CANADA LEARNING CODE

micro:bit Challenge

By: Jen Perry
Duration: 90+ minutes

LEVEL	SUBJECTS	PROVINCES / TERRITORIES	TOOL
Age 7+	Language Arts, Social Studies & Technology	Across Canada	Unplugged

Overview

This is a project that is inspired by micro:bits Global Challenge, “Creativity to Change the World”. Students should have some previous experience with the functions of micro:bit as they create a prototype addressing one of the UN’s Global Goals. As an extension activity, students can complete a micro:bit Global Challenge lesson or using the micro:bit innovation lesson plan, code their own prototype.

Prep Work

- Both the instructor and students should have some knowledge of micro:bit
- Instructor should review UN’s Global Goals
- If completing extension activity: micro:bit (one per student) & computers or a device capable of pairing to micro:bit

Key Coding Concepts

- Algorithms
- Critical Thinking
- Design Thinking & Innovation

Curricular Connections

Language Arts:
Students will listen, speak, read, write, view and represent to respect, support and collaborate with others.

Students will use technology to communicate, inquire, in decision making and problem solving.

References

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

Lesson

1. Explain the UN's Global Goals:
There are some great lessons from World's Largest Lesson:
http://bit.ly/introduce-the-global-goals

Choose a lesson or two to explain the Global Goals.

Here are some suggestions:

- View, "Mala Introducing the World's Largest Lesson"
  (6 minutes)
  http://bit.ly/Malala-worlds-largest-lesson

- Read the Comics Uniting Nations: Heroes for Change:
  http://bit.ly/heroes-for-change

- This is a 60-90 minute lesson explaining the goals:
  http://bit.ly/global-goals-lesson

The UN'S Global Goals include:

1. End poverty in all its forms everywhere
2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture
3. Ensure healthy lives and promote well-being for all at all ages
4. Ensure inclusive and quality education for all and promote lifelong learning
5. Achieve gender equality and empower all women and girls
6. Ensure access to water and sanitation for all
7. Ensure access to affordable, reliable, sustainable and modern energy for all
8. Promote inclusive and sustainable economic growth, employment and decent work for all

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

World's Largest Lesson:
http://worldslargestlesson.globalgoals.org/introduce-the-global-goals/

Mala Introducing the World's Largest Lesson video
https://vimeo.com/138852758

Comics Uniting Nations: Heroes for Change:
https://www.yumpu.com/en/document/read/53587356/heroes-for-change

World's Largest Lesson: Global Goals
http://cdn.worldslargestlesson.globalgoals.org/2018/06/What-World-Do-You-Want-in-2030-Lesson-Plan.pdf

9. Build resilient infrastructure, promote sustainable industrialization and foster innovation
10. Reduce inequality within and among countries
11. Make cities inclusive, safe, resilient and sustainable
12. Ensure sustainable consumption and production patterns
13. Take urgent action to combat climate change and its impacts
14. Conserve and sustainably use the oceans, seas and marine resources
15. Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss
16. Promote just, peaceful and inclusive societies
17. Revitalize the global partnership for sustainable development

Winners of micro:bit Global Challenge projects: https://microbit.org/global-challenge/winners/

Global Challenge Resources for Teachers https://microbit.org/global-challenge/lessons-landing/

micro:bit Innovation Lesson Plan https://microbit.org/global-challenge/ncd-innovation-lesson/

2. Discuss which goals micro:bit and coding technology could address.
How could using technology make the world a better place to live?
Review functions of the micro:bit:

- 25 individually-programmable LEDs: http://bit.ly/25-programmable-leds
- 2 programmable buttons: http://bit.ly/2-programmable-buttons
- Physical connection pins: http://bit.ly/physical-connection-pins
- Light (http://bit.ly/light-sensors) and temperature (http://bit.ly/temperature-sensors) sensors
- Motion sensors: accelerometer (https://bit.ly/accelerometer-sensor) and compass (https://bit.ly/compass-sensor)
- Wireless Communication, via Radio (http://bit.ly/radio-features) and Bluetooth (http://bit.ly/bluetooth-communication)
- USB interface: http://bit.ly/usb-interface-feature

3. For inspiration, check out winners of micro:bit Global Challenge projects:
https://microbit.org/global-challenge/winners/

4. Independently or in collaborative groups, students will create a "paper" prototype that addresses one of the 17 goals (see assignment below).

Note: If students are struggling with coming up with an idea, the instructor can narrow down the goals. Goal suggestions could include:

- Ensure healthy lives and promote well-being for all at all ages
- Build resilient infrastructure, promote sustainable industrialization and foster innovation
- Make cities inclusive, safe, resilient and sustainable
- Take urgent action to combat climate change and its impacts
- Conserve and sustainably use the oceans, seas and marine resources

Assessment

See assessment rubric below.

Extensions

Although the micro:bit Global Challenge is closed, there are still some great resources to guide your students.
The micro:bit Global Challenge focuses on a safety challenge and a non-communicable disease challenge. Each challenge has a series of lesson plans.

Global Challenge Resources for Educators:
http://bit.ly/global-challenge-resource-educators

Students could develop their prototype idea. micro:bit's innovation lesson plan can help guide students through the process of writing an algorithm, coding, testing, and debugging their micro:bit prototype:
http://bit.ly/Innovation-lesson-plan

Micro:bit Global Challenge
Prototype

Names:

_____

_____

_____

Brainstorm:

Choose one or two of the UN's Global Goals and **list some ideas** of how the micro:bit could help address this goal.

For example, a winner of the micro:bit Global Challenge addressed Goal #12: Responsible Consumption and Production.
The Food Waste Watchers designed a device that will help to reduce food waste. The device measures the amount of food that is being thrown away and if it's more than 30g it displays a message to remind them not to waste so much food! The team installed the device in their school's food waste bin and after it was piloted, they reduced the amount of food waste in the school by 50%!

1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

Choose your favourite idea and plan your prototype.

Describe your idea:

Which UN global goal does it address?

Who would benefit from using it?

What does it do?

How does it work?

(What function of micro:bit does it use? For example, does it use a temperature or motion sensor?)

Could you make this prototype actually work? If so, discuss with your group or teacher, what the next steps could be?

Brainstorm some ideas for a name for your prototype.

1.

2.

3.

4.

5.

6.

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8.

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10.

Choose a name:

_____

Brainstorm some logo designs for your prototype:

Final logo design:

Reflection:

What was the most challenging part of developing a micro:bit prototype?

_____

_____

_____

Now that you have an idea, what do you think the next steps will be to develop this prototype?

_____

_____

_____

Developing a micro:bit Prototype Global Challenge:
Student Self- Assessment Rubric

Name(s):

Date:

	Outcomes Not Met (needed support)	Met Outcomes (acceptable)	Exceeded Outcomes	Comments:
Developing a Prototype Planning Sheet is complete				
Goal chosen is documented				
Description of prototype is thorough and professional (no spelling errors & uses proper punctuation)				
Logo design is eye catching and represent-ative of prototype and UN global goal				
Reflection is thoughtful				
(if applicable) Group Work: able to work cooperatively				

Developing a micro:bit Prototype Global Challenge:
Instructor Rubric

Name(s):

Date:

	Outcomes Not Met (needed support)	Met Outcomes (acceptable)	Exceeded Outcomes	Comments:
Developing a Prototype Planning Sheet is complete				
Goal chosen is documented				
Description of prototype is thorough and professional (no spelling errors & uses proper punctuation)				
Logo design is eye catching and represent-ative of prototype and UN global goal				
Reflection is thoughtful				
(if applicable) Group Work: able to work cooperatively				