required to submit their applications via an [online form](#) found on the Digital Xtra Fund website. To help applicants with the grant application, Digital Xtra Fund will also be delivering 2 webinars while the funding is open.

Deadline for submissions
The final deadline for submissions of the grant application is **Tuesday 5 April 2022 at 15:00**. To find out more about eligibility criteria, online application and details about the webinars, please visit: <https://www.digitalxtrafund.scot/apply/>.

Where possible, Digital Xtra Fund also encourages applicants to incorporate other programmes such as Young STEM Leader Programme, Digital Schools Awards, or iDEA badges as part of the proposed initiative. To help contextualise

the skills being learned, applicants may also benefit from involving volunteers from Digital Xtra Fund partners or the STEM Ambassador Programme as they can provide positive role models, first-hand examples, guidance, and support with the delivery of the project. <<

Find out more...

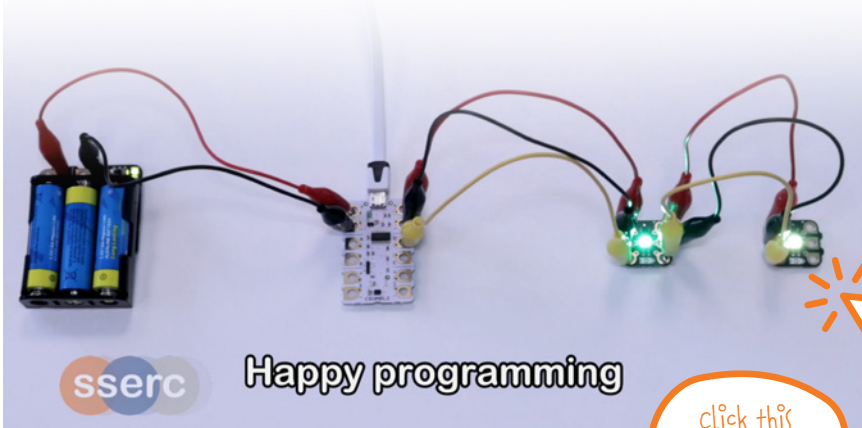
For more information and updates, please follow Digital Xtra Fund on:

- **Twitter**
- **Facebook**
- **LinkedIn**

Or sign up to their newsletter on the website [here](#).

Let's get ready to Crumble!

Embracing digital learning can enhance learning and get learners engaged provided the right tasks are chosen. Initially fast feedback is essential so learners can see they are succeeding or can correct their program quickly and get it working.



The Crumble controller is a cheap, very user friendly microprocessor, with endless extension projects that will enable learners to get started without any previous programming experience. This project gives instant feedback, thereby facilitating formative assessment and building confidence. The software used for the programming is FREE and is based on the drag and drop system

inspired by the highly acclaimed MIT Scratch. All that is required is a Crumble controller, a sparkle and the power supply for the Crumble. Purchasing the Crumble starter pack is an affordable and good way to begin. This project will address the learning outcomes and takes into account Education Scotland's guidelines, "What digital learning might look like," January 2021.

Download the Crumble software from: [Crumble Software | Redfern Electronics website](#).

Having mastered the basics many projects are available at very affordable prices, see [Redfern Electronics](#). These will be covered in later bulletins. <<

STEM Ambassadors in Scotland supporting British Science Week

British Science Week returns this year, with the theme of Growth.

Whether it's growing vegetables in the school garden, the growth of industries such as renewable energy and the space industry or even personal growth, at the STEM Ambassador in Scotland Hub we have something for everyone to get involved with.

Here's just a taster of what we have going on.



STEM AMBASSADORS IN SCOTLAND

Stop Dropping Litter - Book Reading

15 March 9.15 – 10.00 am
via Teams Live (Primary 1–4)

The3Engineers will be joining us to read their first story featuring Scout an avid adventurer concerned with environmental issues.



An interactive Q&A session is included to allow learners to find out about what engineers do and how we can all work to help improve the planet.

To book tickets for this session register [here](#).



Global Science Show

After resounding success last year the virtual science festival the Global Science Show will return with Science Communicators delivering a whole host of online activities for you to engage with.

You can drop into the show on [Twitter](#) at any time for a host of activities and presentations from STEM Ambassadors across Scotland.

[Register your interest](#) and we will keep you up to date with all the event details.

Find an ambassador

During British Science Week or any other week of the year we want to find the ambassador for you.

STEM Ambassadors are employees and students working in STEM focused roles who volunteer their time to help engage and inspire the next generation of learners.

Whether it's running a workshop, judging a STEM competition, or giving a careers presentation or Q&A, they are there to help bring STEM to life in the classroom.

Here's how it works. [Login or register on the STEM database](#) and add an activity, we will promote the activities to our ambassadors and help them get in touch with you.

More information on requesting ambassadors can be found in our [Teachers Guide to STEM Ambassadors](#).

These are just some of the events on offer, to keep up to date with everything British Science Week [register here](#).

Up to date information can also be found at <https://www.stemambassadors.scot/britishscienceweek>.



VEXcode VR free virtual robotics and curriculum



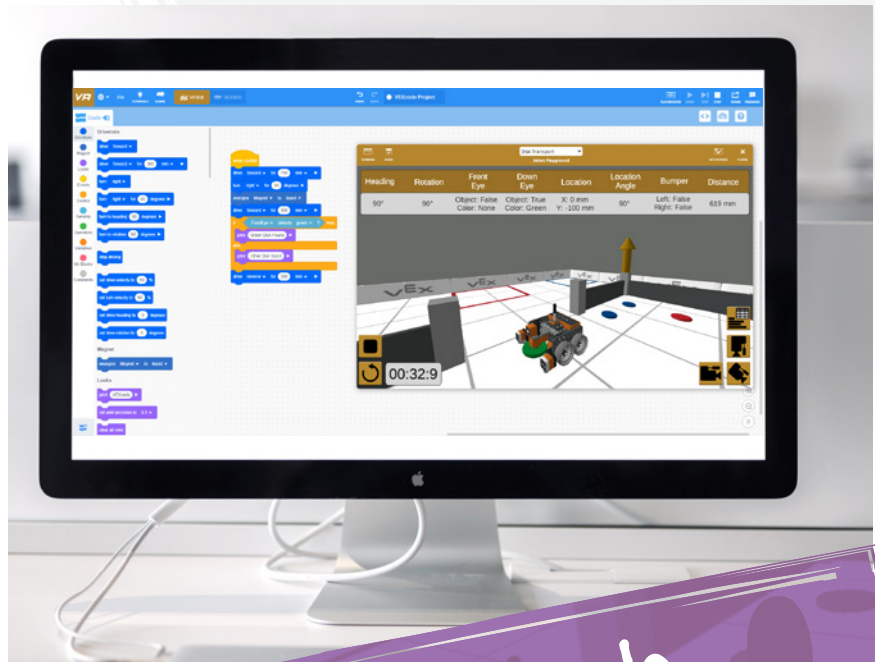
VEXcode VR is a free coding tool which has robotics as the core theme. Using Scratch Blocks or Python, learners code a virtual VEX robot to complete tasks in an on-screen Playground. The simple interface and block programming make it accessible to children from P5 and the Python text-based coding will challenge learners all the way up to S6.

Using robotics is an excellent way to engage learners in computing science and will let them explore many key concepts such as sequence, selection, iteration, variables, functions and more. As well as having numerous integrated activities which you can build into your Computing Science lessons, VEXcode VR also has a complete Blocks and Python curriculum for secondary learners which is intended to be completely learner led and allows for independent learning. These units can be used as part of lessons, as homework tasks or as a complete scheme of work.

VEXcode VR is free to use and can be accessed via your browser on most devices. No signup, log-in or installation is required.

Use VEXcode VR now at <https://vr.vex.com>

Find out more about how to use VEXcode VR in your school and join our training webinar on 15 March. <<



SSERC VEXcode VR Training Webinar
15 March 2022 @ 16:00

