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Introduction to micro:bit

- Grade Level: 4-6, 7-8
- Duration: 60 minutes
- Subject: Mathematics
- Interdisciplinary Connection: Language Arts
- Platform: micro:bit

In this lesson, you will be introduced to micro:bit, a pocket-sized computer. Teachers will learn about micro:bits physical features, the Makecode coding platform, and how to code basic scripts to create an animation. This lesson brings hands-on STEM learning into the classroom in a fun and easy way.

Curricular Connections

Ontario

Grade 5 Overall Expectation:
C3. Coding → solve problems and create computational representations of mathematical situations using coding concepts and skills.

Specific Expectation (s):
C3.1 → solve problems and create computational representations of mathematical situations by writing and executing code, including code that involves conditional statements and other control structures.

Quebec

Cycle 3 Arithmetic

Translates a situation using a series of operations in accordance with the order of operations
Using his/her own words and mathematical language that is at an appropriate level for the cycle, describes...
a. non-numerical patterns (e.g. series of colours, shapes, sounds, gestures)

Objectives

Learning Goals

Students will be able to...

- Operate micro:bits using the Makecode platform
- Understand how code blocks follow sequencing patterns
- Create animations using LED patterns with teacher support

Success Criteria

I can...

- Identify features of micro:bits
- Arrange code blocks in order
- Follow instructions and experiment to create animations

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Material

Required Materials

- Computer with internet access, exit ticket download

Optional Materials

- Physical micro:bit controllers
- Video

Lesson

Activity	Description
Prior Knowledge	Students should be familiar with basic computer functions Students should have a basic understanding of what coding is (sequential order, positional language)
Minds On	5 minutes Have students consider how real world contexts, or familiar tools can be representative of coding with micro:bits. Use Warm-Up Questions: ""Do you know what a flipbook is?" "What about stop-motion? How does it work?"" ""How do cartoon characters move on TV?"" Watch Video

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Model	15 minutes Introduce students to the micro:bit platform and MakeCode environment. Encourage students to ask questions throughout this introduction as they explore these new tools for the first time. **Introduction to micro:bit Features:** Show physical micro:bit (or emulator) and identify key components: • 25 LED lights in a 5x5 grid • Two buttons (A and B) • USB connector • Sensors (accelerometer, compass, temperature) **MakeCode Platform Overview:** Navigate to makecode.microbit.org **Demonstrate the three main areas:** 1. Workspace (where blocks go) 2. Block Categories (color-coded instruction groups) 3. Emulator (virtual micro:bit for testing) Show basic event blocks: ""on start"", ""forever"", ""on button pressed"""".
Practice	**Activity #1: Heart Beat (15 minutes)** Objective: Create a simple animation Before Teaching: Watch the demonstration video to see the complete process for creating a heart animation. This will show you exactly how to guide students through each step and anticipate common challenges. Video/GIF: [Teacher demonstration of creating heart animation] Leading the Activity: Guide your students through creating their heart animation. Have students open MakeCode and find the ""on button B pressed"" block from the Input category.

Students will add their first ""show leds"" block and design a large heart pattern by clicking the squares.

Students will add a second ""show leds"" block with a smaller heart design.

Students will test their animation by clicking button B on the emulator.

To make it more realistic, students can add ""repeat"" and ""pause"" blocks from the Loops and Basic categories.

Activity #2: Animal Animation (15 minutes)

Objective: Create a simple animal movement animation (walking giraffe or other animal)

Before Teaching: Watch the demonstration video to understand how to guide students through planning and creating multiple frames of animation.

Video/GIF: [Teacher demonstration of animal animation frames]

Leading the Activity: Now, explain to students that they will create an animal that appears to move or walk across the micro:bit screen, similar to how cartoons are made with many slightly different pictures shown quickly.

Have students plan their animal animation by sketching 3-4 different positions on paper.

Guide students to open a new project in MakeCode and select the ""on shake"" event block from the Input category.

Students will create their first frame using a ""show leds"" block, designing their animal in its starting position.

Students will add a ""pause"" block, then another ""show leds"" block for the second frame, continuing this pattern for all frames.

	Students will test their animation by clicking the shake button on the emulator or gently shaking a physical micro:bit."
Consolidation	Circle Share: Students will sit in a circle and take turns sharing one thing they learned today or one word that describes how they feel after the lesson (e.g., confused, excited) Reflection Questions: What was challenging about creating animations? How is coding an animation similar to making a flipbook? What other animations would you like to create?
Modifications & Accommodations	Before Activity #1, provide a physical, printed cheat sheet that displays the key code blocks needed (e.g., "on button B pressed," "show leds," "pause") and a simple screenshot of where they are located in the MakeCode interface (Basic, Input categories). For students who are easily overwhelmed, temporarily hide or minimize the less-used block categories (Loops, Variables, etc.) on their screen, if possible, or instruct them to only use the Basic and Input categories.

Assessment

Formative

Exit Ticket: Students will show what they have learned with a self-check survey asking how comfortable they are with concepts learned today [download]:

I can arrange code blocks in the right order (Not yet/Getting there/Got it!)
I can create a simple animation (Not yet/Getting there/Got it!)
I feel confident experimenting with new blocks (Not yet/Getting there/Got it!)

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Extension

Cross Curricular Connections

Language Arts: Practice procedural writing to explain how they created an animation using transition words (first, then, finally)

Language Arts: Write a short story about the animal or object they've created

Extend Your Thinking

For early finishers, or as a follow-up activity, students can:

Create animations for different events (button A+B together)

Design animations that tell a story or joke

Experiment with scroll image blocks for larger animations

TIP: Students will use decomposition to break down their animation idea into manageable steps:

Think of a simple object or concept (sun, person, duck, explosion, rain, etc.)

Break down the ""movement"" details into several LED frames

Design each frame on paper first

Drag the code blocks in sequence and add an event block

Test your frame sequence on the emulator

Adjust your designs as needed using repeat, pause, or clear screen blocks to make the animation more engaging