micro:bit CreateAI

Physical computing in an AI world

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Micro:bit Educational Foundation

Festival of Computing
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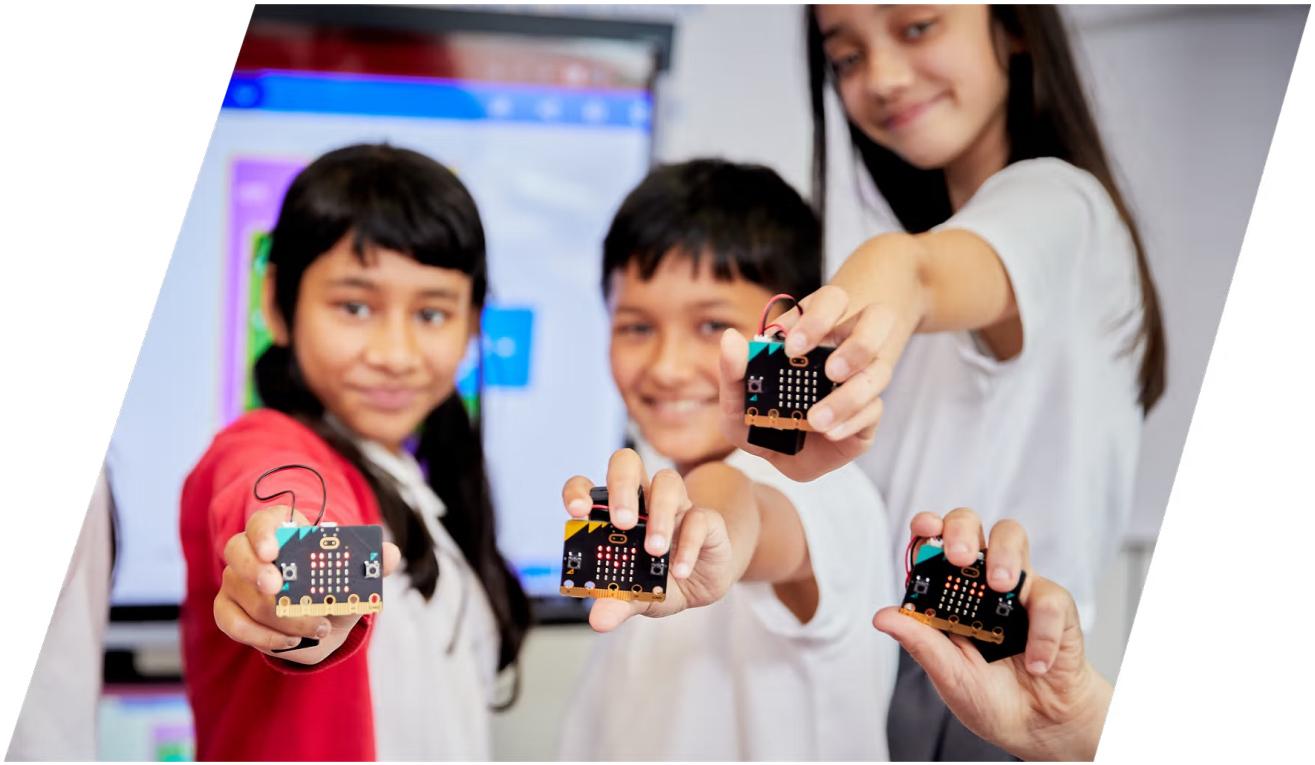
In this session

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

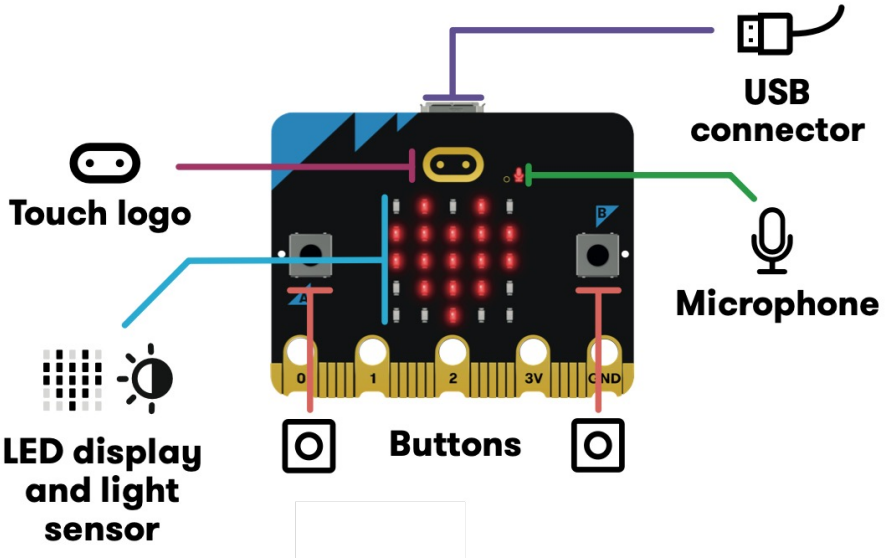
- Small global not-for-profit organisation with roots in UK: BBC's **Make it Digital** campaign for Y7 in 2016 and for KS2 in BBC **next gen** in 2023-4
- Class sets of micro:bits in over 90% of UK primary schools
- Our focus is to engage more girls, underrepresented groups and underserved communities

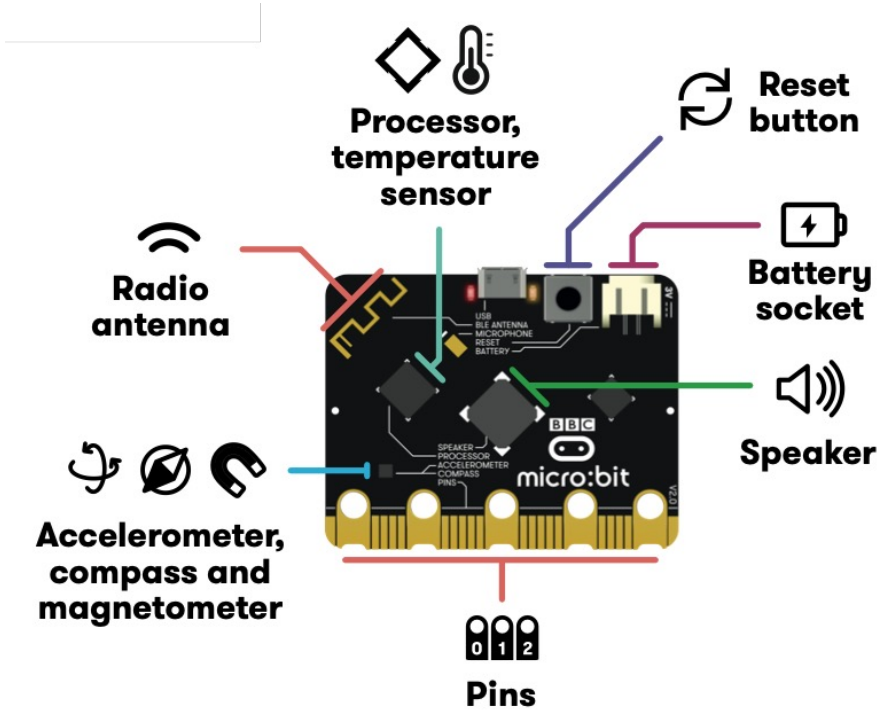
Inspire every child to create their best digital future

- > 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**



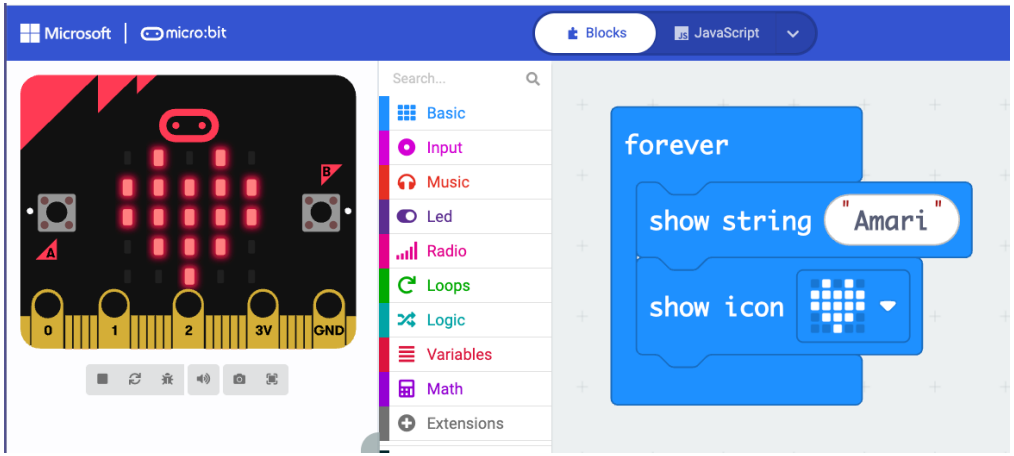


Built-in sensors, plus data-logging for science

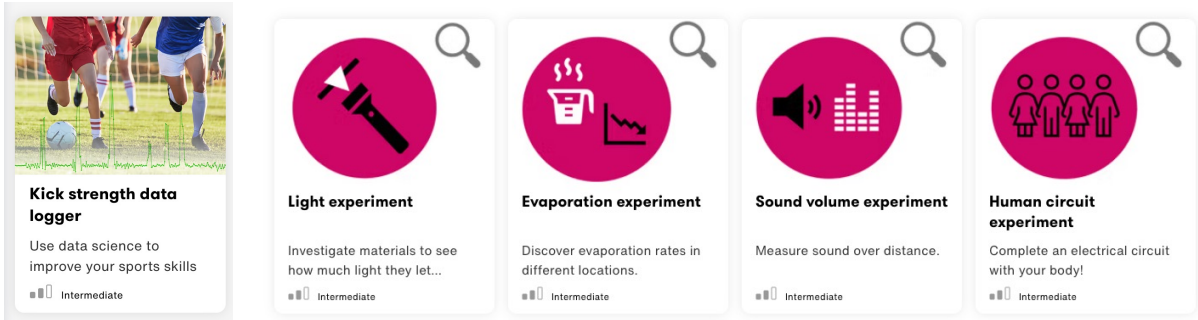
Pins allow you to make your own switches and water sensors from tin foil and cardboard

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

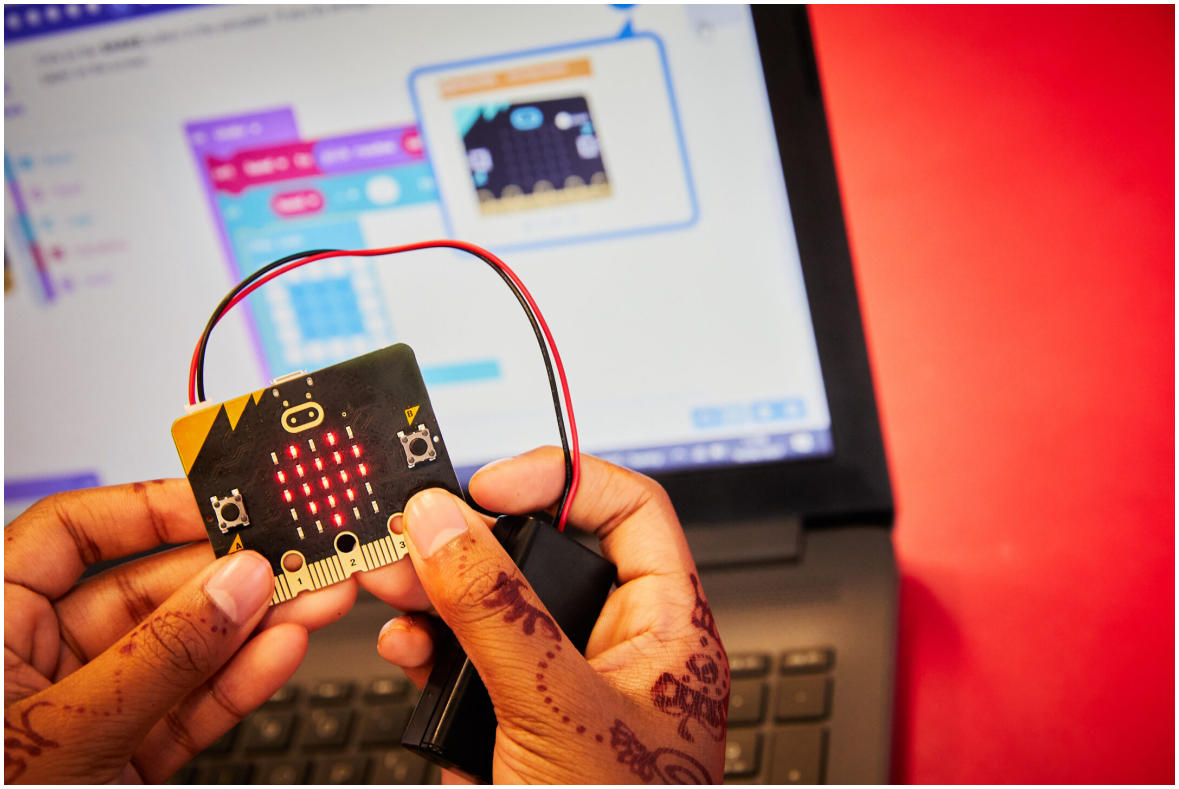


microbit.org



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

AI literacy

Computing literacy

Transferable skills

Let's talk AI and machine learning

Do you own…

- A smartwatch?
- A smartphone?

In the future you might own…

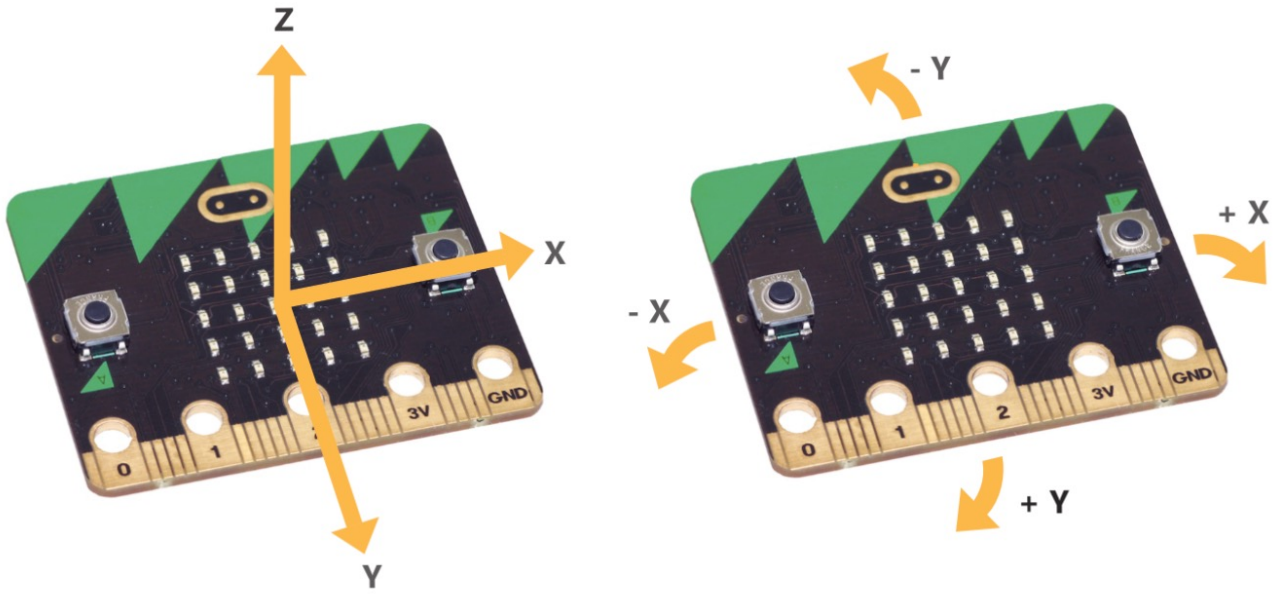
- Smart trainers?
- Smart clothes?

How does your smart device know when you are moving?

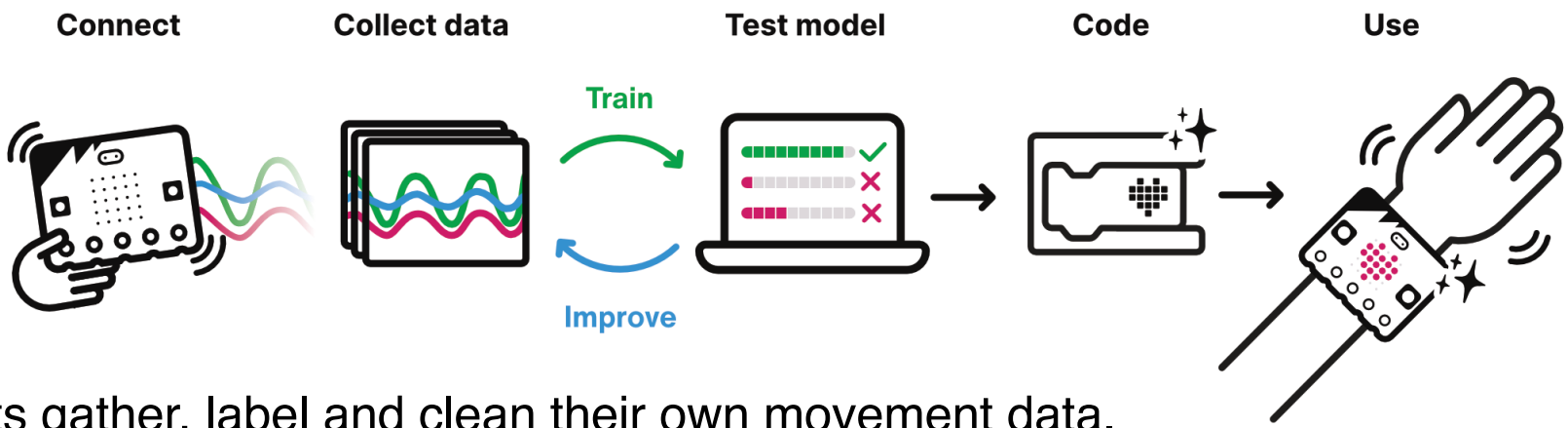
- GPS
- Steps
- Heart rate
- **Movement**
- **Accelerometer**

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.

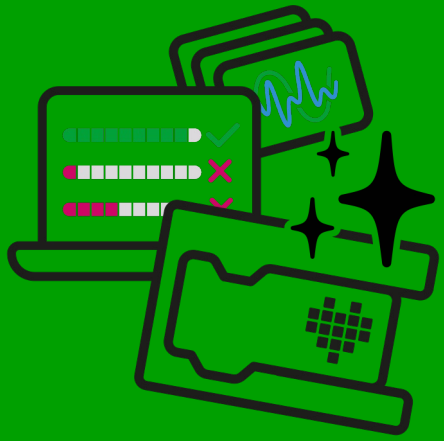
Designed for learning

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

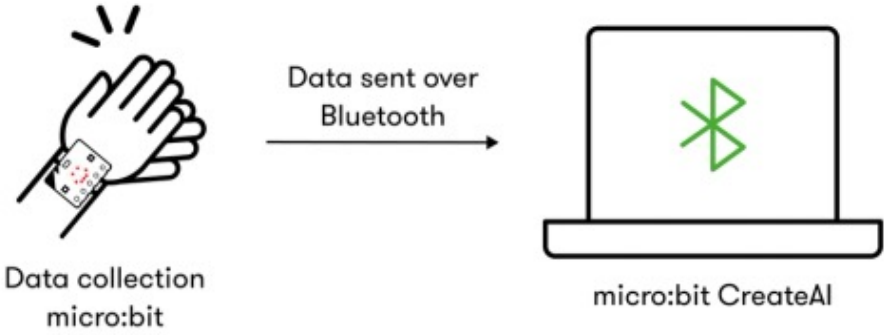
Low technical barriers to access

- 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



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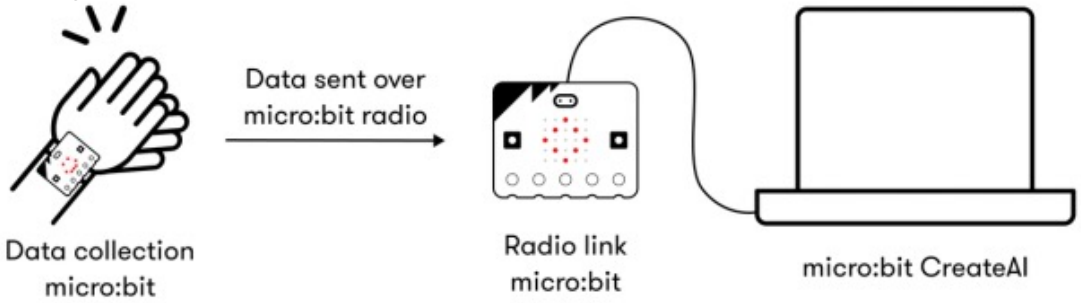


Resources to support AI learning

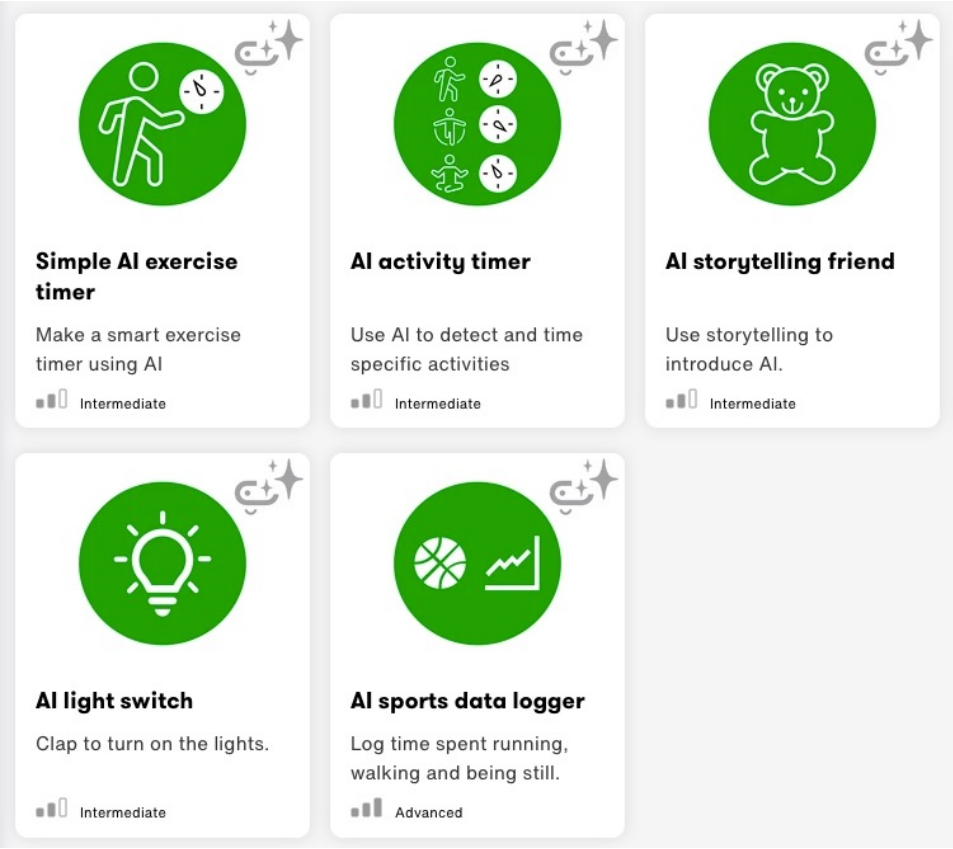
Free on microbit.org

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.



Units of work

Free on microbit.org

CreateAI taster lessons

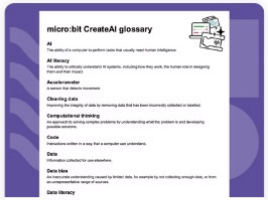
- 2 x 50-minute lessons
- Unplugged intro to AI & ML with animated video explainers
- Hands-on end-to-end use of the tool
- Good for trying it out, code clubs etc

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

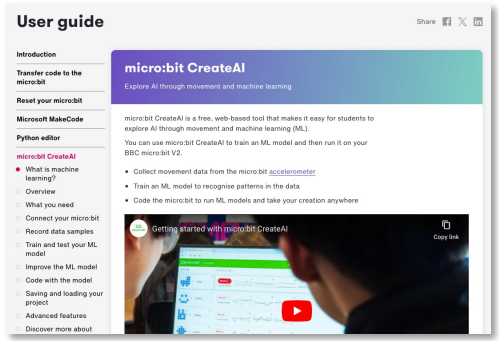


micro:bit CreateAI glossary

Key terms for AI and machine learning

Teaching tools

Tips for preparing to teach with micro:bit CreateAI



https://microbit.org/ai/

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!**