

LESSON: Careers in Digital Technology and an Introduction to Coding Micro:bits

LEVEL: Grades 6-8

OBJECTIVE: Students will be introduced to careers in the Digital Technology sector in New Brunswick. They will gain an introductory understanding of “coding” and will have the opportunity to code a micro-bit using Microsoft MakeCode.

PRIOR KNOWLEDGE:

- Students have used apps and online digital tools. Students can save files to an external drive on a computer.
- Teachers have a working knowledge of Microbits, have tried a tutorial themselves or have taken EECD mini-PD on Microbits.

TIME: 60+ minutes

MATERIALS: Microbit, Power-packs, USB, Laptops (per every 2 students)
Worksheets (in Appendix A)

LEARNING OUTCOMES:

Understand and apply the fundamental principles and concepts of computer science.
Gain practical experience of writing computer programs to solve problems.
Be responsible, competent, confident, and creative users of information and communication technology.



STEP 1: Introductory Video, Definitions and Discussion (5-10mins)

Show video: Careers in Coding and Computer Programming: Digital New Brunswick (1:31)

https://centresofexcellencenb.ca/digitalinnovation/?speaker_series=example-video-3

Afterward: Your province needs you! As the Digital New Brunswick video suggests, there are (and will be) lots of exciting careers available in digital technology and innovation. The streamlined digital services and apps mentioned in the video (for example snow plowing app, bus finder, drivers’ license renewal and medical information) will require creative humans (like you!) to dream up, program and maintain.

Short Definitions and Whole Class Discussion

What is coding? Ask students to describe some of the actions that we use computers to do. (For example, send emails, play video games, perform calculations, etc.) Ask students how they think the computer performs these complicated tasks. (Students may say that there are computer programs that give computers instructions about what actions to take.)

Definition: Coding, sometimes called computer programming, is how we communicate with computers. Code tells a computer what actions to take, and writing code is like creating a set of instructions for a computer. By learning to write code, you can tell computers what to do or how to behave in a much faster way.
Electronic devices like cell phones, laptops, tablets and all their apps require code to function properly. Coding allows humans to communicate with these devices. Modern technology such as traffic lights, calculators, smart TVs, and cars use internal coding systems.

Since computers do not communicate like humans, coding acts as a translator. Code converts human input into numerical sequences that computers understand. Once computers receive these messages, they complete assigned tasks such as changing font colors or centering an image, for example.

Additional discussion: Does anyone know a person who is a computer programmer?

Computer programmers write algorithms for each task a computer needs to do. They then translate the algorithms into a language that a computer can read and follow. This language is called computer code.

STEP 2: Coding Microbits (30+mins)

Show video: Introduction to the Microbit (2:09)

<https://www.youtube.com/watch?v=u2u7UJSRuko>

- 1) Have students choose **one** of the four codes to enact in makecode.microbit.org (see 4 handouts in Appendix A).

You may choose to do one on the SMARTBoard in front of the class as an example, or ping-pong from group to group to help them.

- 2) Once they have completed one of the examples, encourage them to alter the code, and try another tutorial code here: <https://makecode.microbit.org/>

- 3) Allow students to play, test and make their own code from scratch!

Helpful Hint: Encourage, recognize, and share when a group makes a code. Ask student experts to help other students.

Conclusion (10+mins)

CULMINATING DISCUSSION: What did you learn? Why was it important that each step was very simple? How might you make the code shorter or more efficient? [Explain that computer programmers use loops to shorten the codes that they write. A loop is a group of actions that is repeated a given number of times.]

ADDITIONAL ACTIVITIES: 5 Worksheet Challenges in this lesson plan, found here:

Introduction to Coding Lesson https://www.sony.com/campaign/SNA/images/KOOV_Lessons_Activities_CL.pdf

NEXT STEPS: Indepth look at microbit programming, including the use of inputs, outputs, conditionals and loops.

OTHER REFERENCES

- Learning Outcomes <https://microbit.org/teach/lessons/computing-fundamentals-unit-of-work/#:~:text=Learning%20objectives,computer%20programs%20to%20solve%20problems.&text=be%20responsible%2C%20competent%2C%20confident%20and,of%20information%20and%20communication%20technology.>
- Introduction to Coding Lesson https://www.sony.com/campaign/SNA/images/KOOV_Lessons_Activities_CL.pdf
- Microbits Tutorials – EECD Online Mini Course (Sarah Rankin, GNB)

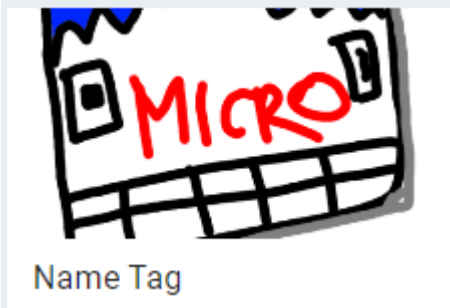
Micro:bit Nametag

1. Plug in your microbit to the usb port on your computer.

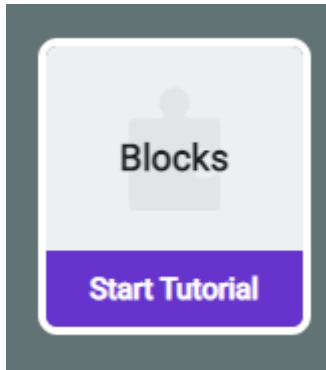
2. Visit this site: <https://makecode.microbit.org/>



3. Under tutorials, click “Nametag”.



4. Click the “Blocks” button and follow the instructions at the top of the screen.



5. You can also follow a video for this code, found here: <https://www.youtube.com/watch?v=xpRI5jjQ31E>

6. Show your teacher the programmed microbit when you get it!

7. Play! Try your own variation of this code.

Micro:bit Step Counter

1. Plug in your microbit to the usb port on your computer.

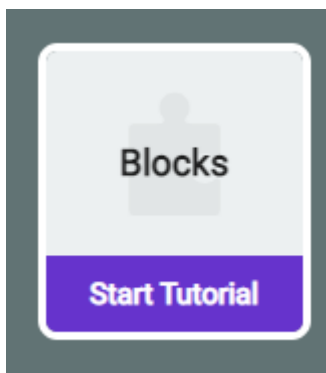
2. Visit this site: <https://makecode.microbit.org/>



3. Scroll down to “Fashion” and click “Step Counter” to find the tutorial.



4. Click the “Blocks” button and follow the instructions at the top of the screen.



5. You can also follow a video for this code, found here: <https://www.youtube.com/watch?v=TTI0OfoclU>

6. Show your teacher the programmed microbit when you get it!

7. Play! Try your own variation of this code.

Micro:bit Smiley Button

1. Plug in your microbit to the usb port on your computer.

2. Visit this site: <https://makecode.microbit.org/>

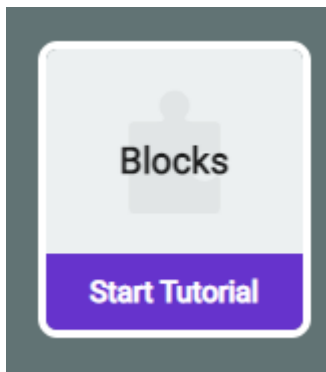


3. Under tutorials, click “Smiley Button”.



Smiley Buttons

4. Click the “Blocks” button and follow the instructions at the top of the screen.



5. You can also follow a video for this code, found here: <https://www.youtube.com/watch?v=BgDxz3M7JIM>

6. Show your teacher the programmed microbit when you get it!

7. Play! Try your own variation of this code.

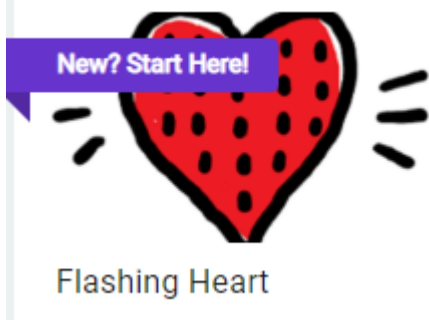
Micro:bit Flashing Heart

1. Plug in your microbit to the usb port on your computer.

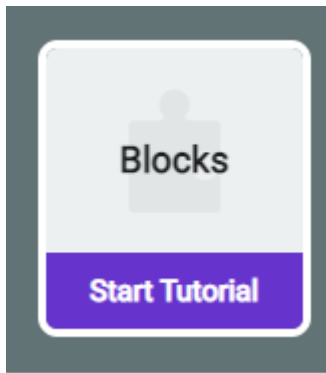
2. Visit this site: <https://makecode.microbit.org/>



3. Under tutorials, click “Flashing Heart”.



4. Click the “Blocks” button and follow the instructions at the top of the screen.



5. You can also follow a video for this code, found here: <https://www.youtube.com/watch?v=NvEOKZ8wh9s>

6. Show your teacher the programmed microbit when you get it!

7. Play! Try your own variation of this code.

Introduction to Micro:bits

Triple E Evaluation Rubric- When to Use Technology by Liz Kolb

Engagement in the learning	0=No	1=Somewhat	2=Yes
The technology allows students to focus on the assignment/activity/goals with less distraction (Time on Task).			✓
The technology motivates students to start the learning process.			✓
The technology causes a shift in the behavior of the students, where they move from passive to active social learners (through co-use or co-engagement).			✓
Enhancement of the learning goals	0=No	1=Somewhat	2=Yes
The technology tool allows students to develop or demonstrate a more sophisticated understanding of the learning goals or content (using higher-order thinking skills).		✓	
The technology creates supports (scaffolds) to make it easier to understand concepts or ideas (e.g. differentiate, personalize or scaffold learning)			✓
The technology creates paths for students to demonstrate their understanding of the learning goals in a way that they could not do with traditional tools.			✓
Extending the learning goals	0=No	1=Somewhat	2=Yes
The technology creates opportunities for students to learn outside of their typical school day. (24/7 connection)		✓	
The technology creates a bridge between students school learning and their everyday life experiences (connects learning goals with real life experiences).			✓
The technology allows students to build authentic life soft skills, which they can use in their everyday lives.			✓
READING THE RESULTS			
<ul style="list-style-type: none"> • 14-18 Points: Exceptional connection • 10-13 Points: Strong connection • 7-9 Points: Average connection (re-evaluate does it enhance &/or extend learning goals in significant way) • 6 Points or below: Low connection (possibly rethink if technology should be used at all) 		<p>TOTALS <u>16</u> /18</p>	