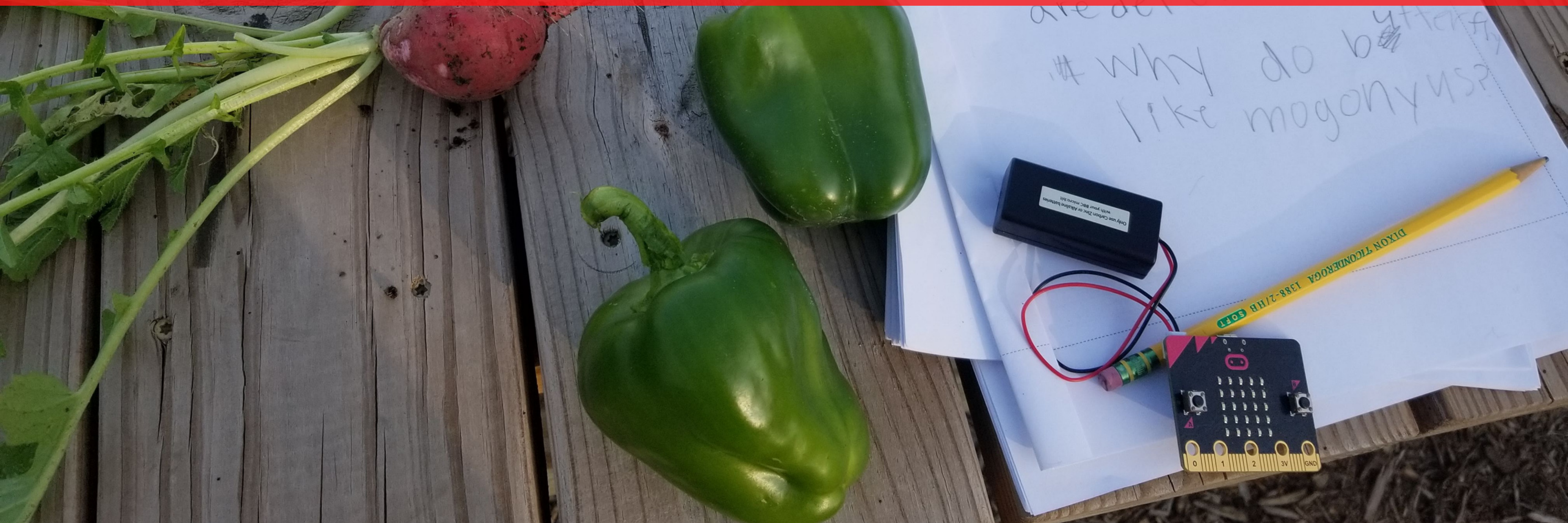


Garden TOOLS

PROFESSIONAL DEVELOPMENT SERIES



A photograph showing two young girls sitting at a light-colored table in a classroom. They are both focused on their laptops. The girl on the left has long, wavy brown hair and is wearing a white t-shirt. The girl on the right has long, straight blonde hair and is wearing a red shirt with white polka dots. The laptops are open, and the screens display what appears to be a coding interface with colorful blocks. The classroom has a wooden floor and blue chairs. A dark blue semi-transparent banner with white text is overlaid across the middle of the image.

Scaffolding student coding experiences

Coding shouldn't be stressful!

We need to scaffold coding experiences so that students can...

- Practice and gain computational thinking skills
- Not feel overwhelmed or disengaged during the process



I want to share a story about Claire...



3rd grade

Cat ears

Hello Kitty t-shirt

Glittery pants

I want to share a story about Claire...

Likes:

- Doing her own thing
- Being outside
- Moving around the classroom

3rd grade



Cat ears

Hello Kitty t-shirt

Glittery pants

I want to share a story about Claire...

Likes:

- Doing her own thing
- Being outside
- Moving around the classroom

Dislikes:

- Following directions
- Sitting still
- Staying in her seat

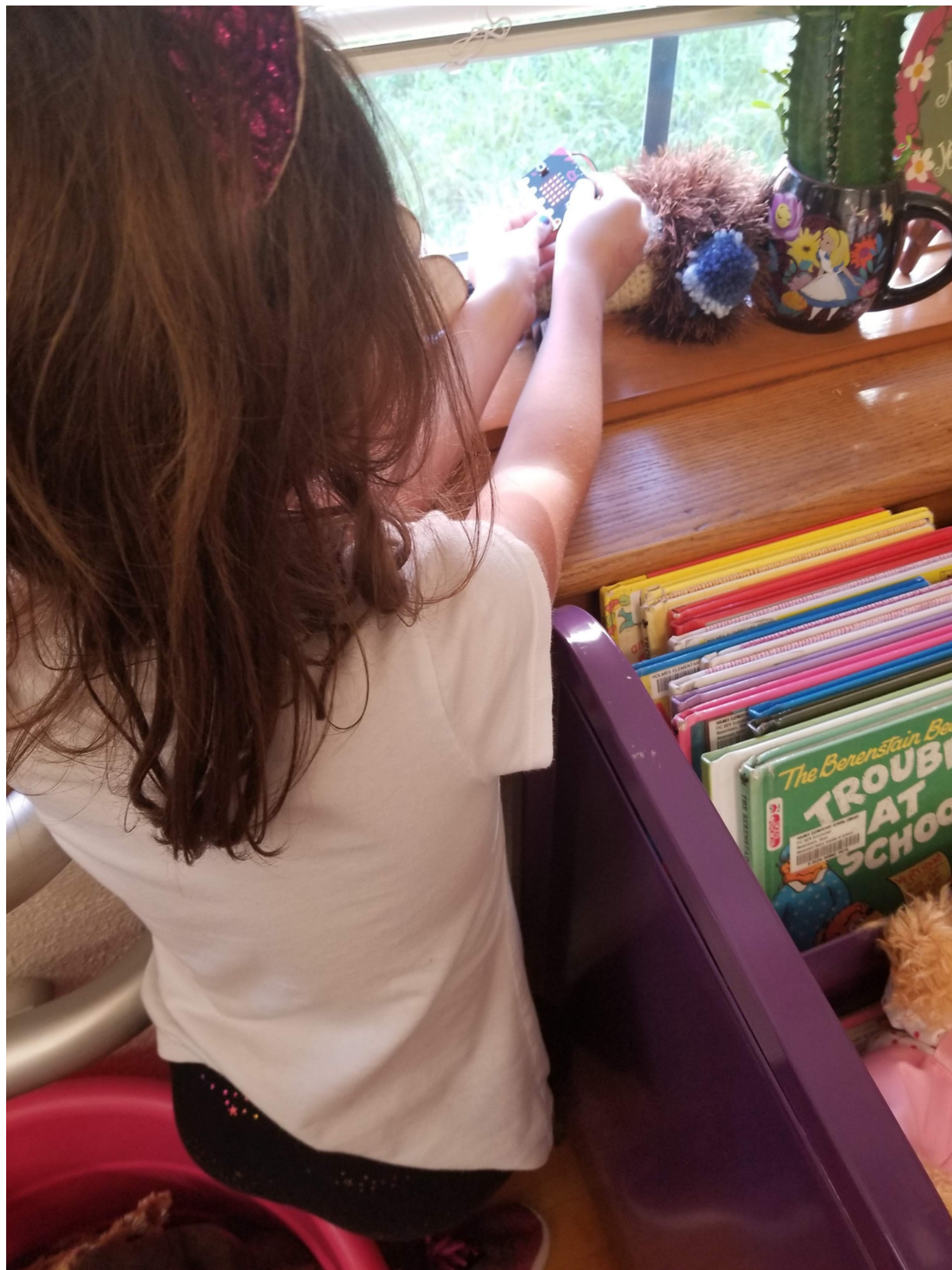
3rd grade



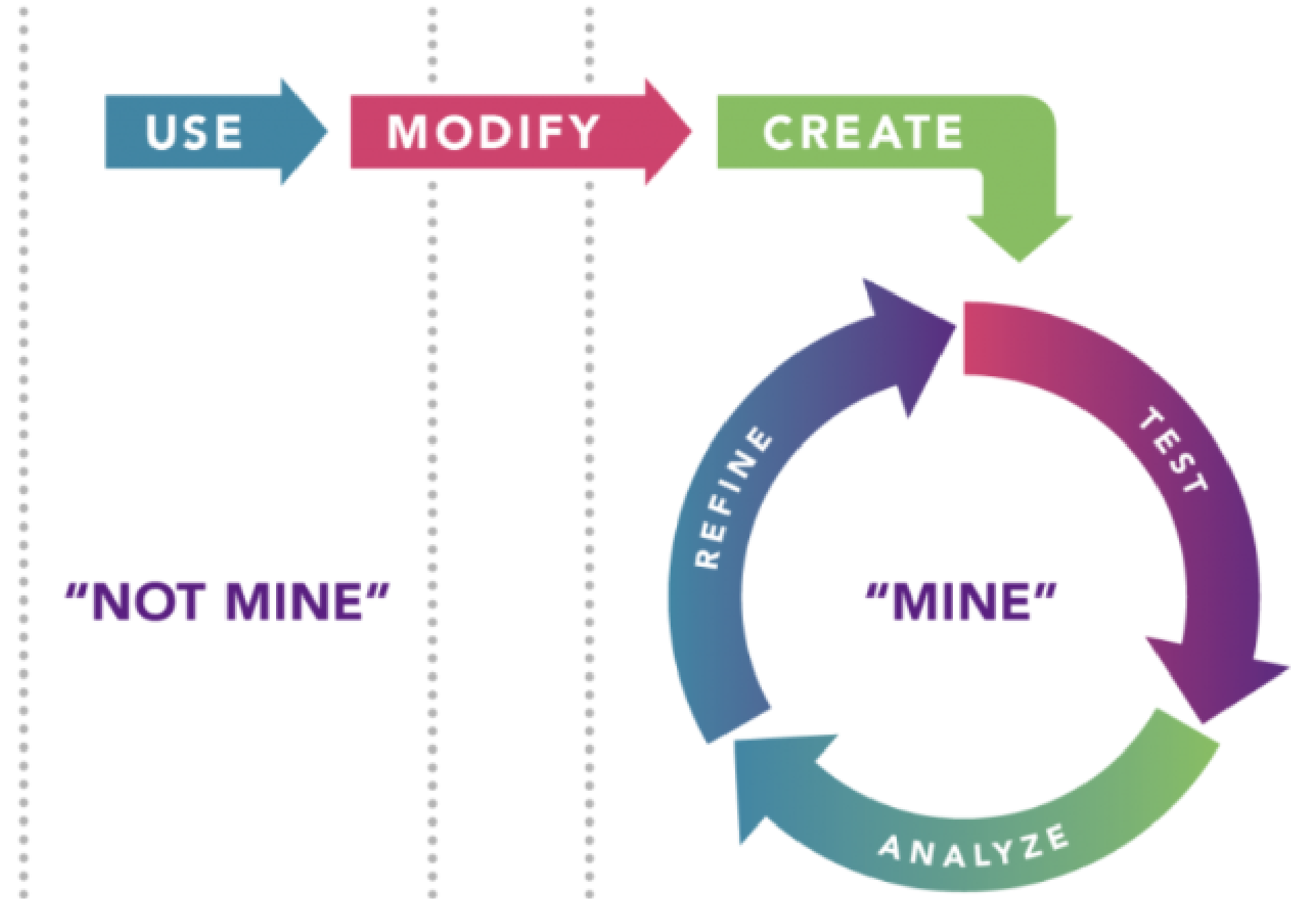
Cat ears

Hello Kitty t-shirt

Glittery pants



The learning sequence is important!



Our goal is moving students from consumers to creators of technology.

“

In the use stage, students are consumers of someone else's creation.

Over time they begin to modify the model, game or program with increasing levels of sophistication.

Later the student may want to change the character's behavior in a way that entails developing new pieces of code.

Through a series of modifications and iterative refinements, new skills and understandings are developed as what was once someone else's becomes one's own.

”

Lee, I., Martin, F., Denner, J., Coulter, B., Allan, W., Erickson, J., Malyn-Smith, J., & Werner, L. (2011). Computational thinking for youth in practice. *ACM Inroads*, 2(1), 32–37.

What can this look like?

What can this look like?



What can this look like?



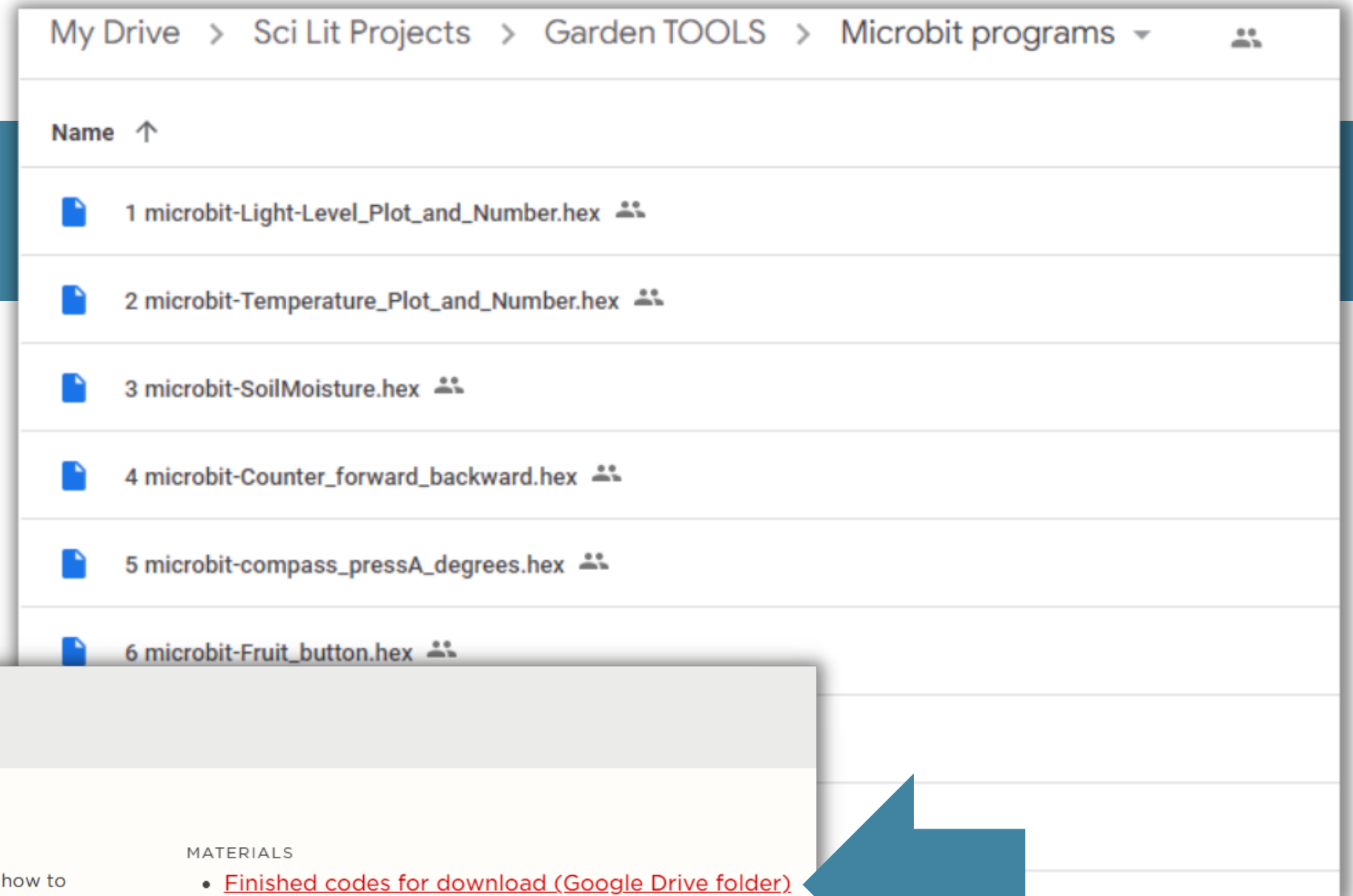
Use

Pre-code the micro:bits

What can this look like?

Use

Pre-code the micro:bits



Garden TOOLS - How-To Coding Guides



RESOURCE SUMMARY

The Garden TOOLS how-to coding guides provide step-by-step instructions on how to program the BBC micro:bit in various ways to gather data in a school garden or other outdoor learning space.

Elementary Classroom Instruction After-School Instruction At-Home Instruction Technology Engineering
Systems Thinking Informed Decision Making Food Water

SHARE TO GOOGLE CLASSROOM

MATERIALS

- [Finished codes for download \(Google Drive folder\)](#)

ASSOCIATED PROJECTS

- [Garden TOOLS Project](#)

What can this look like?



Use



Modify

Pre-code the micro:bits

Provide a coding tutorial

Provide a picture of completed code

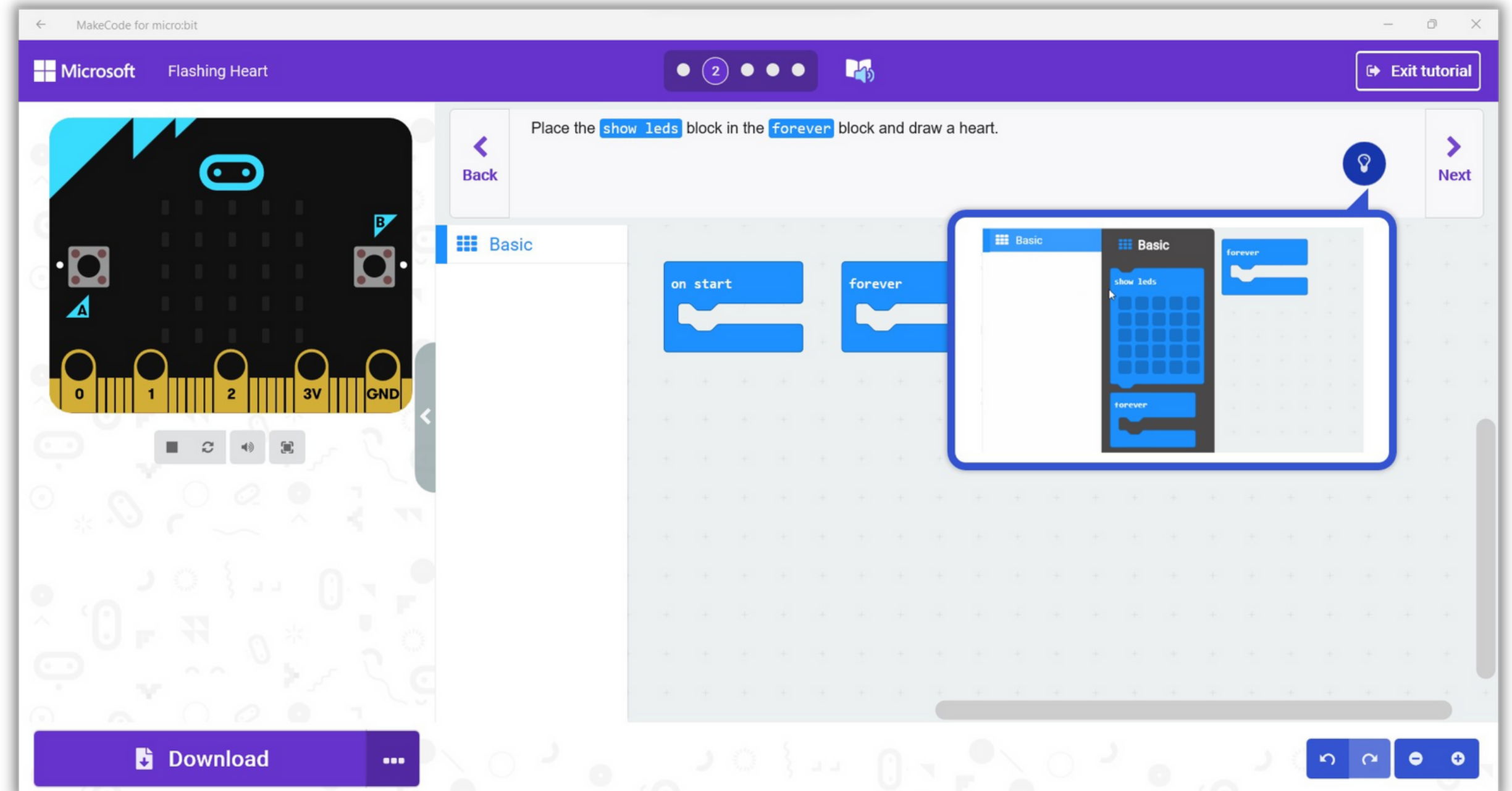
Provide unassembled code blocks

Provide a coding tutorial

LOTS of tutorials are available directly on the front page of the MakeCode for microbit website.

A few notes to consider:

- Limited code menu simplifies and eliminates distraction
- Step-by-step instructions
- Hints in form of pictures
- You likely need to teach students how the tutorial works!

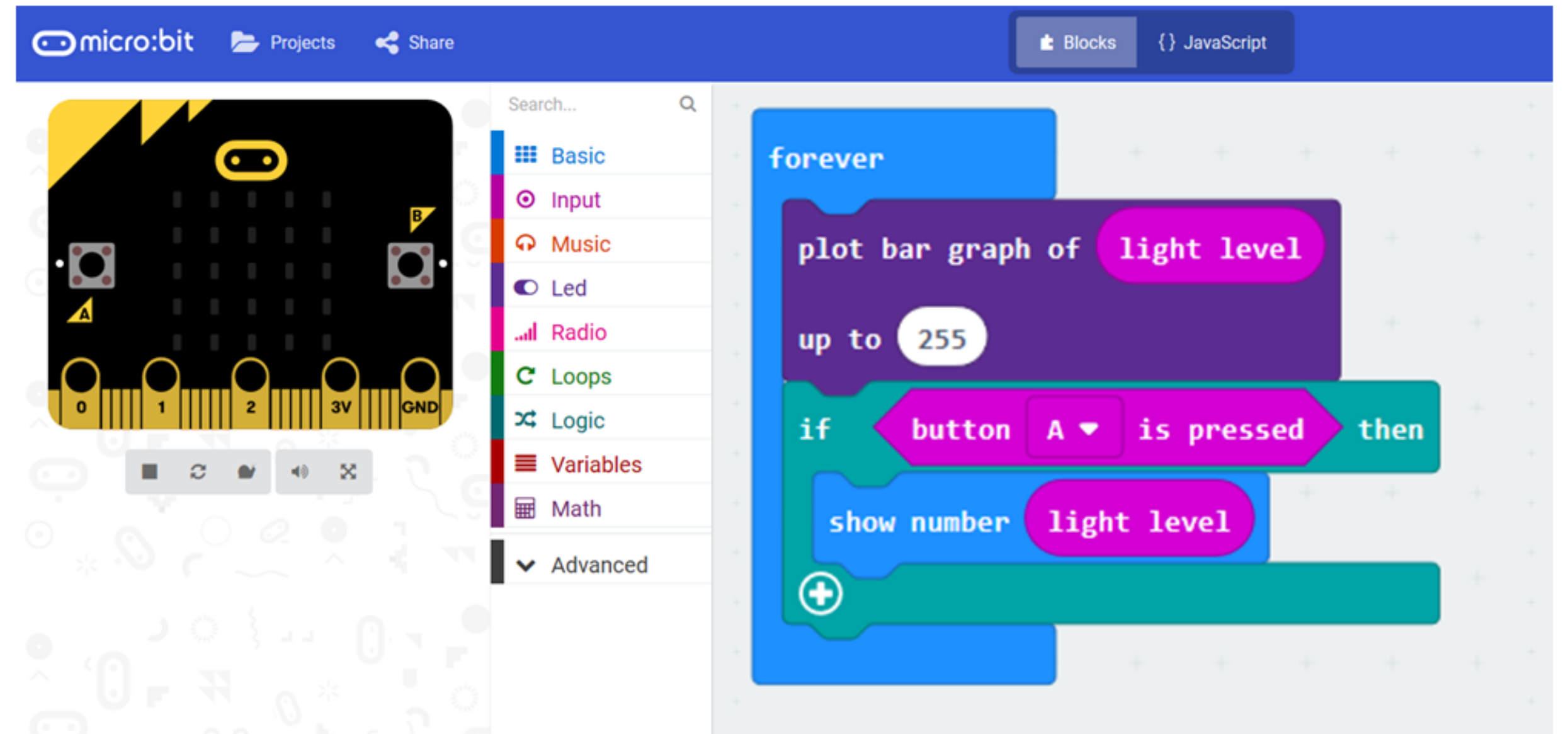


Provide a picture of completed code

A few notes to consider:

- Helpful when no tutorial is available
- Doesn't require written instructions
- No limited code menus, increased # of code blocks = distracting

Measuring light

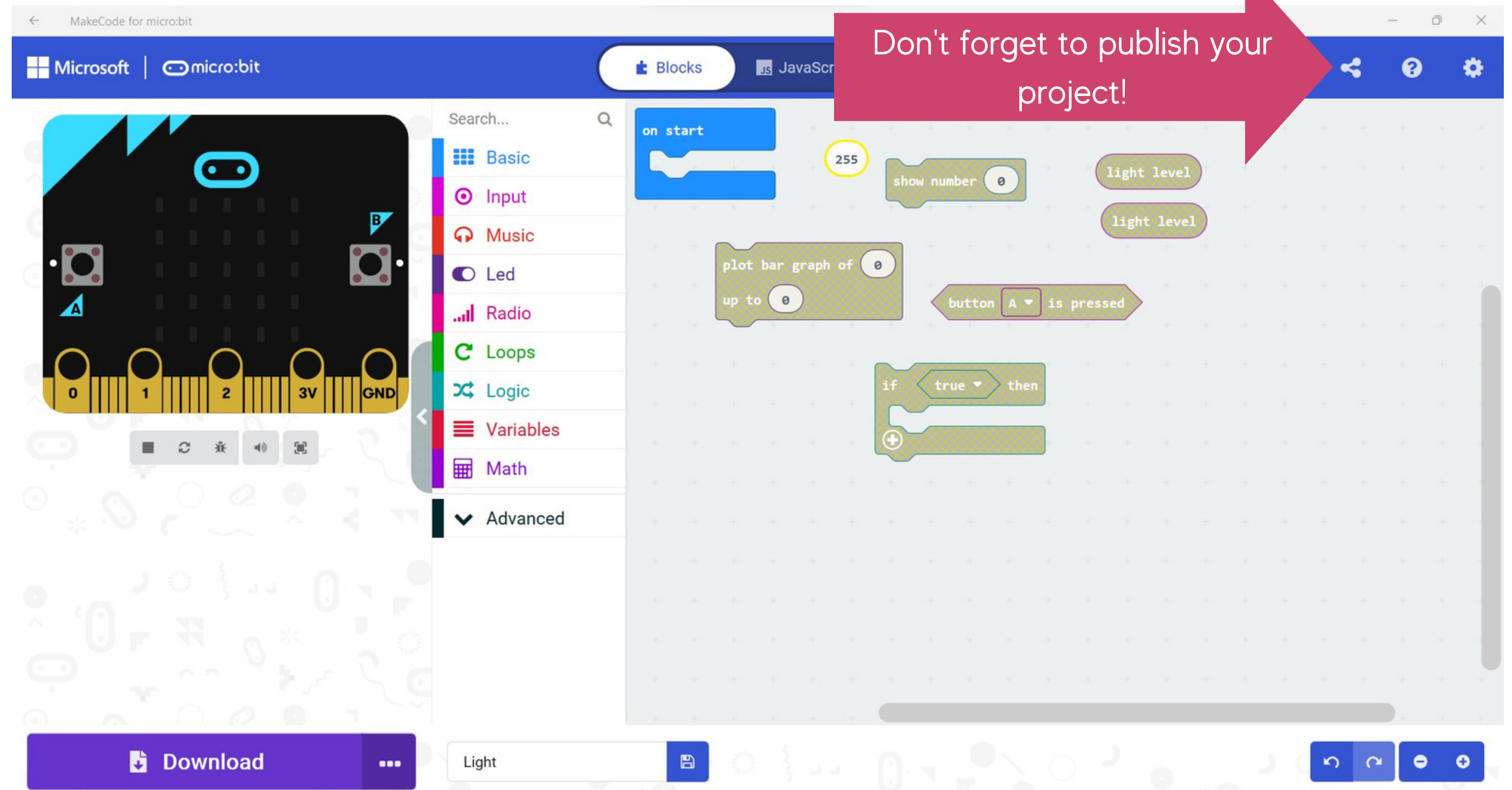


The screenshot shows the micro:bit code editor interface. At the top, there's a blue header with 'micro:bit', 'Projects', and 'Share' buttons. On the right, there are tabs for 'Blocks' and 'JavaScript'. Below the header, on the left, is a virtual image of the micro:bit board with pins labeled 0, 1, 2, 3V, and GND. In the center, there's a search bar and a menu with categories: Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced. On the right, the code editor shows a 'forever' loop containing a 'plot bar graph of light level up to 255' block, followed by an 'if button A is pressed then' block containing a 'show number light level' block. A plus sign in a circle is visible at the bottom of the code area.

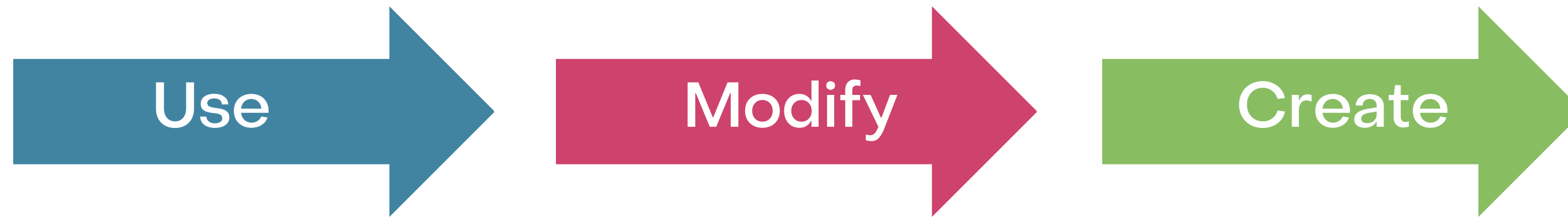
Provide unassembled code blocks

Functions similar to tutorial but you are the one to build it.

- Create new project
- Drag code blocks needed
- Leave them unassembled
- Right click code block to leave a comment (give instructions)
- Publish your project
- Share project link with youth



What can this look like?



Pre-code the micro:bits

Provide a coding tutorial

Provide a picture of completed code

Provide unassembled code blocks

Open coding

Need help creating? Consider starting with project cards!



Garden TOOLS - Project Cards

The Garden TOOLS project cards provide guided instructions for BBC micro:bit coding projects that can be used to extend student learning. Project cards include will guide students to... design a soil moisture sensor to match different plant root depths, design a button to count garden visitors, and design an animated scarecrow to scare away pests.

MATERIALS

[Soil moisture probes \(Project cards\)](#)

[Garden visitor button \(Project cards\)](#)

[Animated scarecrow \(Project cards\)](#)

Gives students a place to start with suggested engineering projects with step-by-step instructions.
It might get their creative juices flowing!