**Unit:** Introduction to Coding and Engineering with Micro:bit Technology

**Topic:** Exploring Coding Fundamentals with Micro:bit

**Lesson:** 1 of [6](https://microbit.org/teach/lessons/first-lessons-with-makecode-and-the-microbit/)

**Learning Standards:**

[**ITEEA’s Standards for Technological and Engineering Literacy (STEL)**](https://assets-002.noviams.com/novi-file-uploads/iteea/standards/18193-00018_iteea_stel_2020_final_security.pdf)**,** [**NYS' Standards for English Language Arts (ELA) Learning**](https://www.nysed.gov/sites/default/files/nys-next-generation-ela-standards.pdf)**, &** [**NYS’ Standards for Computer Science and Digital Fluency (CS&DF) Learning**](https://www.nysed.gov/sites/default/files/programs/curriculum-instruction/computer-science-digital-fluency-standards-7-8.pdf)

**ITEEA’s STEL Standards:**

Aligned standards cover various aspects of technology and engineering education, including systems thinking, historical context, design process, and practical skills like troubleshooting and maintenance. The lesson plan integrates these concepts through hands-on coding activities and problem-solving tasks.

STEL-2M, STEL-2M, STEL-2N, STEL-2N, STEL-2O, STEL-2O, STEL-2P, STEL-2P, STEL-2Q, STEL-2Q, STEL-2R, STEL-2R, STEL-2S, STEL-2S, STEL-3E, STEL-3E, STEL-3G, STEL-3G, STEL-4K, STEL-4K, STEL-4L, STEL-4L, STEL-4M, STEL-4M, STEL-4N, STEL-5F, STEL-5G, STEL-6C, STEL-6D, STEL-6E, STEL-7P, STEL-7Q, STEL-7R, STEL-7S, STEL-7T, STEL-8H, STEL-8I, STEL-8J, STEL-8K, STEL-8L, STEL-8L, STEL-8M, STEL-8M

**ELA Standards:**

The 6th-grade ELA standards cover speaking, listening, language, and vocabulary. They emphasize collaborative discussions, clear expression of ideas, and interpretation of information in diverse formats. Students should delineate arguments, present claims logically with digital media, and vary sentence patterns. Language standards focus on determining word meanings, understanding figurative language, and using academic vocabulary accurately.

6L3, 6L3a, 6L3b, 6L4, 6L4a, 6L4b, 6L4c, 6L4d, 6L5, 6L5a, 6L5b, 6L5c, 6L6, 6SL1, 6SL1a, 6SL1b, 6SL1c, 6SL1d, 6SL2, 6SL3, 6SL4, 6SL5, 6SL6

**CS&DF Standards:**

**Computational Thinking (CT) Standards:**

**7-8.CT.1**: This standard aligns with the lesson plan's objective of designing, comparing, and refining algorithms for a specific task or within a program. It emphasizes understanding how input data and assumptions change the results, which relates to the iterative nature of the engineering design process highlighted in the lesson plan.

**7-8.CT.4:** Writing a program using functions or procedures is essential in the lesson plan, as students engage in coding activities to create interactive animations and games using Micro:bit technology. Utilizing functions or procedures conveys their purpose within the larger task, which is consistent with this standard.

**7-8.CT.6:** Designing, comparing, and refining algorithms aligns with the overall objective of the lesson plan, which is to introduce coding concepts using Micro:bit technology. Students explore different algorithms to achieve specific tasks, reflecting the iterative design process emphasized in the engineering design process.

**Digital Literacy (DL) Standards:**

**7-8.DL.2:** Communicating and collaborating with others using digital tools to create and revise a collaborative product is a fundamental aspect of the lesson plan. Students work together to develop interactive animations and games using Micro:bit technology, demonstrating effective communication and collaboration skills.

**7-8.DL.4:** Selecting and using digital tools to create, revise, and publish digital artifacts aligns with the practical application of coding skills in the lesson plan. Students utilize coding platforms and software applications to develop prototypes and projects, showcasing their digital literacy skills in creating digital artifacts.

**Materials:**

- Tools: [Micro:bit](https://tech.microbit.org/hardware/) software ([MakeCode](https://makecode.microbit.org/device/) | [Error codes](https://makecode.microbit.org/device/error-codes))

- Equipment: Projector or interactive whiteboard

- Supplies: Computers or tablets with internet access, Micro:bit devices, Micro USB cables

**Opening Task:**

- Introduce coding and its applications, particularly with Micro:bit.

**Motivation:**

- Engage students by discussing the relevance and applications of coding in today's technology-driven world.

**Aim:**

- Students will understand coding concepts such as sequences, loops, and conditionals, create interactive animations and simple games using Micro:bit, and apply computational thinking skills to problem-solving.

**Instructional Objectives:**

- S.W.B.A.T. “Students Will Be Able To…”

 1. Understand coding concepts such as sequences, loops, and conditionals.

 2. Create interactive animations and simple games using Micro:bit.

 3. Apply computational thinking skills to problem-solving.

**Presentation:**

1. What are coding sequences?

 - Coding sequences are instructions executed in a specific order to achieve a desired outcome.

2. How can we create interactive animations using Micro:bit?

 - Interactive animations can be created using Micro:bit by programming sequences of actions and reactions.

3. What are loops and conditionals in coding?

 - Loops repeat a set of instructions, while conditionals execute certain actions based on specified conditions.

**Summary:**

- Can anyone explain the concept of loops in coding?

 - Loops repeat a set of instructions until a specific condition is met.

- How would you create a simple game using Micro:bit?

 - By programming sequences of actions and incorporating loops and conditionals to control gameplay.

**Immediate Application:**

- Assign students to create a simple animation using Micro:bit.

**Extension Activity OR Homework:**

- Students reflect on their learning process and identify challenging and interesting coding concepts. They also create a simple animation using Micro:bit at home.

**Additional Activity:**

- Introduce the specific project from "First lessons with MakeCode and the micro:bit" corresponding to this lesson, such as creating a name badge or a simple animation, and guide students through the project step-by-step.

- Allow students to experiment with different features of the Micro:bit and explore additional coding concepts mentioned in the provided text, such as input/output functions, sensors, and variables.

- Encourage collaborative learning and peer support by having students share their projects and provide feedback to each other.