

early years & primary STEM bulletin

Ideas and inspiration for for primary teachers and early years practitioners

- > Micro:bit - huge potential
- > Getting involved with Young STEM Leader Programme (YSLP):
Frequently asked questions



Micro:bit - huge potential

The Experiences and Outcomes in the Technologies area of Curriculum for Excellence were refreshed in March 2017. A key focus of the refresh was the introduction of organisers relating to Computer Science and Digital Literacy to reflect the rapidly changing prevalence and central position of digital technology within our society.

In the Computer Science Experiences and Outcomes, computational thinking is the golden thread that runs throughout. Computational thinking is a problem-solving approach that can be developed in an interdisciplinary way. It entails simplifying problems and breaking them down into smaller, more manageable steps to create solutions.

Block-based programming platforms are an ideal way to develop computational thinking. Each block is a distinct visual instruction that connects to a trigger or another block of code to create and design solutions. There are many block-based programming apps and platforms available; such as Scratch and Scratch JR, Tynker, Hopscotch, Tickle, Lightbot, Cargo-Bot, Kodable, Box Island and many more.

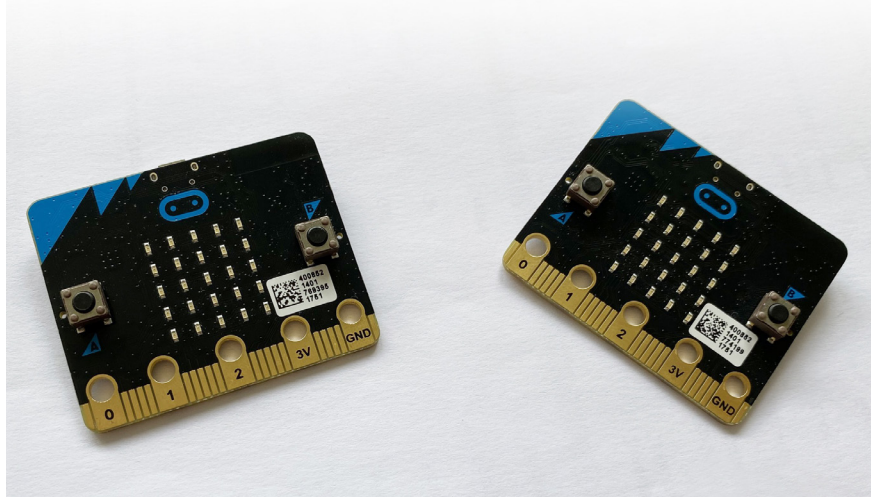


Figure 1 - BBC Micro:bit.

Learning to programme solely on a device can be too abstract for developing a sound understanding of new concepts. Having a physical device that can be programmed and observed running code can add value to the coding experience. That is where companion devices

like Dash and Dot, Spheros, Parrot Drones and the Beebot come in. Pupils can collaborate to design code to complete challenges, run their code and evaluate and improve the code that they have written. Many of these companion devices are prohibitively expensive for schools operating on limited budgets, but the BBC Micro:bit (Figure 1) is an extremely versatile alternative that comes at a fraction of the price.

The Micro:bit is a tiny computer that is easily programmed by beginners using a variety of programming languages. The Makecode website [1] has a programme of progressive tutorials that explain and explore the capabilities of the device (Figure 2). The Makecode website allows for programming using both block code or using Javascript, a text based programming language that allows more complex programming. >>

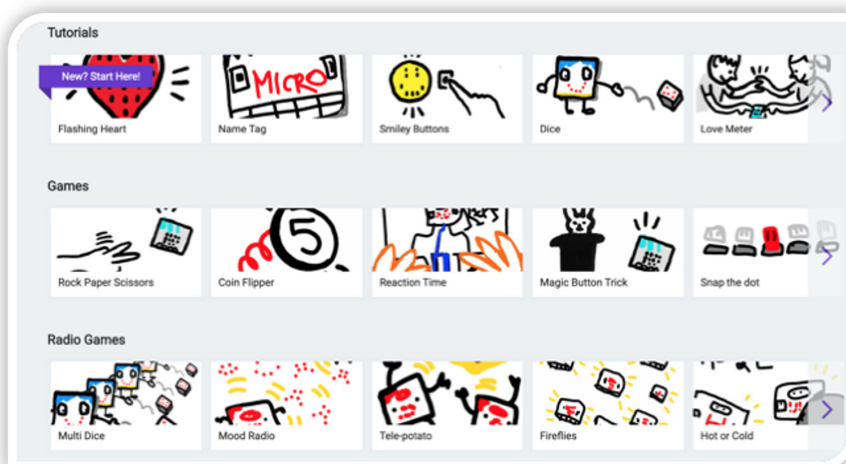


Figure 2 - The Makecode website [1] has a programme of progressive tutorials that explain and explore the capabilities of the device.

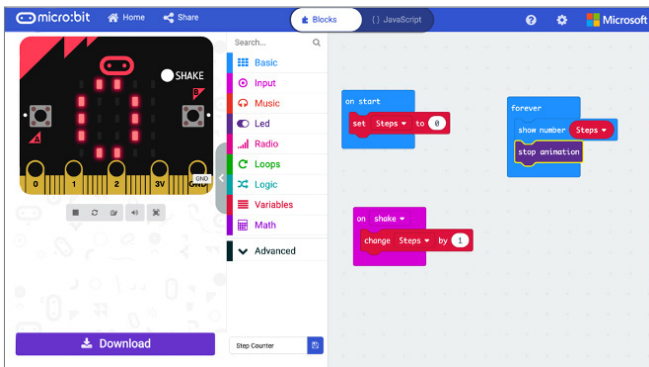


Figure 3

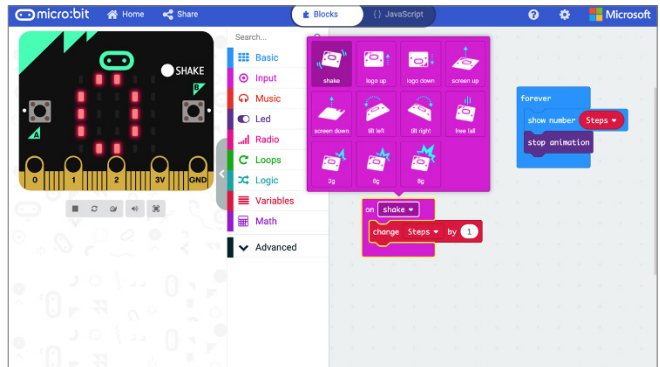


Figure 4

Micro:bit activity tracker project

Using a few blocks of code, it is possible to create a simple activity tracker that has the potential to be the basis of an interdisciplinary STEM project. The lines of code needed to create step counter are shown in Figure 3.

One of the main teaching points in this activity is developing an understanding of variables. If you want your Micro:bit to store and interpret information like a score, or in this case steps, you will have to create a variable called steps. The code in Figure 3 shows that when the Micro:bit accelerometer detects a shake, it adds 1 to the step score. To reset the activity tracker to 0, you would press the reset button on the Micro:bit to restart.

The Micro:bit uses an accelerometer to detect subtle movements of the device. There is a more detailed explanation of what an accelerometer is and how it works, created by educators on the Microsoft Makecode team [2].

You could also investigate if any of the other accelerometer gestures, as shown in Figure 4, could give a more accurate recording of a step like motion for the Micro:bit to record.

Once you have created your activity tracker, you could then design a 'watch strap' to attach it to your

wrist or ankle while powered by a battery pack. This will allow some experimentation as to where the best place to attach the Micro:bit is to get an accurate reading.

There is an online tutorial available from Microbit.org [3] that explains how you can make a step counter

that can be easily customised to an individual and introduces you to the Makecode Classroom environment. Through this you can create a closed classroom environment that allows you as the teacher to assign code to pupils, and to collect their finished code for assessment and evaluation purposes.



Figure 5

CfE Experiences and Outcomes

- I can explore and experiment with digital technologies and can use what I learn to support and enhance my learning in different contexts - TCH 1-01a.
- I can extend and enhance my design skills to solve problems and can construct models - TCH 1/2-09a.
- I understand how computers process information - TCH 1-14b.
- I understand the operation of a process and its outcome. I can structure related items of information - TCH 1/2-13a.
- I can create, develop and evaluate computing solutions in response to a design challenge - TCH 1/2-15a.

References

- [1] <https://makecode.microbit.org> (accessed 24th of March 2020).
- [2] <https://www.youtube.com/watch?v=byngcwjO51U> (accessed 24th of March 2020).
- [3] <https://microbit.org/projects/make-it-code-it/sensitive-step-counter/> (accessed 24th of March 2020).

Getting involved with Young STEM Leader Programme (YSLP): Frequently asked questions

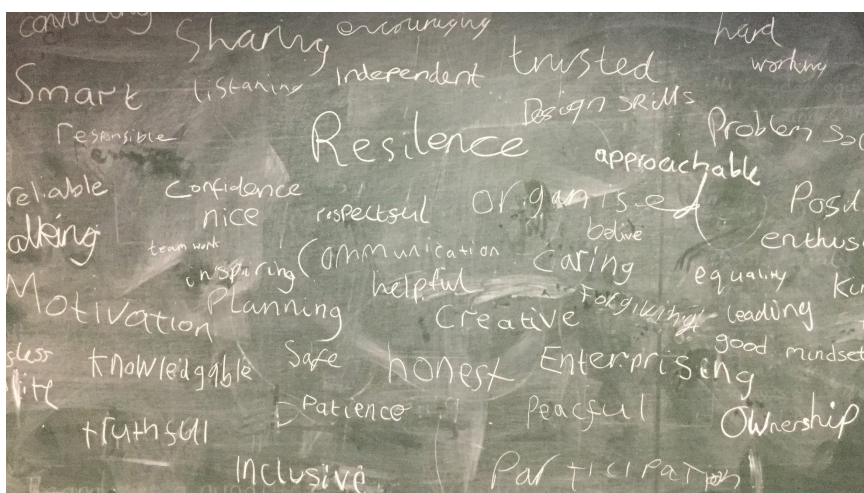
What is Young STEM Leader?

Led by SSERC, the Young STEM Leader Programme (YSLP) programme is an exciting opportunity for young people in Scotland to discover, create, inspire and lead in STEM. The key aim is to facilitate the development of peer STEM role models, inspiring more young people to develop an interest in STEM. Every Young STEM Leader will explore their own interests before creating and delivering an inspiring STEM activity, event or interaction for a selected audience in their school or community. We believe that completing the YSLP will be of great value to Scotland's young people, giving increased access to the many exciting and engaging experiences that STEM offers whilst building valuable skills.

The YSLP is offered in two versions. The non-formal version at CfE Second, Third and Fourth Levels (YSL2, YSL3 and YSL4) is underpinned by a framework that identifies the skills, knowledge and behaviours expected of a Young STEM Leader at each curricular level. Young people will work towards four digital badges – Discover, Create, Inspire and Lead – at each level to gain the award.



Young STEM Leaders at Paisley YMCA support others to build their digital skills.



A word cloud by Primary 7 Young STEM Leaders from Bankier Primary in Falkirk. Here they are exploring the skills, qualities and behaviours of a good leader.

The formal version is offered at SCQF Levels 4, 5 and 6 (YSL4, YSL5 and YSL6), credit rated by SQA and underpinned by learning outcomes and performance criteria for each level. SCQF credit points and Insight data are included.

How do I get started?

Centres wishing to offer the YSLP groups or registered youth work organisations in Scotland. Any organisation that works with young people, with staff who are members of the PVG scheme, can apply to become a Young STEM Leader Delivering Centre.

Relevant staff members can then complete the Tutor Assessor (TA) training, becoming certificated by SSERC in the process. Training will take place online and lasts around two hours for each version. Centres will also be recognised and certificated by SSERC as Young STEM Leader Delivering Centres.

We're looking to recruit over 300 new centres – schools, community groups and youth groups – by the end of this year. To register your interest in becoming a Tutor Assessor visit <https://bit.ly/YSLSignUp>.

What do the young people need to do?

After some initial front-loaded learning delivered by a Tutor Assessor, young people complete a series of tasks in their YSLP Log (online or hard copy) which details all of the learning, planning and STEM leadership. This is an ideal way to ensure the Young STEM Leader is full prepared to deliver a safe and engaging STEM activity, event or interaction.

Visit our website www.youngstemleader.scot or Twitter @YoungSTEMLeader to see examples of our Young STEM Leaders in action! >>



A Young STEM Leader of All Saints Secondary School in Glasgow leading a STEM activity with pupils of St Philomena's Primary.

Do you provide ongoing support?

Yes! Upon becoming a TA, you will have access to all of the supporting documentation for each level, including Support Notes and YSLP Logs. We will also produce Activity Packs for each level which will offer a set of lesson plans and guidance on how to support each level of the programme. The Young STEM Leader Project Team at SSERC are always on hand to answer any questions.

Is there a cost?

The programme is funded by the Scottish Government and is free to all young people, Tutor Assessors and delivering centres across Scotland. <<

How do I find out more?

To find out more about the Young STEM Leader Programme:

- > Visit our website www.youngstemleader.scot
The case studies and resources sections are useful to find out more about the programme.
- > Attend one of our online webinars, book at www.youngstemleader.scot/events
- > Contact us at ysl@sserc.scot or on Twitter [@YoungSTEMLeader](https://twitter.com/YoungSTEMLeader)

