



BRILLIANT LABS CYBER SECURITY

INTRODUCTION KIT

Activity 1 : How important is cybersecurity in our lives?

Objective of Activity 1

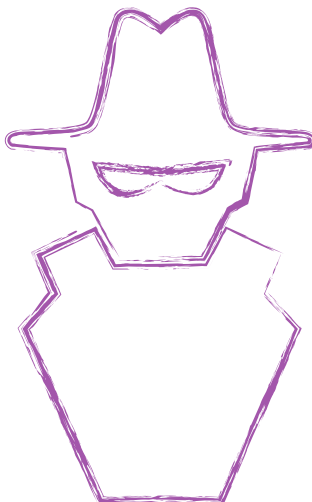
The objective of this activity is to introduce you to cybersecurity terminology, Cyberville, and the use of the micro:bit. Take the time to read the proposed article and ask the students to search the Web as needed to determine the meaning of the words highlighted in yellow. Be careful, some words may not be related to cybersecurity!

Soft Skills to be Acquired in Cyber Security

Resourcefulness, observation, problem solving, and critical thinking.

Please Note

These activities were designed to be done during class time and can be integrated into different subject matter areas. For example, reading the article could be seen as an activity in a language arts or social studies class and using the micro:bit as a cross-curricular activity, or in a math or technology class.





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Useful Glossary for This Activity

Code block: A line of code represented in block form that can be added or removed from a program.

Code: A way to give a computer instructions through a program.

Micro USB cable: This is a wire that connects a micro:bit to the computer. The wire allows the download and gives the electrical current for the micro:bit to work when it is not plugged into a battery. A USB cable is common and often used with other electronic devices.

Malicious intrusion: When a hacker successfully enters a computer to install malicious programs or to steal information.

micro:bit: A small micro controller that can run a program

hacker: A person who attempts to circumvent computer security and take advantage of a computer or computer network vulnerability in an illegal manner.

Program: A series of code that performs a function and produces an expected result.

Computer network: Several computers linked together.

Save: The act of keeping a copy of a program on a computer.

Download: The action of putting a program into a computer.





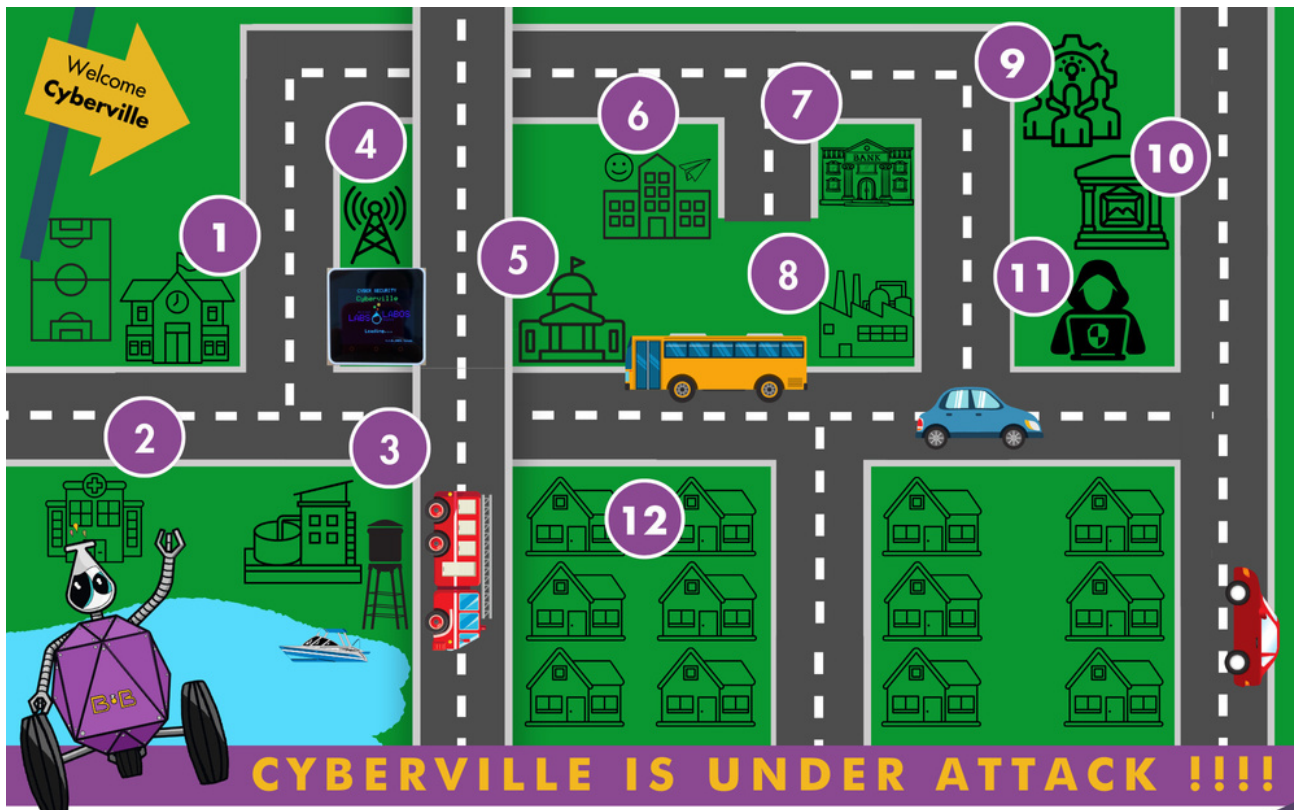
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Welcome to Cyberville

Cyberville was a friendly and peaceful community but recently, they have been experiencing some strange things. Leighlin, the Mayor of Cyberville, has hired you to investigate these issues. First, the Cyberville school's principal, Mrs. Hamilton, reported that the school's website was defaced, then citizens started reporting that money was going missing from their bank accounts. To make matters worse, Clark, the manager of Cyberville's water treatment plant, has concerns that hackers may create some problems which could endanger the water source for the citizens of Cyberville. As you begin to explore these issues, you will certainly uncover more problems and meet other members of the Cyberville community. Is Cyberville under attack from cyber criminals, also called "Black Hats"? In the first 6 activities you will learn about some important cyber security concepts, and how the micro:bit and b.Board function. With this new knowledge, will you be able to help keep Cyberville cyber safe?

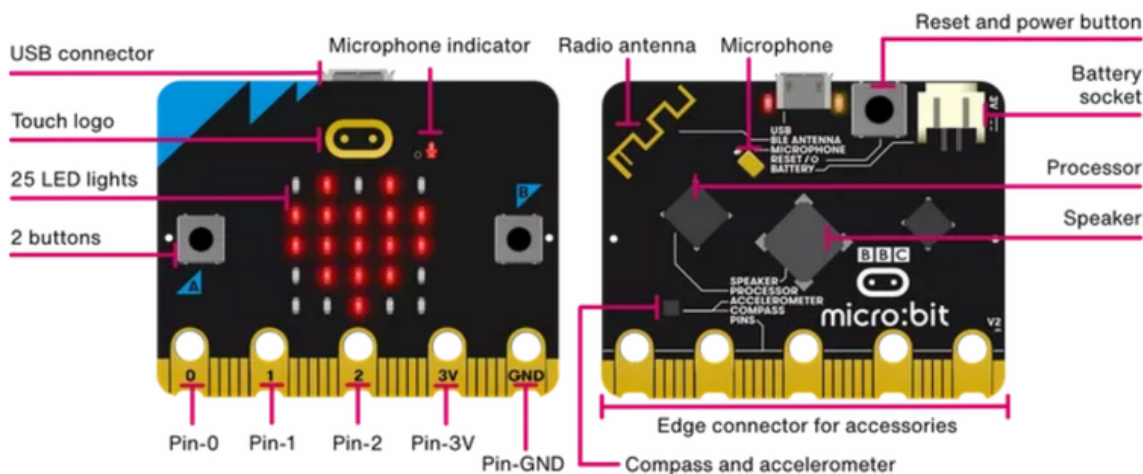


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|------------|------------------|------------|------------------|
| 1 SCHOOL | 4 WiFi-BL | 7 BANK | 10 ARTCENTER |
| 2 HOSPITAL | 5 GOVERNMENT | 8 FACTORY | 11 CYBERSECURITY |
| 3 WATER | 6 BRILLIANT LABS | 9 INDUSTRY | 12 HOUSES |



Micro:Bit Functions and Features

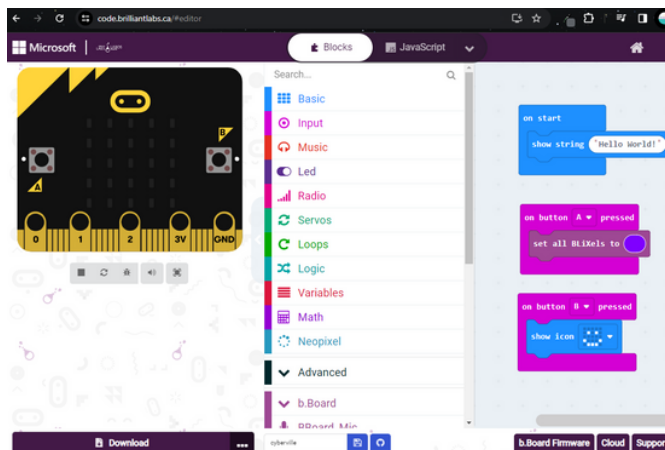
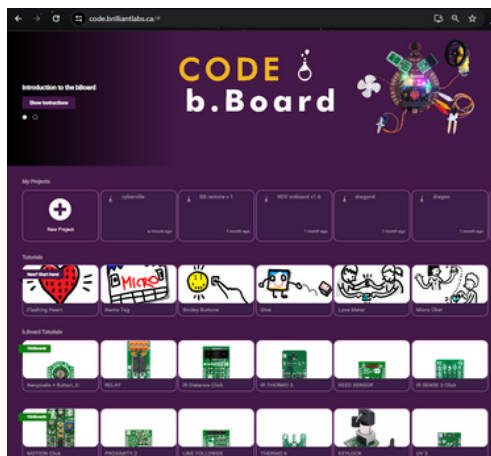
The Micro:Bit is a micro-controller designed to help inventors quickly create and prototype new ideas and inventions. It has a number of features that allow it to control many inputs and outputs as well as communicate with other micro:bits. As you progress through the activities, you will learn more about these features and how you can use a b.Board to take things to the next level!



<https://microbit.org/get-started/what-is-the-microbit>

code.brilliantlabs.ca - An IDE for the micro:bit and the b.Board

An IDE is an Integrated Development Environment. It is an online tool that allows you to program the micro:bit and b.Board. Many tutorials are available to explore if you want to explore on your own!



<https://code.brilliantlabs.ca>



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Before the Activity Begins

Make sure you have the necessary materials and tools on hand before the students arrive. Decide on the best way to distribute the materials. Don't hesitate to ask your students to help out. Why not appoint one or two students to be responsible for preparing the materials before the activity is presented? We suggest teams of 4 or 5 students for this activity.

Materials required from the kit

The kit contains several types of materials that will be used throughout our activities. It is not necessary to have everything available for the students. This is at your discretion. Some teachers may prefer to make only the required materials available to students and others may consider full access to the kit by students. For Activity 1, you will need the following materials:

- 1 micro:bit per team;
- 1 USB cable per team;
- 1 computer with internet access per team.





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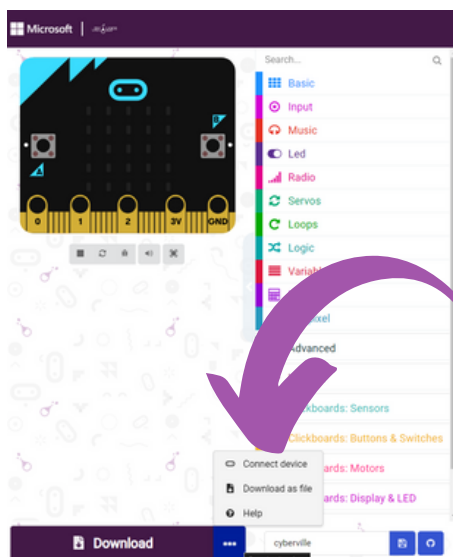
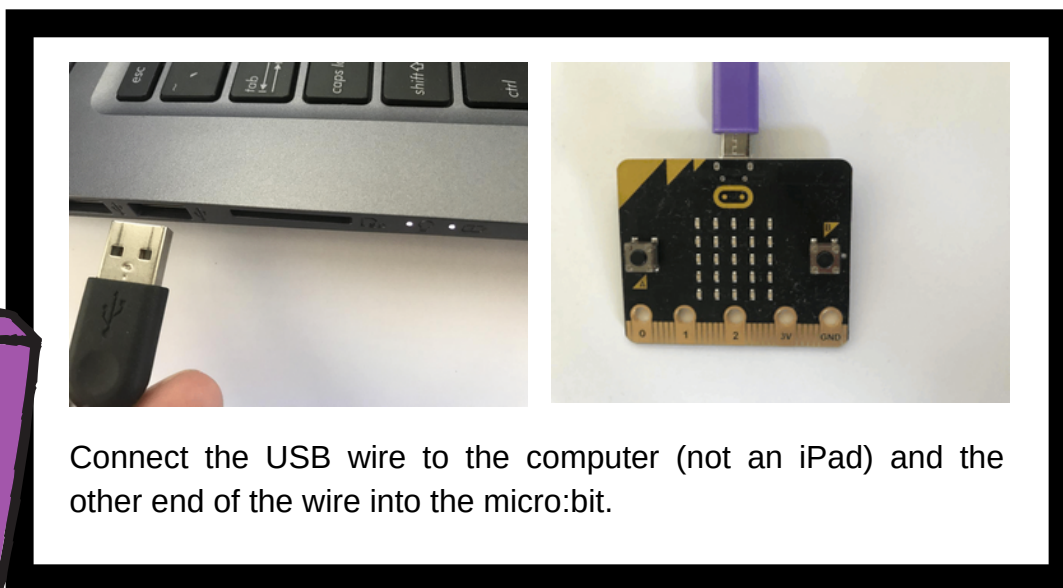


Part 1 - Micro:bit Activity: Welcome to my City

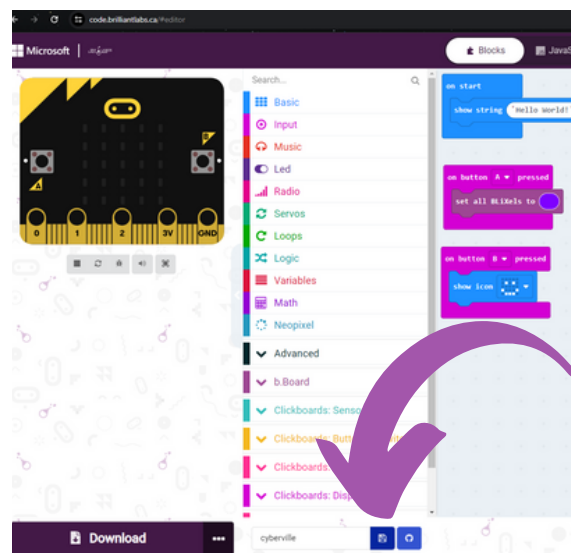
The micro:bit is a powerful micro controller and you will have the chance to do some coding activities that will give you a better understanding of how to protect yourself and how the world of cyber security works. We will walk you through this and you can also give students time to explore and try to create their own programs. This activity will allow students to create a light-up poster to display their community's name.

They can take the name of their community or start thinking of a name they would like to use for building their smart community later in the other activities.

Preparation and instructions for connecting the micro:bit to your laptop



Once you are happy with your code, and there are no errors with the simulator, you can transfer your code to the micro:bit in 2 different ways. You can connect the micro:bit directly to the IDE using the "Connect Device" button and follow the steps, or you can use the save button, then transfer it to the the micro:bit like you would transfer a file to a USB memory stick or an SD card.





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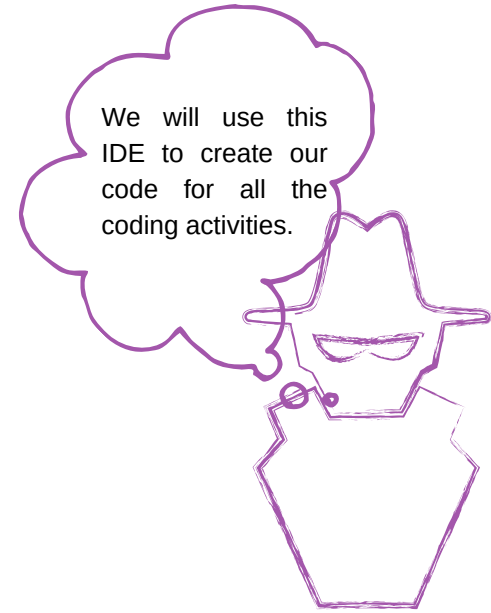


Let's start Activity 1

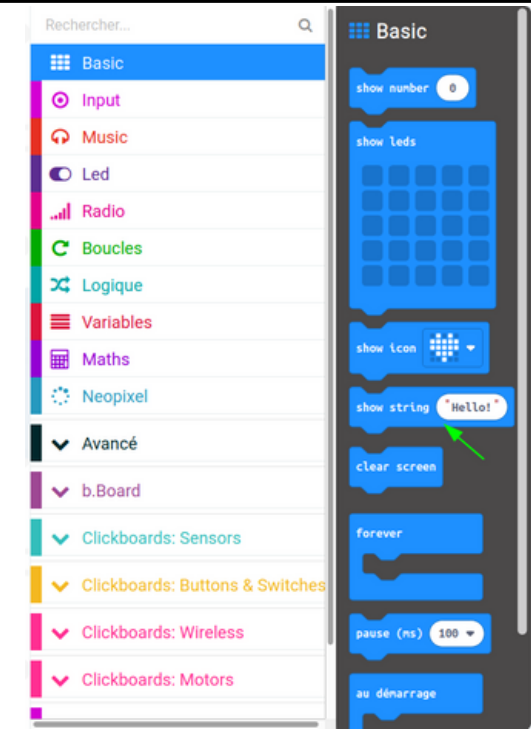


To access the portal go to <https://code.brilliantlabs.ca>


Start a new project by giving a name to your activity (ie: Activity 1).

We will use this IDE to create our code for all the coding activities.



Replace the text with the name of your community. The name should scroll across the screen.





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Explanation

The **forever block** executes the code permanently, i.e. without stopping. By placing the show string block inside the forever block, our community name will scroll on the screen without stopping.

In contrast, if we had placed the show string block inside the on start block, our community name would have scrolled once and the code execution would end immediately after displaying the name on the screen.

The choice of the on start block or the forever block is a personal choice depending on the objective.

How to Download the Code to Your Micro:bit?

- Make sure you follow the instructions on page 4 so you can connect your micro:bit correctly to your laptop.
- Click on Download and save the .hex file in the micro:bit.
- The name of your community now scrolls on your micro:bit (you might have to wait 5-10 seconds before seeing something on the micro:bit).

Suggestion to go further with your micro:bit

- Try to find and see the source code of your program on the coding platform.

End of Part 1



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Part 2 - Cyber Security Activity Water Contaminated by a Hacker

Let the students read the article below and take time to have a large group discussion. You can project the article on a large screen or let students explore the article from their computers.

You can have the story from the link below:

<https://www.cbsnews.com/news/florida-water-hack-oldsmar-treatment-plant/>

Feds tracking down hacker who tried to poison Florida town's water supply

Jeff Pegues

2-3 minutes



February 9, 2021 / 7:02 AM / CBS News

A shocking case of computer hacking has been uncovered in Pinellas County, Florida. Federal investigators are trying to hunt down the person who **tried to poison** a public water supply — remotely.

Investigators say a plant operator monitoring the water plant in the Tampa Bay city of Oldsmar noticed breaches starting Friday morning.

The hacker was controlling the computer system's mouse — opening various functions on the screen and changing the sodium hydroxide in the water supply from about 100 parts per million to more than 11,100 parts per million.

"This is obviously a significant and potentially dangerous increase," Pinellas County Sheriff Bob Gualtieri said. "Sodium hydroxide, also known as lye, is the main ingredient in liquid drain cleaners."

If ingested in large amounts, sodium hydroxide can cause vomiting, chest and abdominal pain, according to the Centers for Disease Control.

Source: <https://www.cbsnews.com/news/florida-water-hack-oldsmar-treatment-plant/>

From the highlighted words, which one are not related to cyber security?



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Discussion

Discuss the definitions of the words highlighted in yellow in the article. A vocabulary activity can be done with these words if needed. Here's some possible questions to ask students to facilitate a discussion following the reading of the article:

- What seems to be the problematic situation in the article?
- What would be some possible solutions?
- Could this happen in our municipality?
- Is cyber security important in our lives?
- How do you protect yourself from hackers in your everyday life?
- The activities in the kit will help us understand what cybersecurity is and how to protect ourselves. Are you interested in learning more about it?
- What is a smart community?
- What is the Internet of Things?

Links of Websites to go Further With This Activity

Please note that the links below are from a third party and Brilliant Labs is not responsible for their content or suggested links published by them. We strongly suggest that you take the time to review each of these links before using them and ensure that they are consistent with your values and what you normally use in your classroom with your students.

- YouTube Video : What is a Microbit? : <https://youtu.be/0NCczXNaTNY>
- YouTube Video : Introducing the BBC micro:bit-BBC Make It Digital : <https://youtu.be/Wuza5WXiMkc>
- The Micro:bit Educational Foundation : <https://microbit.org/>
- Micro:bit projects ideas: <https://microbit.org/projects/make-it-code-it/>
- Web site "Let's code" : <https://microbit.org/code/>



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Let's go further

To finish this first part, we invite you to download the following hex file in your micro:bit. The file may have been created by a hacker...

- Will you dare to start your b.Board anyway?
- What do you think about it?
- This is what we will discuss in the next part...

[HEX file to download](#)

Some Questions to end the Activity

You can also create your own questions.

- What did we learn with this activity?
- Why is this important?
- How does cybersecurity relate to our personal lives?
- Other teacher-generated questions...

End of Part 2 and Activity 1