CANADA LEARNING CODE

micro:fit Step Counter

By: Jen Perry
Duration: 3 Part Lesson (approximately 3 hours)

LEVEL	SUBJECTS	PROVINCES / TERRITORIES	TOOL
Age 7+	Physical Education and Technology	Across Canada	Unplugged, micro:bit

Overview

This is a beginner micro:bit project. This lesson is a three part lesson. The first part focuses on the coding concept variables and includes an unplugged lesson from Code.Org. In the second part, students will program the micro:bit to keep track of their steps and then in the third part, students will create their own fitness step counter strap.

Prep Work

- The instructor should have some knowledge of micro:bit
- micro:bit (one per student)
- Computers or a device capable of pairing to micro:bit
- Students should have had some previous experiences with coding (Scratch or Blockly)
- Materials for step counter strap (fabric, duct tape, cardboard, elastic bands, etc.)

Key Coding Concepts

- Algorithms
- Events
- Variables

Terminology

Algorithm: a step-by-step set of operations to be performed to help solve a problem

Events: When one thing causes another thing to happen

Variable - A placeholder for a piece of information that can change

Curricular Connections

Physical Education:
Health: Participation in physical

Lesson

PART 1

If this is students first experience with micro:bit view introduction video: micro:bit Tutorial Series Part 1: Getting Started
*note: watch first 3 minutes only
http://bit.ly/envelope-variable-educators

Complete Code.Org Variables - In Envelopes Unplugged Lesson (50minutes)

Preview video: Code.Org Variables - In Envelopes
http://bit.ly/envelope-variables-lesson

Review explanation of variables (from Code.Org) and complete unplugged lesson plan (approximately 50 minutes):

“Variables are used as placeholders for values such as numbers or words. Variables allow for a lot of freedom in programming. Instead of having to type out a phrase many times or remember an obscure number, computer scientists can use variables to reference them.” http://bit.ly/envelope-variables-lesson

See Teacher video for additional support:
http://bit.ly/envelope-variable-educators

PART 2:

Program a Prototype Step Counter (30 minutes)
Watch video about the importance of tracking steps:
http://bit.ly/count-those-steps

Complete lesson by micro:bit

The code starts by making a variable called "steps" and setting it to 0. Every time the micro:bit is shaken it adds to the step count and shows it!
http://bit.ly/design-prototype-step-counter

activity can improve fitness—muscular strength, flexibility, muscular endurance, body composition and cardiovascular endurance—and reduce the risk factors related to heart disease, including obesity and high blood pressure.

Active Lifestyle: Physical activity, over time, is beneficial to personal well-being.
Goal Setting: Physical education provides opportunities for students to practise goal setting as they participate.

References

MakeCode Reference Guide:
https://makecode.microbit.org/reference

micro:bit Educators Guide
https://www.slideshare.net/Microsofteduk/bbc-microbit-guide-from-hodder-education

The Official BBC micro:bit User Guide (2018) by Garteth Halfacree

micro:bit Tutorial Series Part 1: Getting Started
https://www.youtube.com/watch?v=ZIW_6rxYNBg

micro:bit by BBC - Creative Classroom Tips for Educators
https://www.youtube.com/watch?v=pR_AapxVudM

PART 3:

Students will design a step counter strap (either for your ankle or wrist). Provide a variety of materials to design the strap.

The design must:

- Have some way of attaching to clothing or have a strap that will securely hold the micro:bit on the wrist or ankle.
- Be comfortable to wear and lightweight
- Be pleasing to the eye (people will want to wear it!)

Assessment

Code.Org Variable Assessment Worksheet
http://bit.ly/envelope-variable-assessment

Design Rubric Assessment (See below):

Extensions

To further student's understanding of variables: Code.Org Variables with Artist

http://bit.ly/variables-with-artist

Code.Org Variables - In Envelopes Video Explanation
https://studio.code.org/s/coursef-2018/stage/14/puzzle/1

Code.Org Variables - In Envelopes Unplugged Activity
https://curriculum.code.org/csf-18/coursef/14/

Code.Org Teacher video for additional support on Variables:
https://www.youtube.com/watch?v=MKmV_awzv8Q&feature=youtu.be

Watch video about the importance of tracking steps:
https://tv.theiet.org/?videoid=7300

micro:bit Step Counter Activity
https://microbit.org/en/2018-02-13-iet-lessons-11/

Code.Org Variable Assessment Worksheet
https://code.org/curriculum/course4/4/Assessment4-Variables.pdf

Extension Activity: Code.Org Variables with Artist
https://studio.code.org/s/coursef-2018/stage/15/puzzle/1

Developing a micro:fit: Student Self- Assessment Rubric

Name(s):

Date:

	Outcomes Not Met (needed support)	Met Outcomes (acceptable)	Exceeded Outcomes	Comments:
Able to independently create program and download to micro:bit				
micro:bit is securely supported				
micro:fit's design is lightweight and comfortable				
micro:fit's design is appealing				
Able to troubleshoot (debug) any issues				

Developing a micro:fit: Assessment Rubric (Instructor)

Name(s):

Date:

	Outcomes Not Met (needed support)	Met Outcomes (acceptable)	Exceeded Outcomes	Comments:
Able to independently create program and download to micro:bit				
micro:bit is securely supported				
micro:fit's design is lightweight and comfortable				
micro:fit's design is appealing				
Able to troubleshoot (debug) any issues				