



# micro:bit CreateAI

Physical computing in an AI world

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Festival of Computing  
1<sup>st</sup> July 2026

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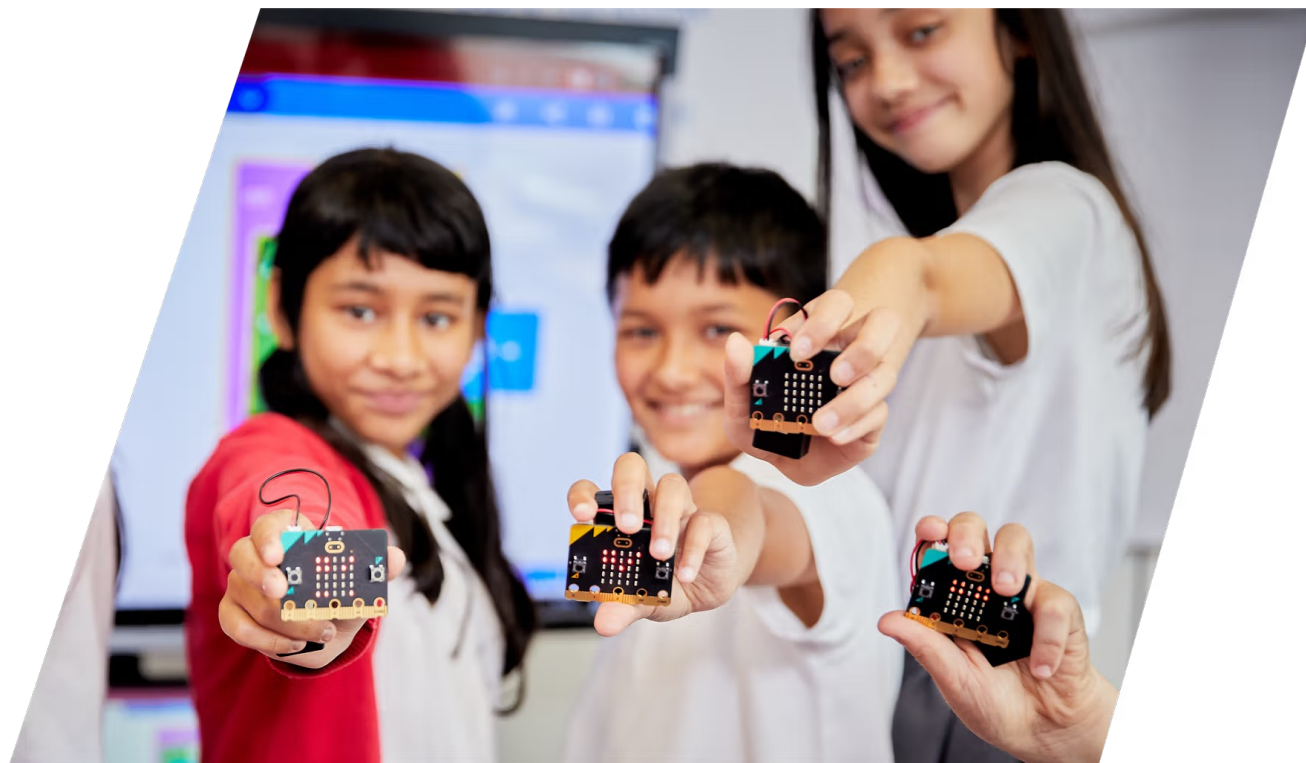


## In this session

What we will cover



- Introduction to the Micro:bit Educational Foundation and the BBC micro:bit
- Introduction to Machine Learning
- A live Demo of micro:bit CreateAI
- Links to the curriculum and units of work for AI



## A bit about us...

Micro:bit Educational Foundation



- Small global not-for-profit organisation with roots in UK: BBC's **Make it Digital** campaign for Y7 in 2016 and for KS2 in BBC **next gen** in 2023-4
- Class sets of micro:bits in over 90% of UK primary schools
- Our focus is to engage more girls, underrepresented groups and underserved communities

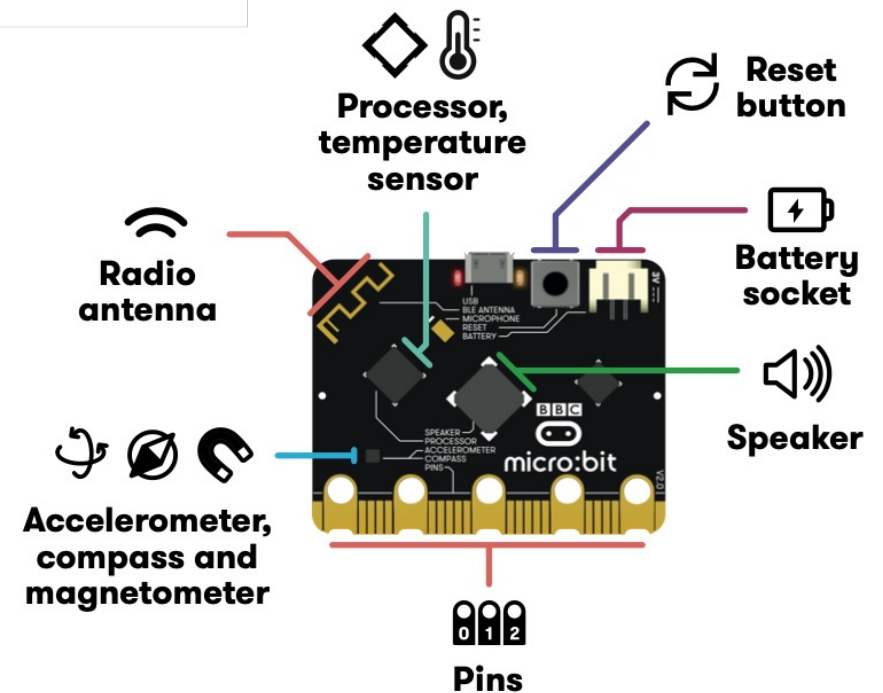
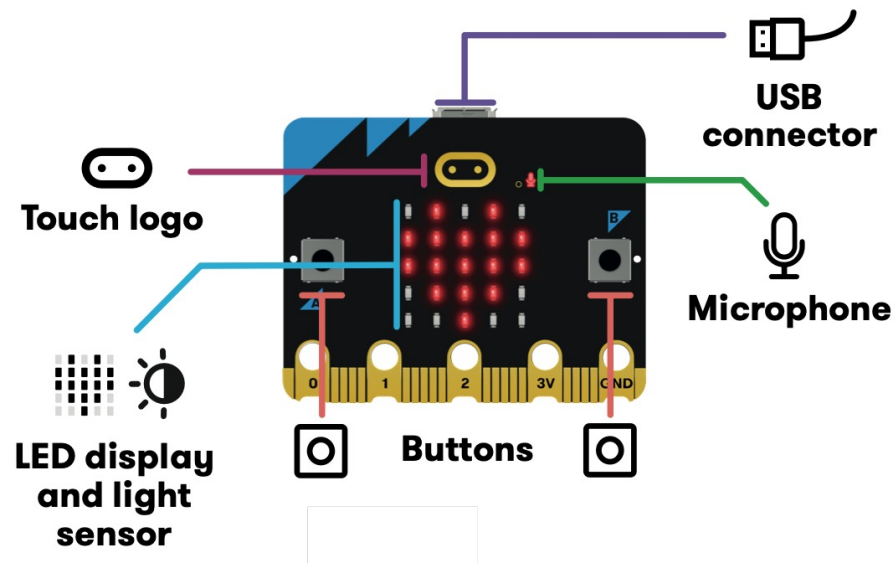
Inspire every child to create  
their best digital future



- > 10m micro:bits manufactured
- 73.5m children have learnt with micro:bit in 85+ countries in the last 10 years

# What is the BBC micro:bit?

A pocket-sized computer for students aged 7-14. Designed for the classroom



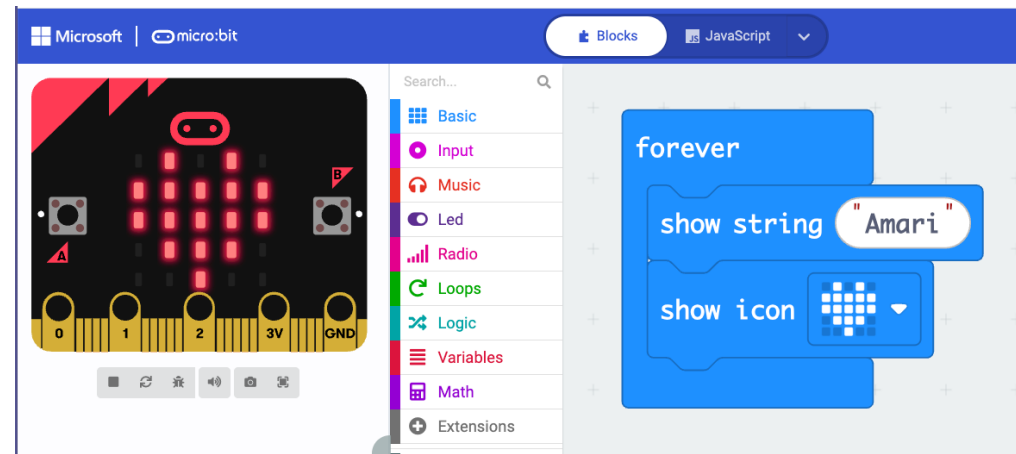
Built-in sensors, plus data-logging for science

Pins allow you to make your own switches and water sensors from tin foil and cardboard

# Free resources and classroom tools



- **Microsoft MakeCode** block editor, similar to Scratch – no logins needed
- Over 100 **projects**, 25 **units of work**, **classroom resources**, 14 **PD courses** – all free



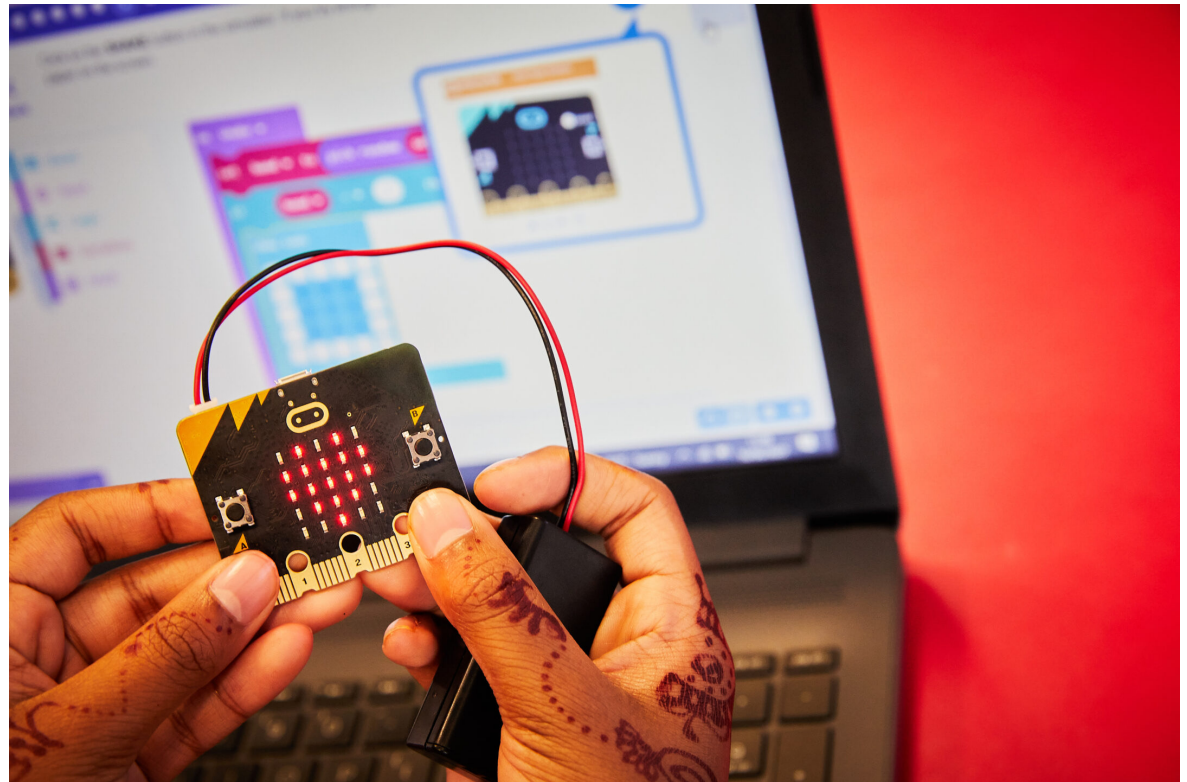
[microbit.org](https://microbit.org)

- Kick strength data logger**: Use data science to improve your sports skills. Intermediate.
- Light experiment**: Investigate materials to see how much light they let... Intermediate.
- Evaporation experiment**: Discover evaporation rates in different locations. Intermediate.
- Sound volume experiment**: Measure sound over distance. Intermediate.
- Human circuit experiment**: Complete an electrical circuit with your body! Intermediate.

# Physical Computing




- Bridges the gap between the digital and physical realms
- Combines programming with real-world devices
- It makes computing tangible
- It encourages creativity and design thinking
- Programs use inputs, processing, and outputs



# The BBC micro:bit: inclusive, creative, engaging



**Data literacy**

A blue rounded rectangle containing a white icon of a magnifying glass over a pulse line, representing data analysis.

**AI literacy**

A teal rounded rectangle containing a white icon of a computer monitor with a cursor arrow pointing to a square on the screen, representing artificial intelligence.

**Computing literacy**

A magenta rounded rectangle containing a white icon of a person with a laptop, representing computing skills.

**Transferable skills**

A green rounded rectangle containing two white icons: a person with a megaphone and a group of people with a lightbulb above them, representing communication and collaborative problem-solving.



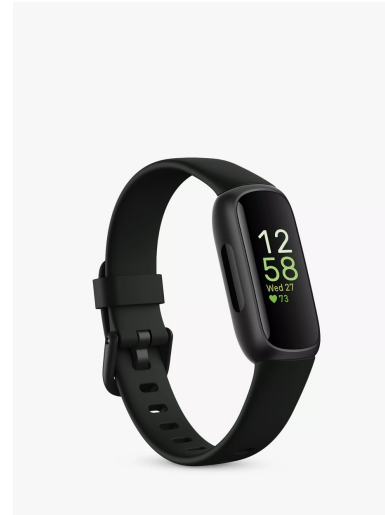
## Let's talk AI and machine learning

### Do you own...

- A smartwatch?
- A smartphone?

### In the future you might own...

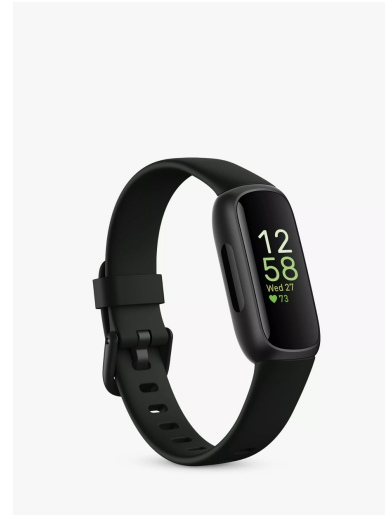
- Smart trainers?
- Smart clothes?





## How does your smart device know when you are moving?

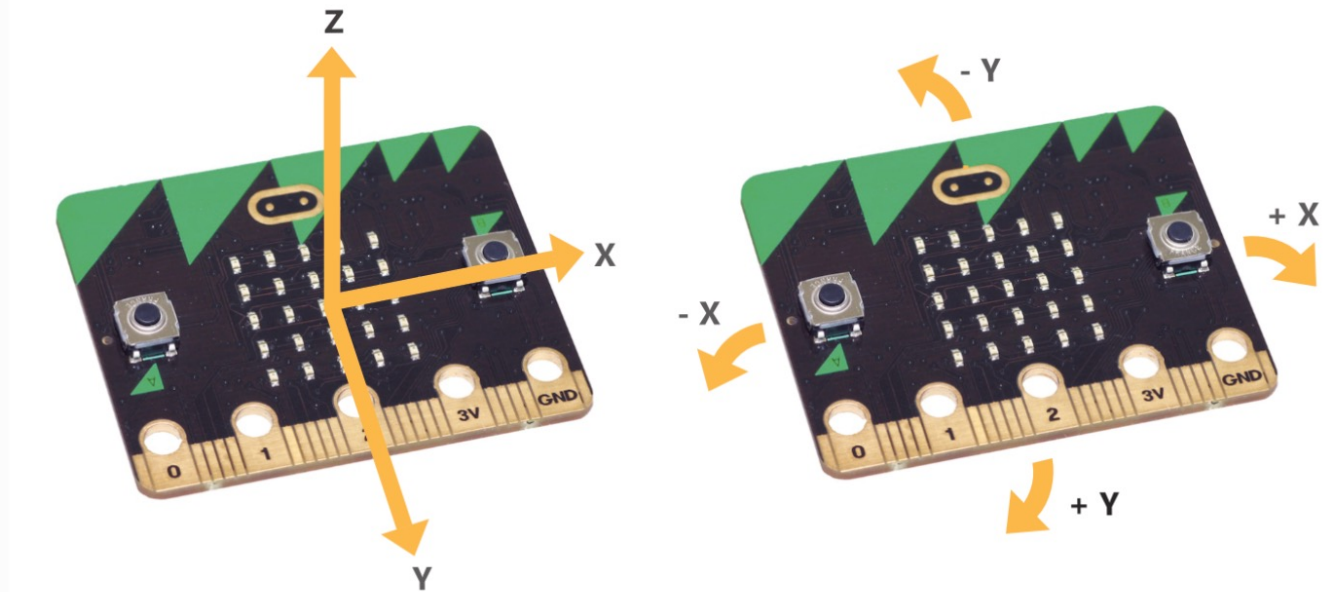
- GPS
- Steps
- Heart rate
- **Movement**
- **Accelerometer**





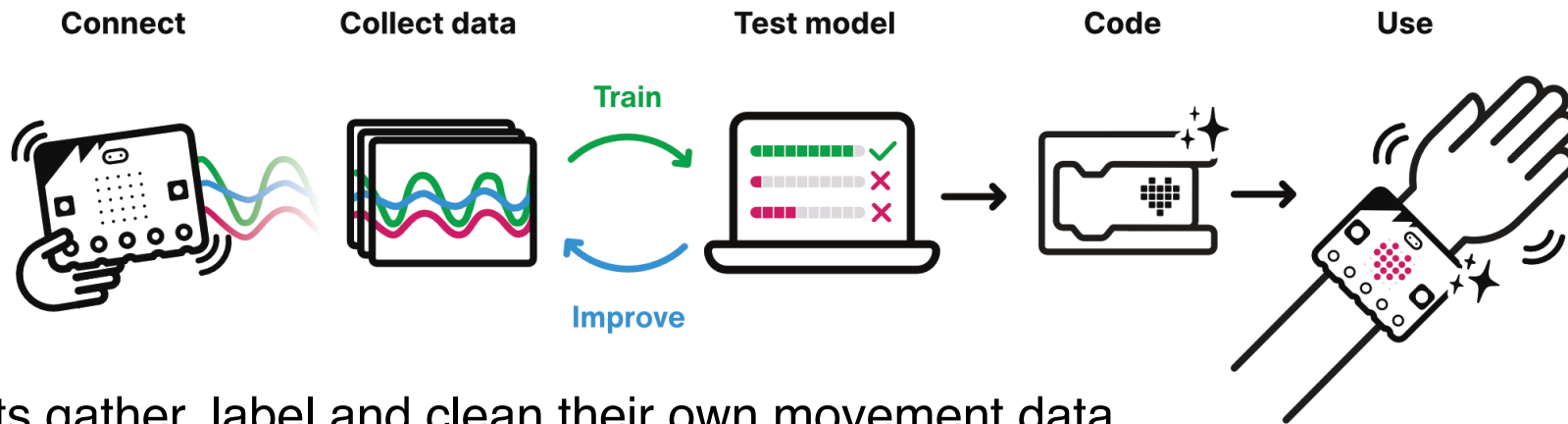
## micro:bit Accelerometer

- X - tilting from left to right.
- Y - tilting forwards and backwards.
- Z - moving up and down.





## CreateAI: unique hands-on making of AI tools



- Students gather, label and clean their own movement data.
- They build and test machine learning (ML) models.
- Use their ML models in code.
- Deploy and test on the micro:bit in self-contained digital devices they can design and build – we think this is unique to CreateAI!
- Direct experience of both traditional algorithms and AI / machine learning algorithms.



## Designed for learning

Bringing the micro:bit approach to AI



- Designed to set you up for success in the classroom
- Suitable for AI beginners (teachers and students) ages 7-14
- Keeping the learning personal, creative, meaningful, playful
- Supporting constructivist, active learning, building student ideas
- Become an AI engineer... for an hour!





# Feeling sporty?

## Micro:bit CreateAI demo





# CreateAI and the curriculum

Existing learning areas



## Computing literacy

- Coding to solve problems
- Using Computational Thinking 1.0
  - Decomposition
  - Abstraction
  - Pattern recognition
  - Algorithms (rule-based)
- Debugging, resilience, collaboration
- Data privacy
- Extends to Computational Thinking 2.0
  - Data-driven algorithms





# CreateAI and the curriculum

Existing learning areas



## Data literacy: Mathematics and Science

- Direct experience of how machines understand the world through data
- Visualising data, spotting patterns
- Making decisions based on data
- Spotting 'bad' and 'good' data, outliers, potential bias



# AI and the curriculum

New learning areas



## AI literacy

- An emerging topic for teaching and learning
- UNESCO and OECD frameworks
  - 2029 PISA assessments of AI literacy
  - How AI systems work
  - Critically compare AI with traditional algorithms
  - The human role in developing AI
  - Impact of AI on people, society, ethics, e.g. from bias
- Revised England National Curriculum
- Vital for young people become critical users of AI, not passive consumers.





## What you need

Low technical barriers to access



- Desktop, laptop, Chromebook
- Chrome or Edge browser
- iPad app out now, Android tablet app coming soon
- 1 or 2 micro:bit V2s per pair of students
- Battery pack
- USB data cable
- Optional way of wearing micro:bit - straps in UK primary next gen school packs
- No logins, no passwords needed
- No cloud servers, we do not see your data – it all runs in your browser on your computer
- No GenAI, no cameras, no risk of inappropriate content

If you have Bluetooth enabled



Data collection  
micro:bit

Data sent over  
Bluetooth



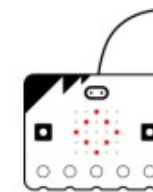
micro:bit CreateAI

If you don't have Bluetooth enabled



Data collection  
micro:bit

Data sent over  
micro:bit radio



Radio link  
micro:bit



micro:bit CreateAI



# Resources to support AI learning

Free on [microbit.org](https://microbit.org)



## Projects

Include ready-made data samples and code to get learning started more quickly. Each takes 60-90 mins.

Videos guide you through the projects.

Ideas to modify, extend, compare with similar projects using algorithms.



- Simple AI exercise timer**  
Make a smart exercise timer using AI  
Intermediate
- AI activity timer**  
Use AI to detect and time specific activities  
Intermediate
- AI storytelling friend**  
Use storytelling to introduce AI.  
Intermediate
- AI light switch**  
Clap to turn on the lights.  
Intermediate
- AI sports data logger**  
Log time spent running, walking and being still.  
Advanced



## Units of work

Free on [microbit.org](https://microbit.org)



### CreateAI taster lessons



- 2 x 50-minute lessons
- Unplugged intro to AI & ML with animated video explainers
- Hands-on end-to-end use of the tool
- Good for trying it out, code clubs etc



### First lessons with CreateAI

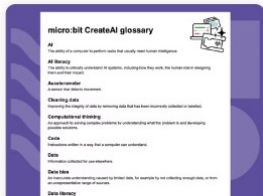


- 7 x 30-minute lessons
- Unplugged intro to AI & ML and card sort activity
- 5 lessons focus in more detail on
  - collecting and labelling data
  - training & testing ML models
  - adding code to build a tool
  - evaluating the AI system
  - adding diverse data



# Other resources to support AI learning

Free on [microbit.org](https://microbit.org)



## micro:bit CreateAI glossary

Key terms for AI and machine learning



## Teaching tools

Tips for preparing to teach with micro:bit CreateAI



## Other resources

- Explainer videos
- AI **glossary** classroom resource
- Comprehensive **User guide** including walk-through video
- **PD** course on AI coming soon
- ...and look for your next gen boxes in school!

<https://microbit.org/ai/>