

## ANIMATED SIGNAGE DISPLAY USING UP TO 4 MICRO:BITS

### (3 LESSONS + 2 SESSIONS OF PROJECT WORK)

**Subject:** Display **Level:** P3-P5  
**Unit:** Computing  
**Topic:** Animated Signage Display using multiple micro:bits

#### Summary:

Students to be able to:

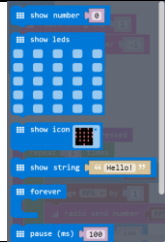
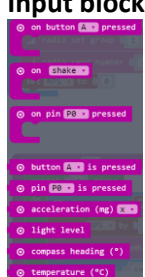
- Communicate messages between multiple micro:bits (up to 4)
- Create customised animated signage display with up to 4 micro:bits

<b>Prior Knowledge:</b>	Students should already know: 1. Block-based coding using Scratch Programming
<b>Learning Objectives:</b>	By the end of the lesson, students should be able to: <ul style="list-style-type: none"> <li>- Communicate messages between multiple micro:bits (up to 4)</li> <li>- Create customised animated signage display with up to 4 micro:bits</li> </ul> <p>Sample codes for reference:  <a href="https://makecode.microbit.org/_Mfw4cj1Ms7F3">https://makecode.microbit.org/_Mfw4cj1Ms7F3</a></p>

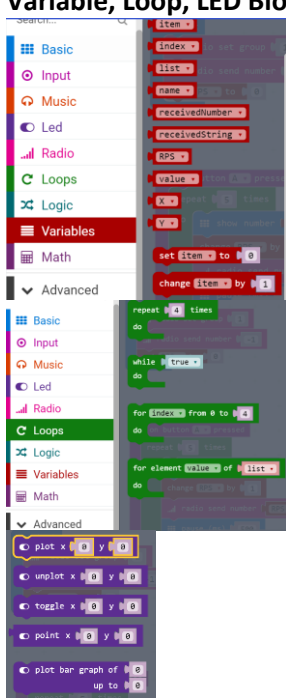
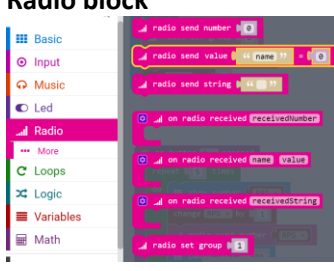
#### LESSON 1: INTRODUCTION AND CREATING ANIMATED DISPLAY ON 1 MICRO:BIT (1.5 hours)

Time	Teacher Activities	Purpose	Resources Needed
<b>Introduction/Pre-activity</b>			
10 min	<ul style="list-style-type: none"> <li>- Teacher to recap block-based programming using Scratch</li> <li>- Teacher to introduce micro:bits and its various functions and parts (button A, B and A&amp;B)</li> <li>- <a href="http://microbit.org/guide/features/">http://microbit.org/guide/features/</a></li> <li>- Teacher to <b>demonstrate various functionalities</b> and possibilities of applications of micro:bits with examples from Makecode.</li> <li>- <a href="http://microbit.org/guide/quick/">http://microbit.org/guide/quick/</a></li> </ul>	Recap prior knowledge and to arouse students' interest in micro:bit.	Makecode  Micro:bits websites <ul style="list-style-type: none"> <li>- <a href="http://microbit.org/guide/features/">http://microbit.org/guide/features/</a></li> <li>- <a href="http://microbit.org/guide/quick/">http://microbit.org/guide/quick/</a></li> </ul>
<b>Lesson development/Main activities</b>			
15 min	Teacher to introduce the <b>basic blocks</b> in Makecode for display and get the students to try out.	Basic blocks	Make Code / 1 Micro:bit

## Lesson Plan

			
15 min	<p>Teacher to introduce the <b>input blocks</b> in Makecode and display of a string/number when a <b>button (A, B or A+B)</b> is pressed or when a <b>shake/certain light level</b> is detected.</p> <p>Allow students to explore using MakeCode simulator/micro:bit.</p>	<b>Input blocks</b> 	Make Code / 1 Micro:bit
30 min	<p>Assign the students a following task:</p> <ul style="list-style-type: none"> <li>- Display an <b>animated display</b> (e.g. flashing heart) when a <b>button is pressed</b>.</li> <li>- <b>Stop</b> the animation display when <b>another button</b> is pressed.</li> <li>- Encourage the students to design different types of animations.</li> </ul> <p>Students who need help can approach the teacher for hints.</p>	<b>Practice and application</b>	Make Code / 1 Micro:bit
10 min	Teacher to get a few students to showcase their designed task.	<b>Assess for learning</b>	Make Code / 1 Micro:bit
<b>Closure and consolidation/Post-activity</b>			
10 min	<p>Teacher to consolidate lesson objective:</p> <ul style="list-style-type: none"> <li>- Make an animated display on a micro:bit using Basic and Input blocks</li> </ul>	<b>Consolidate learning points</b>	

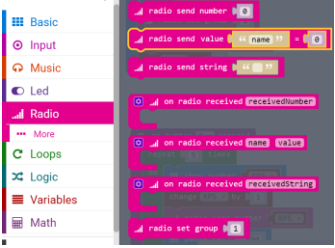
**LESSON 2: ESTABLISH COMMUNICATION BETWEEN 2 MICRO:BITS (1.5 hours)**

Time	Teacher Activities	Purpose	Resources Needed
<b>Introduction/Pre-activity</b>			
10 min	<ul style="list-style-type: none"> <li>- Teacher to recap previous lesson's objective and show the students' work in makecode</li> <li>- Teacher to introduce lesson objective on Wireless communication between 2 micro:bits</li> </ul>	<b>Recap prior knowledge</b>	Makecode  - Students' make codes
<b>Lesson development/Main activities</b>			
20 min	Teacher to introduce the Variable, Loop and LED blocks in Makecode.  Demonstrate to the students on how they can create variables and change them using a loop.	<b>Variable, Loop, LED Blocks</b> 	Make Code / 1 Micro:bit
15 min	Teacher to introduce <b>Radio block</b> .  Teacher to demonstrate how they can send messages to another micro:bit through radio blocks.  For e.g., <ul style="list-style-type: none"> <li>- Radio set group 1</li> <li>- Radio send number 10</li> <li>- On radio received receivedNumber</li> </ul>	<b>Radio block</b> 	Make Code / 2 Micro:bits
30 min	Assign the students a following task: <ul style="list-style-type: none"> <li>- Use Button A to toggle different LED displays (e.g.</li> </ul>	<b>Practice and application</b>	Make Code / 2 Micro:bit

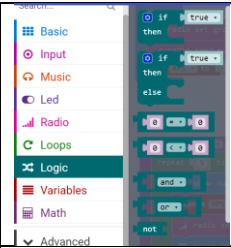
## Lesson Plan

	<p>numbers)</p> <ul style="list-style-type: none"> <li>- Send current display micro:bit 1 to micro:bit 2 by pressing Button B.</li> </ul> <p>Students who need help can approach the teacher for hints.</p> <p><b>*More difficult task:</b></p> <ul style="list-style-type: none"> <li>- Send <b>animated display</b> commands over to micro:bit 2.</li> </ul>		
10 min	Teacher to get a few students to showcase their designed task.	<b>Assess for learning</b>	Make Code / 2 Micro:bit
<b>Closure and consolidation/Post-activity</b>			
10 min	Teacher to consolidate lesson objective: <ul style="list-style-type: none"> <li>- Wireless communication between 2 micro:bits</li> </ul>	<b>Consolidate learning points</b>	

### LESSON 3: SENDING ANIMATED MESSAGES BETWEEN 2 MICRO:BITS (1.5 hours)

Time	Teacher Activities	Purpose	Resources Needed
<b>Introduction/Pre-activity</b>			
10 min	<ul style="list-style-type: none"> <li>- Teacher to recap previous lesson's objective and show the students' work in makecode</li> <li>- Teacher to introduce lesson objective on Bluetooth communication between 2 micro:bit</li> </ul>	<b>Recap prior knowledge</b>	<p>Makecode</p> <ul style="list-style-type: none"> <li>- Students' make codes</li> </ul>
<b>Lesson development/Main activities</b>			
10 min	<p>Teacher to recap show demonstration on how messages can be communicated between micro:bits using the Radio block.</p> <ul style="list-style-type: none"> <li>- Radio set group 1</li> <li>- Radio send number 10</li> <li>- On radio received receivedNumber</li> </ul>	<p><b>Radio block</b></p>  <p>The screenshot shows the MakeCode block palette with the 'Radio' category selected. The code snippet includes: 'radio send number 10', 'radio send value 10 to name 1', 'radio send string 10 to name 1', 'on radio received receivedNumber', 'on radio received name value', 'on radio received receivedstring', and 'radio set group 1'.</p>	
20 min	Teacher to demonstrate how micro:bits message communication can be synchronised with the use of variables as flags and the logic	<b>Logic block</b>	

Lesson Plan

	<p>block.</p> <p>For e.g., If (x is true), then _____</p>		
30 min	<p>Assign the students a following task:</p> <ul style="list-style-type: none"> <li>- Use Button A to toggle different LED displays (e.g. numbers)</li> <li>- Send current display (<b>hello B</b>) micro:bit 1 to micro:bit 2 by pressing Button B.</li> <li>- Micro:bit 2 to reply (<b>hello A</b>) automatically.</li> </ul> <p>Students who need help can approach the teacher for hints.</p> <p><b>*More difficult task:</b></p> <ul style="list-style-type: none"> <li>- Send animated display commands over to micro:bit 2.</li> <li>- Change animation by detecting difference in the <b>shake / light sensor</b> (Tier 2)</li> </ul>	<b>Practice and application</b>	Make Code / 2 Micro:bit
10 min	<p>Teacher to get a few students to showcase their designed task.</p>	<b>Assess for learning</b>	Make Code / 2 Micro:bit
<b>Closure and consolidation/Post-activity</b>			
10 min	<p>Teacher to consolidate lesson objective:</p> <ul style="list-style-type: none"> <li>- Send messages between 2 micro:bits</li> </ul>	<b>Consolidate learning points</b>	

**LESSON 4: PERFORMANCE TASK DAY 1 (1.5 hours)**

Time	Teacher Activities	Purpose	Resources Needed																																
<b>Introduction/Pre-activity</b>																																			
10 min	Teacher to recap all the blocks learned in MakeCode.  Teacher to demost	Recap prior knowledge	Make Code / 2 Micro:bit																																
<b>Lesson development/Main activities</b>																																			
70 min	<p><b>Performance task:</b> “Tell a story by an animation using micro:bits”</p> <p>Teacher shows as example of how animation can be displayed using 4 micro:bits.</p> <p><b>Teacher to show an example of an animation:</b></p> <table border="1"> <tr><td>=</td><td></td><td></td><td></td></tr> <tr><td><b>D</b></td><td>=</td><td></td><td></td></tr> <tr><td><b>4</b></td><td><b>D</b></td><td>=</td><td></td></tr> <tr><td>=</td><td><b>4</b></td><td><b>D</b></td><td>=</td></tr> <tr><td></td><td>=</td><td><b>4</b></td><td><b>D</b></td></tr> <tr><td></td><td></td><td>=</td><td><b>4</b></td></tr> <tr><td></td><td></td><td></td><td>=</td></tr> <tr><td></td><td></td><td></td><td></td></tr> </table> <p><b>Design:</b> Students in their groups to design on a story that they want to tell.</p> <p>They are allowed to make different types of animation using 4 micro:bits.</p> <p><b>Development:</b> Students to use their learned logic to start their coding.</p>	=				<b>D</b>	=			<b>4</b>	<b>D</b>	=		=	<b>4</b>	<b>D</b>	=		=	<b>4</b>	<b>D</b>			=	<b>4</b>				=					Design and development	Make Code / 4 Micro:bit
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<b>Closure and consolidation/Post-activity</b>																																			
10 min	Teacher to consolidate lesson objective: - Make different types of animation using 4 micro:bits.																																		
	<i>(Optional post-class activity)</i>																																		

**LESSON 5: PERFORMANCE TASK DAY 2 (1.5 hours)**

<b>Time</b>	<b>Teacher Activities</b>	<b>Purpose</b>	<b>Resources Needed</b>
<b>Introduction/Pre-activity</b>			
10 min	Teacher to recap all the blocks learned in MakeCode.  Teacher to show some students' incomplete outcome.	Recap prior knowledge	Make Code / 4 Micro:bit
<b>Lesson development/Main activities</b>			
60 min	Students to continue to develop the codes on their micro:bits.	Development	Make Code / 4 Micro:bit
<b>Closure and consolidation/Post-activity</b>			
20 min	Students are then to present their works with teachers' feedback.	Assessment of performance task	Make Code / 4 Micro:bit

**Contributed by:**

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Name of Teacher (Optional): Mr Seow Tian Hou & Ms Nur Shreen Sidek

Date: 5<sup>th</sup> November 2018