@digitallcharity

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Coding for Climate Action, Sustainable Computing & Nature

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About Digit<all>

- A registered UK charity
- Home of Code Week for the UK
- Provides a focus on contextualised resources themed around climate, nature and activity
- Has significant expertise in engaging girls in computing/STEM
- Utilises a group of volunteers and ambassadors from across the UK to support schools
- In the last two years the charity has reached over 200,000 young people
- The charity is driven by three amazing young women in technology
- Training and resources are developed by practicing teachers

Why climate as a context?

Pupils develop a responsibility and passion for the world around them

Helps pupils to understand scientific and computational issues in a cross-curriucular manner

Pupils become more resilient and understand the importance of mitigating the climate and environment crisis

Physical computing is a great way of helping pupils visualise and contextualise such issues with hands-on approaches

Contact with nature can improve the well being of pupils and develop their confidence, motivation and social skills (Children and Research Group)

Introducing children to the diversity of nature can inspire them to pursue STEM subjects and careers

Coding for Climate Action

Overview

- A collaboation between Digit<all> and Amazon Future Engineer
- 6 lesson scheme of work for KS2 (and one for KS3)
- Mapped to the National & TeachComputing Curriculum
- Encourages students to code early warning systems with the micro:bit
- Helps pupils understand how natural hazards can be mititaged thorugh the power of technology
- Helps pupils to work collaboatively and actively to tackle environmental challenges

Coding for Climate Action

Overview

- Lesson 1: Defining the problem
- Lesson 2: Analysing existing solutions
- Lesson 3: Building and EWS
- Lesson 4: Introducing sensors
- Lesson 5: Researching radio and pins
- Lesson 6: Earthwake early warning system

Complete with:

- Lesson slides with weaved PRIMM approaches
- Lesson plans
- NC and TCC mapping
- Activity journal for evidence capture
- Online recorded and live training resources and solutions

Beyond the curriculum

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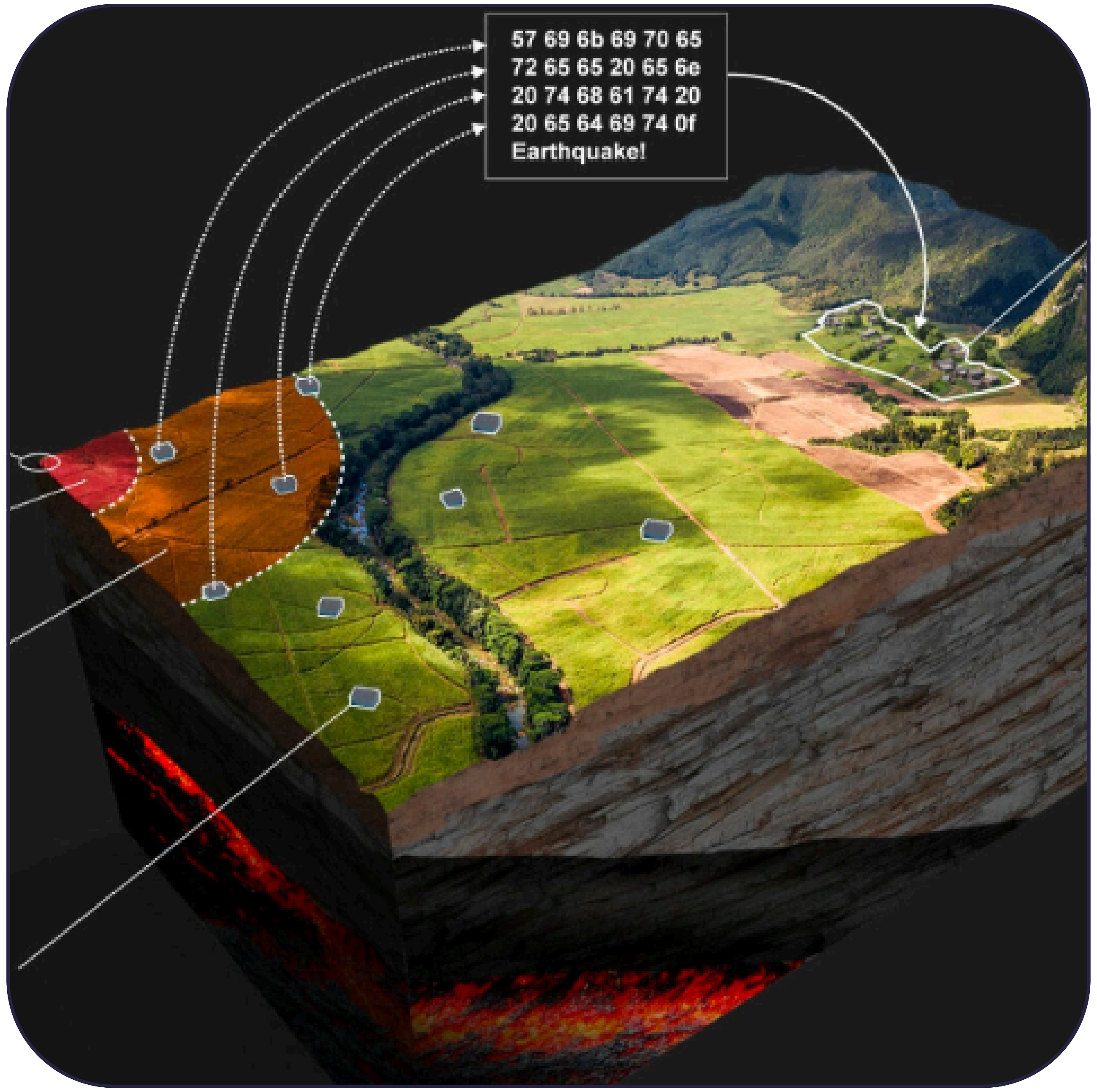
Gatsby benchmarks

- Learning from careers and labour market information
- Addressing the needs of each student
- Linking curriculum learning to careers

Skills Builder ready

- Problem solving
- Creativity
- Staying positive
- Aiming high
- Leadership
- Teamwork



Lesson Number	Lesson Name	Lesson Objectives
1	Define the problem	• I can identify similarities and difference between natural hazards • I can identify the relationship between heat and evaporation • I can describe how Early Warning Systems can be used to mitigate the effect of natural hazards
2	Analysing Existing Solutions	• I can describe the differences between the parts of a system and the functions of those parts. • I can research the part and functions of three different existing technologies • I can explain the part and functions of three existing technologies
3	Build an Early Warning System	• I can identify the differences between hardware and software. • I can identify input, output and repetition in code. • I can modify and complete code that utilises input, output and repetition and variables
4	Introducing Sensors	• I can identify the sensors on a Micro:bit. • I can design and modify programs using sensors. • I can modify and complete code that utilises input, output, count controlled loops and and variables
5	Researching Micro:bit Pins	• I can describe how a simple electrical circuit works. • I can describe how a circuit can be controlled by a physical device. • I can use selection in a program to produce and intended outcome
6	Researching Micro:bit Radios	• I can describe that Micro:bits can send data to one another using radio signals. • I can read the code that is used to send data between Micro:bits. • I can use if/else statements in my code to produce one of two intended outcomes.
7	Earthquake EWS	• I can identify core programming constructs input, output, variables, repetition and selection. • I can write code to achieve a specific outcome. • I can read and predict the outcomes of code

Label	Year 5 Teach Computing Programming Units	Covered in Code for Climate Action
	Programming A – Selection in physical computing	
CS	Create a simple circuit and connect to a computer	Lesson 5
CS	Program a microcontroller to make an LED switch on	Lesson 3, Lesson 4, Lesson 5, Lesson 6, Lesson 7
CS	Connect more than one output component to a microcontroller	Lesson 5, Lesson 7
CS	Program a microcontroller to respond to an input	Lesson 3, Lesson 4, Lesson 5, Lesson 6, Lesson 7
PG	Explain what an infinite loop does.	Lesson 3, Lesson 5, Lesson 6, Lesson 7
PG	Design sequences that use count-controlled loops	Lesson 4
PG	Design a conditional loop	Not Covered
PG	Explain that a condition is either true or false	Lesson 5, Lesson 6, Lesson 7
PG	Use selection (an ' if...then..' statement) to direct the flow of a program	Lesson 5, Lesson 6, Lesson 7
PG	Use selection to produce an intended outcome	Lesson 5, Lesson 6, Lesson 7
DD	Describe what my project will do	Lesson 7
DD	Test and debug my project	Lesson 4, Lesson 5, Lesson 6, Lesson 7
	Programming B – Selection in quizzes	
AL	Identify conditions in a program	Lesson 4, Lesson 5, Lesson 6, Lesson 7
AL	Identify the condition and outcomes in an 'if... then... else...' statement	Lesson 5, Lesson 6, Lesson 7
AL	Explain that program flow can branch according to a condition	Lesson 5, Lesson 6, Lesson 7
PG	Modify a condition in a program	Lesson 4, Lesson 5, Lesson 6, Lesson 7
PG	Use selection in an infinite loop to check a condition	Lesson 5, Lesson 6, Lesson 7
PG	Show that a condition can direct program flow in one of two ways	Lesson 5, Lesson 6, Lesson 7
PG	Identify the outcome of user input in an algorithm	Lesson 3, Lesson 4, Lesson 5, Lesson 6
DD	Outline a given task	Lesson 7
DD	Test my program	Lesson 4, Lesson 5, Lesson 6, Lesson 7
DD	Identify ways the program could be improved	Lesson 3, Lesson 4

Recognising championing schools

- Certificates for lead schools
- Badges for delivery partners, volunteers and teachers

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Key Climate for Coding Action features

Real world contexts

- Develops self-efficacy in girls
- Provide a 'hook' to engage in the activity
- 'Empower' students to collaborate
- Enable the cross-curricular link between Computing and the Science curriculum
- Provides context to prototyping and testing

Radio transmission

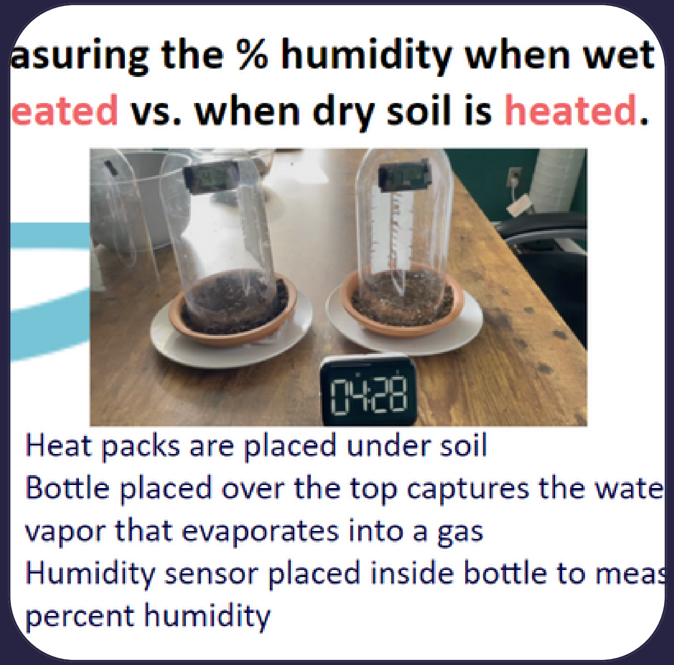
- Enables pupils to get active
- Promotes teamwork and collaboration
- Provides opportunities for pair programming approaches
- Develops computational thinking, especially decomposition and evaluation

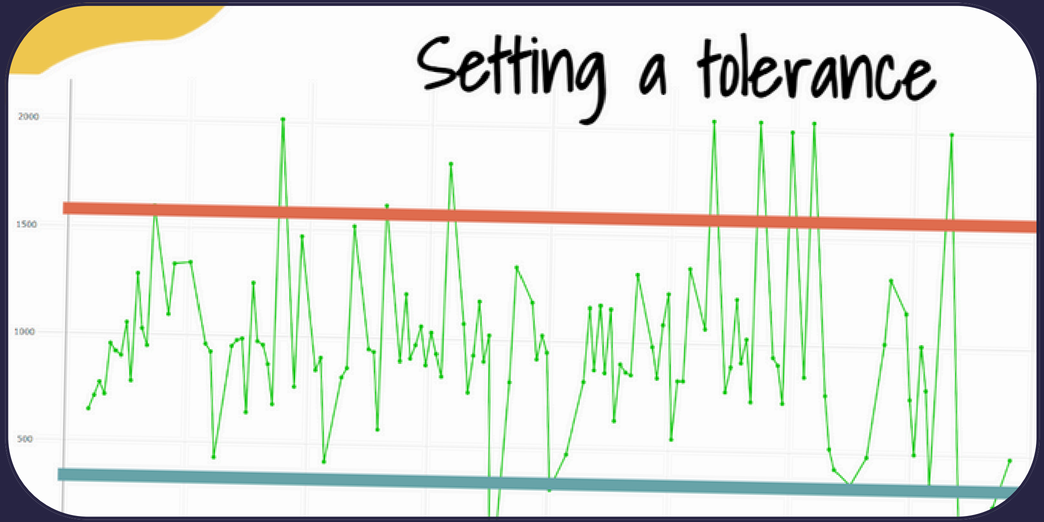
Data logging

- Provides a link from physical capture through to data analysis
- Data logged can be used to inform setting on tolerances
- Enables data comparisons with other pupils and groups

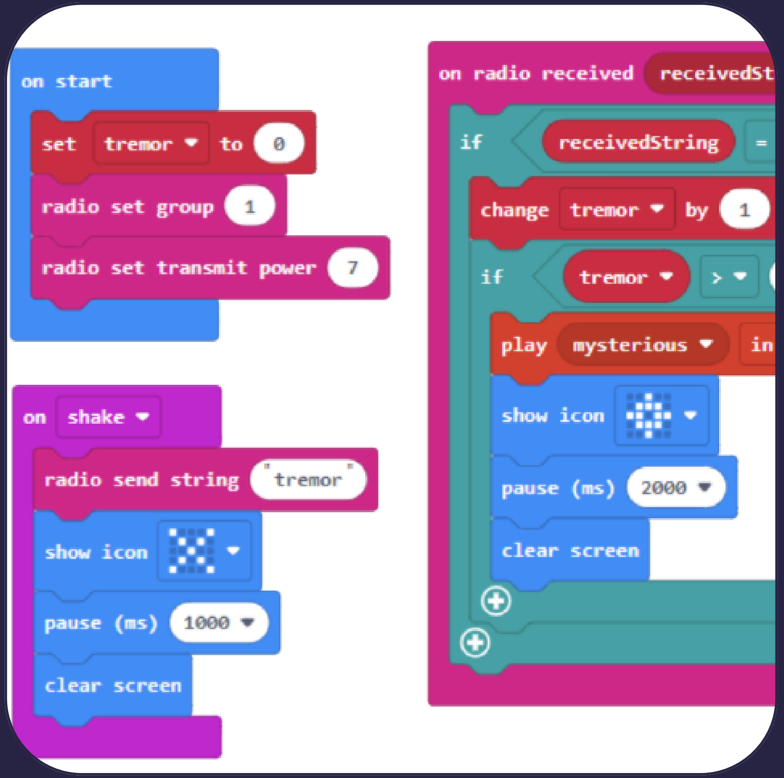
Resources

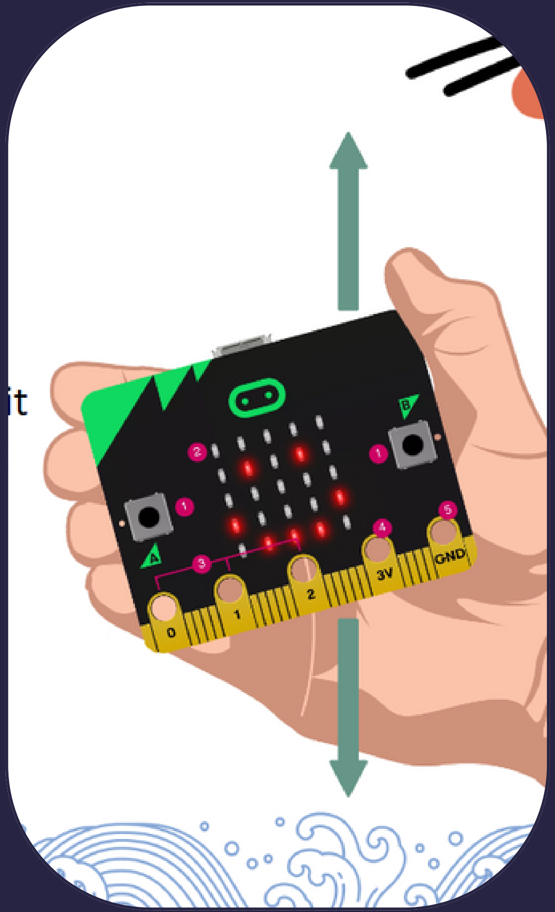
- **Bridging block to text programming**
- **Consideration of accessibility**
- **Active use of the micro:bit**
- **Cross-curricular links with Science and Computing**
- **Supported by live and recorded training**
- **Hour of Code version**






```
accleration_y = 0
if accleration_y >= 225
    basic.show_leds("""
        . . # . .
        . # # # .
        # . # . #
        . . # . .
        . . # . .
        """)
basic.pause(50)
```





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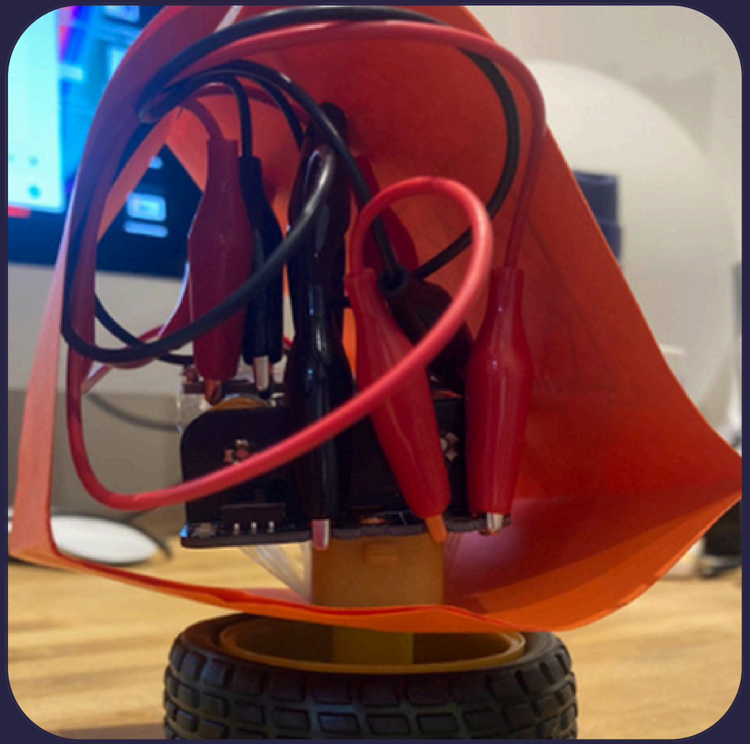
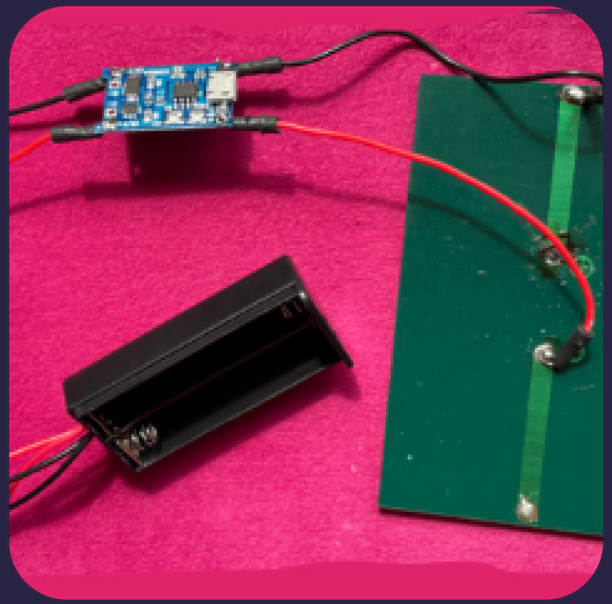
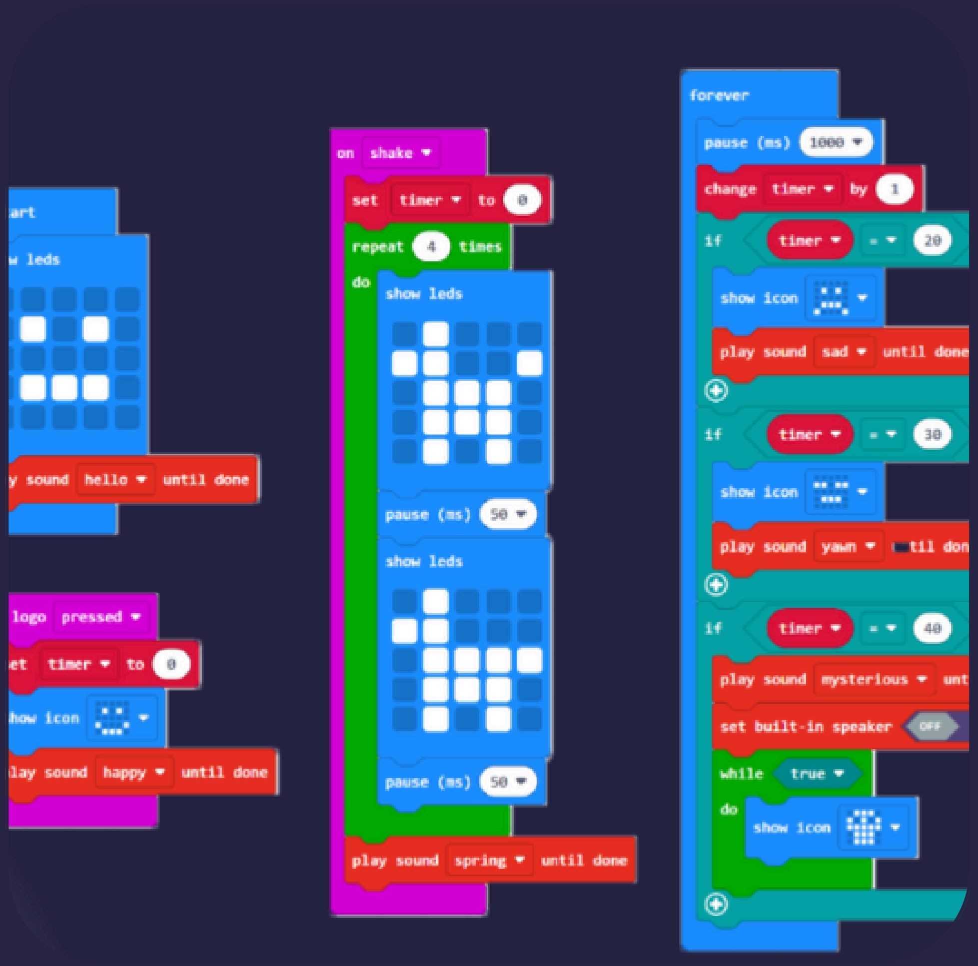
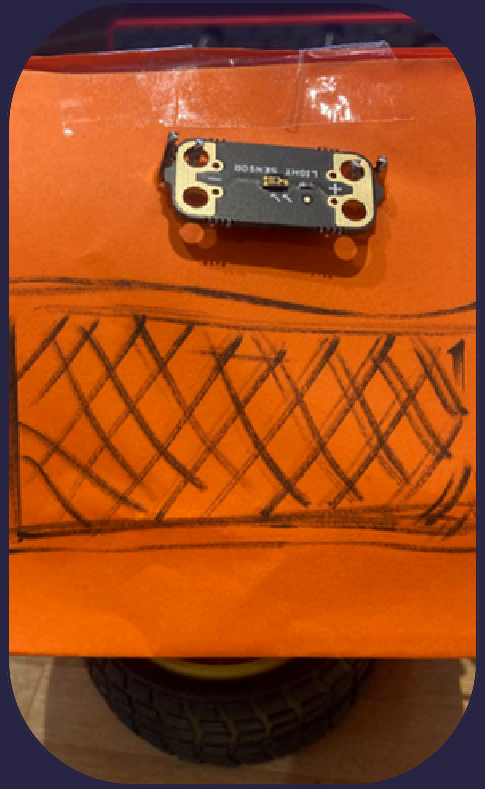
Sustainable Computing

- Solar llamagotchi
- Plant partner
- Particle tracker
- Solar panel sun tracker
- Power down









Getting close to nature, with the micro:bit

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Recipe for success?

- Pilot programmes with dynamic and adaptive resources
- Ensure resources developed with girls in mind
- Encourage activity and contextualisation
- Weave pedagogy approaches such as Fuller and PRIMM
- Computational thinking by stealth
- Pair programming and collaboration opportunities
- Project-based learning, programming, data, engineering and presentation
- Multiple models - units of work, community packages and Hour of Code
- Clear curriculum mapping
- Various training approaches

Prototyping and testing through colllaboration with the micro:bit

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Get involved

- Resources
- Online and recorded CPD
- Grants
- CODE Awards
- Workshops

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